Introduction: Why Theory? (Mis)
Understanding the Context and Rationale

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Prelude

Writing an introduction to the highly discussed and most misunderstood topic of theory in information systems (IS) research circles can be challenging. The IS field has been debating the nature and role of theories for some time with intense debates regarding whether or not a theoretical core is necessary (Weber, 2003, 2006; Lyytinen & King, 2004, 2006) and disagreements concerning whether or not the field can speak of native theories (Grover, Lyytinen, & Weber, 2012; Weber, 2012), and what constitute IS theory and the role of theories in IS (Holmström, 2003, 2006; Lyytinen & King, 2004, 2006).
It is therefore premature to write an integrative summary of all these discussions in this introduction. What is not up for debate is how the field undertakes its research using theories from its “reference disciplines.” By borrowing from these reference disciplines “the theories and methods of these disciplines serve to set the standards by which the quality and maturity of IS research should be measured” (Baskerville & Myers, 2002, p. 1). Whether it is the theory of reasoned action (TRA) or its derivative, the theory of planned behavior from social psychology, resource based view (RBV) and absorptive capacity theory from strategic management, game theory and transaction cost theory (TCT) from Economics, innovation diffusion theory (IDT) from communications, or social cognitive theory and activity theory from psychology, the IS field has consistently borrowed (Lim, Saldanha, Malladi, & Melville, 2013), often uncritically (Markus & Saunders, 2007; Hassan, 2011), to legitimize its research. Given the background of the history of theories in the IS field, the goal of this series of volumes is to advance IS research beyond this form of borrowed legitimization and derivative research toward fresh and original research that naturally comes from its own theories—information system theories. It is inconceivable for a field so relevant to the era of the hyper-connected society, disruptive technologies, Big Data, social media, and “fake news” to not be brimming with its own theories. That is why the title of this series of volumes, “Advancing Information Systems Theories,” is phrased in such way as to emphasize its intended goal. The focus of this series of volumes is on “information systems theories” and not just “theories in the information systems field.”

Any advancement of theory has to begin with some form of agreement with regard to IS theories from thought leaders of the IS community. Although much progress has been made, many questions remain unanswered. The major questions that will be addressed include the following: What can we agree on with regard to theories? What constitutes theories and what doesn’t? Why do we need theories? How can one go about developing theories? What does an IS theory look like? Therefore, the approach in this series of volumes is to solicit from the field’s thought leaders of all levels and accomplishments how they each address these questions. For a field as diverse in its content and approaches as the
IS field, such a goal will be challenging but not insurmountable. The symptoms stemming from the ambiguity surrounding theories in the IS field manifest in various forms. It is omnipresent in panels at major IS conferences since the inception of the IS field (Keen, 1980; Mumford, Hirschheim, Fitzgerald, & Wood-Harper, 1985; Klein, Hirschheim, & Nissen, 1991; Nissen, Klein, & Hirschheim, 1991; Karahanna et al., 2002). It can be seen in editorials and special issues of major IS journals (Weber, 2003, 2006; Hirschheim, 2006; Lyytinen & King, 2006; Straub, 2012; Avison & Malauent, 2014; Gregor, 2014; Lee, 2014; Markus, 2014). It also manifests itself in how authors often hedge their prose when introducing the theory portion of their submissions with the phrase “toward a theory” or “building theory.” And it emerged as a title in the 2019 International Conference for Information Systems (ICIS): “How and Why ‘Theory’ Is Often Misunderstood in Information Systems” (Siponen & Klaavuniemi, 2019).

Much of the discussion on theory in the IS field mirrors the debates in the management research surrounding theory, and these continue unabated (Bacharach, 1989; Weick, 1989, 1995, 1999; Whetten, 1989; van de Ven, 1989; Doty & Glick, 1994; Sutton & Staw, 1995; Colquitt & Zapata-Phelan, 2007; Hambrick, 2007; Whetten, Felin, & King, 2009; Corley & Gioia, 2011; Suddaby, Hardy, & Huy, 2011; Byron & Thatcher, 2016; Shepherd & Suddaby, 2017). Often the misunderstanding about theories in IS and the management fields has to do with how the notion is framed. For example, both Hirschheim (2019) and Hambrick (2007), in criticizing their respective field’s obsession with theory, traced its origins to the historical period when business schools were under pressure to draw its scholarly methods from the more established social sciences, such as psychology and economics, in order to enhance rigor and raise its level of scholarship. In the IS field, this phenomenon of drawing from the “natural science model” (March & Smith, 1995) built a tradition labeled “behavioral IS research” (Hevner, March, Park & Ram, 2004; Goes, 2013). These kinds of derivative research either prominently cite their sources of theory from these reference disciplines, or in the absence of such theories, will as Hambrick (2007) laments, pepper their articles with enough words like “theory,” “theoretical
framework,” or “theorizing” to persuade reviewers that the article has enough theory in it. Kaplan (1964), over half a century ago, wrote about how authors would resort to similar strategies of augmenting their research with words suggesting theory, albeit in essence treating theory only as an afterthought.

