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Benjamin Mueller
University of Groningen, b.mueller@rug.nl

Nils Urbach
University of Bayreuth

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Benjamin Mueller
University of Groningen
Faculty of Economics and Business
Karlsruhe Institute of Technology
Institute of Information Systems and Marketing
b.mueller@rug.nl

Nils Urbach
University of Bayreuth
Faculty of Law, Business and Economics
FIM Research Center
Fraunhofer FIT

Abstract:

Researchers have emphasized theory's pivotal importance in the information systems (IS) discipline since its inception. As in many science disciplines, IS scholars' ability to understand and contribute to theory is an important qualification in research practice. As a discipline, we require solid foundations for why we engage with theory, what theory is for us, and how we work with theory. We synthesize and reflect on the debates on theories and theorizing in the IS discipline. In doing so, we inform (particularly new) authors about the current state of the IS discipline's debate on theory and theorizing and help them identify opportunities in theorizing to put theory to work. We do not intend to advocate or cement that status quo we portray but rather, through informing the community about it, to support early efforts to further develop and move beyond the current state of the debate on theory and theorizing in IS research.

Keywords: Theory, Theorizing, Reasoning, Information Systems Research, IS Research, Philosophy.

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1 Introduction

Generating knowledge from data is a key contribution of science. Comparing data to a heap of leaves without a tree, Steinfield and Fulk (1990) state that accumulated data alone lacks the synthesis and integration needed for knowledge-based claims. Blalock (1969, p. 2) further supports this argument in noting that “any good social scientist knows that the facts do not speak for themselves, [but that] theoretical structures are critical”. Many disciplines—from physics to sociology—have abstraction from facts or data into theory at their core (Atmanspacher, 2007). Such abstractions of conceptual structures are not merely academic; they have implications for researchers’ ability to inform practice. Highsmith (1999, p. 14) illustrates this point by stating: “Techniques without a theoretical base are reduced to a series of steps executed by rote”.

Researchers have often seen a discipline’s theoretical base as a crucial basis for *describing*, *explaining*, and *predicting* the phenomena that disciplinary work relates to; that is, theory explains the *what*, *how*, and *why* of phenomena (Whetten, 1989). Such an understanding helps researchers and practitioners to move beyond rote routines in Highsmith’s (1999) sense and allows them to uncover underlying conceptual structures that enable purposeful and meaningful actions. In other words, theories are systems of concepts and interrelationships among them that jointly explain a phenomenon and show how and/or why it occurs (Gioia & Pitre, 1990).

Researchers in the information systems (IS) discipline have emphasized theory’s pivotal importance since its inception. Researchers have often discussed the legitimacy of the explanations that the IS discipline offers in comparison to its neighboring disciplines as a primary motivation for the discipline’s intense discussion of theory and theorizing (Frank, 2006; Lyytinen & King, 2004). Only by providing credible conceptual accounts will the discipline be able to compete in what Weber (1997, p. 2) calls the “race for credibility”. As early as during the first International Conference on Information Systems, Keen (1980, p. 9) predicted that “unless we build on each other's work, a field can never emerge”. Contributing to theory is an important qualification in research practice, and the ability to combine empirical observations with theoretical abstractions is a key characteristic of publishable research (e.g., Sambamurthy in Lee, 2001). Despite these requirements, IS research seems to continuously struggle with its search for a theoretical core distinct from its reference disciplines (Grover, Gokhale, Lim, Coffey, & Ayyagari, 2006; Lyytinen & King, 2004; Straub, 2006, 2012; Wade, Biehl, & Kim, 2006; Weber, 2003a).

Our key reference disciplines are also intensively re-examining their concepts of theory (e.g., in management with contributions by Hillman, 2011; Shapira, 2011; Shepherd & Sutcliffe, 2011; Suddaby, Hardy, & Huy, 2011; Thompson, 2011; Tsang & Ellsaesser, 2011). While such re-examinations elsewhere have no normative bearing on IS, we suggest that IS would also benefit from intensifying its discussion of theory and theorizing beyond such landmark papers as Gregor (2006) or Weber (2012).

We also need to re-examine theory and theorizing to research new phenomena (e.g., the increasing ubiquity of information and communication technologies, such as social media, mobile devices, and the Internet of things). The related technological and social mangling challenges our theorizing, which the conceptual and methodological difficulties associated with the turn towards sociomateriality in the IS discipline evidence.

Instead of perpetuating what IS researchers currently know and often widely accept, we suggest that we need to critically assess how our discipline approaches theory and theorizing, what deficits there might be, and how we can advance theory and theorizing accordingly. We take stock of the aspects of theory and theorizing that many seem to take for granted. We synthesize and reflect on the current debate on theories and theorizing inside and outside the IS discipline and provide a baseline to make the art and craft of theorizing more accessible. In doing so, we inform (particularly new) authors about opportunities in theorizing and help them to put the concept of theory to work in their own theorizing. We hope to advance and support the discipline’s efforts towards theorizing (e.g., *JAIS* Theory Development Workshops, pre-ICIS workshops of AIS SIG-Phil, and dedicated tracks at ICIS, ECIS, and HICSS) and the increasing demand for theoretical contributions.

In this paper, we do *not* put forth a unifying definition of theory that universally applies to all IS research. On the contrary, the IS discipline has a strong need for conceptual plurality and the promotion of a vast array of different philosophical approaches that each produce different notions of what *theory* and *theorizing* mean. However, some philosophical approaches may have featured more prominently than others. We provide a context for this debate, relate the most important papers to each other, and embed them in a storyline that connects them. In doing so, we focus on helping others to identify relevant papers and, thereby, encourage them to read (and question) them. Based on our discussion below, we hope that theorists and aspiring theorists will develop a clear view of theory and theorizing and that we address some of the conceptual challenges researchers face. In doing so, we support our discipline's (re-) exploration of theory and theorizing and research practice. We provide readers with a starting point for participating in these exciting discussions.

We transposed Whetten's (1989) seminal thoughts on the why, what, and how *in* theories and structure our paper by walking readers through the why, what, and how *of* theory and theorizing in IS research. Following this logic, in Section 2, we start with the *why* for theoretical work. In Section 3, we present basic conceptual foundations of theory. In Section 4, we discuss different modes and strategies of theorizing. In Section 5, we reflect on theory's role for IS research and various opportunities and add a perspective on the *now what* to Whetten's thoughts. In Section 6, we summarize and provide concluding thoughts.

2 WHY: A Motivational Background

Shapira (2011, p. 1320) sees "theory construction as the highest level of scientific inquiry". Beyond this statement, our discipline's history points to the need to re-examine what theory and theorizing are to and for us in our work. While we can provide only an overview here (for a more elaborate discussion, see Hirschheim & Klein, 2012), one can describe the discipline's evolution as one from topics to methods to theories[1].

The topics era (roughly from the 1960s to the early 1980s) involved defining the essential areas of inquiry that IS scholars dealt with. Motivated by a call for more empirical insights to address "wide-ranging speculations about the effects of new technologies on organizations" (Klemmer, 1973, p. 435), many researchers turned to studying IS in the field. Despite this enthusiasm, IS had its critics. For instance, Dearden (1972, p. 90) noted that the:

> *Conceptual entity [of MIS] is embedded in a mish-mash of fuzzy thinking and incomprehensible jargon. It is nearly impossible to obtain any agreement on how MIS problems are to be analyzed, what shape their solutions might take, or how these solutions are to be implemented.*

This observation already underlines the importance of theory.

Despite advances in identifying the topics and domains of IS research, critics raised concerns about the discipline's methodological aspects in the mid-1980s (Hirschheim & Klein, 2012). Some argued that, at this stage, a lack of standards in research methods characterized IS (Khazanchi & Munkvold, 2000). The methods era (mostly until the late 1990s / early 2000s and even after for some areas of IS) led to intensified discussions of methods through methods colloquia, edited collections, and influential essays (such as Chin, 1998; Lee, 1991; or Myers, 1997).

Since the start of the theory era (around the mid-1990s), and with a remarkable recent surge, the IS discipline has taken stock in many different ways to review the different theories it has accumulated over the years (for excellent overviews, please see Barkhi & Sheetz, 2001; Dwivedi, Wade, & Schneberger, 2012; Larsen, Allen, Vance, & Eargle, 2014; Lee, Lee, & Gosain, 2004; Lim, Saldanha, Malladi, & Melville, 2013). This idea of building a theoretical foundation points to the notion of searching for the truth. However, such truth comes in many different forms. Those that view truth in the sense of correspondence (O'Connor, 1975) will build new theories or will refine existing ones in order to more closely approximate reality. Others, who consider truth to be something rooted in a consensus among social actors (Habermas, 1973), view theory as something that documents emergent agreement as they generate more findings around a phenomenon. Across different philosophical positions, the ideal of truth is closely linked to the concept of theory and a key motivator to engage in theoretical work. Whenever researchers review the literature (e.g., when writing conceptual foundations sections), they are standing on the "shoulders of giants"; that is, building on a fundamental trust in previous findings and their implications. The metaphor of the giants' shoulders, attributed to Bernard of Chartres in John of Salisbury's *Metalogicon* (published in 1159), highlights that such a cumulative tradition helps disciplines to advance their understandings of an object of study. As an important supporting function of this advancement, theory makes shared beliefs

[1] This linear model is a simplification; we draw on it only to illustrate the discipline's increasing attention towards theory. In reality, the three aspects of topics, methods, and theories likely overlap, and any new aspect of IS research might go through an intense phase of clarification for all three until the respective research community has reached consensus on how to address the phenomenon at hand.

explicit (Watson in Lee, 2001) and researchers must justify opposing positions or novel approaches to a phenomenon they take.

Several scholars have complained about a lack of an IS-specific cumulative tradition of theory (e.g., Lee, 2001; Weber, 2003b). While some controversy has arisen as to whether IS as a discipline will build a theoretical core (Lyytinen & King, 2004) and, if so, whether it needs to be distinct from other disciplines (e.g., Straub, 2012), researchers have often criticized the IS discipline for borrowing theories from other disciplines instead of creating its own (Baskerville & Myers, 2002; Gregor, 2006). Researchers have explained many phenomena observed in IS research using theories from neighboring disciplines such as sociology or psychology on the behavioral side and computer science or engineering on the technical side (Baskerville & Myers, 2002; Dwivedi, Lal, Williams, Schneberger, & Wade, 2009; Gregor, 2006). As a result, other disciplines and administrators do not often recognize IS as a discipline, and the discipline finds itself competing for scarce resources in terms of journal space, managerial attention, research funding, and bright young minds (Hirschheim & Klein, 2012).

Similar debates on theory's role in some of IS's most important reference disciplines can also be seen to contribute to IS's current efforts to revisit and reexamine theory and theorizing in IS research. For instance, sociology (e.g., Boudon, 1991; Freese, 1980; Merton, 1967; Parsons, 1950) continues to debate the nature and role of theory and its implications for their theorizing. Similarly, management research has also seen several landmark contributions that discuss theory. For instance, the *Academy of Management Review* issued detailed reflections on theory and its role for management research in 1989, 1994, and 1999 (Table 1).

Table 1. Select Conceptual Papers on Theory and Theorizing in Management Research

Year	Journal	Papers
1989	*AMR*	Bacharach (1989), Chimezie (1989), Eisenhardt (1989), Poole & van de Ven (1989), van de Ven (1989), Weick (1989), Whetten (1989)
1994	*AMR*	Doty & Glick (1994), Klein, Dansereau, & Hall (1994)
1995	*ASQ*	DiMaggio (1995), Sutton & Staw (1995), Weick (1995)
1999	*AMR*	Dansereau, Yammarino, & Kohles (1999), Drazin, Glynn, & Kazanjian (1999), Elsbach, Sutton, & Whetten (1999), Folger & Turilo (1999), Klein, Tosi, & Cannella (1999), Langley (1999), Lewis & Grimes (1999), McKinley, Mone, & Moon (1999), Morgeson & Hofmann (1999), Pentland (1999), Tsang & Kwan (1999), Weick (1999), Zaheer, Albert, & Zaheer (1999)
2007	*AMJ/AMR*	Alvesson & Kärreman (2007), Colquitt & Zapata-Phelan (2007), Hambrick (2007), Hitt, Beamish, Jackson, & Mathieu (2007), van Maanen, Sørensen, & Mitchell (2007)
2011	*AMJ/AMR*	Corley & Gioia (2011), Hillman (2011), Oswick, Fleming, & Hanlon (2011), Shepherd & Sutcliffe (2011), Suddaby et al. (2011), Thompson (2011), Tsang & Ellsaesser (2011)

Table 1 shows that the management discipline has reflected on the advances in theory every five to ten years. This reflection not only involves the nature of theory (i.e., its constituents, their philosophical groundings, new conceptualizations, and the integration of nomological nets) but also provides researchers with an opportunity to think about how ways of working with theory have evolved, which roles they play in the discipline's scientific discourse, and what new approaches to theorizing exist. While the IS discipline has also seen a few recent contributions in that vein (e.g., Hovorka, Larsen, Birt, & Finnie, 2013; Straub, 2012; Weber, 2012), we extend this discussion by reflecting on what we already know and what we seemingly take for granted about theory and theorizing. Building on what we can learn about *what* theory is and *how* we theorize, we synthesize the discussion on theory and look for implications that we can apply in IS in the following sections.

