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Understanding the Why, What, and How of Theories in IS Research

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Understanding the *Why*, *What*, and *How* of Theories in IS Research

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Abstract

Theory's pivotal importance has been emphasized in the information systems (IS) discipline since its inception. As in many fields of science, IS scholars' ability to understand and contribute to theory is an important qualification in research practice. This requires 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 field. Our key contribution is to inform (new) authors of the prevailing state-of-the-art and to help identify opportunities in theorizing to put theory to work. While only a first step, we hope that our synthesis of the status quo advances our discipline's current efforts towards enhancing theorizing and addressing the increasing demand for theoretical contributions and that it critically reflects on the status quo to help us move beyond it.

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. This is further supported by Blalock (1969, p. 2) who notes that "any good social scientist knows that the facts do not speak for themselves, [but that] theoretical structures are critical." The centrality of abstraction from facts or data into theory is found in many disciplines, from natural (e.g., physics) to social sciences (e.g., sociology) (Atmanspacher 2007). Such abstractions of conceptual structures are not merely academic; they have implications for researchers' ability to inform practice. This is illustrated by Highsmith (1999, p. 14): "Techniques without a theoretical base are reduced to a series of steps executed by rote."

A discipline's theoretical base is often seen as a crucial basis for the *description*, *explanation*, and *prediction* of the phenomena that disciplinary work relates to – that is, theory offers an understanding of *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 these that jointly explain a phenomenon and show how and/or why it occurs (Gioia and Pitre 1990).

Theory's pivotal importance has been emphasized in the information systems (IS) discipline since its inception. The legitimacy of the explanations offered by the IS field in comparison to its neighboring disciplines is often discussed as a primary motivation for our field's intense discussion of theory and theorizing (Frank 2006; Lyytinen and King 2004). It is only by providing credible conceptual accounts that the discipline will 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 et al. 2006; Lyytinen and King 2004; Straub 2006; Straub 2012; Wade et al. 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 and Sutcliffe 2011; Suddaby et al. 2011; Thompson 2011; Tsang and 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).

Re-examining theory and theorizing is also needed to research new phenomena; for instance, the increasing ubiquitousness of information and communication technologies, from social media to mobile devices to the internet of things. The related technological and social mangling challenges our theorizing, as evidenced by the conceptual and methodological difficulties associated with the turn towards Sociomateriality in the IS discipline.

Instead of perpetuating what is currently known and often widely accepted, we suggest critically assessing 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 many seem to take for granted. We synthesize and reflect on the current debate on theories and theorizing inside and outside the IS field and provide a baseline to make the art and craft of theorizing more accessible. Our key contribution is to inform (particularly new) authors about opportunities in theorizing and to help them to put the concept of theory to work. 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 applies universally in IS research. On the contrary, there is a strong need for conceptual plurality and the promotion of a vast array of different philosophical approaches, each of which produces 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 these in a storyline that connects them. Our work is intended as a help to identify relevant papers and as an encouragement to read (and question) these originals. Based on our discussion below, we hope that theorists and aspiring theorists will develop a clear view of theory and theorizing and that some of the conceptual challenges faced in research will be addressed. This supports 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 the next section, 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, adding 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, the need for a re-examination is rooted in our field's history. While we can only provide an overview here (for a more elaborate discussion see Hirschheim and Klein 2012), the field's evolution can be described as one from topics to methods to theories.[1]

The challenge in the era of topics (roughly from the 1960s to the early 1980s) was to define the essential areas of inquiry IS scholars were dealing 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 was not without 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" – an observation that already underlines the importance of theory.

Despite advances in identifying the topics and domains of IS research, concerns about the methodological aspects were raised in the mid-1980s (Hirschheim and Klein 2012). Some critics argued that, at this stage, IS was characterized by a lack of standards in research methods (Khazanchi and Munkvold 2000). The *methods era* (mostly until the late 1990s / early 2000s, and even ongoing 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 to name a few examples).

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 get an overview of the different theories it has

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[1] This linear model is a simplification; we draw upon it only to illustrate the discipline's increasing attention towards theory. In reality, the three aspects of topics, methods, and theories are likely overlapping 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.

accumulated over the years (for excellent overviews, please see Barkhi and Sheetz 2001; Dwivedi et al. 2012; Larsen et al. 2014; Lee et al. 2004; Lim et al. 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 more findings around a phenomenon are generated. 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”, 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 explicit (Watson in Lee 2001), and any opposing positions must be justified.

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

Another reason why theory's role is under debate in the IS field is because of similar efforts in IS's reference disciplines. For instance, reference disciplines such as sociology (e.g., Boudon 1991; Freese 1980; Merton 1967; Parsons 1950) continue to debate the nature and role of theory and its implications for their theorizing. Management research has also seen a number of 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 and van de Ven (1989); van de Ven (1989); Weick (1989); Whetten (1989)
1994	AMR	Doty and Glick (1994); Klein et al. (1994)
1995	ASQ	DiMaggio (1995); Sutton and Staw (1995); Weick (1995)
1999	AMR	Dansereau et al. (1999); Drazin et al. (1999); Elsbach et al. (1999); Folger and Turilo (1999); Klein et al. (1999); Langley (1999); Lewis and Grimes (1999); McKinley et al. (1999); Morgeson and Hofmann (1999); Pentland (1999); Tsang and Kwan (1999); Weick (1999); Zaheer et al. (1999)
2007	AMJ/AMR	Alvesson and Kärreman (2007); Colquitt and Zapata-Phelan (2007); Hambrick (2007); Hitt et al. (2007); van Maanen et al. (2007)
2011	AMJ/AMR	Corley and Gioia (2011); Hillman (2011); Oswick et al. (2011); Shepherd and Sutcliffe (2011); Suddaby et al. (2011); Thompson (2011); Tsang and Ellsaesser (2011)

Looking at Table 1, the management discipline reflects on the advances in theory every five to ten years. This 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 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 et al. 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 can be learnt about *what* theory is and *how* we theorize, in the following sections, we synthesize the discussion on theory and look for implications that can be applied in IS.

3. WHAT – CONCEPTUAL FOUNDATIONS OF 'THEORY'

The emergence of the term *theory* can be traced back to some of the most influential philosophers of science in the late 17th and early 18th centuries (esp. Hume 1748; Locke 1689), and 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 was 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, 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, even more so owing to the fact that theory is approximated more often than it is realized (Runkel and 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, as well as hypotheses (and predictions) by themselves are rarely theoretical contributions, if at all. But while the difficulty to conceptually grasp what theory is can be comforting for those who struggle with it, it also means that there is limited guidance for researchers and aspiring researchers who intend to theoretically advance the IS discipline.

When defining theory, a very influential definition was proposed by Bacharach (1989), who defines theory as a system of statements targeted at *describing*, *explaining*, and *predicting* real-world phenomena. To do so, a scientific theory is a system with 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 within certain boundaries (summary of Bacharach 1989). Concerning the boundaries, Weber (2012) highlights that theories analytically separate the phenomenon they describe from the context it naturally occurs 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, a theory’s boundaries are often added as a third constituent.