One reason why researchers resort to these strategies has to do with a sense of insecurity about whether or not their research has “enough” theory to satisfy journal editors, and this insecurity is in turn exacerbated by a misunderstanding of what theory means. If the researcher is unclear whether or not the research contains theory, and is under pressure to demonstrate theory, the researcher is very likely to overcompensate and may even find instances of some theory to latch on to regardless of however strained its relevance. This phenomenon is neither a twenty-first-century tendency nor is it limited to the IS field and management. The confusion with regard to theory should not come as a surprise because even the experts on philosophy of science disagree on what exactly scientific theories look like (Suppes, 1967; Suppe, 1977, 2000; Swedberg, 2014). It is no surprise that IS and its allied management fields also experience confusion. The goal of this introduction is to begin the engagement with theories in a substantive fashion by addressing the question as to why theories are needed in the first place. We use the Aristotelian approach documented in his *Posterior Analytics* to answer this “Why Theory?” question. To Aristotle, answers to the why questions comes from answering the question about the meaning and essence of the *explananda* (Charles, 2000); that is, to answer the why question, one needs to answer the what question. The “Why theory?” question requires a clear response to the “What is theory?” question because, much like everything else, why we need something is dependent on a clear definition of that something which is needed. We need air because air contains life-giving oxygen and other elements that help us breathe and therefore live. So, this introduction sets the stage for our engagement with theory by answering two questions: What is theory and why do we need it?
What Is Theory?

Interestingly, Gregor (2006) acknowledges that the nature of theory itself has not received much attention within the IS field. This observation coincides with the struggles the field has with theory. We begin our engagement by reviewing major discussions about the definition of theory within the IS field and compare those discussions with those outside the IS field.

Theory from the IS Field

As Gregor (2006) notes, IS researchers who use “theory” in their research topics fail to give any explicit definition of theory itself and therefore work within their limited scope of their understood version of theory. For instance, when Sarker and Lee (2002) test three competing theories of business process redesign—the technocentric theory of redesign, the sociocentric, and sociotechnical theories of redesign—their version of theory follows from Markus and Robey’s (1988) focus on the causal structure of theory. Their work, therefore, is restricted to a subset of theories that discusses cause and effect, which do not encompass all that could be said about theory. Gregor (2006, p. 616) defines theory in a way that is not limited to causality, but as “abstract entities that aim to describe, explain, and enhance understanding of the world and, in some cases, to provide predictions of what will happen in the future and to give a basis for intervention and action.” Gregor’s definition favors a more inclusive form of theory that could describe, explain, or predict. This definition also implies that although prediction is one of the goals of theories, it is not the only goal. Weber (2012), on the other hand, prefers to align with the definition of theory limited only to Gregor’s Type-IV theory—theory for explanation and prediction—because only this category of theory satisfies his requirement for precision in defining theory’s components, associations, states, and events.

Lee (2014) addresses the question of “What is Theory?” by suggesting that theory cannot be separated from science, and like science the nature
of theory differs across the different terrains of science. According to Lee (2014), the dominance of the natural sciences has colored the conception of theory to mean the science of description and explanation, which may not be suited for the IS field. IS falls into the category of applied sciences that describe how to innovatively create better information systems to meet human needs that do not now exist or have not yet existed. For Lee, this conception of theory excludes both the definition of theory within the positivistic sciences and the interpretive kind. In summary, although Gregor (2006, p. 614) favors the more inclusive definition of theory that includes “conjectures, models, frameworks, or body of knowledge,” her sentiment is not shared across the community (Hirschheim, Dennis, & Willcocks, 2019).