3 WHAT: Conceptual Foundations of "Theory"

One can trace the emergence of the term *theory* back to some of the most influential philosophers of science in the late 17th and early 18th centuries (esp. Hume, 1748; Locke, 1689). Indeed, it is one of the core concepts that determined the emergence of *science* in contrast to *philosophy* (Bryson, 2004; Okasha, 2002). Etymologically, the term derives from the Greek θεωρία (*theoria*), which early Greek philosophers used to describe a contemplative or speculative interpretation of natural phenomena. Theory is an abstraction from the empirical and an important vessel to document our understandings of the world

(Mittelstraß, 2004). Popper (1980, p. 59) expresses this understanding by referring to theories as “nets cast to catch what we call ‘the world’—to rationalize, to explain, and to master it”. Weick (1995, p. 386) proposes that “theory belongs to the family of words that includes guess, speculation, supposition, conjecture, proposition, hypothesis, conception, explanation, [and] model”. He continues by noting that: “if everything from a ‘guess’ to a general falsifiable explanation has a tinge of theory to it, then it becomes more difficult to separate what theory is from what isn’t” (p. 386). Accordingly, it is often hard to define what theory is or is not—especially since theory is approximated more often than realized (Runkel & Runkel, 1984; Weick, 1995). Acknowledging this difficulty, Sutton and Staw (1995) choose a reverse approach and highlight that references to prior work, mere empirical data, lists of variables and constructs, diagrams, and hypotheses (and predictions) by themselves are rarely theoretical contributions if at all. But while the difficulty to conceptually grasp what theory is can comfort those who struggle with it, it also means that researchers and aspiring researchers have limited guidance in theoretically advancing the IS discipline.

Bacharach (1989) has proposed an influential definition of theory: he defines it as a system of statements targeted at *describing*, *explaining*, and *predicting* real-world phenomena. A scientific theory has two core constituents: 1) constructs or concepts and 2) propositions as relationships between these constructs. Collectively, this system presents a logical, systematic, and coherent explanation of a real-world phenomenon in certain boundaries (Bacharach, 1989). Concerning the boundaries, Weber (2012) highlights that theories analytically separate the phenomena they describe from the context they naturally occur in. Thus, such a system represents “a particular kind of model that is intended to account for some subset of phenomena in the real world” (Weber, 2012, p. 4). Accordingly, researchers often add a theory’s boundaries as a third constituent.

3.1 Constituents of Theory

Higher-order concepts are called constructs because we “construct [them] from concepts at lower levels of abstraction” (Jaccard & Jacoby, 2009, p. 13). In other words, they are conceptual abstractions of categories or classes of observations (Priem & Butler, 2001). They are “approximated units” or a “broad mental configuration of a given phenomenon” (Bacharach, 1989, p. 500). They exist only in the world of conception (Ghiselli, 1964), are generally socially constructed (Kerlinger & Lee, 1999), and, as hypothetical concepts, are not observable directly (MacCorquodale & Meehl, 1948). Constructs as conceptual abstractions function as heuristic devices for one to make sense of the empirical beyond individually observed instances of a phenomenon (Nunnally & Bernstein, 1994).

As one of the key constituents of theories, constructs need to be clear: a researcher must precisely understand what they are conceptualizing. In his seminal editorial on construct clarity, Suddaby (2010) suggests four criteria that improve the quality of constructs and the theories they belong to. First, one must translate empirical phenomena into theoretical constructs via *definitions.* Good definitions are comprehensive, precise, and parsimonious. Second, one should clearly state the *scope conditions* of constructs, which directly contributes to strong theory building. Following Whetten (1989), Suddaby (p. 350) states that a theory should explain “what the constructs are, how and why they are related, who the constructs apply to, and when and where they are applicable”. Third, Suddaby (2010) emphasizes *coherence* or *logical consistency* in (and, as we show below, *among*) constructs. He refers to a theorist’s ability to create logically consistent and theoretically integrated arguments. Fourth, tone needs to make sure that readers can understand the *relationships between constructs*. Thus, Suddaby (p. 350) suggests that one should “demonstrate the historical lineage of a new construct and position that construct on the horizon of extant related constructs”.

As the latter indicates, constructs rarely make sense in isolation—“no construct is an island” (Suddaby, 2010, p. 350). One implicitly defines constructs in terms of a network of associations with observables and other constructs (Cronbach & Meehl, 1955). Observables refer to associations between a construct and formal variables that (reflectively or formatively) specify it and link it to the empirical. As Kaplan (1964, p. 55) note, although constructs are “not observational either directly or indirectly”, they “may be applied or even defined on the basis of the observables”. Constructs’ relationships to other constructs highlight the need to consider the links between them. According to Bacharach (1989), links enable researchers to draw conclusions about a phenomenon’s mechanisms and dynamics that a certain set of constructs describes and to propose explanations and predictions about their observable behaviors. These propositions are conceptual arguments about how and why certain constructs share relationships and about the nature of these relationships. Such relationships can take many forms, such as cause-and-effect, functional, or sequential relationships (Spradley, 1979). Bhattacherjee (2012) highlights that the patterns that emerge based on these relationships form the basis for explaining and predicting. He defines propositions as "tentative and conjectural relationships between constructs" that one expresses in a declarative form and that one can empirically test and judge as true or false (p. 16). However, while propositions describe the relationships between constructs, one cannot test them directly because they too are conceptual phenomena. Bacharach (1989) introduces the distinction between conceptual propositions and empirical hypotheses. Much like observable variables instantiate constructs, one derives hypotheses from propositions to provide evidence about whether a proposed relationship between two constructs holds in reality. The conclusions from empirically testing hypotheses then serve as logical evidence to support or refute those propositions via inference. Thus, "propositions are generally derived based on logic or empirical observations" (Bhattacherjee, 2012, p. 16).

But one cannot expect proposed relationships to hold universally. As Dubin (1978) indicates, specific bounding assumptions constrain all theories. According to Bacharach (1989, p. 496), "a theory is a statement of relations among concepts within a set of boundary assumptions and constraints". The assumptions and constraints that limit a theory's applicability cover issues such as values (e.g., the national or organizational culture the phenomenon is embedded in, the researcher's own values), time (e.g., certain historical contexts or statements of duration), and space (e.g., collocated or distributed teams). Gregor (2006) builds on the boundary notion and shows how it allows one to draw conclusions about a theory's extent of generality (i.e., generalizability).

The three constituents introduced above—1) constructs as the fundamental concepts that a theory covers, 2) propositions as the relationships between these constructs, and 3) boundaries, which constrain the context in which a theory applies—indicate that one creates a theory if all these elements come together. In turn, a unique network of constructs and relationships, which one can delineate from similar theories based on its boundaries, characterizes that theory. Researchers sometimes refer to the resulting system of constructs, propositions, and assumptions as a nomological network—a sort of theory fingerprint. Such nomological networks are among the most important concepts concerning the *what* of theory. The term describes the network that emerges when one places various constructs in relationship to one another, and this network generally serves two functions (Börner, 2007). First, a nomological net helps one to implicitly define constructs by understanding the links between them. Second, one gains the ability to (statistically) assess a construct's validity in terms of how well it fits into such a network—one reason why researchers introduced the nomological network into theorizing to begin with (Cronbach & Meehl, 1955). One can understand a nomological network as "mak[ing] clear what [a theory] is [by looking at the] interlocking system of laws which constitute a theory" (Cronbach & Meehl, 1955, p. 290). One can find examples of nomological networks in Furneaux and Wade's (2009) or Hovorka et al.'s (2013) work.

Once one has established a nomological network, one needs to think about an appropriate way to represent and communicate it. Theories are conceptual: they rest in the mind of the researcher who initially proposed them; alternatively, they are mental configurations shared among a group of researchers (such as disciplines or schools). Gregor (2006) proposes that a "theory must be represented physically in some way" (p. 620) to make it "accessible to more than one person" (p. 621). She identifies words, mathematical terms, symbolic logic, diagrams, tables, and figures as possibilities to physically represent such a conceptual network in which one theory can have more than one form of representation (e.g., explained in words and depicted in a figure).

3.2 Forms of Theory

While we introduce the basic building blocks that constitute a theory above, it remains difficult to tell apart conceptual statements that are theory from those that are not (Sutton & Staw, 1995). Gregor (2006) suggests that some properties that constitute a theory depend on a theory's purpose. She introduces five theory types that correspond to a different purpose. Type 1 theories (theories for analysis and description) make a phenomenon accessible to scientific investigation. They conceptualize a phenomenon by translating it into an abstract representation, which allows one to recognize patterns between various instances of the phenomenon. As these patterns emerge from one's empirically observing the phenomenon, theories gradually grow beyond merely describing the phenomenon and begin to enable one to explain why certain observations occur. These type 2 theories (theories for explanation) stress the casual and conceptual links between the various constructs that interact while the phenomenon occurs. Type 3 theories (theories for prediction) reliably predict observations without necessarily being able to explain why the predicted outcome occurs. Type 4 theories (explanation and prediction) go beyond the former type to integrate explanation and prediction into a comprehensive model. Introducing a different focus, type 5 theories refer to theories for design and action: following the notion of the IS discipline as a science of the artificial (Gregor, 2009; Simon, 1996), an understanding of phenomena that incorporates some explanation and prediction eventually enables one to design a corresponding information system that acts as a predictable intervention in the system and produces a desired outcome.

Beyond Gregor (2006), Lee, Briggs, and Dennis (2014) and Lee and Hovorka (2015) introduce purpose as a distinguishing factor of a theory's form: they distinguish between theories for either explanation or interpretation and discuss how theories satisfy the requirements of these different purposes.

The artifact constitutes a form of theory closely associated with Gregor's (2006) type 5 theories. Often described as constructs, models, methods, or instantiations (Hevner, March, Park, & Ram, 2004; March & Smith, 1995), one can refer to an artifact to as an artificial, human-made thing that one purposefully created to serve a particular purpose or have a specific meaning in a given context. Individuals often introduce such artifacts into contexts to change a phenomenon's outcome. To that end, an artifact entails a level of understanding about the phenomenon and itself becomes a vessel for documenting and testing theoretical knowledge (Carroll & Kellogg, 1989). In design research, researchers often document an artifact's relationships to general knowledge in so-called design theories (Gregor & Jones, 2007; Piirainen & Briggs, 2011; Walls, Widmeyer, & Sawy, 1992). Despite the fact that calls to more clearly define the IS artifact are more than a decade old (most notably Orlikowski & Iacono, 2001), we still lack a precise and commonly agreed-on definition. As a result, the design research community continues to discuss how theoretical design is or needs to be and how theory relates to the design artifact (e.g., Baskerville, Lyytinen, Sambamurthy, & Straub, 2011; Gregor, 2009; Junglas et al., 2011).

Besides the nature of theory, Markus and Robey (1988) also draw our attention to different forms of logical structure that theories embed[2]. They draw on Mohr's (1982) distinction between process and variance theories to explain different forms a theory can take. While variance and process theories have several important logical differences[3], they differ in their assumptions about the relationships between antecedents and outcomes. Mohr (1982, p. 36) notes that "the distinction between process theory and variance theory is best conceptualized in terms of necessary and sufficient conditions as modes of explanation", which means that, "in variance theory, the precursor is a necessary and sufficient condition for the outcome" (Mohr, 1982, p. 37). In contrast, process theories generally only posit the precursor as a necessary but not sufficient condition for the outcome (Mohr, 1982) and focus more on explaining how outcomes develop over time (Markus & Robey, 1988). Thus, "process theories assert that the outcome can happen only under [certain] conditions, but that the outcome may also fail to happen [while] variance theories posit an invariant relationship between causes and effects when the contingent conditions obtain" (Markus & Robey, 1988, p. 591). Process theories afford an analytical focus on change and becoming (manifested through temporality, activity, and flow) that is fairly characteristic of this logical form of theories (Langley, Smallman, Tsoukas, & Van De Ven, 2013). While one can criticize process theories for allowing "the possibility of other, more powerful causal factors influencing the outcome" and for evoking "the possibility of spurious, epiphenomenal relationships", they generally compensate for these shortcomings with rich descriptions of "a combination of necessary conditions with probabilistic processes in a specified time sequence" (Soh & Markus, 1995, p. 30)—a characteristic Mohr (1982, p. 37) refers to as a "recipe".