3.1 Constituents of Theory

Looking at constructs reveals that “such higher order concepts are called constructs because they […] are constructed from concepts at lower levels of abstraction” (Jaccard and Jacoby 2009, p. 13). In other words, they are conceptual abstractions of categories or classes of observations (Priem and 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 constructed socially (Kerlinger and Lee 1999), and, as hypothetical concepts, are not observable directly (MacCorquodale and Meehl 1948). The purpose of constructs as conceptual abstractions is to function as heuristic devices to make sense of the empirical beyond the individually observed instances of a phenomenon (Nunnally and Bernstein 1994).

As one of the key constituents of theories, construct clarity is crucial. There must be a precise understanding of what is being conceptualized. 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, empirical phenomena must be translated into theoretical constructs by means of *definitions.* Good definitions are comprehensive, precise, and parsimonious. Second, Suddaby (2010) emphasizes that clearly stating the *scope conditions* of constructs contributes directly to strong theory-building. Following Whetten (1989), 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” (Suddaby 2010, p. 350). Third, Suddaby (2010) emphasizes the importance of *coherence* or *logical consistency*. He refers to a theorist’s ability to create logically consistent and theoretically integrated arguments. Fourth, the reader must be able to understand the *relationships between constructs*. Thus, Suddaby (2010, p. 350) suggests “to 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). Constructs are implicitly defined in terms of a network of associations with observables and other constructs (Cronbach and 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 noted by Kaplan (1964, p.55), although constructs are “[…] not observational either directly or indirectly, [they] may be applied or even defined on the basis of the observables.” The relationships to other constructs highlight the need to consider the links between constructs. According to Bacharach (1989), links enable researchers to draw conclusions about the mechanisms and dynamics of a phenomenon described by a certain set of constructs and propose explanations and predictions about their observable behaviors. These propositions are conceptual arguments about how and why certain constructs share relationships and 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 are stated in a declarative form [, …] must be empirically testable [, …] and can be judged as true or false” (p. 16). However, while propositions describe the relationships between constructs, they too are bound to the conceptual and cannot be tested directly. Bacharach (1989) introduces the distinction between conceptual propositions and empirical hypotheses. As observable variables instantiate constructs, hypotheses are derived 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 that proposition by means of inference. Thus, “propositions are generally derived based on logic or empirical observations” (Bhattacherjee 2012, p. 16).

But proposed relationships cannot be expected to hold true universally. As indicated by Dubin (1978), all theories are constrained by specific bounding assumptions. 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 drawing conclusions about a theory’s extent of generality (i.e., generalizability).

The three constituents introduced above – (1) constructs, as the fundamental concepts covered by a theory, (2) propositions, as the relationships between these constructs, and (3) boundaries, which constrain the context in which a theory applies – indicate that a theory is created if all these elements come together. In turn, said theory is then characterized by a unique network of constructs and relationships, and can be delineated from similar theories based on its boundaries. The resultant system of constructs, propositions, and assumptions is also referred to 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 various constructs are placed in relationship to one another and is generally serves a dual function (Börner 2007): On the one hand, the nomological net helps to implicitly define constructs through understanding to which neighboring constructs any one construct is linked and what the nature of these links is. On the other hand, this leads to an ability to (statistically) assess a construct’s validity in terms of how well it fits into such a network – one of the initial purposes for introducing the concept of the nomological network into theorizing (Cronbach and Meehl 1955). A nomological network can be understood as “mak[ing] clear what [a theory] is [by looking at the] interlocking system of laws which constitute a theory” (Cronbach and Meehl 1955, p. 290). Examples of nomological networks can be found in the work of Furneaux and Wade (2009) or in a recent analysis by Hovorka et al. (2013).

Once a nomological network is in place, a final step is to think about an appropriate way to represent and communicate it. Theories are conceptual, resting 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 have introduced the basic building blocks that constitute a theory, it remains difficult to tell apart conceptual statements that are theory from those that are not (Sutton and Staw 1995). Gregor (2006) suggests that some properties that constitute a theory are contingent on a theory’s purpose. She introduces a set of five theory types in which each corresponds to a different purpose. The most basic purpose is making a phenomenon accessible to scientific investigation. She introduces theories for analysis and description (type 1) as contributions that serve this purpose. They conceptualize a phenomenon by translating it into an abstract representation that will allow for pattern recognition between various instances of the phenomenon. With these patterns emerging from the empirical observation of the phenomenon, theories gradually grow beyond a mere description of the phenomenon and begin to enable explanations of why certain observations occur. These type 2 theories (theories for explanation) stress the causal and conceptual links between the various constructs that interact while the phenomenon occurs. Some theories reliably predict observations without necessarily being able to explain why the predicted outcome occurs (theories for prediction; type 3). In a next step, theories integrate explanation and prediction into a comprehensive model (theories for explanation and prediction; type 4). 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 the design of a corresponding information system that acts as a predictable intervention in the system and produces a desired outcome (theories for design and action; type 5).

Beyond Gregor (2006), purpose as a distinguishing factor of a theory's form is also introduced by Lee et al. (2014) and Lee and Hovorka (2015), who distinguish between theories for either explanation or interpretation and discuss how theories satisfy the requirements of these different purposes.

A form of theory closely associated with Gregor's (2006) theory type five is the artifact. Often described as constructs, models, methods, or instantiations (Hevner et al. 2004; March and Smith 1995), an artifact can be referred to as an artificial, human-made thing that was purposefully created to serve a particular purpose or have a specific meaning in a given context. Such artifacts are introduced into said context 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 and Kellogg 1989). In design research, the artifacts' relationships to general knowledge are often documented in so-called design theories (Gregor and Jones 2007; Piirainen and Briggs 2011; Walls et al. 1992). Despite the fact that calls to more clearly define what the IS artifact in fact is are more than a decade old (most notably Orlikowski and Iacono 2001), we still lack a precise and commonly agreed upon definition. As a result, the design research community is strongly engaged in a discourse about how theoretical design is or needs to be and how theory relates to the design artifact (e.g., Baskerville et al. 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 embedded in a theory.[2] They draw on Mohr's (1982) distinction between process and variance theories to explain different forms a theory can take. While there are a number of important

2 Markus and Robey (1988) also look at *causal agency* and *level of analysis* to look at different explanations of organizational change. While these are also important aspects, we consider them as beyond the scope of this paper.

logical differences,[3] variance theories differ from process theories 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." This 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 are more interested in explaining how outcomes develop over time (Markus and 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 and 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 et al. 2013). While process theories can be criticized, since they "allow for the possibility of other, more powerful causal factors influencing the outcome, and evoke the possibility of spurious, epiphenomenal relationships," they generally compensate for this by rich descriptions of "a combination of necessary conditions with probabilistic processes in a specified time sequence" (Soh and 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 discussed above are the most prevalent forms of theories in IS. Beyond these, systems theories might complement the two dominant forms (Burton-Jones et al. 2015). As discussed by Mattessich (1978, p. 277), "the systems approach is based on the insights that the interrelations of certain components result in a [new] system with its very own properties," emphasizing the components, relationships, properties, and boundaries of this system in contrast to

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

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 is comprised of wholes and parts that change over time. This makes system approaches particularly appealing to multilevel issues, since a consideration of the process through which the whole emerges from the interactions of the parts is uniquely able to capture issues of structure and social shaping. Thus, Kozlowski and Klein (2000) highlight that a researcher who employs system thinking must pay close attention to the role of time in her or his theory, since the behaviors of the parts are generally more dynamic than the behavior of 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 have discussed, are 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. Here, the historical evolution of a theory is often depicted as a process in which the theory emerges or is built based on a strong basis of descriptive narratives (Holmström et al. 2009; Maanen 1989). Such empirical accounts help one to base theoretical considerations on fit and relevance (Glaser and Strauss 1967). This process highlights that knowledge grows by extension and that providing accounts of small, comprehensible events can start building cumulative theory (Sutton and Staw 1995; Weick 1989; Weick 1992). While this isn't necessarily a starting point of any theory's existence, it provides an opportunity to anchor one end of a range continuum. Here, *substantive theories* are early contributions that are often bound to a specific context or are contingent on a high number of as yet unexplored factors that possibly impact on a phenomenon (Gregor 2006; Weick 1992).