**Theory from the Management Field**

Much of the discussion about theory in the IS field is guided by discussions in the management field that continue unabated. The first wave of these discussions in 1989 defined theory, what constitutes theory, and what theoretical contribution looks like. Introducing the forum on theory, van de Ven (1989, p. 486) lauded good theory because it “advances knowledge in a scientific discipline, guides research toward crucial questions, and enlightens the profession of management.” Bacharach (1989, p. 498) offers a definition of theory that is repeated by many IS researchers (Mueller & Urbach, 2017) as “a statement of relationships between units observed or approximated in the empirical world …[with the goal of answering the] how, when, and why.” He made it clear that descriptions (such as categorization of data, typologies, and metaphors) do not qualify as theories because they only answer the “what” question. To this, Whetten (1989) adds that models are indistinguishable from theories. Thus, a theoretical model qualifies as a theory. To him a “complete theory” must contain four essential elements that address the what, how, and why of the theory and a fourth element consisting of who, where, and when. The what and the how elements define the domain of the theory as well as the model that could be tested, while the why element explains the logic and justification for the theory.
The second wave of discussion among management theorists also addressed what theory is, by discussing what theory is not (Sutton & Staw, 1995; Weick, 1995). They emphasize that theory has to do with answering the why question, and since literature reviews, data, and hypotheses do not address the why question, they do not qualify as representations of theory. They recommend lessening the expectations for strong theory to allow researchers to focus on data and empirical findings without necessarily demanding theory to be constructed. This argument about accepting papers that may have strong theory but not empirical data, or papers with empirics but not strong theory, is picked up in the IS field by Avison and Malaurent (2014) and by Grover and Lyytinen (2015). Weick (1995, p. 385) adds that “most products that are labelled theories actually approximate theories,” so, half-done frameworks, preliminary hypotheses and discussion of concepts qualify as means to develop theory and should be at least valued as such. For Weick, the term theory should not be restricted to just good theory or grand theories and should include the interim struggles, just like how physicians theorize about what is wrong with the patient from data and symptoms without necessarily introducing any theory. In this example, equally important to the theory (or diagnosis) is the context in which the theory lives, and, thus, the theorizing process itself becomes critical because it points to the depth of the theoretical analysis provided by the researcher. Theory therefore is much richer, multidimensional, and much more nuanced than most would like it to be, and that is why “good theories” are hard to come by (DiMaggio, 1995).

The third wave of discussions on theory in management was marked by Hambrick’s (2007) complaint of concerning the management field’s obsession with theory at the expense of interesting empirical discoveries. In response, Corley and Gioia (2011) laid out what theoretical contributions amount to, providing some practical guidance as to what originality, utility, relevance, and prescient scholarship that influences the future of management might look like. The conclusion of all that discussion (Suddaby et al., 2011) was that by and large management researchers failed to develop their own theories and that any theory they use fails to capture the rich manifestations of organizations in society (Kilduff,
Mehra, & Dunn, 2011; Oswick, Fleming, & Hanlon, 2011; Sandberg & Tsoukas, 2011; Shepherd & Sutcliffe, 2011). One reason for this phenomenon is that the management field neglected testing to whittle down the morass of theories (Pfeffer, 2014) that had already cluttered the field since its early history (Koontz, 1961).

It would take more than a decade after Hambrick’s (2007) complaint for management theorists to consider that perhaps they have restricted the meaning of theory too much, leaving no room for the varied knowledge about management. Thus, Sandberg and Alvesson (2020) propose an expansion of the meaning of theory in order to engender a more creative approach toward alternative, multidimensional, heterogenous views of organizational phenomena. Their proposal includes structural elements specifying minimal requirements for “theory” without restricting its meaning. Those structural elements specify a purpose for the theory, direct the theory to a phenomenon, embody some conceptual order, provide insights beyond common sense, hold relevance that can be evaluated, have empirical support, and are constrained by certain boundary conditions. Using primarily purpose and the target phenomenon as criteria, they build a typology of theory types very different from traditional views of theory— theories that explain, comprehend, order, enact, and provoke.

Theory from the Social Sciences

Before discussing what theory means to social scientists such as economists and sociologists, it is useful to understand what the term “theory” means. The term “theory” itself is Greek from theoria, which means “looking at, viewing, beholding” (Liddell & Scott, 1889), and historically, in this sense, theorists played the role of philosophers as the beholders of society. Thus, in Nicomachean Ethics, Aristotle saw the life of contemplation (theoretikos) as the only activity that could be loved for its own sake, compared to the lower lives of pleasure and politics (Liedman, 2013). Perhaps it was Francis Bacon (1620) and Isaac Newton (1687) who changed how people viewed theory from the act of beholding to understanding the precision of the universe and, ultimately, transforming the hallmark of theory toward predictability. Their legacy would be later
carried by others who see theories as axiomatic systems containing sets of propositions to be tested in experiments (Hallberg, 2013).

The original meaning of theory as the act of beholding was exemplified by scholars such as Adam Smith (1776), one of the founders of present-day economics, who set out on *An Inquiry into the Nature and Causes of the Wealth of Nations*. Theory, to the classical economists, was not just about utilitarian goals as depicted by models promoted by the neoclassical economists; it was also about understanding the workings of an economy based on both market transactions and requirements of moral philosophy. Economists have always held competing views about what constitutes economic theory, but this diversity of thought in economics succumbed to positivist pressures, and in the end economic theory subscribed to either post-positivist Popperian views of theory or its more scientistic extremes (Blaug, 1997). Those following Popper (1959, p. 59) saw theory as a means of explaining the world that’s out there since “theories are nets cast to catch what we call ‘the world’: to rationalize, to explain, and to master it. We endeavor to make the mesh ever finer and finer.” Mainstream economics have largely followed this understanding of theory. Others such as Duhem (1906) and Quine (1951) argue that the world is not so deterministic and theory is necessarily underdetermined. The human sciences schools of theory (Dilthey, 1883; Gadamer, 1976) hold that social science theories differ in nature from natural science theories. For Dilthey, theories are not just descriptions of physical and natural phenomena. Our meaningful lives demand that theory should also include descriptions of lived experiences and historical statements, understanding (*verstehen*) of unique instances, and evaluative judgments and practical rules, all of which are summed up in his proposed science of the spirit (*Geisteswissenschaften*).