While one could also argue for other logics as fundamental forms of theories (e.g., co-evolution, contingency, or networks), the two logics we discuss above are the most prevalent forms of theories in IS. However, systems theories might complement the two dominant forms (Burton-Jones, McLean, & Monod, 2015). As Mattessich (1978, p. 277) discusses, "the systems approach is based on the insights that the interrelations of certain components result in a [new] system with its very own properties." This statement emphasizes the components, relationships, properties, and boundaries of this system in contrast to its environment. The systems approach to theoretical thinking is strongly rooted in the ideas of systems theory (Bertalanffy, 1951; Luhmann, 1984) and posits that the world comprises wholes and parts that change over time. This makes system approaches particularly appealing to multilevel issues since, by considering the process through which the whole emerges from the interactions of the parts, one can uniquely capture issues of structure and social shaping. Thus, Kozlowski and Klein (2000) highlight that researchers who employ system thinking must pay close attention to the role of time in their theories since

[2] Markus and Robey (1988) also look at *causal agency* and *level of analysis* to look at different explanations of organizational change. While these aspects are also important, they are beyond our scope here.

[3] For an overview of characteristics, see Mohr (1982), Markus and Robey (1988), or Soh and Markus (1995).

the parts generally behave more dynamically than the whole; thus, the shaping of the whole tends to lag behind. Also, all parts of the system (i.e., any individual part, the whole, and all the other individual parts) are interlinked by mutual feedback and feed-forward mechanisms. This reciprocity, together with the emergence we discuss, represents two key differences of systems theories over process and variance approaches (Burton-Jones et al., 2015).

3.3 Range of Theory

Another distinguishing characteristic of theories again derives from looking at IS's reference disciplines. These disciplines often depict a theory's historical evolution as a process in which it emerges or is built based on a strong basis of descriptive narratives (Holmström, Ketokivi, & Hameri, 2009; Maanen, 1989). Such empirical accounts help one to base theoretical considerations on fit and relevance (Glaser & Strauss, 1967). This process highlights that knowledge grows by extension and that providing accounts of small, comprehensible events can start building cumulative theory (Sutton & Staw, 1995; Weick, 1989, 1992). While this is not necessarily the starting point of every theory, this statement provides an opportunity to anchor one end of a range continuum. Here, *substantive theories* are early contributions that often apply only to a specific context or depend on a high number of as yet unexplored factors that possibly impact a phenomenon (Gregor, 2006; Weick, 1992).

When researchers observe that theoretical statements are valid across various instances of a phenomenon, they produce stronger theories of increasing range (Dey, 1999; Shapira, 2011). In turn, researchers' confidence in these theories grows (Meehl, 1967). For instance, Glaser (1978) provides guidelines for developing advanced theory based on prior substantive theories. These *mid-range theories* show some extent of generalization based on the empirical design used to support them or by being connected to other, more established theoretical explanations (Boudon, 1991; Merton, 1967).

Formal theories—or *grand theories*—exhibit an even higher range or extent of generalizability through, for instance, repeated empirical testing and refinement and/or exhaustive knowledge about a phenomenon's contingencies (Parsons, 1950). While some controversy over the *mid-range* versus *grand* distinction remains (most noticeably due to the positions that Merton (1967) and Parsons (1950) have developed), theorists do not generally seem to contest that one can use the extent of generality to characterize theories.

Related closely to theories' generalizability, researchers have also long debated fecundity (also referred to as *richness* or *completeness*) versus parsimony in theories (Wacker, 1998; Weber, 2012; Weick, 2007). While the former emphasizes rich detail and unique insights into the complexity of a given context, the latter prefers simpler explanations that involve fewer propositions and constructs. Based on the principle of Ockham's razor, theorists are generally advised to prefer simpler theories that one can generalize to a greater extent even though one must make a fundamental tradeoff between parsimony and fecundity (Weber, 2012).

Presenting another take on a theory's range, Lee and Hubona (2009) suggest two general forms of theory validity: formative and summative validity. Formative validity describes a theory's ability to capture a phenomenon's concepts and their relationships, and one can achieve it via a diligent theory-building process over time. Summative validity means that the theory survives repeated empirical testing and that its external validity grows as the theory can model, explain, and predict more instances of a phenomenon. Thus, substantive, mid-range, and formal/grand theories can (and need to) co-exist in order to explain a complex social or sociotechnical phenomenon. This coexistence also suggests that there is no natural hierarchy of value among substantive, mid-range, and formal/grand theories. On the contrary and particularly in light of the tradeoff between fecundity and parsimony, we need theories of all ranges to discover, document, and further develop our conceptual understanding of phenomena.

The emerging discussion of theories' different abstraction levels also deserves particular attention. All theories (from substantive to grand) concern a specific phenomenon that one can ultimately empirically observe. However, some theories are difficult to apply directly to the empirical. These so-called *meta-theories* outline ontological networks of constructs and relationships that apply over several areas of investigation (Milton & Kazmierczak, 2006; Straub, Limayem, & Karahanna-Evaristo, 1995). They transcend common theories in that they are theories about theories rather than an abstraction from the empirical (Furfey, 2011). Much like meta-models in software engineering, one can use meta-theories as guidelines for creating context-specific or system-specific theories. A meta-theory does not aim to specify each instance of a phenomenon (i.e., empirical observations underlying a given theory) (Milton &

Kazmierczak, 2006) but provide an ontological arrangement of constructs and of abstracted assumptions and relationships (Ritzer, 2001). It offers an overarching perspective, facilitates theory development, and allows for a deeper understanding of theory (Gregor, 2006; Ritzer, 2001)[4]. Examples of such meta-theory include structuration theory (Giddens, 1984) or socio-technical systems theory (Bostrom, Gupta, & Thomas, 2009).

4 HOW: Methodological Foundations of "Theorizing"

About theorizing, van Maanen et al. (2007, p. 1148) observe: "Good theory is difficult to produce, and unlike pornography, we may not even recognize it when we see it". This observation suggests that merely seeing theory as a product is not enough: one needs a process perspective on theory. In this sense, theorizing refers to the evolution of theory over time and to theory's emergence. Product (theory) and process (theorizing) do not have to compete or contract one another; they are complementary. Depending on the researcher's perceptions of the relationship between process and product, one can understand theorizing as "any process as long as it produces theory" or as "a process that inevitably produces theory". Although literature on this topic seems "sparse and uneven, and tends to focus on outcomes and products rather than processes" (Weick, 1989, p. 517), researchers have proposed some approaches. We now introduce five primary forms of theorizing in IS research. We then turn to established approaches to theory evaluation and reflect on the interplay between product and process to better understand how researchers theorize.

4.1 Forms of Theorizing

Several seminal papers and books offer different approaches to theorizing (e.g., Dubin, 1976; Freese, 1980; Gioia & Pitre, 1990; Jaccard & Jacoby, 2009; Weber, 2012). For instance, Dubin (1976) provides guidelines for constructing theoretical models in three major steps. First, the researcher starts by selecting things or units (Dubin: *variables*) of interest. Second, the researcher determines how these units relate to each other conceptually (*laws of interaction*) and the theory's domain (*boundary specification*). Third, the researcher specifies the states in which the model or theoretical system operates (*system states*).

Notably, this view of the end product of theorizing should not detract from the relevance of intermediary steps in theorizing. As we note above, theorizing is often a gradual process, and one should not view theory as something binary (Runkel & Runkel, 1984; Weick, 1995). The literature has recently begun to recognize pre-theoretical structures as an essential part of building theories. Hassan (2014) sheds light on the products of theorizing "that not only approximate theory, but more importantly are critical elements in the steps towards strong theory" (p. 2). He identifies discursive formations, questions, analogies, myths, metaphors, paradigms, concepts, constructs, statements, propositions, models, and frameworks as important products from theorizing and elaborates on where they operate in the theorizing process.

With the components of a theoretical model in place, the researcher should consider the de facto use of such a model. Returning to Dubin (1976), a first step involves logically elucidating the model, which comprises making "as many truth statements that derive from the model as suit the tastes or interests of the theorist" (p. 29) that constitute the theory's propositions. After defining the propositions, the researcher tests whether the model has any connection to the empirical world (i.e., tests one or more of the propositions). For testing, the researcher converts propositions into hypotheses by substituting an empirical indicator for each unit in the proposition. In testing, researchers should be aware of the dual goal of prediction and understanding: while a practitioner would best judge a theoretical model based on the accuracy of the predictions it generates, a researcher may appreciate a theory for the understanding it contributes to the researcher's knowledge.

At a less procedural level, one can understand theorizing as a form of reasoning; that is, an attempt to craft a conceptually convincing argument to describe, explain, and predict phenomena observed in the empirical world (Ochara, 2013). In this vein, one can conceive of theoretical reasoning as "the process of

[4] *Meta-theory*, which is sometimes used as in meta-analyses or meta-studies, can also refer to a theory that emerges from one's synthesizing multiple (separate) theories, which are grounded in their own empirical observations. One can do so through either identifying boundary-spanning constructs (constructs shared by multiple theories) (e.g., Furneaux & Wade, 2009), constructing overarching meaning (Bostrom et al., 2009; Uto, 2005), or synthesizing studies that build on similar nomological networks or principal effects (medical research provides many examples of this type of meta-theorizing). However, we propose that one can also refer to such theories as higher-order theories because they also describe the empirical. We use *meta-theory* in the sense of theory about theories.

using existing knowledge to draw conclusions, make predictions, or construct explanations" (El Alfi, El Alami, & Asem, 2009, p. 8). Thus, part of theorizing involves using the general to explain and predict individual cases. Vice versa, we build general knowledge from an additive understanding of repeated observations of similar phenomena in the past. Thus, theorizing is an iterative and never-ending dance: from the specific to the general and from the general to the specific (i.e., inductive and deductive reasoning, respectively).

Concerning inductive and deductive reasoning, Steinfield and Fulk (1990) present four major approaches to theorizing. First, inductive theory-building asks researchers to formulate theories based on observed patterns of events or behaviors. Using this approach, researchers explain observed patterns by referring to the unique attributes of the phenomenon in question. Second, researchers can also base theories on a bottom-up conceptual analysis of different predictor sets potentially relevant to a phenomenon. They then use the resulting framework as a heuristic guide to develop propositions about this phenomenon. Third, they can *extend or modify* existing theories to explain a phenomenon in a new context, such as a different organizational setting with new technologies. Fourth, they can apply existing theory *in entirely new contexts.* They then conceptually equate a less-understood with a better-understood phenomenon in order to "mobilize an existing body of knowledge to deduce expectations for the new situation" (Steinfield & Fulk, 1990, p. 18).

While we could discuss all four approaches in great detail, we focus on reviewing induction and deduction as primary modes of theoretical reasoning. Nonetheless, other forms of theorizing exist. Most notably, we introduce *retroductive* and *abductive* theorizing and look at theorizing through *design and action* to account for some specificities in IS research.

4.1.1 Inductive Theorizing

Inductive reasoning starts with observations that are specific and limited in scope and that produce a generalized conclusion that is likely but not certain in light of accumulated evidence—in other words, it makes inferences from the particular to the general (Baggini & Fosl, 2010; Honderich, 2005; Lee & Baskerville, 2003). Induction involves a process in which general rules evolve from individual cases or observations of phenomena (*data-driven*) on the basis of a posteriori explanations (DePoy & Gilson, 2007). Inductive reasoning can provide valuable insights and can increase human knowledge, such as making predictions about future events or as yet unobserved phenomena. However, induction is based on a set of observations that is not complete and cannot yield certainty (Gauch, 2003). In general terms, inductive theorizing tries to climb the ladder of analytic abstraction (Carney, 1990). This process of "inferring the general theoretical phenomenon of which the observed particular is a part…is perhaps the most critical move in [inductive] theory building" (Langley et al., 2013, p. 8).

While the tools employed in most forms of theorizing are agnostic to the form of theoretical reasoning, IS and its reference disciplines provide several prominent examples of tools used to support inductive theorizing, such as (but not limited to) case-based theory building, grounded theory, simulations, and experiments[5].

Case-based theory building uses one or more cases to create theoretical constructs, propositions, and/or midrange theory from case-based empirical evidence (Eisenhardt, 1989). According to Yin (2003), case studies use a variety of data sources to provide rich empirical descriptions of a phenomenon's particular instances. Such cases form the basis of the inductive theory development. The resulting theory is emergent since it is "situated in and developed by recognizing patterns of relationships among constructs within and across cases and their underlying logical arguments" (Eisenhardt & Graebner, 2007, p. 25). Researchers have long recognized case study research as a viable IS research strategy since, with the strategy, one can study information systems in a natural setting, can learn about the state of the art, can generate theories from practice, and can answer *how* and *why* questions to understand the nature and complexity of the occurring processes. Further, the method suits areas with few previous studies (Benbasat, Goldstein, & Mead, 1987). Accordingly, several methodological contributions have drawn considerable attention to case-based theory building across most of IS's prevalent philosophical stances

[5] These tools are agnostic to the underlying mode of theoretical reasoning (i.e., they are not exclusively associated with any one mode of reasoning). For instance, one can equally use simulations in inductive and deductive reasoning. Nonetheless, research practice in IS over the past decades has produced some dominant associations. For instance, researchers have mostly used surveys and statistical path modeling to validate hypotheses derived deductively but case study designs to support inductive reasoning.