Since theoretical statements are observed to be valid across various instances of a phenomenon, stronger theories of increasing range are produced (Dey 1999; Shapira 2011). In turn, this increases our confidence in these theories (Meehl 1967). For instance, Glaser (1978) provides guidelines for developing advanced theory based on prior substantive theories. Such *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 – also referred to as *grand theories* – exhibit an even higher range or extent of generalizability, for instance, through repeated empirical testing and refinement and/or exhaustive knowledge about a phenomenon's contingencies (Parsons 1950). While some controversy over the *mid-range* vs. *grand* distinction remains, most noticeably rooted in the positions developed by Merton (1967) and Parsons (1950), the general range of the extent of generalizability does not seem to be contested among theorists.

Closely connected to this is the long-standing debate about fecundity (also referred to as *richness* or *completeness*) vs. 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 involving fewer propositions and constructs. Based on the principle of Ockham's razor, such simpler theories with a higher range are generally preferable, even though a fundamental tradeoff between parsimony and fecundity must be made (Weber 2012).

As another take on range, Lee and Hubona (2009) suggest two general forms of theory validity. *Formative* validity describes a theory's property to capture a phenomenon's concepts and their relationships, and is achieved through 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 is able to 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 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, theories of all ranges are important to discover, document, and further develop conceptual understanding of a phenomenon.

An issue that deserves particular attention is the emerging discussion of theories' different abstraction levels. Theories of all different ranges (from substantive to grand) share the commonality that each is a theory about a specific phenomenon that is ultimately empirically observable. 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 and Kazmierczak 2006; Straub et al. 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, meta-theories can be used to 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 and Kazmierczak 2006), but provides 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 are structuration theory (Giddens 1984) or socio-technical systems theory (Bostrom et al. 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 suggests that merely seeing theory as a product is not enough; a process perspective on theory is needed. In this sense, *theorizing* refers to the evolution of theory over time as well as to theory emergence. Product (theory) and process (theorizing) do not have to be competing or contradicting views; they are complementary. Depending on the researcher's perceptions of the relationship between process and product, theorizing

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4 *Meta-theory*, which is sometimes used as in meta-analyses or meta-studies, is also used to refer to a theory that emerges from a synthesis of multiple theories that are grounded in their own empirical observations but have to date been separate theories. This is done through either boundary-spanning constructs (constructs shared by multiple theories) (e.g., Furneaux and Wade 2009) or a construction of overarching meaning (Bostrom et al. 2009; Uto 2005). Medical research provides many examples of meta-theorizing. However, we propose that such theories could also be referred to as higher-order theories because they are also describing the empirical. We use *meta-theory* in the sense of theory about theories.

can be understood 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), some approaches have been proposed. 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* theorizing is done.

4.1 Forms of Theorizing

Several seminal papers and books offer different approaches to theorizing (e.g., Dubin 1976; Freese 1980; Gioia and Pitre 1990; Jaccard and Jacoby 2009; Weber 2012). For instance, Dubin (1976) provides guidelines for the construction of theoretical models, in three major steps. First, the researcher starts with a selection of 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 states in which the model or theoretical system operates need to be specified (*system states*).

Notably, this view of the end product of theorizing should not detract from the relevance of intermediary steps in theorizing. As noted earlier, theorizing often is a gradual process, and theory should not be viewed as a dichotomy (Runkel and 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” (Hassan 2014, 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 within the theorizing process.

With the components of a theoretical model in place, the de facto use of such a model should be considered. Returning to Dubin (1976), a first step is a logical elucidation of the model. This consists of 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 the propositions have been defined, the researcher tests whether the model has any connection to the empirical world (i.e., tests one or more of the propositions). For testing, propositions are converted 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 from the practitioner’s perspective, a theoretical model is best judged by the accuracy of the predictions it generates, a researcher may appreciate a theory owing to the understanding it contributes to her or his knowledge.

At a less procedural level, theorizing can be understood 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, theoretical reasoning can be conceived of as “the process of using existing knowledge to draw conclusions, make predictions, or construct explanations” (El Alfi et al. 2009, p. 8). Thus, part of theorizing is the usage of the general to explain and predict individual cases. Vice versa, general knowledge is built 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; also termed as inductive and deductive reasoning.

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, observed patterns are explained by referring to the unique attributes of the phenomenon in question. Second, theories can also be based on a *bottom-up conceptual analysis* of different predictor sets potentially relevant to a phenomenon. The resulting framework is then used as a heuristic guide to develop propositions about this phenomenon. Third, existing theories can be *extended or modified* to explain a phenomenon in a new context, such as a different organizational setting in which new technologies are employed. Fourth, existing theory can be *applied in entirely new contexts.* Scientists 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 and Fulk 1990, p. 18).

While all four approaches could be discussed in great detail, we will now focus on an introductory overview of induction and deduction as primary modes of theoretical reasoning. Nonetheless, there are other forms of theorizing. 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 and Fosl 2010; Honderich 2005; Lee and 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 and 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. But induction is based on a set of observations that is not complete and cannot yield certainty (Gauch Jr. 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 a number of 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 is a research strategy that 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 are rich, empirical descriptions of particular instances of a phenomenon that are based on a variety of data sources. 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 and Graebner 2007, p. 25). Case study research has long been recognized as a viable IS research strategy, since researchers can study information systems in a natural setting, can learn about the state of the art, and can generate theories from practice, it allows the researcher to answer *how* and *why* questions and thus to understand the nature and complexity of the occurring processes, and it is an appropriate way to research an area in which few previous studies have been done (Benbasat et al. 1987). Accordingly, case-based theory-building has drawn considerable attention by several methodological contributions across most of IS's prevalent philosophical stances (e.g., Benbasat et al. 1987; Klein and Myers 1999; Lee 1989; Myers and Klein 2011; Paré 2004; Wynn and Williams 2012).

Another strategy is the *grounded theory method* (Corbin and Strauss 1990; Glaser and Strauss 1967; Urquhart et al. 2010). Grounded theory's basic assumption is a focus on understanding a phenomenon by looking at its facets in different contexts. Grounded theory seeks to understand the underlying constructs, their relationships, and the dynamics of these relationships in a continuous interplay be-

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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, simulations can equally be used in inductive and deductive reasoning. Nonetheless, research practice in IS over the past decades has produced some dominant associations. For instance, surveys and statistical path modeling are mostly used to validate hypotheses derived deductively, while case study designs seem to be employed more strongly to support inductive reasoning.

tween 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 the development of context-based, process-oriented descriptions and explanations (Myers 1997). Yet grounded theory has drawn criticism (Bryant 2002; Kelle 2006; Urquhart 2002). For instance, the split into the methodologically focused school of Strauss and Corbin (1990) vs. Glaser's (1992) focus on the emergent theory illustrates the process vs. product dichotomy. 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 and Olbrich 2011b).