Going back to Greek origins that equate theory with philosophy and the love of true knowledge, Gadamer (1975, p. 454) sees theory as the highest form of practice, the “highest manner of being human.” Through the act of beholding from a distance, theory gives what is being witnessed its validity by being caught up in it. To Gadamer (1998), the researcher who fulfills the intended goal of the research is not as impressive as one who is sidetracked by a puzzling outcome and as a result beholds something new and unexpected. What that researcher stumbled on outside
oneself is the real theory. In the beginning, sociologists would vacillate between these forms of theories, but eventually would also take the road of scientization (Alexander, 1982). For Homans (1974), theory must be propositional, forming a deductive system following the covering-law view of explanation. Using the so-called Carnegie Project on Theory, Parsons attempted to push his idea of action theory (Parsons & Shils, 1962) as the grand framework that would unify the social sciences (Isaac, 2020). Others (Alexander, 1982) challenge this “scientization” of sociology and hold on to the view that neither the empirical observational world nor the non-empirical metaphysical world alone can determine social theory.

For Alexander (1982), scientific thought and theories can take many forms and exist on an epistemological continuum (Fig. 1.1). Larson (1973) notes that theory is “one of the most amorphous terms in science. [It may be] as broad as all thought or as narrow as a single thought [and may] vary from complete conjecture to solid confirmation, from unarticulated impression to precisely defined prediction.” (p. 4). With such a wide range of possibilities, limiting theory to merely verificational dimensions of empirical practice would have an impoverishing impact on theorizing, and would limit any progress to methodological innovation and analysis. How does one reconcile these different forms of theory?

**Fig. 1.1** The epistemological continuum (Reproduced from Alexander (1982) with permission from the author)
The answer might lie with the giants of the social sciences. The likes of Emile Durkheim, Max Weber, Karl Marx, and Bronisław Malinowski did not begin their research with a handy theory borrowed from some reference discipline and simple propositions with convenient constructs. They observed certain compelling facts and events, such as the different occurrences of suicide, the growth of capitalism in religious societies, and the question of class conflict and possibilities of universal culture, and began theorizing the core concerns of their phenomenon of interest in a myriad of forms. This is how giants in the past approached their research. There was no need for any ostentatious declaration of theory or elaborate justification of how their research extended other theories.

**A Novel View of Theory**

One way of reconciling the different meanings of theory is to redefine theory not based on its ontological or epistemological form, or even in its evaluative and teleological form, but as a communication tool like a map that points to all its discoveries (Abend, 2008). When one party insists on answering the “What is theory?” question based on its ontology, structure, composition, how good a theory it is, and what it is designed for, one is forced to take sides (Weber, 2012). At this current stage of the IS field’s development, such a view of theory is at least unproductive, if not harmful (Siponen & Klaavuniemi, 2019). For example, limiting theory to its positivist epistemological form creates an unnecessary dichotomy with journal editors and reviewers between research that has or does not have theory embedded in it (Ågerfalk, 2014). This dichotomy manifests itself in how researchers become too “hung-up on theory” (Avison & Malaurent, 2014; Grover & Lyytinen, 2015; Hirschheim, 2019), causing researchers to miss out on more productive and significant areas of research to where their energies could be directed. In the IS field, this dichotomy feeds into the received view that research can be either exploratory—commonly taken pejoratively—or explanatory, the latter describing “real” research that needs to happen. As a result, certain types of qualitative research such as those that apply interviews are pigeonholed as being exploratory until such point that a “definitive” survey can be undertaken to validate the findings of the exploratory research.
Viewing theory from a communicative stance as opposed to its ontological, epistemological, evaluative, or teleological form is not unlike how formal theorists view theory. For example, Bacharach (1989, p. 496) describes a theory as “no more than a linguistic device used to organize a complex empirical world. Therefore, the purpose of theoretical statements is twofold: to organize (parsimoniously) and to communicate (clearly).” Ramsey (1965, p. 212) describes theory “simply as a language for discussing the facts the theory is said to explain” This semantic, communicative, and linguistic view of theory is proposed by Abend (2008) so that theory itself will be free of all kinds of baggage that have been piled on to it in the past century, and so that social scientists will be free to adopt and work with any form of theory in order to make epistemic progress.