(e.g., Benbasat et al., 1987; Klein & Myers, 1999; Lee, 1989; Myers & Klein, 2011; Paré, 2004; Wynn & Williams, 2012).

The *grounded theory method* (Corbin & Strauss, 1990; Glaser & Strauss, 1967; Urquhart, Lehmann, & Myers, 2010) focuses on understanding a phenomenon by looking at its facets in different contexts. The method focuses on understanding a phenomenon's underlying constructs, their relationships, and the dynamics of these relationships in a continuous interplay between data collection and analysis (Urquhart et al., 2010). As a result, grounded theory allows for original and rich findings that are closely tied to the underlying data (e.g., Orlikowski, 1993). In IS, grounded theory has proved to be useful for developing context-based process-oriented descriptions and explanations (Myers, 1997). Yet, grounded theory has also drawn criticism (Bryant, 2002; Kelle, 2006; Urquhart, 2002). For instance, the methodologically focused school of Strauss and Corbin (1990) has come under fire from Glaser's (1992) focus on the emergent theory. The tension between these positions, which has led to a sort of split in the grounded theory literature, illustrates the process versus product dichotomy we drew attention to above. While available guidelines for grounded work in IS try to stay clear of this orthodox distinction or even try to reconcile these two camps (e.g., Myers, 2013; Urquhart et al., 2010), the often substantive theories resulting from grounded work seem to create little resonance (Mueller & Olbrich, 2011b).

Researchers have increasingly begun to consider *simulations* and *experiments* as methodological approaches to inductive theory building. *Simulation* is particularly useful when the theoretical focus is longitudinal, non-linear, or procedural or when it is challenging to obtain empirical data (Davis, Eisenhardt, & Bingham, 2007; Repenning, 2002). Thus, "simulation can be a powerful method for sharply specifying and extending extant theory in useful ways" (Davis et al., 2007, p. 480). To counter criticism that simulation methods yield little in terms of actual theory development, Davis et al. (2007) offer a roadmap for how to use simulations to develop theory. Similarly to simulation, *experiments* can address problems and limitations encountered in other methodologies and can, thus, aid theory development (Croson, Anand, & Agarwal, 2007). Although underrepresented compared to other approaches as yet, the IS literature has produced some papers that demonstrate the use of simulations and experiments for theory building (e.g., Tung & Quaddus, 2002).

An important aspect for any theorist or aspiring theorist employing inductive theorizing is the so-called "fallacy of induction". In simple terms, for any inductive theory to have prescriptive value, the logic of induction must rest on the assumption that future events will occur in exactly the same way as past instances of the event have—a phenomenon that Hume (1748) describes as the "uniformity of nature". In most inductive work, primarily in theorizing from case studies, researchers have addressed this issue by emphasizing analytical generalizability over statistical generalizability (Walsham, 1995; Yin, 2002). Analytical generalizability describes a situation in which one inductively abstracts observations into the realm of the conceptual in order to identify an explanatory pattern. Thus, observations and the conclusions based on them are generalized only analytically and are not supposed to be generalized in the statistical sense (i.e., as predictions for other as yet unobserved members of the same population). Indeed, Lee and Baskerville (2003), whose paper represents one of the most important treatments on the topic, discuss why inductive theorizing is never generalizable beyond the immediately observed cases.

4.1.2 Deductive Theorizing

Deductive reasoning begins with a researcher's asserting a general principle or belief and applying it to explain a specific phenomenon (Baggini & Fosl, 2010; Honderich, 2005; Hyde, 2000). To deduct is to draw logical consequences from premises; if the original assertions are true, the conclusion must also be true. When effectively used in combination with a powerful theory as an a priori explanation (theory driven), strict deductive reasoning logic can result in a certain conclusion (DePoy & Gilson, 2007). However, while one can use deductive reasoning to make observations and to expand implications, "the conclusion of a deductive argument is already contained, usually implicitly, in its premises" (Gauch, 2003, p. 157). In other words, researchers have criticized purely deductive reasoning as not being able to provide any new insight that goes beyond its premises.

As Dubin (1976, p. 18) notes: "we seem to value deductive theorizing much more than inductive theorizing". In a deductive approach to theorizing, researchers often select explanations from the large range of reference theories. Many IS researchers believe that the IS discipline has proposed few truly IS-specific theories in the past several decades (e.g., Burton-Jones et al., 2015; Weber, 2003a), although some controversy on this topic has emerged (e.g., Moody, Iacob, & Amrit, 2010; Straub, 2012). Indeed, many IS researchers explain phenomena via theories from neighboring disciplines (Baskerville & Myers, 2002; Gregor, 2006). According to Agarwal (in Lee, 2001, p. xiv), "theories and concepts from sociology, economics, and organization theory can assist IS researchers in the formulation of conceptual models that help us gain insights". The technology acceptance model (Davis, 1989), which builds on the theory of planned behavior (Ajzen, 1991) and the theory of reasoned action (Fishbein & Ajzen, 1975) from social psychology, exemplifies this adaptation.

However, when researchers decide to adopt reference theories, they must consider the imported theory's assumptions and fit to the phenomenon, the *dependent variable* and how it matches the phenomenon, the boundary conditions and whether the phenomenon is inside them, and the theory's ability to rule out alternative explanations. Further issues include the selected theory's historical context, how the selected theory impacts on the choice of research method, and the theorizing process' contribution to a cumulative theoretical body of knowledge (Truex, Holmström, & Keil, 2006).

Sparrowe and Mayer (2011) offer hands-on advice for deductive theorizing; they suggest that grounding hypotheses is "one of the most important tasks in crafting effective theory" (p. 1101). Researchers should 1) position hypotheses in relation to related research, 2) develop a clear, logical argument that explains why the core variables or processes are related in the proposed fashion, and 3) create a sense of coherence in the relationships among the variables and processes in the proposed model. These criteria all synchronize with what, according to Suddaby (2010), improves construct clarity. Common pitfalls in grounding hypotheses include lack of specificity, fragmented theorizing, and stating the obvious (Sparrowe & Mayer, 2011).

Classically, a deductive form of theorizing is based on tools such as *surveys* and *experiments*. *Survey* research involves using standardized questionnaires to systematically collect data about people and their preferences, thoughts, and behaviors (Bhattacherjee, 2012). Typically, researchers analyze the quantitative-empirical data they have collected via inferential statistics to reach conclusions about associations between variables or to test hypotheses (e.g., Straub, Boudreau, & Gefen, 2004). One strength of survey research is its ability to measure a wide variety of unobservable data while being economical in terms of a researcher's time, effort, and cost. *Experimental* research, on the other hand, is a research design for analyzing hypotheses in a controlled environment. In it, a researcher manipulates variables (as treatments), randomly assigns subjects to different treatment levels, and observes the results of the treatments on other variables (Campbell & Stanley, 1963). The unique strength of experimental research is its ability to link cause and effect through treatment manipulation while controlling for extraneous variables, which provides high internal validity (Bhattacherjee, 2012).

While survey and experimental research are the most popular approaches in deductive theorizing, we acknowledge that one might also similarly apply other approaches, such as forms of *positivist case study research* (Hyde, 2000; Paré, 2004; Sarker & Lee, 2002). When using techniques such as pattern matching, theorists can go beyond the preliminary theoretical constructs and frameworks that Eisenhardt (1989) suggest and can actively search for deductively derived patterns in their data (Hyde, 2000). Miles and Huberman (1994) extend this set of techniques by highlighting additional approaches for confirmation and testing in case-based research. Their work hints at theorizing approaches that, in some way, combine inductive and deductive theorizing.

4.1.3 Retroductive Theorizing

While IS researchers have most commonly employed inductive and deductive modes of theorizing, they have also acknowledged other forms of theoretical reasoning; namely, *retroductive* and *abductive* reasoning (Ochara, 2013).

One can see retroductive reasoning as a way to reconcile the deductive-inductive dichotomy. It seeks to overcome the challenges of merely inductive or deductive processes: induction assumes the existence of data that are not theory laden (Alvesson & Sköldberg, 1994), while deduction implies that theories removed from data are possible (Sæther, 1998). Retroduction strongly emphasizes the interplay between the two. As a mode of theoretical reasoning, it uses the concept of analytic frames as a working hypothesis constructed from data or pre-existing theory and then gradually refines these frames through engagement with data. Analytical frames help one to "articulate ideas, and through this both classify and characterize phenomena" (Sæther, 1998, p. 247). To refine these frames, one compares them to images constructed through the process of abstraction from empirical observations (Ragin, 1994). Ultimately, this process leads to a theory that is equally aligned with the empirical data and analytically generalizable.

Beyond such fairly sequential models of combining deductive and inductive theorizing, retroductive theorizing is also open to blended or parallel approaches.

In terms of tools, one can see methodological approaches to retroductive theorizing in works that embody analytic induction (Gilgun, 2001; Goldenberg, 1993; Hammersley, 2011; Robinson, 1951), also known as qualitative deductive analysis (Gilgun, 2010). While not in widespread use in IS as yet, Lapointe and Rivard (2005) and Sarker, Sarker, and Sidorova (2006) illustrate how one can apply retroductive theorizing in the IS context. The latter study engages in a mild form of retroduction by using a “theoretical scaffold” (Walsham, 1995) as a sensitizing device only for data analysis.

4.1.4 Abductive Theorizing

While all of the above forms of theorizing entail some form of interplay between empirical observation and explanation, abductive reasoning emphasizes theorizing that relies on a leap of faith in the sense of an inference towards the best explanation (Baggini & Fosl, 2010; Harman, 1984; Honderich, 2005). It starts with “an anomaly [and proceeds] to the delineation of a kind of explanatory hypothesis which fits into an organized pattern of concepts” (Paavola, 2004, p. 279). As such, in abductive theorizing, one typically begins with an incomplete set of observations and proposes the most feasible explanation of the phenomenon (Dubois & Gadde, 2002; Patton, 2002). Abductive theorizing assumes that one can explain a set of observations in multiple viable ways. The reasoning process then involves weighing the adequacy of competing explanations, which leads to the most valid and useful explanation (*logic and discovery*) (DePoy & Gilson, 2007). As one adds more observations, one continues to defend the “superior” explanation against the initial explanations (given that the new observations may alter them) and/or new rival ones. While deduction reasons from the general to the specific and induction reasons from the specific to the general, abduction constantly compares between the general and the specific until one has found the most suitable explanation (Patton, 2010).

Many IS studies that follow a critical realist stance use some form of abductive theorizing (e.g., Bygstad, Munkvold, & Volkoff, 2016; Morton, 2006; Wynn & Williams, 2012). Researchers should consider multiple possible explanations as they analyze more and more of their data (Wynn & Williams, 2012). Thus, they should ask themselves “what reality must be like (i.e., what mechanisms must exist) for the observed event to have occurred” (Wynn & Williams, 2012, p. 799). One then uses these proposed mechanisms for further data analysis in that they guide the analysis and must be supported as one analyzes more and more observations. In a way, abductively identified mechanisms then become a form of analytical frames (compare retroductive theorizing above), although their origin differs (i.e., not rooted in previous theoretical considerations)[6]. While few studies overall have used abductive theorizing as yet, Volkoff, Strong, and Elmes (2007) and Lauterbach, Kahrau, Mueller, and Maedche (2014) provide illustrations about doing so.

One can also interpret abductive theorizing as developing preliminary working hypotheses before inductively analyzing data (Peirce, 1998). While inductive theorizing seeks out facts (or patterns), abduction seeks theory as part of researchers’ mental process of revising their belief systems (Gonzalez & Sol, 2012). In other words, what Peirce (1998) refers to as informed guessing animated by hope supports the process of making sense of data to build theory. In theorizing, one then compares these initial guesses to the data to see whether they hold up. Abduction guides data analysis, but one must challenge the analysis with additional insights as the analysis progresses. If the analysis suggests other, more powerful explanations (referred to as the *eureka* moments of abduction), they will replace the initial abductive guess.

While not commonly found in IS research, one can link the latter interpretation of abduction to the process of designing artifacts. Here, abduction compares to creative design ideas that one can use to initiate a design project and guide it to the implementation of early prototypes (Tomiyama, Takeda, Yoshioka, & Shimomura, 2003). Logically, one must see evaluating the artifact as challenging these early abductive thoughts and as providing the opportunity to improve the design (Gonzalez & Sol, 2012).