Simulations and *experiments* are increasingly considered 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 et al. 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. Very similarly to simulation, the use of *experiments* can address problems and limitations encountered in other methodologies, and can thus aid theory development (Croson et al. 2007). Although under-represented 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 and 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 described by Hume (1748) as the "uniformity of nature". In most inductive work, primarily in theorizing from case studies, this issue has been addressed by emphasizing analytical generalizability over statistical generalizability (Walsham 1995; Yin 2002). Analytical generalizability describes a situation in which observations are inductively abstracted into the realm of the conceptual in order to identify an explanatory pattern. Thus, observations and conclusions based on these 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). One of the most important treatments of this matter is that of Lee and Baskerville (2003), who provide a discussion of why inductive theorizing is never generalizable beyond the immediately observed cases.

4.1.2 Deductive Theorizing

Deductive reasoning begins with the assertion of a general principle or belief and proceeds to apply that principle to explain a specific phenomenon (Baggini and 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. Effectively used in combination with a powerful theory as a priori explanation (*theory-driven*), strict deductive reasoning logic can result in a certain conclusion (DePoy and Gilson 2007). However, while deductive reasoning can be used to make observations and to expand implications, "the conclusion of a deductive argument is already contained, usually implicitly, in its premises […]" (Gauch Jr. 2003, p. 157). In other words, purely deductive reasoning is criticized as not being able to provide any new insight that goes beyond its premises.

As Dubin (1976, p. 18) noted, "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. There is a shared view in IS research that only few truly IS-specific theories have been proposed in the past years (e.g., Burton-Jones et al. 2015; Weber 2003a), although some controversy has emerged (e.g., Moody et al. 2010; Straub 2012). This is why many phenomena observed in IS research are explained via theories from neighboring disciplines (Baskerville and Myers 2002; Gregor 2006). According to Agarwal, "theories and concepts from sociology, economics, and organization theory can assist IS researchers in the formulation of conceptual models that help us gain insights" (Agarwal in Lee 2001, p. xiv). A popular example of the adaptation of a reference discipline's theoretical reasoning is the Technology Acceptance Model (Davis 1989), which is based on the Theory of Planned Behavior (Ajzen 1991) and the Theory of Reasoned Action (Fishbein and Ajzen 1975); the latter two originated from social psychology.

But 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 that require careful reflection are 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 et al. 2006).

Sparrowe and Mayer (2011) have further 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; all these criteria are in sync 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 and Mayer 2011).

Classically, a deductive form of theorizing is based on tools such as *surveys* and *experiments*. *Survey* research involves the use of standardized questionnaires to systematically collect data about people and their preferences, thoughts, and behaviors (Bhattacherjee 2012). Typically, quantitative-empirical data collected are analyzed by means of inferential statistics to reach conclusions about associations between variables – or to test hypotheses (e.g., Straub et al. 2004). One strength of survey research is its capability 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 and 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 other approaches might also similarly be applied. Forms of *positivist case study research* (Hyde 2000; Paré 2004; Sarker and Lee 2002) are a case in point. When using techniques such as pattern matching, theorists can go beyond the preliminary theoretical constructs and frameworks suggested by Eisenhardt (1989) and can actively search for deductively derived patterns in their data (Hyde 2000). Miles and Huberman (1994) extend this by highlighting additional techniques 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 inductive and deductive are the most heavily employed modes of theorizing in IS research, there are other forms of theoretical reasoning that can extend theorizing in IS research. Beyond inductive and deductive reasoning, two further modes of reasoning are acknowledged in the literature: *retroductive* and *abductive* (Ochara 2013).

Retroductive reasoning can be seen 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 and 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 refined. Analytical frames help one to “articulate ideas, and through this both classify and characterize phenomena”

(Sæther 1998, p. 247). To refine these, one compares them to images constructed through the process of abstraction from empirical observations (Ragin 1994). Ultimately, this 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, methodological approaches to retroductive theorizing can be seen 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, studies by Lapointe and Rivard (2005) and Sarker et al. (2006) illustrate the application of retroductive theorizing in the IS context. The latter study engages in a mild form of retroduction, using a "theoretical scaffold" (Walsham 1995) as a sensitizing device only for data analysis.

4.1.4 Abductive Theorizing

While all of the above entail some form of interplay between empirical observation and the explanation thereof, abductive reasoning emphasizes theorizing that relies on a leap of faith in the sense of an inference towards the best explanation (Baggini and 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). Following this, abduction typically begins with an incomplete set of observations and proceeds with the selection of the most feasible explanation of the phenomenon (Dubois and Gadde 2002; Patton 2002). It assumes multiple viable explanations for a set of observations. The reasoning process then involves weighting the adequacy of competing explanations and arriving at that most likely leads to a valid and useful explanation (*logic and discovery*) (DePoy and Gilson 2007). As more observations are added, the explanation deemed to be superior must defend its selection against the initial or additional rival explanations. While deduction reasons from the general to the specific, and induction vice versa, abduction constantly compares between the general and the specific until the most suitable explanation has been identified (Patton 2010).

Many IS studies that follow a critical realist stance use some form of abductive theorizing. Theorists are urged to consider multiple possible explanations as more and more of their data are analyzed (Wynn and Williams 2012). Thus, theorists should ask themselves "what reality must be like (i.e., what mechanisms must exist) for the observed event to have occurred" (Wynn and Williams 2012, p. 799). These proposed mechanisms are then used for further data analysis in that they guide the analysis and must be supported as more and more observations are analyzed. In a way, abductively identified mechanisms then become a form of analytical frames (compare retroductive theorizing above), although their origin is different (i.e., not rooted in previous theoretical considerations).[6] Such approaches are evident in respective methodological papers such as Bygstad et al. (2016), Morton (2006), or Wynn and Williams (2012). While few studies have used this mode of theorizing as yet, papers by Volkoff et al. (2007) and Lauterbach et al. (2014) provide illustrations.

Abductive theorizing can also be interpreted as the development of preliminary working hypotheses preceding the inductive analysis of the data (Peirce 1998). While such inductive theorizing seeks out facts (or to detect patterns), abduction seeks theory as part of a researcher's mental process of revising his or her belief system (Gonzalez and Sol 2012). In other words, the process of making sense of the data to build theory is supported by what Peirce (1998) refers to as informed guessing animated by hope. In theorizing, such initial guesses are then compared into the data to see whether they hold up. Abduction guides data analysis but must also be challenged by additional insights as the analysis

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6 Looking at the literature on critical realist work, the principal methodological recommendation drawn from this abductive form of theorizing is termed *retroduction* (see Table 2, Figure 2, and pp. 799-801 (esp. footnote 5) in Wynn and Williams 2012). As highlighted above, we argue that *mechanisms*, as analytic frames, are initially proposed in an abductive process before they can be used retroductively. By referring to the writing of Charles S. Peirce – as summarized in Buchler (1955) and Tomas (1957) – Wynn and Williams describe this as *retroduction* (the initial discovery of new mechanisms) and *retrodiction* (the application of previously identified mechanisms). They highlight that this interplay of retroduction and retrodiction can also be understood as an abductive process in the sense of Peirce (Buchler 1955; Tomas 1957).

progresses. If the analysis suggests other, more powerful explanations (referred to as the *eureka* moments of abduction), these will replace the initial abductive guess.