By viewing theory in this way, we do not have to argue about whether or not the field has a theoretical core (Gray, 2003), what constitutes theoretical contribution (Grover, 2012; Ågerfalk, 2014), or whether we need theory-light papers (Avison & Malaurent, 2014). We only need to understand how the theory communicates its content. Doing so does not mean that we are not interested in the components of theory, or do not work toward constructing good theory. We do this so that, as a field we can all be on the same page and start theorizing about IS without arguing whether or not our discussions have theory and start making progress that will eventually lead to “good” theories. Some might say that if everything is theory, then the term “theory” itself becomes meaningless. It is not that anything can be theory; rather that theory can refer to many things. There is a big difference between saying “anything” and “many things” (Corvellec, 2013). Inspired by Abend (2008), we propose in the next section the ten semantic forms of theory that are best suited for the IS field. Following Gregor’s (2006) recommendation for IS researchers to better describe the theory they are using, our ten semantic forms of theory provide the necessary detail of the communicative contents of theory that will prevent any misunderstanding that might ensue.

Ten Semantic Forms of Theory (What Theory Means)

Before describing the many semantic meanings of theory, it is important to distinguish all of them from the layman’s version of theory, which is
the form when someone says ‘that’s just a theory,’ which normally refers to a guess or something that lacks credibility or, worse, the stuff of conspiracy theories which are not backed by any evidence. Essentially, theories are statements of claims that can be received as knowledge and they can take the following ten linguistic and communicative forms.

Theory 1: Theory as Proposition or Empirical Generalization

To a logician, a proposition is something that may be asserted or denied, that is, it has to be either true or false. Often they are made up of one or more declarative sentences (Copi & Cohen, 2001). These declarative sentences or general propositions represent what most scholars would call at least an “empirical generalization” (Abend, 2008), which is the minimum expected in any journal article. Merton (1945) defines empirical generalizations as taking two forms: an isolated proposition summarizing observed uniformities of relationships between two or more variables; and scientific laws, which are statements of invariance derivable from a theory. Propositions can be as simple as “all men are mortal” and in this case can be nonrelational or, as Merton (1945) defines it, can be relational and therefore relate changes of one entity to the changes of another (Fawcett, 1998). Regardless of the nature of the proposition, it generally says something about a concept or relates one concept with another. Statements of claims within this category include laws since laws explain facts and relate them to other facts. An example of such a general proposition is the law of supply and demand which is often called the theory of supply and demand. It is referred to as a law since it describes a universal increase in prices as quantity demanded increases and the decrease in prices as the quantity of supply increases. Kaplan (1964) describes at least seven different types of laws that form part of explanatory theory. The form of the law varies depending on its universality or generality. For example, Michel’s (1915) “iron law of oligarchy” is a form of genetic law that defines the state of an organization based on its age and asserts that all complex organizations, regardless of how democratic they are when started, eventually develop into oligarchies. General propositions or empirical generalizations may or may not be laws but nevertheless yield a certain order of knowledge.

Propositions are the elements of explanation (Achinstein, 1983), which, in turn, is the goal of theories. Science is essentially about the “very process of exhibiting the systematic connections of propositions about matters of common knowledge” (Nagel, 1979, p. 6). Thus, isolated propositions trigger theory formulation by the process of restating it as a relation that extends beyond its original context. The example of Durkheim’s (1895) comparison of suicide rates between Catholics and Protestant populations illustrates
Theory 1: (continued)

this process. Durkheim found a lower suicide rate among Catholics which posed a theoretical problem. What could be causing such a regularity? Why are the rates different? By connecting a set of isolated propositions that included concepts of social cohesion, psychic support, unrelieved anxieties, and the proposition that Catholics had greater social cohesion than Protestants, he formulated the theory that groups with certain conceptualized attributes (e.g., social cohesion) can be expected to display different behavior (i.e., suicide) and theorized various forms of suicidal behaviors. Theory emerged from this process as a result of the cumulation of both relational propositions and research findings.

Relational propositions typically assert the patterns of covariation between two or more concepts and make up the components of both explanatory and predictive theories. These forms of explanation assert the direction, shape, or strength of specific relations. These relational propositions often begin as nonrelational propositions. Nonrelational propositions include existence propositions that assert the existence or level of existence of a phenomenon and definitional propositions that describe the characteristics of that phenomenon. The positivists’ term “operational definition” is a specific type of definitional proposition that allows the researcher to use a concept in a particular manner so as to allow for the proposition to be tested (Fawcett, 1998).