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6 The literature on critical realist work has mostly termed the principal methodological recommendation drawn from this abductive form of theorizing *retroduction* (see Wynn and Williams, 2012, pp. 799-801, Table 2, Figure 2, and especially footnote 5). As we highlight above, we argue that one initially proposes *mechanisms*, as analytic frames, in an abductive process before one can use them retroductively. By referring to the writing of Charles S. Peirce as Buchler (1955) and Tomas (1957) summarize it, Wynn and Williams (2012) describe this process as *retroduction* (the initial discovery of new mechanisms) and *retrodiction* (the application of previously identified mechanisms). They highlight that one can also understand this interplay of retroduction and retrodiction as an abductive process in the sense of Peirce (Buchler, 1955; Tomas, 1957).

4.1.5 Theorizing through Design and Action

A final form of theorizing entails work that employs tools such as design or action research. Such approaches are characterized by interventions into the "real world" and seek to influence or change the phenomenon being studied and theorized. Thus, they create *possible worlds* (Frank, 2009) and allow contrasting different realities (i.e., instances of a problem) by allowing one to observe whether a meaningful intervention leads to a desired outcome. Interventions in this sense need to involve researchers' at least partially understanding the phenomenon their research intervenes in. In turn, this intervention changes the values of the variables that empirically characterize the phenomenon or alter its nomological net altogether (e.g., by introducing moderating effects or by changing the sequence of events). If the intervention works (i.e., produces the desired outcome a researcher hypothesized), the researcher can infer both the intervention and the theoretical understanding of the underlying phenomenon to be accurate. Thus, the understanding can inform future interventions such as managerial actions or the design of an information system. This form of theorizing strongly relates to the prescriptive knowledge embodied in Gregor's (2006) theories for design and action (type 5).

IS has a long tradition of action research (e.g., Baskerville, 1999; Checkland & Holwell, 2007; DeLuca, Gallivan, & Kock, 2008; Lau, 1999). While the move towards recognizing design work as a form of IS research is much younger, recent contributions have highlighted the similarity of action and design research (e.g., Cole, Purao, Rossi, & Sein, 2005; Järvinen, 2007; Sein, Henfridsson, Purao, Rossi, & Lindgren, 2011). Nonetheless, the relationship between theorizing and design remains controversial. Our community has increasingly focused on reconciling the two (e.g., Fischer & Gregor, 2011; Kuechler & Vaishnavi, 2012; Lee, Pries-Heje, & Baskerville, 2011; Piirainen & Briggs, 2011) by, for instance, comparing design to grounded theorizing (e.g., Mueller & Olbrich, 2011a).

When looking at theoretical work through design and action, we see five distinct theorizing forms: 1) theory as an input to design, 2) theory as a means to evaluate design (i.e., to hypothesize effects), 3) theory as a scaffolding for empirical evaluation (e.g., design experiments), 4) theory as a sensemaking device to interpret the results of empirical intervention, and 5) theory as an output of evaluation in the sense of a refined or altered conceptual understanding. While many seminal contributions on design have recognized the first four forms of theoretical work in design (e.g., Hevner et al., 2004), a coherent understanding of what kind of knowledge is involved in them has yet to emerge (Gass, Koppenhagen, Biegel, Maedche & Mueller, 2012). The fifth form of theoretical work in design has only recently begun to receive increased attention. Here, researchers have often interpreted the development of design theory as a theoretical output of design (Gregor & Jones, 2007; Kuechler & Vaishnavi, 2008; Piirainen & Briggs, 2011; Walls et al., 1992). To support this interpretation, one can interpret the heuristics that go into structuring and understanding the problem one seeks to solve and those that one uses to design alternative solutions as important potentials for theoretical contributions through design. Also, researchers in the IS discipline have increasingly begun to recognize processes to extend prior research through design efforts (Kuechler & Vaishnavi, 2011). Nonetheless, controversy around viability and utility in design on the one hand and truth and parsimony in theories on the other hand (e.g., Baskerville et al., 2011; Hevner et al., 2004; Junglas et al., 2011; Österle et al., 2011) suggests that work on theorizing via design and action can significantly improve our understanding about how to contribute theoretically through these research types.

4.2 Theory Evaluation

Researchers that seek to successfully develop theories also need quality criteria to demonstrate their work's virtue and viability. Weick (1989) summarizes what makes good theory:

> *A good theory is a plausible theory, and a theory is judged to be more plausible and of higher quality if it is interesting rather than obvious, irrelevant or absurd, obvious in novel ways, a source of unexpected connections, high in narrative rationality, aesthetically pleasing, or correspondent with presumed realities* (p. 517).

While these criteria are powerful, a theorist might find them difficult to assess and implement.

At a more concrete level, Weber (2012) presents a framework and criteria for evaluating theory. According to his work, one should evaluate a theory from two perspectives: the quality of the individual components that make up the theory and the theory as a whole. Concerning the parts of a theory, Weber advises researchers to describe them precisely because they implicitly define the theory's boundary or domain (i.e., the phenomena the theory covers). Many scholars consider a discipline's understanding of the boundary conditions associated with its theories as a good proxy for the quality of its theories (Gray & Cooper, 2010). Such a precise understanding of constructs' and theories' boundaries also links to the ideal of conceptual clarity that Suddaby (2010) discusses. To assess theory as a whole, Weber (2012) proposes five attributes that "have widespread acceptance among researchers as being significant when assessing the quality of a theory" (p. 13). First, one should deem a theory's focal phenomena important for practice and research (*importance*). Second, a good theory makes novel contributions to a discipline (*novelty*). Third, high-quality theories achieve good levels of predictive and exploratory power in relation to their focal phenomena via a preferably small number of constructs and associations (*parsimony*). Fourth, a well-developed theory demonstrates a balance between being narrow and general in its coverage (*level*). Fifth, and in the philosophical tradition of Popper (1980), theories should be articulated clearly to foster tests that researchers can use to examine the conditions they believe will most likely lead to falsifying the theory (*falsifiability*).

Weber's (2012) framework covers most of the common advice on a theory's quality criteria in the pertinent literature. Of course, much of Weber's thinking is bound to the philosophical assumptions his work builds on. While researchers in other philosophical traditions should not adopt his criteria too literally, the underlying ideas are good starting points when evaluating theory or developing arguments about why these criteria do not apply to a particular theoretical contribution and which other criteria one should use instead. To provide a broader picture, we synthesize the many suggestions on "good" theorizing (Bacharach, 1989; Bhattacherjee, 2012; Corley & Gioia, 2011; Glaser & Strauss, 1967; Lee & Baskerville, 2003; Lee & Hubona, 2009; Steinfield & Fulk, 1990; Suddaby, 2010; Wacker, 1998; Weber, 2012; Weick, 1987; Whetten, 1989; Witkin & Gottschalk, 1988) into a list of quality criteria (Table 2) even though the list is neither comprehensive nor complete.

Beyond these criteria, a theory must demonstrate novelty. Novelty requires a theory to either address a previously unstudied phenomenon, to provide a novel explanation for an already studied phenomenon, or to provide key improvements over a previous theory (Weber, 2003b). One should also understand novelty should from a social perspective (Weber, 2012) since the language used to communicate the theory must be appealing and convincing (Locke & Golden-Biddle, 1997), which is particularly true if novel theoretical contributions seek to break established theoretical paradigms (Weber, 2012).

Table 2. Exemplary Quality Criteria

Quality criteria	Description
Logical consistency	• Coherent constructs, propositions, scope conditions, and assumptions. • All of the above are internally consistent.
Explanatory power	• How much does a given theory explain? • Specifies the what, how, and why.
Falsifiability	• The theory must be potentially disprovable. • Allows for empirical testing.
Parsimony	• Much of a phenomenon is explained with as few variables as possible. • Only includes relevant information.
Nomological validity	• Construct makes sense in the context of others relating to it. • Construct describes what we are interested in.
Generalizability	• Conclusions can be drawn concerning another set of observations. • Only conclusions that are logically supported are drawn.
Utility	• Relevant to practitioners. • Unique findings.

Novelty also relates to advancing science through further developing and extending a discipline's knowledge. Following Weick (1989), one can portray the theory-construction process in organizational studies as *disciplined imagination*. In this sense, "the discipline in theorizing comes from consistent application of selection criteria to trial-and-error thinking and the imagination, …from deliberate diversity introduced into the problem statements, thought trials, and selection criteria that comprise that thinking" (Weick, 1989, p. 516). Following this understanding, researchers iteratively design, conduct, and interpret imaginary experiments in searching for the most appropriate explanation. Related activities resemble the three processes of evolution: *variation*, *selection*, and *retention*. Variations in the form of novel conjectures simulate possible scenarios that could explain a phenomenon. Selection includes judgments about whether a conjecture is interesting, plausible, consistent, and appropriate. Finally, after performing the selection process, one retains the conjecture with the best comparative performance in terms of describing, explaining, and predicting. Olbrich and Mueller (2013) propose another perspective to evaluate theory. Based on similar dimensions to a theory's range and type (which we introduce above), these authors propose criteria to characterize both explicit theorizing (i.e., the original contributors' identifying their contribution as a theory based on the fact that all constituent characteristics are present) and implicit theorizing (i.e., through new authors' building on the work of others based on a sound understanding of a given contribution's theoretical core) even though they also show how difficult it is to assess theoretical contributions. They suggest that such frameworks help to trace the historical lineages of theories. For instance, they point to the history of the IS success model (DeLone & McLean, 1992, 2003) and how it grew through cycles of extension and re-integration.

Concerning theory evaluation, Wacker (2008) defines a "good" theory as "a fully explained set of conceptual relationships used for empirical testing" (p. 7). He continues by identifying four properties of theory that a set of relationships need to be a theory (definitions, domain, relationships, and predictions) and additional properties that assure that the theory is a "good" theory. Together, these properties of a theory (as a product) provide the basis for a set of guiding principles for "good" theory building (as a process) for authors to use in their research (Figure 1).

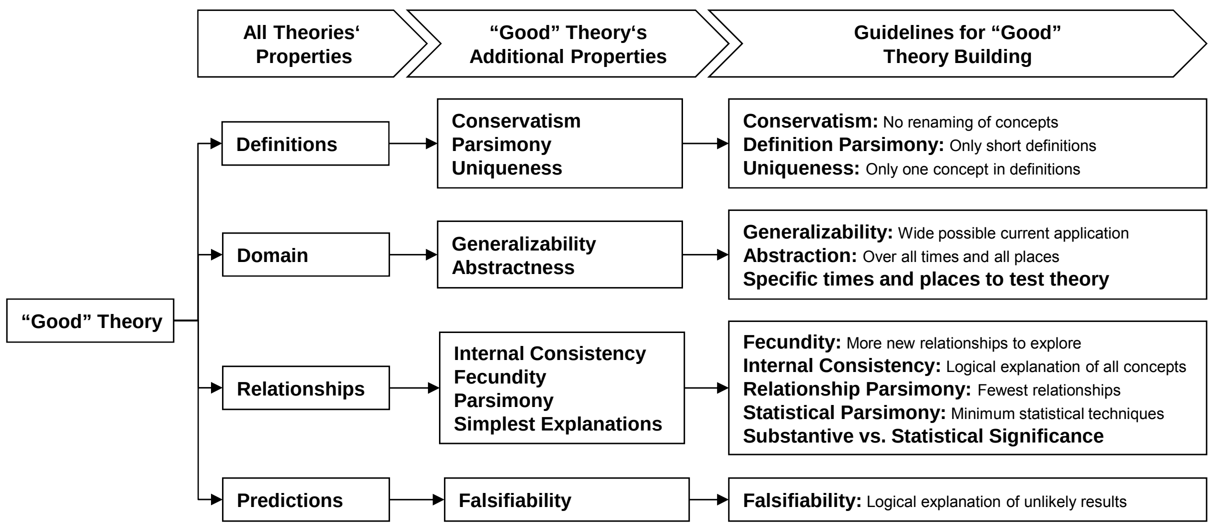

Figure 1. Interdependent Quality Criteria for Theory and Theorizing (Wacker, 2008, p. 13)

4.3 Working with Theory

Having established a fundamental understanding of the *why*, *what*, and some of the *how* of theory and theorizing, we turn to how to work with theory and how theory informs research practice. As we note in Sections 2 and 3, one can generally see theory as both an input to and an output of research. As an input, it enables researchers to conceptualize a phenomenon of interest and, thus, capture it in their observations. As an output, it documents what we know about a phenomenon as a synthesis of our work and helps to inform others who will do similar studies afterwards.

