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Research Perspective

Social Mechanisms for Causal Explanation in Social Theory Based IS Research

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Abstract

In this paper, I argue for the development of explanatory theory in IS research. I critically examine ways of explaining IS phenomena, identify alternative epistemological approaches used in the social sciences, and point out the significance attributed to causality. I focus in particular on the development of explanation in process IS research that draws from social theory. I introduce the notion of social mechanism and suggest that tracing social mechanisms in research that draws from social theories of action and technology can lead to more complete and novel causal explanations of IS phenomena.

Keywords: Explanatory Theory, Social Mechanisms, Social Theory Based Research, Process Theory, Causality, Narrative Method.

* Cynthia Beath was the accepting senior editor. This article was submitted on 24th June 2011 and went through three revisions.

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1. Introduction

Explanatory theory addresses why and how observed phenomena occur, and thus helps us to better understand the world. However, the nature and structure of explanatory theory and the way it is developed have attracted relatively little attention in the IS field. Articles on the principles and criteria of good theory rarely address explanatory theory as such; instead, they tend to conflate explanatory and predictive theory (i.e., theory intended to answer questions of whether a phenomenon will occur in the future or in other contexts) (Bacharach, 1989; Weber, 2012). Many aspects of good theory in general are relevant to explanatory theory. But there are distinctive features and issues associated with explanation, the most prominent of which concerns the importance attributed to causality in the propositions of the theory (Gregor, 2006). Explanation, according to contemporary epistemology, requires unravelling causal processes that bring about theorized phenomena (Markus & Robey, 1988; Pentland, 1999; Tsoukas, 1989; Van de Ven & Poole, 1995).

I assume that IS theories are not constructed *de novo*: they do not spring out of data, even if an empiricist methodology such as grounded theory is pursued (Carroll & Swatman, 2000; Suddaby, 2006). At the very least, IS theory development draws on theoretical perspectives that provide ontological and epistemological assumptions regarding human action and the relationship between technology and society. Such theoretical assumptions frame the researcher's perception of phenomena that merit explanation (Garfinkel, 1981) and the choice of entities and relationships through which the explanation is constructed. Hence, my study of explanatory theory focuses on a stream of IS research that constructs its investigation by drawing general assumptions about the nature of human action and about the relationship of technology and society from contemporary sociology and the interdisciplinary field of science and technology studies (STS) (Bijker & Law, 1992; Bourdieu, 1977; Giddens, 1984; Latour, 2005; MacKenzie & Wajcman, 1985). To strengthen the explanatory capacity of such research, I propose developing causal claims by tracing social mechanisms that bring about IS phenomena.

The structure of the paper is as follows: in Section 2, I present current thinking about the role of general theory and causality in the development of explanation. I draw from epistemology and the literature of IS and organizational studies to argue for the development of causal propositions in the premises of general theoretical perspectives. I examine how explanation is framed by general theory and how causal claims can be constructed. In Section 3, I take a critical look at the way IS researchers who draw from social theory frame their objects of study and how they develop propositions to explain them. I observe that such research tends to form explanation by refining concepts of the researchers' chosen theories of action and technology. Empirically derived insights enrich and adjust the foundational concepts but do not add new explanation propositions beyond those suggested by the concepts of the general theoretical framing of the research. In Section 4, I introduce the concept of social mechanism as a building block for causal process theory. I discuss three aspects of social mechanisms research: the analytical level at which social mechanisms can be drawn, social mechanisms as a way to construct causal phenomenon-specific and context-dependent explanation, and the way social mechanisms can be traced to form explanatory theory. In Section 5, I suggest a shift of social theory-based IS research effort toward the development of causal process explanatory theory by tracing social mechanisms that bring about IS phenomena. I also summarize the strengths and weaknesses of social mechanisms theory. In the conclusion, I point out that the changes I suggest will require reviewers and journal editors to have an open attitude toward research that breaks from established tacit norms.

2. Explanatory Theory for IS Phenomena

Philosophers of science distinguish two ways of constructing explanation: by fitting observed phenomena in general theories (covering law explanation) and by identifying their underpinning causal associations and processes (Brandon, 1990; Salmon, 1998). In recent decades, there has been a shift

towards the latter (Scriven, 1975; Vayda & Walters, 2011)¹. Influential sociologists have questioned the capacity of all-embracing theories to provide satisfactory explanations of social phenomena, and have suggested that researchers narrow their focus in order to explain delineated phenomena such as social mobility or employee behavior (Merton, 1967; Mills, 1959). Theories of bounded relevance and validity that explain specific social phenomena have come to be known as “middle-range” theories.

More recently, similar concerns about deriving explanations from general theories have surfaced in several social science fields, including organizational studies and management. These concerns are echoed in the debates about the overreliance of IS and organizational studies on theories imported from more-established disciplines (Grover, Lyytinen, Srinivasan, & Tan, 2008; King & Lyytinen, 2006; Oswick, Fleming, & Hanlon, 2011; Truex, Holmström, & Keil, 2006). Oswick et al. (2011), for example, observe that imported theories in the field of organizations and management studies are often general theories of a high level of abstraction, which are “domesticated” by refining and extending them to fit the phenomena studied in the field. Davis and Marquis (2005) critique the tendency in organizational studies to derive explanations from general theoretical paradigms such as transaction cost economics, resource dependence theory, and institutionalism. They argue that these theories cannot address the variety of effective forms of organizing that have been observed in different countries or the emerging new forms of organizing in the context of globalized economic activity. Rather than searching for a substitute grand theory of organization, Davis and Marquis suggest a research approach that develops theory appropriate for contemporary ways of organizing by empirically unravelling the causal paths that form observed organizational phenomena (Davis & Marquis, 2005, p. 340). Nevertheless, Davis and Marquis understand the empirical search for causal explanation to be theoretically grounded; they advocate the development of empirically derived causal explanation in the perspective of institutional theory.