Theory 2: Theory as Model

Empirical generalizations and laws are often described in mathematical language to improve its precision and to measure the magnitude of change in the relations between variables. Such interconnected collections of propositions are called models, and many theorists qualify them as theories. Ontologically, models can be created without any theoretical justification since it is essentially an imaginary material analogy, not necessarily existing in any real physical system (Hesse, 1966), but are useful because it simplifies the complex reality into an abstraction that allows the research question to be addressed at a practical level of detail (Rosenblueth & Wiener, 1945). Semantically, the model communicates useful notions of positive and neutral analogies (Hesse, 1966), albeit as an imperfect form of the phenomenon of interest, but allows the researcher to draw out new relations between the model properties and the phenomenon of interest. This process of drawing out new relations outside the original context of the model is the act of theorizing and makes models, from a linguistic perspective, theories.

(continued)
As Harré (1970, 1976) explains, a model is no more than a putative analogue for a real mechanism, modeled on things, materials, and processes that we already understand. Harré (1970) describes several types of models distinguished according to whether the subject of the model is also the source of the model. For instance, a model airplane in a wind tunnel is constructed based on the original airplane and is called a homeomorph, which can differ in terms of scale, purity, and level of detail. Models in which the subject is not the same as the model, for example economic models, are termed “paramorphs,” which are used to model processes that are unknown or yet to be investigated. One of the earliest theorizing works on magnetism by William Gilbert (1893) applied the model of the earth as a magnet to explain why compasses point north. Likewise, biologists and paleontologists apply principles of modeling each time they attempt to predict what role biological structures in animals (or dinosaurs) play in their habitat and, thus, also predict (and speculate in the case of dinosaurs) how they can be conserved (or why they went extinct).

Models are often conflated with research frameworks even though in terms of communicating what is significant about the research, they are distinct. For one, models and theories are constituents of a framework since a framework is defined as the researcher’s map of the phenomenon of interest, which consists of the main concepts, constructs, intellectual traditions, models, and theories (Miles & Huberman, 1994). The conceptual framework plays the role of the mechanism that addresses why the research topic matters and why the research method is appropriate and rigorous (Ravitch & Riggan, 2012), serving as the source of stability for the research regardless of which model or theory is adopted or abandoned.

One important role of theories is to bring something novel to the “stock of current knowledge and practice” (Rynes, 2002, p. 311) or add value to other researchers and practitioners. Because models uncover what is not evident or significantly modify existing assumptions or beliefs, many consider models to be theories (Dubin, 1969; Whetten, 1989; Jaccard & Jacoby, 2010). In the IS field, two models in particular, namely the Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) and the IS success model (Delone & McLean, 1992), are claimed to be the two most applied IS theories (Moody, Iacob, & Amrit, 2010; Straub, 2012). TAM was abstracted from the theory of reasoned action (TRA) (Fishbein & Ajzen, 1977), and its later versions incrementally reverted back to its origins (Benbasat & Barki, 2007). Therefore, how much TAM added to the stock of current knowledge may be put to question. The IS success model started out as a comprehensive taxonomy of factors such as system quality, information quality, use, user satisfaction, and impact from numerous studies. In other words, it too modeled what already existed and arguably add limited value to other researchers and practitioners.
Theory 3: Theory as Paradigm

Paradigms are very close to models but deserve a separate category of linguistic form of theory because of its transformative potential and unique role in the conceptual development of the IS field. As a form of heuristic, paradigms have been largely misunderstood in the IS field (Hassan & Mingers, 2018). Instead of remaining faithful to Kuhn’s (1970) intended goal of positioning paradigms as concrete solutions to particular problems that can serve as exemplars for solving other problems, paradigms are understood in the IS field as philosophy or epistemology, which consequently resulted in researchers taking sides (Banville & Landry, 1989; Landry & Banville, 1992; Hassan, 2014). Paradigms draw from their communicative role of long-held theory that are employed as concrete “puzzle-solutions” (Kuhn, 1970, p. 175) or exemplars that can replace explicit rules as a basis for the solution of remaining puzzles. Paradigms as Theory 3 goes beyond models as Theory 2 because it ties together not just philosophical or epistemological elements (belief system, myths, speculation, and ways of seeing), but also sociological (recognized achievements, political bases, and accepted opinions) and conceptual elements (standard terminology, analogies, procedures, and tools).

The conceptual and artifactual sense of paradigms illustrates well how paradigms play the role of theories. Related to Theory 1, paradigms can take the form of symbolic generalizations or formal expressions that are shared unquestionably by the research community. Thus, the symbolic generalization $e = mc^2$ acts as both theory and paradigm by internally supporting researchers in their research efforts as well as explaining to others externally what those researchers (i.e., theoretical physicists) do. Examples of theory as paradigms in the IS field include the paradigm of decision support systems (DSS) as a research program that is based on Gorry and Scott-Morton’s (1971) descriptive theory (Theory 8). Another example is the paradigmatic hierarchy of information largely owed to Kenneth Boulding (1955), who introduced the hierarchy of information consisting of data, information, and knowledge.