While not commonly found in IS research, the latter interpretation of abduction can be linked to the process of designing artifacts. Here, abduction compares to creative design ideas that can be used to initiate a design project and guide it to the implementation of early prototypes (Tomiyama et al. 2003). Logically, evaluation of the artifact must be seen as challenging these early abductive thoughts and as providing the opportunity to improve the design (Gonzalez and Sol 2012).

4.1.5 Theorizing through Design and Action

A final form of theorizing entails work that employ tools such as design or action research. Such approaches are characterized by interventions into the ‘real world’ and that 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 observing whether a meaningful intervention leads to a desired outcome. Interventions in this sense need to involve some extent of understanding the phenomenon the research is intervening in. In turn, this intervention will change 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 the researcher hypothesized), both the intervention and the theoretical understanding of the underlying phenomenon can be inferred to be accurate. Thus, the understanding can inform future interventions such as managerial actions or the design of an information system. This strongly relates to the prescriptive knowledge embodied in Gregor’s (2006) theories for design and action.

There is a long tradition of action research in IS (e.g., Baskerville 1999; Checkland and Holwell 2007; DeLuca et al. 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 et al. 2005; Järvinen 2007; Sein et al. 2011). Nonetheless, the relationship between theorizing and design remains controversial. Increasingly, our community's attention is drawn to reconciling the two (e.g., Fischer and Gregor 2011; Kuechler and Vaishnavi 2012; Lee et al. 2011; Piirainen and Briggs 2011), for instance by comparing design to grounded theorizing (e.g., Mueller and 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 sense-making 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 the first four have been recognized in many seminal contributions on design (e.g., Hevner et al. 2004), the fifth form is receiving increased attention. Here, the development of design theory is often interpreted as a theoretical output of design (Gregor and Jones 2007; Kuechler and Vaishnavi 2008; Piirainen and Briggs 2011; Walls et al. 1992). To support this, the heuristics that go into structuring and understanding the problem to be solved and those used to design alternative solutions can be interpreted as important potentials for theoretical contributions through design. Also, processes to extend prior research through design efforts are increasingly recognized in the IS discipline (Kuechler and 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 understandings of 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 the virtue and viability of their work. Weick (1989) offers a summary on what makes good theory and proposes that "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 all these are powerful criteria for evaluating theory, a theorist might find that they are difficult to assess and implement.

At a more concrete level, Weber (2012) presents a framework and criteria for theory evaluation. According to his work, a theory should be evaluated 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, researchers are advised to describe them precisely because they implicitly define the theory's boundary or domain, that is, the phenomena the theory is intended to cover. Many scholars consider a field's understanding of the boundary conditions associated with its theories is perceived as a good proxy for the quality of its theories (Gray and Cooper 2010). This also links to the ideal of conceptual clarity introduced by Suddaby (2010). 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, a theory's focal phenomena should be deemed 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 can be used to examine the conditions researchers believe will most likely lead to the theory being falsified (*falsifiability*).

Weber's 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 is grounded 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 why these criteria don't apply to a particular theoretical contribution and which other criteria should be used instead. To provide a broader picture, we have synthesized the many suggestions on 'good' theorizing (Bacharach 1989; Bhattacherjee 2012; Corley and Gioia 2011; Glaser and Strauss 1967; Lee and Baskerville 2003; Lee and Hubona 2009; Steinfield and Fulk 1990; Suddaby 2010; Wacker 1998; Weber 2012; Weick 1987; Whetten 1989; Witkin and Gottschalk 1988) into a list of quality criteria (Table 2), even though that list is neither comprehensive nor complete.

Beyond these, a theory must demonstrate its 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). Novelty should also be understood from a social perspective (Weber 2012), since the language used to communicate the theory must be appealing and convincing (Locke and Golden-Biddle 1997). This 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 the advancement of science through further developing and extending a discipline's knowledge. Following Weick (1989), the theory construction process in organizational studies can be portrayed 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, 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, the result of the selection process is the retention of a conjecture with the best comparative performance in terms of describing, explaining, and predicting. Another perspective to evaluate a theory was proposed by Olbrich and Mueller (2013). Based on dimensions that are very similar to a theory's range and type, as introduced above, they 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 and McLean 1992; DeLone and McLean 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 are needed in order for a set of relationships 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).

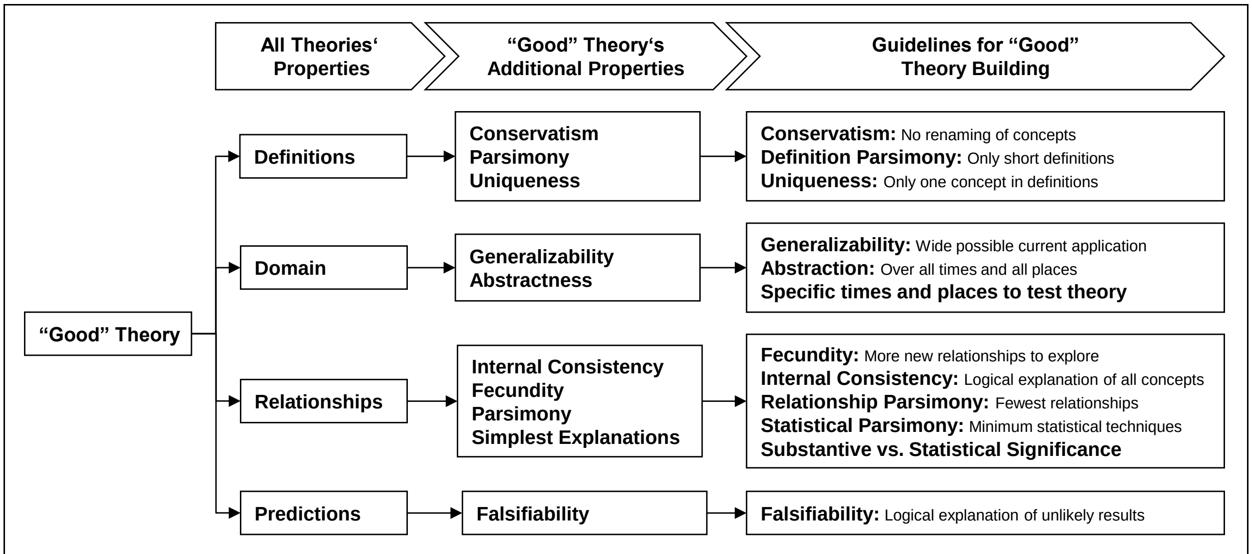

Figure 1. Interdependent Quality Criteria for Theory and Theorizing (Wacker 2008, p. 13)

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 noted, theory can generally be seen as both an input to and an output of research. As an input, it enables the researcher to conceptualize a phenomenon of interest and thus capture it in her or his 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 after us.