Suggestions for complementing general theory-driven perspectives with phenomenon-specific causal explanations are congruent with views of explanatory theory that have emerged in contemporary epistemology. Salmon (1998, p 77) argues for explanation derived from a combination of general theory and analysis of observed phenomena to work out the causal processes that generate them. In short, in the context of the debate about whether explanations should be derived from general theory or causal reasoning, the position that seems to be gaining acceptance is that the two approaches are complementary rather than mutually exclusive. This is a position that I consider pragmatically appropriate for IS theory and, on this premise, the questions I explore below are how causal explanatory theory is articulated with general theory and what form causal explanation takes.

2.1. Identifying the Object of Study with Reference to General Theory

Any study of social phenomena deals with entities that are ascribed various value-laden meanings by their human participants and the researchers (Bacharach, 1989). A major aspect of identifying and delineating a research object in IS research is the theory about society and technology adopted by the researcher. Such theory guides, either explicitly or implicitly, the choice of some focal entities rather than others, the meanings given to them, the associations, and the constructs studied by the research (Weber, 2012). Consider two different ways in which IT use has been explained in IS: by theories focusing on individual intention (Vankatesh, Morris, Davis, & Davis, 2003) and by theories considering users as social actors (Lamb & Kling, 2003). The former is founded on a view of human action as stemming from individuals' calculated behavior; it seeks to identify factors affecting the intentional behavior of independently acting individuals. The latter is founded on a view of action as being shaped in relation to social context; it seeks to identify how individuals come to use technology in situations of social interactions that are constrained and enabled by their institutional setting. Research that seeks to explain IT use on the basis of behavioral intention may consider social conditions that influence human behavior, but preserve the fundamental focus of the explanation on independently acting individuals (Vankatesh & Morris, 2000). Research that assumes the social

¹ The possibility of causal explanations continues to be a topic of intense debate in the philosophy of science. Doubts stem from Hume's critique of causality and more recent conceptions of nature and society as fundamentally indeterminate (Salmon, 1998). Moreover, there is ongoing debate on the relative merits and difficulties associated with the variance and process approaches some of which I discuss in this paper.

embeddedness of IT use (Rowlands, 2009; Watson-Manheim & Bélanger, 2007) seeks to explain it by focusing on human actors making sense of technology and using it in their interactions in norms-laden social collectives.

Often, research of IS phenomena involves more-complex theoretical choices than a foundational theory of action and technology. Theorists draw from a continuum of highly abstract foundational theories that explain the world we live in, theories of bounded generalization that apply to phenomena deemed similar, and more narrowly bounded, phenomenon-specific theories².

Consider, for example, how Wasko and Faraj (2005) theoretically frame their research for explaining the use of electronic networks by professionals. Working in the general theoretical perspective of IT users as social actors, they draw from several conceptually compatible social theories of action and knowledge. These include the theory of knowledge creation in communities of practice, and a theory of collective action centering on the notion of social capital. Wasko and Faraj's theory building has a relatively narrowly demarcated research object, focusing on the use of electronic networks that support knowledge sharing among professionals. In their research, existing theory not only conceptually shapes the research object but also provides hypotheses for answering the focal question of why professionals share their knowledge when they participate in electronic networks. Following an approach commonly used in IS research (see, for example, McKnight, Cummings, & Chervany, 1998; Sykes, Venkatesh, & Gosain, 2009), they construct relevant hypotheses by assembling existing relevant knowledge compatible with their theoretical perspective. Subsequently, their empirical research seeks to test the validity of the proposed hypotheses. In this way, Wasko and Faraj bring existing knowledge at various levels of abstraction to bear on explaining the new and still poorly understood phenomenon of IT-enabled social networking. An alternative approach, which I propose in this paper, is the empirical construction of new explanatory propositions in conceptual frames derived from social theories.

2.2. Constructing Causal Explanation

I turn now to examine the form of causal explanation. The most thorough discussion of causality in the IS literature is Markus and Robey's (1988) article on the causal structure of theory on IT and organizational change, which outlines the two forms causal relationships may take: variance and process causal models. Variance models identify causes as antecedent conditions for observed effects, which establishes "X causes Y" relationships that are empirically validated through statistical methods. Such models do not elaborate on how X causes Y. In contrast, process causal models reveal the logical link between initial conditions and outcomes by tracing causes in sequences of actions and events that connect them.

Causality is also acknowledged by Orlikowski and Baroudi (1991) in their analysis of the ontological and epistemological aspects of IS research approaches. Positivist research seeks to establish "uni-directional cause-effect relationships that are capable of being identified and tested via hypothetic-deductive logic and analysis" (Orlikowski & Baroudi, 1991, p 9); interpretive research constructs explanations that are causal, but not in the uni-directional sense and not for the same purpose as the positivists: "Interpretive researchers posit circular or reciprocally interacting models of causality, with the intention of understanding actors' views of their social world and their role in it" (ibid).

Notwithstanding this early attention to the issue of causality, in the IS field there has been relatively little discussion of causal explanation. Causality is rarely explicitly articulated. Consider how causality is implied rather than explicitly established in Wasko and Faraj's (2005) explanation of sharing in electronic networks. Their hypotheses describe relationships between dependent and independent variables that are implicitly causal, stating, for example, that specific cognitive characteristics of individuals make them prone to contribute to networks of practice. The causal reasoning of such hypotheses may or may not have been established in the theoretical work on cognitive capital that Wasko and Faraj draw from, but, in their research, it is taken for granted rather than being investigated. Their empirical study aims at statistically establishing the strength rather than the causal logic of the relationship between professionals' cognitive characteristics and sharing behavior.

² I am grateful to an anonymous reviewer for suggesting this clarification.