In any of these two modes, DiMaggio (1995) argues that there are two important views on theory's role for researchers. First, DiMaggio points to theory as a (cumulative) narrative, an account of a social process through which theory is built as a communal consensus over time. This view stresses empirical tests of the narrative's plausibility and careful attention to the narrative's scope conditions. DiMaggio acknowledges that theory can also represent sudden enlightenment that is complex, de-familiarizing, and rich in paradox. In this vein, "theorists enlighten not through conceptual clarity but…by startling the reader into satori [i.e., sudden enlightenment and a state of consciousness attained by intuitive illumination]" (p. 391). Second, DiMaggio highlights theory's role as covering laws; that is, as "generalizations that, taken together, describe the world as we see (or measure) it" (p. 391). This view indicates theory's role as a blueprint from which we draw our theoretical understandings of a phenomenon of interest. Also, it is imperative to relate findings back to this understanding.

Across these two views, theory serves as the cumulative basis through which we document and advance how we understand the world—the giants' shoulders we all stand on. We argue that scholarly work is strong if it helps to make these shoulders a little higher, which means that researchers need to strike a balance between building and testing theory in their work in order to make valid and valuable contributions. This arguments links to Colquitt and Zapata-Phelan's reasoning (2007): they build on the two principal dimensions of building and testing theory to introduce five theoretical contribution types. While two of the five types have a low potential for genuine contributions (i.e., reporting and qualifying), the three remaining ones (i.e., testing, building, and expanding) have high potential for substantial theoretical contributions. *Testing* refers to a situation in which researchers build a strong foundation for their work in extant literature and then verify whether the resultant model's predictions hold true empirically. *Building* refers to a novel contribution since it introduces new or significantly refined conceptualizations with the potential to reshape how we understand a phenomenon. This type of theoretical contribution also covers the grounded development of entirely new nomological networks for as yet unexplored phenomena. Theory-building work does not necessarily test the effects of its newly proposed concepts on our understandings. *Expanding* unifies theory testing and theory building to advance our theoretical understanding while substantiating this advancement through testing. Colquitt and Zapata-Phelan (2007) note that expanding is specifically useful when linked to established theory, a variant of expanding they provide ample examples of, but we suggest that new or refined conceptualizations can also result from expanding.

While the three types of theoretical contributions Colquitt and Zapata-Phelan (2007) introduce are fairly intuitive, we suggest that tone should keep in mind that these three opportunities for contribution link with different kinds of observations made in the field and different genres of papers written as a result.

For theory-*testing* papers, for example, theorists have to ground their work well in a theory's existing constituents as presented by extant literature. In their work, theorists that want to test that theory are likely to make a majority of observations that the underlying theory has already predicted or has at least indicated. As a result, we expect the core of the theory's nomological net to remain stable, which helps one to identify the least common denominator (i.e., the parsimonious and more generalizable core of the theory that is valid across a number of contexts). But the testing mode's potential for theoretical contribution hinges on the extent to which its results lead to an adaptation or at least a refinement of the underlying theory or moves the theory's boundaries (e.g., by adapting moderators or conducting the test in an as yet untested context). Much of the IS literature related to the technology acceptance model provides ample examples of this type of theorizing. Papers that use confirming observations to make a testing-based theoretical contribution need to maintain the underlying theory's conceptual core and have to link the confirming observations made during testing to that core while highlighting how their adaptations increase that theory's summative validity (Lee & Hubona, 2009).

In recent discussions in the IS discipline, a research strand oriented to testing seems to deserve special consideration: replication. Replication generally assumes that scientific studies are repeatable and that repetitions yield sufficiently similar outcomes to resolve doubt regarding the findings of an original study (Ravetz, 1971). Replication also relates strongly to Popper's (1980) idea of falsifiability. Replication essentially describes a study that seeks to replicate an original study to see if the same results show up to support mostly the same conceptual conclusions. While the literature on replication recognizes that one cannot repeat the same study twice exactly (Brogden, 1951; Rosenthal & Rosnow, 1984), one must carefully assess skepticism as to whether replication in social systems is possible at all (Tsang & Kwan, 1999). Tsang and Kwan (1999) and Dennis and Valacich (2014) offer more refined taxonomies of approaches to replication. The latter, for instance, differentiate between exact replications (i.e., studies that exactly copy an original study), methodological replications (i.e., studies that use exactly the same method but conduct their work in a different context), and conceptual replications (i.e., studies that use the exact same research question or hypotheses but employ different methods) (Dennis & Valacich, 2014). Already common in other disciplines such as medicine or physics, this approach to test-based theorizing has begun to gain a foothold in business research areas. IS seems less advanced in this regard (Dennis & Valacich, 2014) and has only begun to discuss the matter to resolve confusion and skepticism (e.g., Olbrich, Frank, Gregor, Niederman, & Rowe, 2015).

For theory expanding papers, theorists' work will likely produce observations that are in line with extant theory and, thus, confirm it. At the same time, in order to expand the original theory, theorists must also generate extending observations that go beyond the theoretical status quo. While confirming observations ensure that one does not have to abandon the original theory altogether, the extending observations highlight how and why the expanded theory surpasses the original one. The extending observations might require one to substantially redraw the theory's original nomological network (e.g., by reconceptualizing constructs or developing new propositions). The IS success model exemplifies an example of this approach to theorizing. After its introduction (DeLone & McLean, 1992) and revision (DeLone & McLean, 2003), several researchers tested the model several times in various contexts (e.g., Almutairi & Subramanian, 2005; Iivari, 2005) to become one of most influential IS theories (Moody et al., 2010). Papers that focus on expanding theory have to carefully contrast and compare their expanded theory to the original theory and elaborately discuss the original theory's shortcomings in order to be convincing.

Of course, observations not in line with extant theory can also differ so fundamentally that they outright contradict existing theory. Similarly, observations (or phenomena altogether) might be novel such that any theoretical lens readily at hand can simply not capture them. In such cases, theorists have to shift towards *building* new theory after diligently ruling out measurement errors or any other type of methodological bias. Markus' (1994) theory on media richness exemplifies one example of an established theory that faced contradictory observations; her results indicated that senior managers use email heavily, even for equivocal communication tasks, which contradicted the then-dominant interpretation of media richness theory. Examples of newly built theories from the IS discipline include Lapointe and Rivard's (2007) alternate template theory of IS implementation outcomes, Walls et al.'s (1992) IS design theory for vigilant executive information systems, Orlikowski's (1993) analysis of CASE tools as catalysts for organizational change, or—in a more grounded sense—Day, Junglas, and Silva's (2009) theory on information flow impediments in disasters. In working with contradicting or novel observations, theorists need to convincingly demonstrate that their observations actually are irreconcilable with incumbent theory while, at the same time, ruling out rivalry explanations. On a final note, theorists who build new theory—whether from scratch or based on contradictory evidence—must not both build *and* test theory at the same time. Over time, however, the newly built substantive theory must prove that it outperforms incumbent or rival explanations in the discipline.

In building new theory, a special type of replication study may prove to be a valuable future approach: while replication typically seeks to reproduce an original study's results and, thereby, confirm the original findings, one can also conduct replication studies based on the assumption that reproduction will not work—therefore purposefully creating contradicting observations. For instance, researchers may suspect that technological advances or changes in cultural context will lead an original theory to break down. While most such replication will try to literally replicate the original study, tone can also replicate a study outside its original context (e.g., Asamoah, Andoh-Baidoo, & Agyei-Owusu, 2015; de Vreede, Jones, & Mgaya, 1998).

Combining the three theoretical contribution types that Colquitt and Zapata-Phelan (2007) discuss (i.e., testing, expanding, and building) with the three empirical observation types we identify above presents a pattern that helps theorists to reflect on their observations in order to recognize the theorizing type and paper genre they engage in (or, conversely, to recognize whether the observations and analyses they make concur with the theorizing type they intended to engage in). In the spectrum between these three types of theoretical contributions and empirical observations, most confirming observations suggest a strong leaning towards contributing through testing, while extending observations align more with expanding manuscripts. Likewise, novel or contradicting observations call for building theory as Figure 2 illustrates.

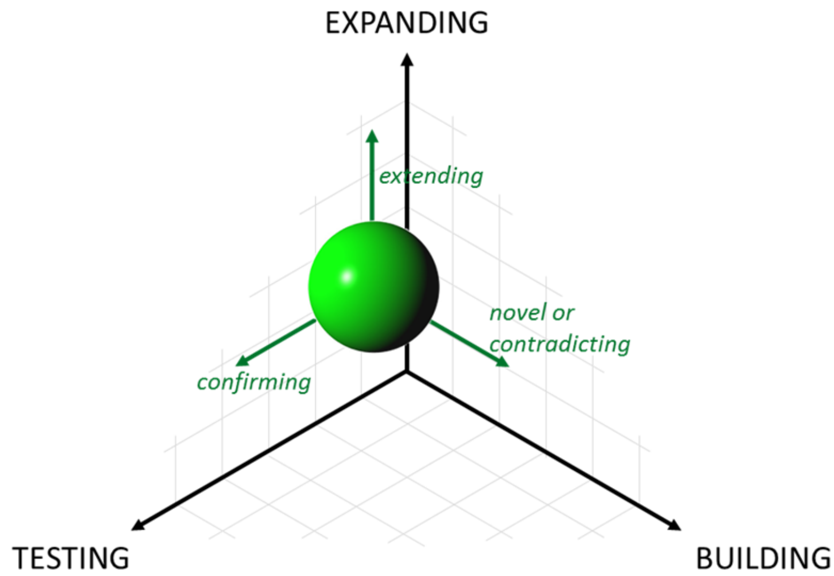

Figure 2. Types of Observations and Their Alignment with Theorizing Types

Of course, one cannot easily differentiate these three types of theorizing, nor can one easily differentiate the three types of observations we propose. Colquitt and Zapata-Phelan (2007) counter that problem by placing their types of theoretical contribution as extremes in the corners of a 5x5 matrix rather than simply juxtaposing them on a 2x2 theory-building and theory-testing matrix. In our Figure 2, we account for this overlap by acknowledging that a theorist's intended contribution may not be a pure form of any one of Colquitt's and Zapata-Phelan's (2007) types of theorizing but that it may incorporate varying degrees of all three depending on the underlying observations that one uses to ground the theorizing. While we look at the three types of theorizing in a slightly more refined manner, we agree with Colquitt and Zapata-Phelan (2007) in calling for researchers to more carefully reflect on their intended contributions, observations, and paper genre, which we highlight above.

Beyond theorizing with some form of observation that may or may not concur with extant theory, theorizing can also occur in a purely conceptual form. Such pure theory manuscripts mostly describe a phenomenon through convincingly developing constructs and propositions (Zmud, 1998). Similar to our three types of observations, such purely conceptual papers may take different stances in regards to existing theory—from extensions to novel or contradicting theories. In all such cases, one has to justify why we need the new theory "based on in-depth exploration of the philosophical and/or theoretical issues in existing theory" (Rivard, 2014, p. v). In these conceptual papers, construct clarity (Suddaby, 2010) is a key concern and even more central than in other types of theoretical contributions (Rivard, 2014). Pure theory manuscripts are important for a discipline's conceptual development, and many editors in the IS discipline have called for more (e.g., Markus & Saunders, 2007; Rivard, 2014; Weber, 2003b; Zmud, 1998). While not as common as the other types of theorizing, examples in IS research range from conceptual development papers (e.g., Burton-Jones & Grange, 2013) to philosophical essays (e.g., Berg, 1998) or review papers (e.g., Leidner & Kayworth, 2006; Melville, Kraemer, & Gurbaxani, 2004).

5 Now What: Future Directions for Theory and Theorizing

Recent developments in IS research as seen in dedicated conference tracks, workshops, special issues, and edited books show a strong push towards revisiting what theory and theorizing mean to the IS community. Much of what we collated to date will likely come under fire (or already is so) in the resulting debates. Nonetheless, our synthesis not only provides an important foundation for all these future discussions but also should help IS researchers to more easily identify what it is that they (might) disagree with, which will allow them to contribute to the ongoing debate on advancing theory and theorizing in IS. We now extend existing discussions on theory and theorizing in IS beyond the foundations we synthesize thus far.

5.1 Revisiting the Concept of Theory

Several recent contributions suggest revisiting what theory is and what roles it has in IS research (e.g., Avison & Malaurent, 2014; Bichler et al., 2016; Lee, 2014; Majchrzak, Markus, & Wareham, 2016; Markus, 2014). These calls challenge an intellectual tradition in IS research that has imposed certain concepts of theory and theorizing. In fact, the constituents and forms of theories we present above depend on certain philosophical foundations. For instance, Bacharach's (1989) terminology on a theory's constituents is skewed towards a positivist epistemological position and a variance-oriented interpretation of the concept of theory—an interpretation certainly in line with the theoretical thinking in management science and other related disciplines of business research that prevailed when Bacharach wrote and published his paper. Bacharach's original definitions assume that a "real world" must exist so that a theory can adequately capture it. Similarly, researchers have often described variance and process theories in terms that resemble the philosophical divide between positivists and interpretivists. And, at a more general level, the act of observing reality through the empirical suggests a representational view of the world typically associated with positivist, neo-positivist, or critical realist views of the world.