In any of these two modes, DiMaggio (1995) argues that there are two important views on theory's role for researchers. First, DiMaggio (1995) 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 stresses empirical tests of the narrative's plausibility and careful attention to the narrative's scope conditions. DiMaggio (1995) 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" (DiMaggio 1995, p. 391). Second, DiMaggio (1995) 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 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, theory serves as the cumulative basis through which we document and advance our understandings of 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. This 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 the reasoning by Colquitt and Zapata-Phelan (2007), who build on the two principal dimensions of theory-building and theory-testing to introduce five theoretical contribution types. While two of these have low potential for genuine contribution (i.e., reporting and qualifying), the three remaining ones (i.e., testing, building, and expanding) have high potential of becoming substantial theoretical contributions. *Testing* refers to a situation in which researchers build a strong foundation for their work in extant literature and then seek to 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 our understandings of a phenomenon. This 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, advancing our theoretical understandings 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 be a result of expanding.

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

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. This helps to identify the least common denominator, 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, for example 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 using 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 and 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 they yield sufficiently similar outcomes to absolve an original study of any suspicion of being merely serendipitous (Ravetz 1971). This 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 the same study cannot be exactly repeated twice (Brogden 1951; Rosenthal and Rosnow 1984), skepticism as to whether replication in social systems is possible at all must be carefully assessed (Tsang and Kwan 1999). Tsang and Kwan (1999) as well as Dennis and Valacich (2014) offer more refined taxonomies of approaches to replication. The latter, for instance, differentiate between exact replications (i.e., studies that are exact copies of 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., with exactly the same research question or hypotheses, but employing different methods) (Dennis and Valacich 2014). Already common in other disciplines such as medicine or physics, this approach to test-based theorizing is gaining a foothold in business research areas. IS seems less advanced in this regard (Dennis and Valacich 2014) and has only begun to discuss the matter to resolve confusion and skepticism (e.g., Olbrich et al. 2015).

Theorists that aim at *expanding* a theory to make their claim for contribution are confronted with a certain set of confirming observations in line with extant literature, but also generate extending observations that go beyond the incumbent theory. While the confirming observations are important, so as to ground the theorizing in the original theory, and to ensure that one does not have to abandon the original theory altogether, the extending observations will highlight how and why the expanded theory is superior to the original form. The extending observations might require a substantial redrawing of the theory's original nomological network, for example by reconceptualizing constructs or developing new propositions. An example of this approach to theorizing from the IS field is the IS success model. After its introduction (DeLone and McLean 1992) and revision (DeLone and McLean 2003), this model was tested several times by several researchers in various contexts (e.g., Almutairi and Subramanian 2005; Iivari 2005) to become one of most influential IS theories (Moody et al. 2010). Papers that aim at expanding have to carefully contrast and compare their expanded theory to the original theory and have to provide elaborate discussions of the original theory's shortcomings in order to be convincing.

Of course, observations that are not in line with extant theory can also be so fundamentally different that they outright contradict existing theory. Similarly, observations (or phenomena altogether) might be novel such that they can simply not be captured with any theoretical lens readily at hand. In such cases, theorists have to shift towards *building* new theory after diligently ruling out measurement errors or any other type of methodological bias. An example of an established theory that faced contradictory observations is the work of Markus (1994) on media richness; 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 from the IS field of newly built theories would be Lapointe's 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 et al.'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, rivalry explanations are ruled out. However, this should not be misread as an obligation of the theory-builder to also be a theory-tester. Nonetheless, the newly built substantive theory must prove that it outperforms incumbent or rival explanations in the field.

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, thereby confirming the original findings, replication studies can also be motivated by 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, it is also possible to replicate a study outside its original context (e.g., Asamoah et al. 2015; de Vreede et al. 1998).

Combining the *three theoretical contribution types* discussed by Colquitt and Zapata-Phelan (2007) (i.e., testing, expanding, and building) with the *three empirical observation types* we identified above leads us to recognize a pattern that helps theorists to reflect on their observations in order to recognize the theorizing type and paper genre they are engaging in. Or, conversely, whether the observations and analyses they make are in line with the theorizing type they intended to engage in. In this, a majority of confirming observations suggests 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 illustrated by Figure 2.

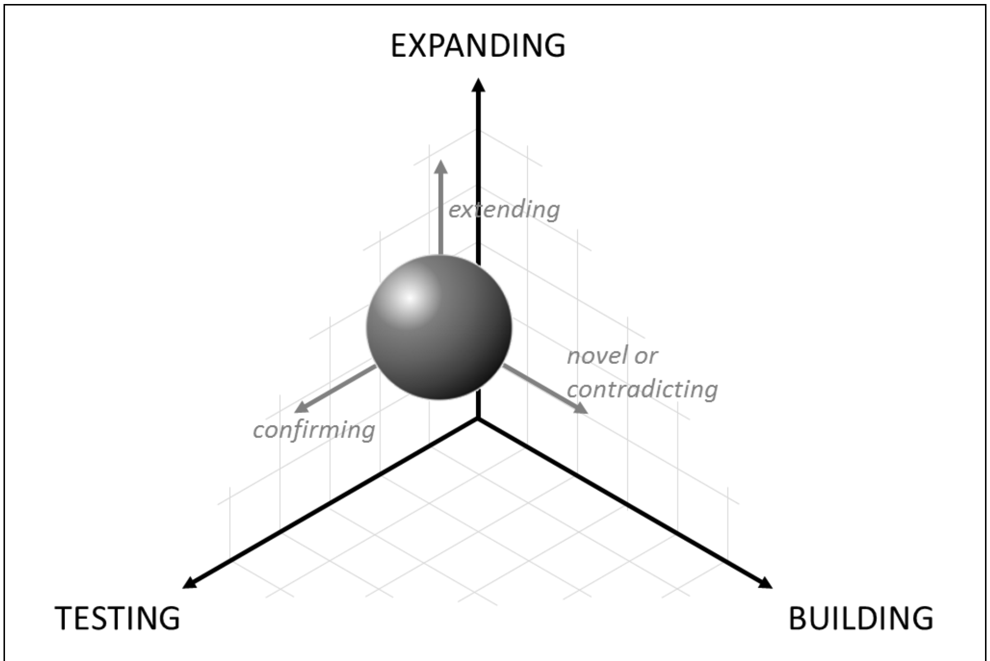

Figure 2. Types of observations and their alignment with theorizing types

Of course, the delineations between these three types of theorizing and the three types of observations we proposed are not easy to make. Colquitt and Zapata-Phelan (2007) try to counter that problem by not simply juxtaposing their types of theoretical contribution on a simple 2x2 matrix of theory-building and theory-testing, but by placing the types of theoretical contribution discussed above as extremes in the corners of a 5x5 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 are being used to ground the theorizing. While we propose to look at the three types of theorizing in a slightly more refined manner, we agree with Colquitt and Zapata-Phelan (2007) in calling for careful reflection on intended contribution, observations made, and paper genre, which we highlighted above.

Beyond theorizing with some form of observation that may or may not be in line with extant theory, theorizing can also occur in a purely conceptual form. Such pure theory manuscripts emphasize the description of a phenomenon through a convincing development of constructs and propositions (Zmud 1998). Similar to our three types of observations discussed above, such purely conceptual papers may take different stances in regards to existing theory; from extensions to novel or contradicting theories. In all of these cases, the new theory has to justify why it is needed "[…] 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 regarded as important for a discipline's conceptual development and have been called for by a number of editors in our field (e.g., Markus and 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 (e.g., Burton-Jones and Grange 2013) to philosophical essays (e.g., Berg 1998) or review papers (e.g., Leidner and Kayworth 2006; Melville et al. 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 provides not only an important foundation for all these future discussions, but will also help IS researchers to more easily identify what it is that they (might) disagree with. This will allow them to contribute to the ongoing debate on advancing theory and theorizing in IS. We will now extend existing discussions on theory and theorizing in IS beyond the foundations we have synthesized thus far.