Causality is also discernible in interpretive IS case studies. A good example is Davidson's (2002) interpretive study on instability in information requirement determination (IRD), which builds on the socio-cognitive concept of technology frames (Orlikowski & Gash, 1994). Davidson discusses an IRD destabilization case in terms of shifting between two salient socio-cognitive frames of the IS under construction: business value of IT and IT delivery strategy. Causality is alluded to in the case study narrative that describes events and conditions of the project that led to the shifting of frames and consequently brought about project failure. Davidson makes no causal claims. She presents her contribution as a process model that "draws analytic attention to the dynamics and possible consequences of frame shifts" (Davidson, 2002, p. 352).

One reason for interpretive researchers' reluctance to refer to their explanatory concepts as causes of the phenomena they study is their awareness that these particular concepts never fully capture the way socio-technical phenomena are brought about. Interpretive research holds a perspective of IS phenomena as emerging from the interaction of human actors and technology. Simple single-directional causal relations cannot account for the interpretive flexibility of actors encountering technology. The processes shaping IS phenomena and their consequences are dynamic and largely unpredictable (Klein & Myers, 1999; Markus & Robey, 1988; Orlikowski, 1996; Walsham, 1995, 2006)³. Giddens, whose version of structuration theory has been influential in interpretive IS research, considers causal statements important because they underpin theoretical generalization. He cautions, nevertheless, that causal relationships in social scientific theory are inherently unstable because they are subject to actors' reasoning in response to the intended and unintended consequences of their actions (Giddens, 1984).

Thus, the development of explanation in interpretive IS research faces the difficulty of searching for causal processes of meaning making and action in the context-dependent unfolding of dynamic interactions of people with technology. Causal processes cut across levels of analyses between the individual and the collective, connecting the interpretations and actions of individuals with the norms of the collectives by which they are influenced. They are often recursive rather than linear. The development of such explanatory theory is not a trivial task. Taking this challenge seriously, I examine these issues below in more detail in relation to the interpretive IS research stream that draws from social theory.

3. Explanation in IS Research that Draws from Social Theory

There is a relatively long history of developing socio-theoretical explanations of IS phenomena. Davenport (2008) traces it to the "social informatics" research tradition in the US (Sawyer & Tapia, 2007) and the "socio-technical" research in the UK (Avgerou, Ciborra, & Land, 2004; Dutton, 1999; Mumford, 2006). Early contributions include the explanatory perspective of the "web of computing" model by Kling and Scacchi (1980) and Kling and Scacchi (1982), and the calls for expanding the IS research landscape with social theory and philosophy at the 1984 conference of the IFIP 8.2 series (Fitzgerald, Hirschheim, Mumford, & Wood-Harper, 1985). Such research became more prominent in the 1990s with a number of influential publications (Bloomfield, Coombs, Knights, & Littler, 1997; Jones, 1999; Monteiro & Hanseth, 1996; Nardi, 1997; Orlikowski, 1992; Orlikowski & Robey, 1991; Star & Ruhleder, 1996; Walsham, 1997). A stream of theory building efforts, that I refer to in this paper as "social theory IS research", has thus been founded on the premise that action is shaped by social context and, in turn, that action shapes its context (Berger & Luckmann, 1967; Bourdieu, 1977; Giddens, 1984). This research also draws from theories of technology from the burgeoning STS field (Bijker & Law, 1992; Law, 1991; MacKenzie, 1996).

Social theory IS research is not a monolithic theory body. There are significant differences among the foundational theories of action and technology that it draws on. Debates concern both the interpretation of these theories (Jones & Karsten, 2008, 2009; Orlikowski, 1992, 2000; Poole, 2009),

³ Radical versions of social constructionist ontology and interpretive epistemology do not accept the search for causality as a meaningful endeavor. They argue that description of phenomena is the only valid knowledge form (for a critique see Martin, 2011). Nevertheless it is not obvious to me that the rarity of explicit causal theoretical claims in interpretive IS research results from espousing anti-causality philosophical positions on society and knowledge. Interpretive research in IS does not produce only thick descriptions (Geertz, 1973) but includes analyses to derive generalizable conceptual explanation, with discernible realist and pragmatist world views that are at ease with causality (Gross, 2009; Mingers, 2004; Shapiro, 2005).

and the relative merits of the resulting IS theory (Kallinikos, 2004). Moreover, IS theorists creatively draw on theories at different levels of abstraction, blending middle range theories of the sociology of organizations with philosophical positions on the ontology and epistemology of action and technology—see, for example, the way Ciborra and his associates combine phenomenology with actor network and other sociological theories to explain the formation of corporate information infrastructures (Ciborra & Associates, 2000).

Despite such differences and blending, it is reasonable to look for common core characteristics in the theory building effort of this stream. Boxenbaum and Rouleau (2011) argue that theory development in fields of knowledge tends to follow norms and common behaviors that, borrowing the metaphor of Goffman's scripted behavior on the theatre stage, they call "epistemic scripts". Scripts for knowledge production underpin the theory-building research effort and the presentation of this effort in academic texts. Particular scripts become tacit knowledge for a community of researchers, forming institutionalised conventions of academic knowledge production. Epistemic scripts influence not only what knowledge researchers produce but also what academic readers, journal editors, and reviewers recognize as legitimate ways of building theoretical claims and what they see as valid theoretical contributions. In Section 3.1, I examine the way theoretical contributions are constructed in social theory IS research.

3.1. General Theoretical Framing and the Construction of Explanatory Propositions

To examine the epistemic script of social theory IS research, I searched six IS journals (*MISQ*, *ISR*, *I@O*, *J AIS*, *EJIS*, *ISJ*) for papers published since 2000 that include the terms structuration, actor-network theory (ANT), practice, situated action, and/or embeddedness in the abstract. Although such a search cannot capture the full spectrum of social theory IS research, I believe it produced a representative sample of papers. This search identified 42 papers that, at closer inspection, I found to indeed present research grounded in structurational theories of action and technology. In a nutshell, in this sample, the most prevalent strategy for explanatory theory building is combining existing theory and empirical observation in process analysis of case studies. Researchers frame a phenomenon they seek to explain in terms of the concepts of their selected general theories, which they subsequently refine and extend with insights gained from the case studies to explain their focal phenomenon⁴.