For instance, researchers construct constructs and theories as an abstraction of things that one can directly observe. These latent entities logically rest on the philosophical assumptions of their original contributors, which has two implications: First, these assumptions entail relevant meta-theoretical assumptions and the researcher's ontological and epistemological positions. Second, the meaning of what a theory is depends on a theorist's foundational convictions. Beyond the meaning of *truth* we touch on in Section 2, what a theorist makes of a theory also critically depends on the researcher's understanding of key theoretical terms such as *explaining* or *predicting*. Thus, a construct or a theory could have different meanings depending on who proposed it and who read it. Myers (2013), based on Bernstein (1983), identifies different meanings of *theory*: from a positivist perspective, "theories are held to be artificial constructions or models, yielding explanation in the sense of a logic of hypothetico-deduction" (p. 41); from an interpretive position, "theories are mimetic reconstructions of the facts themselves, and the criterion of a good theory is an understanding of meanings and intentions rather than deductive prediction" (p. 41).

Beyond what *theory* means to positivists and interpretivists, the increasing recognition of post-positivist stances also requires explicit reflection. Not only realist and pragmatist perspectives but also reflexive positions seem to exacerbate the potential dissensus on what theory is and means (Alvesson & Sköldberg, 2009; Gioia & Pitre, 1990). Each of these positions has its own assumptions and meanings of *theory* and *theorizing*. For instance, positivist researchers (or those in more recent variants of that particular philosophical position) will ground their work in a realist ontology and a representational epistemology, which has wide-ranging implications on the meaning of theory, of theories' constituents (e.g., constructs, propositions, boundaries), and of theorizing. Further, different strands of non-positivist thinking (e.g., social constructivism, phenomenology, post-modernism, post-structuralism, flavors of feminism, or critical theory) attach different meaning to these concepts.

We propose that theories—as a product of the scientific process—structure, document, accumulate, and further develop knowledge relevant to understanding and solving a problem (Steinfield & Fulk, 1990). They are conceptual entities that abstract classes of observations to make sense of emergent patterns (Morgeson & Hofmann, 1999; Nunnally & Bernstein, 1994). We suggest that this fundamental purpose of a theory is essentially paradigmatically neutral, although the implications of how to come up with and what to do with theory differ across paradigms.

However, more radical positions question theory beyond this essence. Hovorka (in Bichler et al., 2016) suggests we need to re-think the very concept of theory. He suggests that one should not think of theory as a product or outcome of science but proposes that IS should adopt a perspective focused on science as a practice. Hovorka argues that one should instead understand theory as discourse, which shifts the emphasis from the product to the process of theory-based interaction in a certain discursive community. Contributions such as Hovorka's indicate the emergence of a debate on what theory is as scholars such as Lee (2014) and Markus (2014) have called for in response to Avison and Malaurent's (2014) critique of the so-called theory fetish in the IS discipline.

We see future contributions in the IS discipline's becoming more critically engaged with the philosophical foundations that most of the IS discipline's engagement with theory is grounded in. While one cannot overestimate the importance of papers such as those by Gregor (2006) or Weber (2012), much of their work rests on specific ontological and epistemological assumptions on the nature and roles of theory in IS scientific discovery, which also applies to the other papers we have drawn on so far to review theories and theorizing in IS research and to the picture we draw based on them

However, recent discussions indicate that a number of philosophical streams are preparing to leave their conceptual niches. Many (we list a few examples earlier in this section) will likely have less of a realist ontology and representational epistemology than the once-dominant approaches to theory and theorizing in IS research. Given theory's centrality for IS research and its publication, it seems imperative that the IS discipline (represented by editors, reviewers, and authors) engage in constructive philosophical discourse to broaden our understanding of theory and theorizing. After all, we would not want to dismiss contributions that agential realists or feminists make based only on criteria not made for them. One can find similar struggles in the IS discipline when looking at early interpretive research (see, e.g., Lee, 1991) and how long it took for the discipline to resolve this merely epistemological issue.

In this vein, sociotechnical systems currently exemplifies an exciting IS research area with much revived interest. What seemingly started out as a feud between two ontological camps—ontological separability of the technological and the social on the one hand (Leonardi, 2011) and ontological inseparability on the other hand (Orlikowski & Scott, 2008)—has spiraled into a heated debate on the ontological core assumptions that underlie IS researchers' ability to study the inter-play or intra-play of the social and the technological in practice (Leonardi, 2013; Mutch, 2013; Scott & Orlikowski, 2013). In the wake of this discussion, researchers have discovered or proposed many new philosophical positions, most of which seem to primarily contribute to increased confusion and insecurity among researchers as to *how* to theoretically contribute to this area and *what* such contributions should look like. In response to this confusion, Mueller (in Bichler et al., 2016) suggests that new conceptions of theory are likely to emerge from this debate.

In this ongoing debate on the future of theory and theorizing, the IS discipline will likely not end up with some uniform and universally agreed-on definition of theory and/or theorizing. Also, in presenting the *what* and *how* of theory (see Sections 3 and 4), we do not mean to advocate for such unification. However, to be prepared for debates on how to advance theory and theorizing, one needs to be grounded in the status quo. Beyond a sound command of the extant concepts and conventional definitions we present here, such preparation also includes essential works on the IS discipline's philosophical foundations (e.g., Becker & Niehaves, 2007; Hirschheim, 1985; Mingers & Willcocks, 2004). Such grounding will also enable theoreticians to recognize where current definitions and concepts are problematic or lack the necessary analytical and conceptual power to help them when studying certain phenomena. To be fruitful, such debate must be critical. For instance, we will likely hear voices that advocate a reduced reliance on management as a source of literature and guidance on theory and theorizing and will start appreciating other reference disciplines more (e.g., sociology, anthropology, philosophy of technology, contemporary natural sciences, and so on)—a point of view already put forward (Agarwal & Lucas, 2005; Grover, Lyytinen, Srinivasan, & Tan, 2008).

At a higher level, the discussion on what theory is connects to what Lyytinen and King (2004) refer to as plasticity of a discipline's (theoretical) core. To be a functioning market for ideas, scholars should employ theory—or multiple competing theories and their explanations of a phenomenon—in ways that enable "scholars (and practitioners) [to] exchange their views regarding the design and management of information and associated technologies in organized human enterprise" (Lyytinen & King, 2004, p. 236). Only if this market is dynamic enough to adapt and evolve will the IS discipline built around that market be able to produce salient and strong results. Other scholars support this position by talking about "adaptive instability" (Robey, 2003, p. 354) or boundary-spanning critical reflection (Galliers, 2003). For theorists to be able to engage in such an exchange, they need to understand what theory means and what roles it has in the scientific process. Otherwise, the IS discipline runs the risk of backing itself up into a particular paradigmatic corner or to irreconcilably fragment its findings into myriad philosophical boxes.

5.2 Reconsidering Deductive Theorizing

Colquitt and Zapata-Phelan (2007) suggest that reporting, qualifying, and testing do little to build new theory, which seems to resonate strongly with some of the criticism in the IS community that highlight that IS's reliance on reference disciplines' theories might harm the discipline's identity (Benbasat, 2001; Benbasat & Zmud, 2003)—notwithstanding the discussion on whether IS needs a unique theoretical core (Grover et al., 2006; Lyytinen & King, 2004; Straub, 2006, 2012; Wade et al., 2006; Weber, 2003a). Nonetheless, some of the most mature theoretical discourses in IS (e.g., TAM-based models, along with the myriad papers that test their propositions) are strongly rooted in reference disciplines' theories and have contributed greatly to advancing what we know about IS. While one can interpret the IS discipline's borrowing theories from reference disciplines as signaling IS research's relevance at the intersection of its adjacent disciplines, many scholars—both IS and non-IS—have complained about the lack of an IS-specific cumulative tradition and emphasize the importance of generating native, IS-specific theories (Lee, 2011; Weber, 2003b; Zmud, 1998).

To answer this call, theorists must look for opportunities to overcome the limitations of deductive theorizing due to its non-ampliative nature (Gauch, 2003). Oswick et al. (2011) have introduced one such example: they see the deductive theory-building process's major constraint as its focus on issues of refinement, resonance, and extension; this emphasis closes down the space for generating genuinely new and radically homegrown theories. To counterbalance the prevalence of this one-way borrowing, they propose a two-way dialectic process of conceptual blending. They introduce their approach to deductive theorizing, which adopts dissonant thinking, dis-analogy, and counterfactual reasoning, to promote new ways of thinking about theory development and to stimulate the generation of new and more radically homegrown theories.

Shepherd and Sutcliffe (2011) suggest a similar opportunity to enrich deductive theorizing in IS research. They suggest that, while researchers have advanced inductive approaches by drawing on deductive elements, they have not yet advanced deductive theorizing by drawing on inductive elements. As a solution, they suggest that researchers need to more explicitly draw on the extant literature they use to deductively develop their studies' conceptual underpinnings. Grounded in a coherence framework and a pragmatic perspective, their approach suggests that one should think about the literature as an ex ante source of data that one explores inductively. In contrast to the dominant deductive approach that "relies on theorists' knowledge and experience to narrow the scope of the search" (Shepherd & Sutcliffe, 2011, p. 362), they suggest that a more inductive, bottom-up analysis of the literature helps theorists to uncover tensions, conflicts, and contradictions. As a result, their inductive top-down theorizing "may enhance the discovery or creation of a paradox (within or across paradigms) and is especially appropriate when previous research is vast, dynamic, complex, and/or from disparate sources" (p. 374). However, conversely, we suggest that their approach may be less appropriate when bodies of literature are narrow, stable, simple, and well integrated.

Although both these contributions stem from the management literature, they may help IS theorists to increasingly recognize some of IS's substantive characteristics. The reemergence of sociotechnical thinking (see, e.g., Cecez-Kecmanovic, Galliers, Henfridsson, Newell, & Vidgen, 2014, and the papers published in *MISQ*'s corresponding special issue) or the increased attention to software-based platforms (e.g., Tiwana, Konsynski, & Bush, 2010) and corresponding mechanisms for the co-creation of value (see, e.g., Grover & Kohli, 2012 and the papers published in *MISQ*'s corresponding special issue) seem to provide excellent resources for the dialectic blending that Oswick et al. (2011) suggest or a more inductive exploration of the literature—both inside and outside the IS domain—as Shepherd and Sutcliffe (2011) propose. Explicitly recognizing the unique characteristics of information systems involved in the phenomenon one studies is an opportunity that IS researchers need to leverage. Rather than minimizing any deviation from the original theory, exploring how and why the explanation of IS-specific instances of the phenomenon need to differ from original reference theories helps to emancipate theorizing in IS from its reference disciplines and could even significantly contribute to the original theory in these reference disciplines. In this sense, extending how we theorize when reasoning deductively in IS—particularly when re-integrating findings with the knowledge base—is an opportunity that counters some of the growing criticism towards deductive work in IS.

5.3 Towards the Multiverse

The idea of using boundary-spanning constructs to integrate multiple nomological nets into higher-order theories (see footnote 4) points to the opportunity of working with more than one theory. In particular, we need to extend observations made while building new theory since one might have found the missing link between two hitherto separate nomological nets. We suggest that multi-theoretical work is among the most exciting modes of working with theory. Lewis and Grimes (1999) review multi-theoretical research in management broadly. They identify a set of six different patterns of interplay between two or more theories. First, *bracketing*, in which one pays special attention to the original theorists' assumptions and underlying views, contrasts two competing theories. This approach employs a kind of "literal replication" of a phenomenon in that one compares two independent explanations. Research that reviews incommensurable, competing theories has often used this approach thus far. Second, reviews also often use *bridging*. It is more of a unifying approach in the sense that one identifies transitioning zones between theories that help to bridge two separate paradigms. In its often merely conceptual application, bridging often spurs transdisciplinary collaboration. Third, following a *parallel* pattern refers to one's using multiple paradigms simultaneously to highlight contradictions when working with multiple paradigms in parallel. One can apply this pattern to evaluate two or more rival explanations. It often relies on the empirical evaluations that result from the competing theories. Keil, Mann, and Rai (2000) exemplify the parallel pattern: they tested four theories on project escalation to determine which theoretical model had the highest explanatory power. Fourth, one employs a *sequential* pattern when one consciously uses theories to inform other theories. Thus, one uses the output of any one theory as the purposeful input for another; or, in Lewis and Grimes's (1999, p. 675) words, "theorists seek to grasp…disparate yet complementary focal points" of the theories used sequentially. Fifth, and closely related to the idea of higher-order theories (see footnote 4), the *metatheorizing* pattern describes "a higher level of abstraction [that] does not imply unification or synthesis but, instead, the ability to comprehend paradigmatic differences, similarities, and interrelationships" (Gioia & Pitre, 1990, as cited by Lewis and Grimes, 1999, p. 675). Constructs in such a metatheoretical approach then span different nomological nets. Hovorka et al.'s (2013) study exemplifies such work in that the authors analyze a set of different theories in order to integrate them. Sixth, emplying an *interplay* pattern for multi-theoretical work refines the meta-theorizing approach by highlighting the importance of using multiple theories simultaneously in order to leverage complementarities between them.