5.1 Revisiting the Concept of Theory

A number of recent contributions suggest revisiting what theory is and what roles it has in IS research (e.g., Avison and Malaurent 2014; Bichler et al. 2016; Lee 2014; Majchrzak et al. 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 are contingent on certain philosophical foundations. For instance, Bacharach's 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 was prevalent when Bacharach's article was written and published. Bacharach's original definitions assume that a 'real world' must exist, so that a theory can adequately capture it. Similarly, variance and process theories are often described 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, constructs and theories are constructed by the researcher as an abstraction of things that are directly observable. These latent entities logically rest on the philosophical assumptions of their original contributors. This has two implications: First, any theory clearly depends on the theorist's assumptions. This entails relevant meta-theoretical assumptions as well as 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 touched on earlier, this 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. This seems to be exacerbated not only by realist and pragmatist perspectives, but also reflexive positions (Alvesson and Sköldberg 2009). 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 – with wide-ranging implications on the meaning of theory, theories' constituents (e.g., constructs, propositions, boundaries), and theorizing. Further, different strands of non-positivist thinking – involving, for example, social constructivism, phenomenology, post-modernism, post-structuralism, flavors of feminism, or critical theory – attach very 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 and Fulk 1990). They are conceptual entities that abstract classes of observations to make sense of emergent patterns (Morgeson and Hofmann 1999; Nunnally and 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) advocates re-thinking the very concept of theory. He suggests that theory should not be thought of as a product or outcome of science, but proposes that IS should adopt a perspective focused on science as a practice. Hovorka argues that theory should rather be understood as discourse, shifting the emphasis from the product to the process of theory-based interaction in a certain discursive community. Contributions like Hovorka's are indicative of the emergence of a debate on what theory is, as called for by scholars such as Lee (2014) and Markus (2014) in response to Avison's and Malaurent's (2014) critique of the so-called theory fetish in the IS field.

We see future contributions in the IS field becoming more critically engaged with the philosophical foundations that most of the IS discipline's engagement with theory is grounded in. While the importance of papers such as those by Gregor (2006) or Weber (2012) cannot be overestimated, much of their work rests on specific ontological and epistemological assumptions on the nature and roles of theory in IS scientific discovery. The same is true for the other papers we have drawn on so far to review theories and theorizing in IS research and for 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 of them (we listed a few examples earlier) will likely have less of a realist ontology and representational epistemology than the once-dominant approaches to theory and theorizing in IS research. Given the centrality of theory 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 researchers' understanding of theory and theorizing. After all, we would not want to dismiss contributions made by agential realists or feminists lightly based only on seeking to assess their contributions with criteria not made for them. Similar struggles in the IS discipline are evident when looking at early interpretive research (see, e.g., Lee 1991) and how long it took for this merely epistemological issue to be resolved.

An example of an exciting IS research area here is the revived interest in sociotechnical systems. 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 and 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 and Orlikowski 2013). In the wake of this discussion, many new philosophical positions have been discovered or proposed, 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 upon definition of theory and/or theorizing. Also, what we have presented in the *what* and *how* above is not advocacy for such unification. But to be prepared for debates on how to advance theory and theorizing, it is necessary to be grounded in the status quo. Beyond a sound command of the extant concepts and conventional definitions we present here, this also includes essential works on the IS discipline's philosophical foundations; for instance, Becker and Niehaves (2007), Hirschheim (1985), or Mingers and 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 be of help concerning studying their phenomena. To be fruitful, such debate must be critical. For instance, we will likely hear voices advocating 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 and Lucas 2005; Grover et al. 2008).

At a higher level, the discussion on what theory is connects to what Lyytinen and King (2004) refer to as plasticity of the (theoretical) core of a discipline. 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 and 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 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, understanding what theory means and what roles it has in the scientific process are implicit prerequisites. Otherwise, the IS discipline runs the risk of backing itself up into a particular paradigmatic corner or to irreconcilably fragment its findings into a myriad of philosophical boxes.

5.2 Reconsidering Deductive Theorizing

Colquitt and Zapata-Phelan (2007) suggest that reporting, qualifying, and testing do little to build *new* theory. This 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 IS discipline’s identity (Benbasat 2001; Benbasat and Zmud 2003); notwithstanding the discussion on whether IS needs a unique theoretical core (Grover et al. 2006; Lyytinen and King 2004; Straub 2006; Straub 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 of papers testing their propositions) are strongly rooted in reference disciplines’ theories and have contributed greatly to the advancement of what we know about IS. While such borrowing of theories from reference disciplines can be interpreted as a sign of relevance of IS research 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 owing to its non-ampliative nature (Gauch Jr. 2003). One such opportunity was introduced by Oswick et al. (2011), who see the major constraint of the deductive process of theory-building 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. Based on dissonant thinking, dis-analogy, and counterfactual reasoning, their approach to deductive theorizing seeks to promote new ways of thinking about theory development and to stimulate the generation of new and more radically homegrown theories.

A similar opportunity to enrich deductive theorizing in IS research lies in suggestions by Shepherd and Sutcliffe (2011), who suggest that while many advances have been made in terms of enriching inductive approaches with deductive elements, the same progress has not yet advanced deductive theorizing by drawing on inductive elements. As a solution, they suggest a much more explicit treatment of the extant literature used to deductively develop a study's conceptual underpinnings. Grounded in a coherence framework and a pragmatic perspective, their approach suggests thinking of the literature as an ex ante source of data that is explored inductively by the researcher. In contrast to the dominant deductive approach, "[…] which relies on theorists' knowledge and experience to narrow the scope of the search […]" (Shepherd and 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, for example, Cecez-Kecmanovic et al. 2014 and the articles published in MISQ's corresponding special issue) or the increased attention to software-based platforms (e.g., Tiwana et al. 2010) and corresponding mechanisms for the co-creation of value (see, for example, Grover and Kohli 2012 and the articles published in MISQ's corresponding special issue) seem to provide excellent resources for the dialectic blending suggested by Oswick et al. (2011) or a more inductive exploration of the literature – both inside and outside the IS domain – as proposed by Shepherd and Sutcliffe (2011). The explicit recognition of the unique characteristics of the IS phenomenon is an opportunity that should be leveraged. Rather than minimizing any variation 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 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 Multi-Verse

The idea of boundary-spanning and integrating multiple nomological nets into higher-order theories (see footnote 4) points to the opportunity to work with more than one theory. Particularly the extending observations made while building new theory are important here, since a theorist 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) provide a seminal review of multi-theoretical research in management broadly. They identify a set of six different patterns of interplay between two or more theories. First, *bracketing* is used to contrast two competing theories, with special attention to the original theorists' assumptions and underlying views. This approach employs a kind of 'literal replication' of the phenomenon in that two independent explanations are compared. This approach is often used in reviews of – to date – incommensurable, competing theories. Second, *bridging* is also often used in reviews. It is more of a unifying approach in the sense of identifying transitioning zones between theories that help to bridge two separate paradigms. In its often merely conceptual application, bridging often spurs transdisciplinary collaboration. Third, when working with multiple paradigms in *parallel*, theorists use multiple paradigms simultaneously to highlight contradictions. This approach can be applied to evaluate two or more rival explanations. These approaches often rely on the contestants' empirical evaluations. An IS example of the parallel mode can be seen in Keil et al. (2000) who test four theories on project escalation to determine which theoretical model has the highest explanatory power. Fourth, a *sequential* mode is employed when theories are used consciously to inform one another. Theorists thus use 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), *metatheorizing* 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 and Pitre 1990, as cited by Lewis and Grimes, 1999, p. 675). Constructs in such a metatheoretical approach then span different nomological nets. Exemplary work was done by Hovorka et al. (2013), who analyze a set of different theories, seeking to integrate them. Sixth, Lewis and Grimes (1999) introduce *interplay* as a refinement of the meta-theorizing approach. They highlight the importance of using the multiple theories under consideration simultaneously in order to leverage their complementarities.