To better understand this pattern of theory construction, I took a closer look at research on IT-mediated organizational knowledge that is founded on a cluster of theories known as the "practice lens" (Elingsen & Monteiro, 2003; Levina & Vaast, 2005, 2008; Vaast & Walsham, 2009). The practice lens is underpinned by theories of action with a social constructionist epistemology and versions of phenomenology (Brown & Duguid, 2001; Gherardi, 2000; Lave & Wenger, 1991; Sandberg & Tsoukas, 2011). It is cast in juxtaposition to technical/rational approaches that explain organizational phenomena as being the result of calculated and planned decision making. The fundamental premise of the practice lens is that organizational phenomena, such as innovation, are shaped through people's enactment of tasks in the everyday life of their work place.

Research from the perspective of practice has formed a distinctive, and to some extent cumulative, explanatory theory-building endeavor with respect to IT mediated organizational learning and knowledge management (Schultze & Leidner, 2002). Orlikowski's (2000, 2002) publications on IT-mediated organizational change and on knowing and learning have played a foundational role for the practice lens in this IS research subfield⁵. Building on Giddens' structuration theory and on ideas about the interaction of people and technology from cognitive anthropology with phenomenological underpinnings (Hutchins, 1996; Lave, 1988; Suchman, 1987), Orlikowski elaborates through case

⁴ This is a pattern of theorising similar to the epistemic script of "evolution" and "differentiation" that Boxenbaum and Rouleau (2011) found to be prevalent in the organizational theory field. Boxenbaum and Rouleau argue that theorists often incorporate in their proposed theory concepts and ideas from the broader literature and from empirical observation in a bricolage manner, but they do not account for this process in the presentation of the research.

⁵ According to Google Scholar, these two publications have been cited more than 4000 times as of March 2013.

studies highly abstract concepts, such as technology-in-practice and organizational knowing. These concepts are widely used in subsequent IS research that adopts the practice lens.

Many researchers extend general theories of practice to address specific issues of knowledge in organizations. For example, Levina and Vaast (2008) engage with the phenomenon of global information technology outsourcing and address issues of collaboration in IS projects outsourced to offshore locations. Their research illustrates and refines the theoretical perspective of collaboration in practice, using mostly Bourdieu's theory of practice. They thus suggest that boundaries of communication that disrupt collaboration are due to status differences among participants that result from differential accumulation of various forms of social capital.

The pattern of theory building exemplified in Levina and Vaast (2008) is as follows. The object of study is framed by combining concepts from foundational social theories of practice such as Giddens' structuration theory, or "domesticated" versions of them (Oswick et al., 2011) such as Orlikowski's theory of organizational knowing in practice. The research involves interpretations of case studies through these framing theory concepts. Analysis both demonstrates the validity of the practice lens concepts developed in prior research and adjusts them to construct conceptual refinements suitable to the specific issues or social settings under study (Levina & Vaast, 2005; Vaast & Walsham, 2009).

This way of theory building is significantly different from Wasko and Faraj's (2005) research, which derives propositions entirely from existing theory and uses empirical evidence to test it. In Orlikowski (2000, 2002) and Levina and Vaast (2008), theoretical propositions are constructed by interplaying existing general theory and empirical insights. However, the explanations developed are not new concepts: they convey the insights of a chosen general practice theory to the particular case under investigation. This epistemic script does not seek to empirically derive entirely new understandings of how a phenomenon is brought about. It does not generate suggestions "of relationships and connections that had previously not been suspected" (Weick, 1989, p 524).

The possibility of creating surprising new explanations in social theory IS research is demonstrated in Bowker's (1997) study of knowledge development in organizations. While conceptually positioned in the structuralist theoretical tradition, Bowker's explanatory effort departs from the epistemic script of refining original concepts, and constructs a surprising novel theoretical contribution. His research highlights the significance of forgetting, and identifies in a case study two "strategies" through which forgetting happens: clearance and erasure (Bowker, 1997, p 114). In the last part of his paper (though only briefly), Bowker discusses the theoretical contribution of forgetting in relation to existing theoretical positions on knowledge, classification systems, and the development of information infrastructure. He notes that his suggestion is complementary to other explanations that stem from the social construction of knowledge and the practice lens.

It is not clear how Bowker (1977) identified forgetting as a significant part of the phenomenon of organizational knowledge. The empirical study seems to have played an important role in his research, but he does not elaborate on how he identified forgetting as part of organizational knowing; processes such as forgetting are not possible to observe. The importance of the researcher's intuitive leap notwithstanding, I suggest that phenomenon-specific explanatory propositions can be constructed by tracing the causal paths of actions and events that lead to observed outcomes, and, in Section 3.2, I more specifically examine the form causality takes in social theory IS research.

3.2. Causality

The practice lens IS stream manifests the reluctance of interpretive research to develop explicit causal propositions on the dynamic, circular, and reciprocal links through which outcomes such as learning and knowing are achieved. For example, Orlikowski's (2000) rich case narrative of IT and organizational change indicates a number of detailed causal processes, such as users' efforts to fulfil the career development criteria of their organization or their work adjustments according to their perceived match of technology to the task at hand. Orlikowski discusses several organizational conditions, processes, and consequences, but she is careful to only point out the different forms these may take in different

cases, rather than assembling causal propositions about their relationships. The richness of her case study insights is channelled to support and substantiate the concept of technology-in-practice, which calls to mind a general causal process of how organizational change happens. Orlikowski's aim to develop a general theoretical perspective of practice suitable for IS research is entirely valid and justifiably influential in the social theory IS subfield. Nevertheless, the widespread adoption of general theory refinement as the epistemic script in research framed by theories of practice has constrained the development of context and technology-specific causal explanation.