Theory 4: Theory as Worldview (Weltanschauung)

Closely related to paradigms and drawing from constructivist and interpretive philosophy is the notion of the worldview (Weltanschauung) that takes the form of theory as sets of beliefs, myths, speculation, standards, ways of seeing, and organizing principles that govern perception (Wisdom, 1972). This map that determines reality is called upon when one applies a theoretical perspective (Burton-Jones, McLean, & Monod, 2015) or experiences a
“worldview shift” (Dent, 1999). Dilthey (1957) notes that one constructs a worldview in order to make sense of the vagaries and mysteries of life. Typically, this form of theory takes the shape of incommensurable ways of seeing the world and practicing science in it. Masterman (1970) calls it the metaphysical paradigm. A classic example in history for this theory is the theory of phlogiston (Becher, 1703), which captured the imagination of researchers for nearly a century. This theory replaced one of the four Aristotelian elements that make up the world with a substance called phlogiston. It was an element that could not be bottled but could be transferred and was the reason for the combustibility of substances. Later, Lavoisier (1777) would help dethrone this theory and replace it with the theory of oxygen. Unlike the other theories that address the specific phenomenon, Theory 4 is about how to look at, grasp, and represent other theories. Theory 4 provides the syntax, the language, and linguistic equipment—some may say, the a priori framework (scheme, map, and grid) independent of experience, but with the power and insight to create the possibility of experience. For the IS field, a classic example of Theory 4 is General Systems Theory (Bertalanffy, 1968). Like other worldviews, it does not take the shape of a particular theory, but does help prescribe certain features of the investigation, and can be refuted with the help of other forms of theory (Wisdom, 1972).

Other examples of this form of communication commonly found in the IS field are the juxtaposition of variance theory with process theory, postmodern theory, theory of practice, actor-network theory (ANT), complexity science, and sociomateriality. Mohr’s (1982) conception of variance versus process theories was introduced through Markus and Robey’s (1988) work on understanding causality. Using this juxtaposition, it was possible to logically view causality as either the result of covariation among properties within a system (variance theory) or the result of necessary conditions connected in a process of events (process theory). Substantive theories can be shaped based on these two different perspectives. On the other hand, postmodern theory does not refer to causality, but to a metaphysical paradigm, a worldview that shares a tradition of mistrust of grand theories (Theory 5) and modernism (Bertens, 1993). ANT does not refer to any collection of works of different thinkers, but a deliberate elision meant to highlight the tension between the first two words—actor and network—in order to foreground the network effects of everything, social and material, in social theory (Latour, 2005). Drawing in part from ANT, sociomateriality represents the study of technology that challenges the separation of technology, work, and organizations as discrete entities or mutually dependent ensembles and takes the extreme view that people and things only exist in relation to each other (Orlikowski & Scott, 2008). All of these perspectives provided the IS field with a variety of worldviews that added to the richness of how IS field studies technology.
Theory 5: Grand Theory for Society

Related to Theory 4, which provided the framework for how theory could be constructed, Theory 5 covers instances within those perspectives that take the shape of an all-embracing unified theory in which observations about every aspect of the phenomenon, unbounded in space and time, find their ordained place. It is natural to seek grand theories to explain all phenomena as researchers are under a lot of pressure to address the vast ranges of concerns of their society. Early philosophers such as Aristotle, Kant, and Hegel experienced the same pressures and offered their grand solutions, most of which fell into deserved disuse. Merton (1968, p. 45) calls these theories “total systems of sociological theories” and argues that although scholars with any credibility felt they should follow in the footsteps of their illustrious grand theorists of the past, such efforts are premature because the field itself is not ready for such theories.

C. Wright Mills (1959, pp. 33–34), who coined the term “grand theory,” went further and lamented that the insistence on a single, often normative view “are so general that its practitioners cannot logically get down to observation … to problems in their historical and structural contexts … [it is] drunk on syntax, blind to semantics” and called for a moratorium on grand theories. Examples of scholars attempting to offer such theories read like the who’s who of social theorists. Karl Marx (1866) proposed a grand theory of class relations, social conflict and transformation, and claims that the ownership of economic modes of production manifests in exploitation that ultimately leads to revolution by those who do not own those modes of production. Talcott Parsons espoused the need for “the establishment of a general theory in the social sciences … by unifying discrete observations under general concepts … providing generalized hypotheses for the systematic reformulation of existing facts and insights” (Parsons & Shils, 1962, p. 1). This grand theory of social action became one of the foundations for functionalism, a Theory 4 for society that sought to achieve societal equilibrium through stable roles and functions.