In any of these ways, theorists can build an extended understanding by looking at a phenomenon through two or more theoretical lenses to better understand phenomena from more than one perspective (Mueller & Raeth, 2012). This extension can take three forms: redundant (multiple theoretical lenses result in similar observations, which contributes to summative validity), complementary (different lenses result in observations of different facets of the phenomenon that are mutually exclusive yet collectively capture the phenomenon exhaustively), or tangential (different lenses result in observations of different facets of the phenomenon that are mutually exclusive and cannot capture the phenomenon exhaustively). In any of these perspectives, theorists engage in what Grover (2013) refers to as using "multiple theoretical lenses in a supra-additive manner" (p. 277); that is, combining theories such that the resultant conceptual perspective is richer than just the sum of its parts.

Lapointe and Rivard's (2007) study represents an example of multi-theoretical work. These authors combine three theories of user resistance to explain contradictory empirical observations and propose a richer model. We also suggest that integrating theories across multiple levels is an instance of the interplay approach. For example, Quigley, Tesluk, Locke, and Bartol (2007) use theories on multiple levels to build a more comprehensively explain knowledge sharing.

One can also extend the idea of multiples beyond work with multiple theories alone. We see two current trends as opportunities for IS theorists: 1) the increased attention to multilevel theory and 2) theorizing based on multiple methods. Concerning the former, new perspectives on change and stability (Dansereau et al., 1999) or a more explicit recognition of parts and wholes across multiple levels in emergent systems theories (Burton-Jones et al., 2015) represent opportunities for more or refined theory in IS. While multilevel work has wide-ranging implications and challenges for data collection and analysis (Klein et al., 1994), researchers have long recognized the opportunities connected to it (Klein et al., 1999). As multilevel research can become challenging, Klein and Kozlowski (2000) discuss in detail the critical steps in conceptualizing and conducting such studies. Ranging from choosing constructs to sampling and selecting the data-analysis approach, they provide detailed reflections on the implications of going multilevel. Beyond examples in IS (e.g., Burton-Jones & Gallivan, 2007; Lapointe & Rivard, 2005), trend towards multilevel theory is also reflected in similar developments in the wider management area (Hitt et al., 2007).

Researchers have long recognized the latter, multi-methodological approaches as opportunities for theoretical contributions (Kaplan & Duchon, 1988; Mingers, 2001). While most approaches commonly focused on combining qualitative and quantitative methods (Jick, 1979; Mayring, 2001), mixing methods provides a comprehensive arsenal for complementary and convergent triangulation to support theorizing (Flick, 2010). Seminal examples such as Markus's (1994) multi-methodological study of media richness illustrate the opportunities of such approaches.

5.4 Reconsidering the Role of Context

Recognizing the role of context (Bamberger, 2008; Johns, 2006; Whetten, 2009) is another opportunity for future theoretical contributions in IS. Given technology artifacts' context specificity, no single conceptualization of technology will likely work for all usage contexts (Orlikowski & Iacono, 2001). Thus, IS researchers need to consider technology artifacts' characteristics, their usage contexts, and users' characteristics (Hevner et al., 2004). Johns (2006) distinguishes two levels of analysis when thinking about context: the *omnibus context* and the *discrete context*. The omnibus context refers to a broadly conceptualized context (e.g., location or time), and the discrete context refers to the specific contextual variables or levers that shape behaviors or attitudes (e.g., task characteristics of specific physical conditions). To incorporate context into theory development, Hong, Chan, Thong, Chasalow, and Dhillon (2014) propose two general approaches: single-context theory contextualization and cross-context theory replication. In single-context theory contextualization (which primarily addresses the discrete context), the researcher starts with identifying a well-established general theory and gradually refines it based on the particular context being studied. At the first level of contextualization, one may refine general models by adding or removing core constructs. At the second level, one contextualizes general models at a finer level by incorporating context-specific factors that are directly relevant to the characteristics of technologies, users, and usage contexts. One can do so in three ways: 1) by incorporating contextual factors as antecedents of core constructs or dependent variables, 2) by incorporating contextual factors as moderators of relationships, or 3) by de-composing core constructs into contextual factors. Following the second general approach to contextualization, cross-context theory replication (which primarily addresses the omnibus context), a researcher replicates a theoretical model in different contexts and then consolidates the findings into a context-contingent theory by conducting theory-grounded meta-analyses (Bamberger, 2008; Johns, 2006). We suggest that accounting for context is a promising opportunity for theorizing in the IS domain. Indeed, the recent turn towards practices supports an increasing emphasis on context; that is, looking at what people actually do at an individual level—a trend in both the IS community (e.g., Arvidsson, Holmström, & Lyytinen, 2014; Peppard, Galliers, & Thorogood, 2014) and the management discipline (e.g., Jarzabkowski, 2004; Jarzabkowski & Whittington, 2008; Whittington, 2006). From a theorist's perspective, two opportunities are promising: 1) looking at what people actually do (as opposed to only what they think or say they are doing) allows researchers to investigate the emergent interplay of various agencies in the field, how they influence each other, and the effects that emerge through their interplay across different levels (also compare Schultze & Boland, 2000); and 2) doing context-aware research has the potential to better link IS theories with the managerial practice we seek to inform (Sandberg & Tsoukas, 2011) and, thus, defuse some of the concerns about the IS discipline's relevance as we turn our attention to theory.

While these four opportunities do not exhaustively account for the roles that theory can play for IS scholars, we need to reflect on them while going through the *how* of theorizing. Understanding theory's roles and their implications and realizing some of the resulting opportunities helps a theorist to reflect on how to work with theory at different points in time throughout the theorizing process—especially in light of the interplay between theory and method we refer to in Section 4. Knowing when to draw on theory's conceptual arguments, being able to constantly reflect on the results and their interpretation as theoretical understanding changes and evolves, and being able to wrap up the theorizing by synthesizing key findings enable one to generate, document, and communicate knowledge—a key contribution of science.

6 Discussion and Conclusion

In this paper, we synthesize the foundations for understanding what theory and theorizing in IS research entails. We challenge readers to reflect on the intrinsic meanings and the corresponding value of theory's conceptual descriptions regardless of which camp they "belong" to. We do not claim an all-encompassing almanac of theory let alone exhaustive prescriptions for theorizing. Great minds have left their mark in these discussions; we can only synthesize their contributions. Nonetheless, such a synthesis is an important contribution. Most importantly and in light of the intensified discussion on theory and theorizing in and beyond the IS discipline, we provide a starting point for this discussion. We provide a clear look at *why* theory matters, *what* theory is, and *how* we work with it. Beyond reviewing the current state of the discussion on the product and process perspectives, we briefly reflect on the *now what*: theory's roles in IS and some opportunities to work with and towards theory in IS research. This paper offers those who wish to join the discussion and to reflect on theory a sound foundation and enables and encourages particularly younger researchers to more explicitly theorize their thoughts and results. We do not construct a grand, unifying theory of theories but sensitize readers to the importance of philosophy in this context. Further, we do not suggest that any particular view of theory and theorizing is superior to any other. By showing what is out there—however skewed it might be—we hope to encourage others to contribute their thoughts to advance the discussion.

As Rivard (2014) notes, a theorist's imagination and erudition are important to making a significant theoretical contribution, too. Zmud (1998, p. xxix) supports this statement in nothing that theory manuscripts "stand solely on their authors' understanding of a phenomenon [and the] relevant theoretical perspectives for embracing this phenomenon". Zmud (1998) extends this argument by stressing the importance of a theorist's writing abilities. Researchers need to express even the most convincing arguments with excellent writing (Pollock & Bono, 2013). Leading journals recognize the need to enable future theorists to frame and write up their intended contributions. The recent *Academy of Management Journal* editorial series (Bansal & Corley, 2012; Bono & McNamara, 2011; Colquitt & George, 2011; Geletkanycz & Tepper, 2012; Grant & Pollock, 2011; Sparrowe & Mayer, 2011; Zhang & Shaw, 2012), especially Sparrowe and Mayer's (2011) contribution on grounding hypotheses in deductive theorizing, are important resources for all those who seek a stronger command of theoretical writing.

Many IS papers have successfully tested theory and some have successfully expanded it, but surprisingly few have truly built new theory. Looking at the different observation types and how they relate to different theorizing types, we suggest that working with contradictory observations holds important potential for more powerful emergent and native theorizing largely neglected in IS. However, "path-breaking" theorizing is most likely closest to the ideal that DiMaggio (1995) proposes: contradictions—or the conceptual resolutions thereof—help to build the complex, de-familiarizing, and paradoxical enlightenment that makes a good theory While perceived as too disruptive by some scholars, challenging or disconfirming some dominant theories IS is in line with the building on each other's contributions that Keen (1980) called for, too. More importantly, challenging and disconfirming will help to maintain the plasticity of the IS discipline's core knowledge (Lyytinen & King, 2004).

Theory, much like methodology, is a means to an end and not an end in itself. We must be careful not to over-engage in the theory discourse. Recently, Avison and Malaurent (2014) sparked a lively debate on what theory can and should mean to us. They raise six concerns that may result from what they refer to as a "theory fetish" (p. 4) in IS. We caution every researcher to reflect on the concerns they raise and to ensure that we engage in theory and theorizing not merely for the sake of theory. What is more important is our genuine intention to make sense of the world around us; to advance our collective ability to describe, explain, and predict the phenomena we study; and to inform managerial practice. To this end, asking the right questions is at least as important as working with or building the right theories.

While drawing a diagram might be worth a thousand words, it might not be enough if we do not explicitly cover theory's core constituents. Once we can do so, we will find the full potential of what theory has to offer: it provides us with a framework that we can use to synthesize and integrate our empirical findings, helps us to generate a priori hypotheses, which add rigor and falsifiability to our research; allows others to generalize our conclusions across a spectrum of organizations and technologies; provides perspective on the larger issues; directs us to more broad-based knowledge claims; directs our attention to key issues of organizational functioning rather than technological imperatives, and provides a mechanism for integrating new and emerging disciplines with other related disciplines (Steinfield & Fulk, 1990). Further, following Sutton and Staw (1995) and Whetten (1989), theorizing reminds us to *understand* the phenomena we study. In contrast to the merely empirical (i.e., exclusively presenting empirical data as if it speaks for itself), a theorist should rise above mere descriptions and correlations. Only then will the IS discipline be able to claim scientific legitimacy regardless of whether or not we have native IS theories.

We conclude with an observation by some of the perhaps most esteemed theoreticians of our time: "There is nothing so practical as a good theory" (Lewin, 1945, p. 129; later reemphasized by van de Ven, 1989, p. 488). While they refer to the utility of theory for practice, in our view, the same is true for IS research practice. Theory matters.

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About the Authors

Benjamin Mueller is an Assistant Professor of Information Systems and Change Management at the University of Groningen, the Netherlands, and an Associate Researcher at the Karlsruhe Institute of Technology, Germany. His research and teaching focus on how advanced information and communication technologies transform organizations. He pays particular attention to mechanisms through which individuals augment their work with technology and the resultant organizational benefits. His research is published in journals such as, for example, the *Journal of the Association for Information Systems*, the *Journal of Management Information Systems*, *Business & Information Systems Engineering*, or *Information & Management*. Benjamin is also committed to serve the IS community. He served as a co-chair for the "IS Foundations" track at ICIS 2017 and for the "Advancing Theories and Theorizing in IS Research" track at ECIS (2014-2016) and has taught multiple PhD seminars on theory and theorizing.

Nils Urbach is Professor of Information Systems and Strategic IT Management at University of Bayreuth, Germany, as well as Deputy Director of the FIM Research Center and the Fraunhofer Project Group Business and Information Systems Engineering. Nils Urbach has been working in the fields of strategic information management and collaborative information systems for several years. In his current research, he focuses on digital transformation, future IT workplace, and blockchain, among others. His work has been published in several academic journals such as the *Journal of Strategic Information Systems*, *Journal of Information Technology*, *IEEE Transactions on Engineering Management*, *Information and Management*, and *Business & Information Systems Engineering* as well as in the proceedings of key international conferences such as the *International Conference on Information Systems* and the *European Conference on Information Systems*.