One example of social theory IS research in which causal processes become clearer is Goh, Gao, and Agarwal's (2011) study that seeks to explain successful implementation of health information systems in hospitals. This research is framed by the concepts of adaptive structural theory (DeSanctis & Poole, 1994; Markus & Silver, 2008) and the theory of organizational routines (Feldman & Pentland, 2003). The empirical analysis develops a model of a virtuous circle formed by three categories of causal processes, associated with functional affordances, symbolic expressions, and agents' actions. The model comprises causal explanation in the form of mechanisms that bring about observed outcomes. These mechanisms are more than refinements of general theory concepts. They are fairly new insights derived from the interplay of theory with empirical data.

In short, there are different ways that explanation of IS phenomena can be constructed in process research that draws from social theory. Table 1 shows a summary of the main characteristics of the examples I drew above from the literature. In this table, Wasko and Faraj (2005) exemplifies research that draws from existing theory to form propositions of relationships with implicit causality and tests them statistically. Levina and Vaast (2008) exemplifies the epistemic script that sheds light on IS phenomena by drawing explanatory concepts from existing theory and refining them in case studies. Bowker (1997) exemplifies research that is theoretically clearly framed and derives new explanatory concepts from a case study. Goh et al.'s (2011) research centers on the empirical search for social mechanisms in a general theoretical perspective. The strength of their approach in comparison to the approach taken by Levina and Vaast (2008) is the potential for identifying phenomenon-specific causal processes beyond those directly implied by the general theory concepts. I explore this type of explanation in Section 4 by introducing the notion of social mechanism and I point out its relevance to IS research.

Table 1. Examples of Explanation Construction in Social Theory IS Research

	Role of general theory in forming explanations	Role of empirical study in forming explanations	Causal structure	Theory features: breadth and novelty
Wasko and Faraj (2005)	Source of hypotheses for variables and their relationships. Provides an implicit causal logic underpinning the hypotheses.	Tests variance hypotheses.	Multiple relationships of variables within the chosen theoretical perspective.	Bounded to a specific phenomenon (professional knowledge sharing on electronic networks); builds on existing theory to explain a new phenomenon.
Levina and Vaast (2008)	Demarcates object of study and provides general explanatory concepts with implicit causality.	Demonstrates the merits of and refines general theory concepts to explain issues in a IS phenomenon.	Explanation by one implicit causal process path.	Bounded to an IS phenomenon (collaborative knowing in outsourcing); limited theoretical novelty in the form of adjustment of existing concepts.
Bowker (1997)	Implicitly frames a conceptual research space.	Source of a new explanatory concept in the implicit theoretical perspective.	Single concept explanation of implicit causality.	Abstract and of relevance to a broad category of organizational contexts. High theoretical novelty.
Goh et al. (2011)	Explicitly frames the research space and demarcates object of study.	Traces causal paths within the theoretically framed research space.	Multi-causal process model; nevertheless inherently partial and incomplete.	Bounded to an IS issue (success of IT implementation) and organizational context (hospital); novel detailed phenomenon-specific explanation.

4. On Social Mechanisms

In a very general sense, mechanisms are sets of entities and activities that produce change from an initial state to observed outcomes (Bunge, 2004; Gross, 2009; Hedström, 2005; Hedström & Swedberg, 1998b; Martin, Weisenfeld, & Bekmeier-Feuerhahn, 2009; Mayntz, 2003; Steel, 2004). Social mechanisms have received a great deal of attention in philosophy and across the social sciences as building blocks for the construction of causal explanations of social phenomena⁶ (Bhaskar, 1986; Falletti & Lunch, 2009; Little, 1995; Reskin, 2003; Steel, 2004; Van de Ven & Poole, 1995). They reveal causal processes that explain how a social phenomenon is created⁷.

Gross (2009) summarized the main points of agreement and disagreement in the debates on what constitutes satisfactory social mechanisms-based explanation. There seems to be agreement that:

- a) Social mechanisms are processes that link causes and effects
- b) Social mechanisms comprise sequences of action and/or events unfolding in time
- c) Social mechanisms invoked to explain unique events form the basis for propositions of causal processes with a certain degree of generality, and
- d) Social mechanisms research constructs explanation by analysing a phenomenon to identify constituent entities and causal relationships in processes of actions and events that generate its observed outcomes. In social theory IS studies, the entities of social mechanisms comprise individuals, collectives, artefacts, or their hybrids, such as web based business firms. Social mechanisms may show how actors came to form specific meanings of an IS situation, why they acted in a particular way, or why their actions and interactions with technology took a particular path in relation to their context.

Social mechanisms abound in IS theory but, like causal claims more generally, they are rarely explicitly identified and mentioned as such. Examples of social mechanisms invoked in IS explanations without acknowledging them as such are the coercive, mimetic, and normative “forces” of institutionalization in research that draws from the neo-institutionalist theory (Mignerat & Rivard, 2009). Many social mechanisms are discernible in the publications I examined in the previous section; for example, knowing in practice (Orlikowski, 2002), cognitive framing of technology (Davidson, 2002), and forgetting (Bowker, 1997).

Since social mechanisms already exist in IS explanations, the reader is likely to be wondering at this point why it matters that they are not mentioned as such and what the value is of recognizing them explicitly. My argument is that explicit identification of social mechanisms makes the constituent parts of causality surface to form explanatory theory of complex social phenomena. The tracing of social mechanisms in empirical studies can lead to an approach of theory development in the social theory IS research tradition that departs from the prevailing epistemic script of forming explanation by refining foundational theory concepts. It is a methodology for the development of multi-causal explanation in IS research⁸.