In any of these ways, theorists can build an extended understanding by looking at a phenomenon through two or more theoretical lenses, to get a better understanding of the phenomenon from more than one perspective (Mueller and Raeth 2012). This extension can take three forms: Redundant (multiple theoretical lenses result in similar observations, contributing 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, theorists engage in what Grover (2013) refers to 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.

An example of multi-theoretical work is the study by Lapointe and Rivard (2007), who combined three theories of user resistance to explain contradictory empirical observations and propose a richer model. We also suggest that an integration of theories across multiple levels is an instance of the interplay approach. Here, Quigley et al. (2007) use theories on multiple levels to build a more comprehensive understanding of knowledge-sharing.

The idea of multiples can also be extended beyond work with multiple theories alone. Two trends we see as opportunities for IS theorists are the increased attention to multilevel theory and 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) are 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), the opportunities connected to it have long been recognized (Klein et al. 1999). As multilevel research can become challenging, Klein and Kozlowski (2000) provide a detailed discussion of critical steps in conceptualizing and conducting such studies. Ranging from the choice of constructs to sampling and the selection of the data analysis approach, they provide detailed reflections on the implications of going multilevel. Beyond examples in IS (e.g., Burton-Jones and Gallivan 2007; Lapointe and Rivard 2005), the trend towards multilevel theory is also reflected in similar calls in the wider management area (Hitt et al. 2007).

The latter, multi-methodological approaches, have long been recognized as opportunities for theoretical contributions (Kaplan and Duchon 1988; Mingers 2001). While most commonly focused on a combination of 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' (1994) multi-methodological study of media richness illustrate the opportunities of such approaches.

5.4 Rediscovering 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 the context-specificity of technology artifacts, no single conceptualization of technology will likely work for all usage contexts (Orlikowski and Iacono 2001).

Thus, considering the characteristics of the technology artifacts, the technology's usage context, and the users' characteristics are critical for IS researchers (Hevner et al. 2004). Johns (2006) distinguishes two levels of analysis when thinking about context: the omnibus context and the discrete context. While *omnibus context* refers to a broadly conceptualized context (e.g., location or time), *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 et al. (2014) propose two general approaches: single-context theory contextualization and cross-context theory replication. In single-context theory contextualization (primarily addressing the discrete context), the researcher starts with the identification of a well-established general theory and gradually refines it based on the particular context being studied. At the first level of contextualization, general models may be refined by adding or removing core constructs. At the second level, general models are contextualized at a finer level by incorporating context-specific factors that are directly relevant to the characteristics of technologies, users, and usage contexts. This can be done 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 (primarily addressing 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. This is supported by the recent turn towards practices, that is, looking at what people actually do at an individual level; a trend in both the IS community (e.g., Arvidsson et al. 2014; Peppard et al. 2014) and the management discipline (e.g., Jarzabkowski 2004; Jarzabkowski and Whittington 2008; Whittington 2006). From a theorist's perspective, two opportunities are promising: First, looking at what people actually do (as opposed to only what they think or say they are doing) will allow us to investigate the emergent interplay of various agencies in the field, how they influence each other, and their effects across different levels (also compare Schultze and Boland 2000). Second, this has the potential to better link IS theories with the managerial practice we seek to inform (Sandberg and Tsoukas 2011), hopefully defusing some of the concerns about the IS discipline's relevance as we turn our attention to theory.

While these four opportunities are not an exhaustive account of the roles theory can play for IS scholars, it is important to reflect on these four while going through the *how* of theorizing. Understanding theory's roles and their implications, along with 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 referred to in the *how* section above. 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 to be able to wrap up the theorizing by synthesizing key findings enable the generation, documentation, and communication of knowledge which (as noted) is a key contribution of science.

6. DISCUSSION AND CONCLUSION

We have synthesized 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, irrespective 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 provide a synthesis of their contributions. Nonetheless, such a synthesis is an important contribution. Most importantly, and in light of the intensified discussion on theory and theorizing within 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 this review of the current state of the discussion on the product and process perspectives, we briefly reflected 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 did not seek to construct a grand, unifying theory of theories, but sensitize readers to the importance of philosophy in this context. We do not suggest that any particular view of theory and theorizing is superior to any other, equally viable approaches. 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 as important to making a significant theoretical contribution. This observation is supported by Zmud (1998, p. xxix), who notes 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 alerting us to the importance of a theorist's writing abilities. Even the most convincing arguments need to be wrapped in excellent writing (Pollock and 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 and Corley 2012; Bono and McNamara 2011; Colquitt and George 2011; Geletkanycz and Tepper 2012; Grant and Pollock 2011; Sparrowe and Mayer 2011; Zhang and Shaw 2012), especially the contribution by Sparrowe and Mayer (2011) on grounding hypotheses in deductive theorizing, are important resources for all those who seek a stronger command of theoretical writing.

Most papers published in IS show surprisingly successful testing, some with a flavor of expanding, but only a few truly build new theory. Looking at the different observation types and how they relate to different theorizing types leads us to suggest that working with contradictory observations holds important potential for powerful theorizing largely neglected in IS. However, 'path-breaking' theorizing is most likely closest to the ideal proposed by DiMaggio (1995): Contradictions – or the conceptual resolutions thereof – help to build the complex, de-familiarizing, and paradoxical enlightenment that makes a good theory. While perceived as more disruptive by some, challenging or disconfirming some theories IS holds dear as a discipline is as in line with the building on each other's contributions that

Keen (1980) was looking for as testing and qualifying are. More importantly, challenging and disconfirming will help to maintain the plasticity of the IS discipline's core knowledge (Lyytinen and 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, a contribution by 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 raised by Avison and Malaurent (2014) 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 theory's core constituents are not explicitly covered. Once we are able to do so, we will find the full potential of what theory has to offer: It provides IS researchers with a framework for synthesis and integration of our empirical findings, helps to generate a priori hypotheses, which add rigor and falsifiability to our research, allows our conclusions to be generalizable 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 fields with other related fields (Steinfield and 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 – that is, exclusively presenting empirical data as if it speaks for itself – a theorist should rise above mere descriptions and correlations. Only then will the IS field be able to claim scientific legitimacy – whether or not we have theories that are native to IS.

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 referred to the utility of theory for practice, in our view, the same is true for IS research practice. Theory matters!

7. REFERENCES

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