In Section 4.1, I examine three contentious aspects of social mechanisms research that theorists need to be aware of (Gross, 2009): the question whether social mechanisms explanation should break down phenomena to the behavior of individual actors or can involve collective social entities,

⁶ Mechanisms are found in the physical sciences as well as the social sciences. While most theorists in the social sciences use the term social mechanisms to refer to mechanisms underpinning social phenomena, many just refer to “mechanisms”. The term “causal mechanism” is also often used as a synonym to social mechanism. The concept “generative mechanism” of critical realism (Mingers, 2004) refers to social mechanism in the context of social phenomena. I understand Pentland’s (1999) term “generating mechanism” to refer to social mechanism, too.

⁷ The most comprehensive account of the development of a theory by tracing social mechanisms is McAdam, Tarrow, and Tilly’s (2001) book *Dynamics of contention* on social movements. Another example is Gaventa’s (1980) explanation of quiescence in a miners’ community that faced conditions of deprivation.

⁸ An example of constructing multi-causal explanation in the form of social mechanisms can be found in Avgerou (2013).

issues regarding the generalization of social mechanisms derived to explain specific cases, and questions regarding how social mechanisms can be traced.

4.1. The Type of Entities that Form Social Mechanisms

Ultimately, all social phenomena result from actions of individuals, whether calculated, spontaneous, or habitual. However, individual actors are embedded in social systems and social phenomena are subject to opportunities and constraints from these systems. A fully analytical explanation of a social phenomenon in terms of individuals' actions is understood to involve three types of elementary mechanisms, bridging levels of analysis (Hedström & Swedberg, 1998a):

1. Macro-to-micro mechanisms explaining how individual action is enabled or restricted by the social context in which it is embedded; this involves theories that link a social structure or context with the behavior of individual actors. Such examples include Goffman's (1963) theory of individuals' behavior in public places and Ciborra and Lanzara's (1994) explanation of innovation in software development in terms of the influence of an organization's social relations (its formative context) on the behavior of programmers.
2. Micro mechanisms explaining individual action; these are psychological or social-psychological mechanisms showing how specific desires, beliefs, and opportunities lead to specific actions (Hedström, 2005). A well known example of micro mechanisms in IS research is the explanation of people's intention to use IT in terms of their perception of its usefulness and ease of use (Davis, 1989).
3. Micro-to-macro mechanisms explaining how the actions of individuals produce an observed collective outcome, such as market models in neoclassical economics. An example in IS research is Devaraj and Kohli's (2003) explanation of the economic performance impact of IT in hospitals in terms of employees' usage of available IT systems.

Some scholars in analytical sociology advocate creating rigorous explanatory theory at the level of individual action and interaction by focusing on the motivations of intentional individuals confronting opportunities for action (Hedström, 2005). Nevertheless, they acknowledge that efforts to identify causal mechanisms at the level of individual action are confronted with large and complex causal chains. Identifying mechanisms at the individual level of analysis may not be an effective or feasible way of explaining social phenomena. Mechanisms in terms of collective actors are therefore accepted as a methodological strategy to cope with theoretical complexity. In this argument, a mixed-level analysis (Markus & Robey, 1988) is accepted on the pragmatic grounds that it is unrealistic to trace the causal explanation of complex social phenomena in elementary mechanisms at the level of individuals' psychology and behavior.

A stronger argument in favour of mechanisms that involve collectives is made on ontological grounds. An analogy from the sciences may be helpful to clarify why it is not necessary or indeed desirable to trace micro-to-micro explanatory mechanisms when trying to explain social phenomena. While all biological phenomena may be traceable down to chemical processes, a great deal of effective explanation of phenomena studied by the life sciences is constructed at the level of higher units of analysis of "cells" and "organs". Similarly, social phenomena may be explained in terms of collective action rather than in terms of the psychological properties and processes of the individuals involved. In other words, macro-macro social mechanisms are justified on the ontological grounds that social reality is stratified, with each level exhibiting emergent properties and sustained by relationships that are logically valid only at that particular level. For example, the explanation of phenomena associated with national societies may require social mechanisms that refer to government institutions. Thus, the reduction of social phenomena to the aggregate effect of intentional individual actors has been criticised in both the broader social sciences (Archer & Tritter, 2000; Gross, 2009; Mills, 1959) and IS

(Lee, 2010; Sarker & Valacich, 2010) for ignoring the importance of social wholes and therefore often leading to misleading conclusions.

The different positions in this debate on the types of social mechanisms necessary to explain a social phenomenon stem from the researchers' adopted theory of action (Gross, 2009). Theories that assume the social embeddedness of human action, such as the practice lens, consider collectives such as "communities of practice" as necessary components of explanatory propositions to account for the enabling and constraining relationships of social structure. More generally in social theory IS research, collective entities and processes unfolding in a social context are likely to be seen as playing an important role in the generation of aggregate effects from the actions of individuals.

4.2. Causality and Generalization of Social Mechanisms Based Explanation

The social mechanisms approach to explanatory theory develops a causal reconstruction of a phenomenon by identifying the processes through which an observed outcome was generated (Bunge, 2004; Machamer, Darden, & Craver, 2000; Mayntz, 2003). In variance research, social mechanisms provide the logical link required to explain statistically generalizable relationships among variables, thus avoiding mistaken claims of causality known as the confounders problem (Steel, 2004). This is the role of mechanisms in research such as that of Mithas, Tafti, Bardhan, and Goh (2012) and Lee, Barau, and Whinston (1997), where the identification of mechanisms is a first stage for the design of empirical tests of the relationship between variables. In causal process theory, which is relevant to social theory IS research, mechanisms and processes form a continuum. While mechanisms are processes in their own right, they concatenate with other mechanisms into larger process theories.

There are significant differences between the variance and process approaches regarding the way mechanisms-based explanation forms theoretical claims. In the former, a mechanism identified by existing theory or in a case study is the basis for the formation of a hypothesis, the validity of which is tested statistically to support a general explanatory claim. In the latter, theory development is not separated from theory testing; an explanation is constructed by process tracing which generates evidence both for the occurrence of a mechanism and the validity of the causal logic of this mechanism (Steel, 2004; Suddaby, 2006). The objective of the research is to elicit a causal logic in the occurrence of a phenomenon. The existence of the mechanism and the variations it may take in different contexts can be investigated further in comparative case studies.

In process models, a social mechanism does not determine a straightforward cause-and-effect relationship. Social mechanisms identify intermediate events and action that contribute to the transition from an initial state A of a phenomenon to an observed outcome B, but they are always partial explanations of B. The transition from A to B may depend on conditions other than the initial state of A, and may involve multiple influences in the broader context of the transformation from A to B. In different contexts, a particular social mechanism may produce different effects. In other words, social mechanisms do not entail one-to-one cause and effect relationships between social entities or events. Merton (1968) clarifies this point regarding the self-fulfilling prophecy mechanism as an explanation of a financial crisis: individuals worried about the possibility of a banking crisis and initiating a run on their banks contribute to the crisis becoming reality. But whether a run on the bank will happen, and the significance of any such run for the financial sector, depend on many other processes, actions, and reactions, such as measures taken by the regulator of an economy to reassure depositors.

Therefore, social mechanisms in process theory are indeterminate explanations—they cannot predict the outcomes of certain initial conditions. In different contexts, a particular social mechanism may not be triggered and opposing social mechanisms may alter the final outcome. As Markus and Robey (1988) point out, the causes identified in process theory are insufficient for the occurrence of outcomes. They do not support claims of universally held relationships and their predictive capacity is limited.

Generalizing social mechanisms-based process explanations falls in the category of generalization from description to theory identified by Lee and Baskerville (2003), which is achieved by deriving

abstractions from the specifics of a case (Dyer & Wilkins, 1991; Eisenhardt, 1989; Glaser & Strauss, 1967). A major challenge in constructing social mechanisms-based explanatory theory is how “to identify social mechanisms specific enough to have explanatory value for particular observed outcomes or relationships, but at the same time general enough to apply in different empirical fields” (Mayntz, 2003, p. 254). As Falletti and Lynch (2009) put it, social mechanisms-based theory is derived from the specificity of particular cases by identifying portable concepts that operate in similar cases in different contexts, without, nevertheless, determining particular outcomes.

Some mechanisms are cast at a high level of abstraction and are broadly applicable; others are much more specific and apply to only certain organizational settings. The extent of generalization of social mechanisms theory is delineated by the boundaries of the research object. It also depends on the extent to which the concepts capturing the proposed social mechanism as a causal process are transferable to other phenomena to reveal the logic of a transformation of an initial state towards an outcome. If the object of research and the context of a case study are clearly delineated, a reader will be able to see the limits of generalizability of the proposed theory and judge the relevance of the proposed social mechanisms to other cases. Nevertheless, even with careful delineation of boundaries, the fundamental indeterminacy of social mechanism explanations makes law-like generalization impossible and statements of their probabilistic regularity precarious.

4.3. How Social Mechanisms are Identified

Social mechanisms at the organizational and societal levels of analysis tend to be traced in narrative accounts of processes (Abbott, 2001; Abell, 2004; Dyer & Wilkins, 1991; Eisenhardt, 1989; George & Bennett, 2005; McAdam, Tarrow, & Tilly, 2008; Pentland, 1999). However, narrative analyses in process research do not necessarily develop social mechanism-based causal theory. Research that follows the process approach often describes processes as sequences of events in time but does not identify how they bring about observed outcomes. For example, while Sabherwal and Robey's (1995) analysis of IS development narratives identifies patterns of systems development actions, thus challenging the staged life cycle model, it does not identify any causal logic for the sequences they found. Similarly, Newman and Robey's (1992) process model of user-analyst relationships comprises antecedent conditions, types of events, and the nature of analyst/user relationships outcomes in an information systems project, but does not elaborate any causal logic that explains the way events lead to outcomes. In both these examples, theory is constructed by identifying and measuring variables for statistical predictions rather than offering social mechanisms-based explanations.

Pentland (1999) makes a distinction between narratives that present the “surface structures” of a process and narrative analyses that identify “deep structures” that underlie the sequence of events, which he calls “generating mechanisms”: “to describe a process, one needs event sequences. But to explain a process, one needs to identify the generative structures [social mechanisms] that enable and constrain it” (Pentland, 1999, p. 722). Surface structures are found in the stories told by the actors interviewed by the researchers and in the text produced by the researcher to describe ethnographic observations. It is more difficult to identify the mechanisms that drive the process and explain observed outcomes. Searching for processes that explain outcomes, Pettigrew (1997) suggests, is likely to reveal multiple interacting processes embedded in multiple layers of contexts:

Metaphorically we are studying some feature of organizational life not as if it represents one stream in one terrain, but more like a river basin where there may be several streams all flowing into one another, dependent on one another for their life and shaping and being shaped by varieties of terrain each constraining and enabling in different intensities and ways (p. 340).

Various methods, with various degrees of rigour, have been proposed and used to trace social mechanisms in case narratives. In general, analyses of narratives that aim to identify social mechanisms focus on verbs that describe actions producing transformations of initial conditions towards the observed outcomes. They also elicit the reasoning that drove actors to act in a particular

way. Subsequently, the validity of conjectured social mechanisms is confirmed with methods such as network analyses, discourse analyses, and comparative case studies (McAdam et al., 2008).

To trace mechanisms contributing to the successful implementation of information systems by medical professionals in the context of a hospital, Goh, Gao, and Agarwal (2011) conducted a narrative network analysis as suggested by Pentland and Feldman (2007). Buttriss and Wilkinson (2006) outline a number of methods they used for tracing social mechanisms in a case describing the internationalization of a company in the electronic components industry. They include the tracing backwards in time of the chains of actions and conditions that led to the internationalization outcome, the identification of concurrent actions that converged to the eventual outcome and of those actions that produced divergent paths of events, and the identification of processes of actions with cumulative and feedback effects.

In all these examples, the tracing of social mechanisms involves inductive methods, such as grounded theory (Glaser & Strauss, 1967). However, accounts of methods in research descriptions may misleadingly present the generation of causal propositions as a merely data-driven effort for the identification of social mechanisms. As I argue in this paper, empirical investigation is not devoid of theoretical influence, and, in process research, the construction of conceptual propositions about social mechanisms that explain observed outcomes is not separated from their testing (Suddaby, 2006). Ultimately, causal explanations are accounts of concealed processes, which are only indirectly observable from their outcomes, and their tracing requires the researcher's "disciplined imagination" (Weick, 1989) and intuitive leaps.

5. Developing Social Mechanism Explanations in Social Theory IS Research

I suggest that the IS research stream that draws from social theory can produce more complete and novel explanations of IS phenomena by altering its epistemic script to include the tracing of social mechanisms. The main components of this approach are as follows:

- a) Identification of an IS phenomenon of interest, the explanation of which is the research goal. Although research focuses on the specificities of case studies, the object of explanatory theory should be a phenomenon recognizable as occurring in more than one contexts.
- b) Conceptual framing of the IS phenomenon of interest as an object of research by drawing from general social theories of action and technology, such as theories of practice. Such framing comprises fundamental assumptions on how socio-technical change happens, according to which the entities, relationships, and processes under study are conceptually identified.
- c) Tracing of social mechanisms in case narratives of events, actions, and interactions that produce observed outcomes of the phenomenon under study. While carried out in a theoretical framing, the search for social mechanisms should seek to unravel, in analyses of empirical data from one or multiple cases, causal paths of conditions, actions, and events that generate the observed outcomes.

The resulting theory will most likely comprise several social mechanisms interwoven in broader processes that bring about the phenomenon under study and its outcomes. Some of the social mechanisms may indeed be refinements or adjustments of the core concepts of the underpinning social theory, while others may be additional new, phenomenon-specific, concepts.

Explanation by social mechanisms adds two main strengths to social theory IS research. First, social mechanisms make explicit the causal paths that produce outcomes of IS phenomena, and thus, according to the epistemology of explanation, makes better explanatory theory. Second, being empirically driven, the tracing of social mechanisms is likely to produce new insights beyond those

implied by the theories that frame the research, and therefore to contribute more complete, multi-causal explanation. Still, social mechanisms-based process theory needs to be understood as an incomplete and indeterminate form of causal explanation. Social mechanisms are neither sufficient to fully explain an observed outcome, nor necessarily present in all occurrences of the same phenomenon. This may appear weak compared to explanatory theory in the natural sciences, but explanation by social mechanisms is arguably the only type of explanation suitable for social and socio-technical phenomena (Giddens, 1984).

A major practical challenge in the suggested approach is related to the difficulty of conducting and presenting process research that makes sense of and constructs arguments from masses of unstructured data (Langley, 1999; Pentland, 1999; Pettigrew, 1997). The researcher needs a method for tracing social mechanisms that will bring adequate rigour to the research process without stifling imagination and creativity. Such methods hardly exist at present, and need to be developed.

The explanatory power of the resulting theory would be judged differently by positivist and non-positivist researchers and reviewers. For positivists, the indeterminacy and non-falsifiability of explanation in the form of social mechanisms are serious shortcomings. Some non-positivists would find making explicit causal claims undesirable. Social mechanism explanation may be more conducive to functionalist explanation rather than making sense of emerging meanings. Goh et al.'s (2011) research shows that social mechanism explanation can accommodate both the functional and the symbolic, but it may indeed be easier to trace social mechanisms related to functions than to meanings and interpretations that bring about social phenomena.

6. Conclusion

In this paper, I create awareness about the importance of causality in explanatory research, and I point to social mechanisms as components of causal process theory. I examine in some detail the explanatory capacity of IS research that draws from social theory, and suggest that such research can produce more powerful theory if it develops causal explanation in the form of social mechanisms. "More powerful" in this context means multi-causal process theory that reveals relationships that generate IS phenomena. Such an approach can produce more complete explanations than the prominent pattern that seeks to understand IS phenomena by refining general socio-theoretical concepts. It can develop new theoretical explanations beyond those implied by the concepts of the framing general theories by empirically eliciting the unfolding of causal processes that bring about IS phenomena.

It will take, of course, more than the IS researchers' awareness of the importance of causality to shift the epistemic script of socio-theoretical IS research towards the search for social mechanisms. Reviewers' recognition of the desirability and legitimacy of process research that is explicitly causal is as important as researchers' willingness to form phenomenon-specific theories in the form of multi-causal explanations.

Social theory publications form a relatively small proportion of the IS literature, and this publication space has been achieved gradually with the establishment of principles that have made interpretive process research credible in the IS community. As I mention above, process research is considered a difficult approach to constructing convincing arguments that can be presented in the limited space of a journal article. Authors and reviewers often seek legitimacy by reference to publications that set the criteria of good interpretive research. This may facilitate publication, but it creates a path dependence that stifles the development of new research approaches such as identifying social mechanisms. Senior editors can play a vital leaders' role in shifting the epistemic script of this research stream to allow for the introduction of research approaches with more explanatory power.

The construction of social mechanisms explanation may gain recognition more easily in research of emerging phenomena of IS innovation for which there is not an established research pattern. As the Internet is creatively intertwined with new areas of social activity and as IS researchers are confronted with an range of still poorly understood phenomena, research will need to increase its

capacity for phenomenon-specific, empirically-driven explanatory theory building. General theoretical perspectives are indispensable to guide researchers, and it makes better research if they are explicitly stated in the framing of the research object. Yet the onus for the social theory IS research community is to develop research practices to explain the outcomes of this relentless innovation by uncovering phenomenon-specific causal paths of socio-technical interaction.

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