Despite the alleged failures of grand theories, there has been a remarkable resurgence of new forms of these theories by their students and proponents. Returning back to Kant’s Critique and Hegel’s dialectical materialism, the founders of the Frankfurt School, Theodor Adorno, Max Horkheimer and others who were critical of both capitalism and Soviet socialism, established a reinterpretation of Marxism called critical theory to fill the gaps in Marxist theory to address more contemporary social issues (Held, 1980). Some of those ideas found their way into the IS field through the work of Habermas (Lyytinen & Klein, 1985). Functionalist thought espoused by Spencer and Parsons continued to be spread by Merton and later Daniel Bell and Anthony Giddens (1976, 1984). Giddens sought a middle ground between macro theories and micro theories and proposed the
Theory 5: (continued)

theory of structuration, which viewed societal accomplishments as having an effect on both the people and the actions of the people shaping or structuring society. Understanding this process requires a double hermeneutic; not just interpreting what people do, but also interpreting how people interpret their world. It is this form of grand theory that IS scholars attempted to appropriate with limited success (Orlikowski & Robey, 1991; Jones, 1999). Another grand theory appropriated by IS scholars was the theory on attitude (Fishbein & Ajzen, 1975), which made its way into TAM. That version of grand theory from social psychology has had a considerable influence on IS research.

Theory 6: Theory as Methodology

Among the great thinkers that could also be considered grand theorists were those that focused on anti-positivist thought. These opened up a whole landscape of theories that cannot be strictly called a theory in the sense of providing some form of explanation (see next Theory 7) or model. This category of theory is closest to Kuhn’s (1970) notion of paradigm as classical textbooks, standard illustrations and analogies, standard procedures, and techniques and tools (Masterman, 1970), which we dub theory as methodology. Thus, when sociologists discuss “Weberian theory” (Collins, 1986), they are not referring to the theory of bureaucracy or of Protestant ethics, which Max Weber (1930, 1947) is famous for, they are referring to his approach and recasting of sociology as a science that deals with meaningful social action, action that is directed to another human being. Included in that recasting of sociology are precise theoretical concepts such as different types of meaningful social actions, the focus on instrumental rationality, and the interpretive approach (from where we get interpretivism) using the German word verstehen, which redefined the goal of theory toward understanding rather than explaining (von Wright, 1971; Benton & Craib, 2001). Also included in this form of theory is Lewin’s (1951) “field theory,” which he defined as “a method of analyzing causal relations and of building scientific constructs” (p. 45, original emphasis).

A related approach that was introduced at about the same time was phenomenology, also proposed as an alternative to positivistic behaviorism and its denial of self-reflection as a source of knowledge. Although the prime source for phenomenology is credited to Edmund Husserl (1911), who would influence later philosophers and theorists such as Heidegger, Merleau-Ponty, Garfinkel, and Schütz, phenomenology was practiced,
albeit unnamed, by Hindu and Buddhist philosophers, Brentano’s (1874) classification of mental phenomena, and William James’ (1890) appraisal of stream of consciousness. It was primarily Schutz (1954, 1961) who influenced Berger and Luckmann (1966) to coin the terms “social reality” and “social construction,” which have become part of an acceptable research method in the IS field (Boland, 1985; Walsham, 1995). For Husserl, a phenomenological investigation involves setting aside what we already know (bracketing) including commonsense beliefs (or any theories we might have) in order to describe using just our sense perceptions (phenomenological reduction). Heidegger (1977a, 1982) reinterprets Husserl’s phenomenology as the philosophical problem of ontology and rejects Husserl’s bracketing of the world, and instead views phenomenology as the problem of being (or being-in-the-world) rather than of the act of observing beings. Any object therefore cannot be experienced without necessarily experiencing how those objects can be in the world taking the form of a seamless engagement (ready-to-hand) with them. Riemer and Johnston (2014, 2017) apply Heidegger’s phenomenological approach to reimagine the role of the IT artifact and connects Heidegger’s phenomenology to the Weltanschauung of sociomateriality.

Heidegger’s critique of Husserl provided the background for another theory of methodology to emerge—hermeneutics—which had existed for as long as text needed to be interpreted. Thus, biblical hermeneutics referred to the scriptural theory of exegesis, which was later appropriated by Schleiermacher (1978) as the science or art of understanding. Dilthey (1883) chose hermeneutics as the historically oriented theory for developing his project of Geisteswissenschaften (Human Science). Heidegger (1999) would expand Husserl’s (1911) concept of phenomenology from its limited image of what something is to what it means to being something (or in short, its ontology). Taking hermeneutics as the manner of engaging, approaching, accessing, and explicating this ontology, Heidegger (1999) proposed the hermeneutics of facticity, which would then be refined by his student Hans-Georg Gadamer (1975) as hermeneutic phenomenology. When Gadamer (1975) talks about the theory of hermeneutic experience, he is referring to an understanding that fully realizes any presuppositions of both text and author and that distinguishes true prejudices and biases from false ones in order to experience the others’ claim to truth.

At about the same time Gadamer was working out the new hermeneutics on the Continent, Barney Glaser and Anselm Strauss (1967) were working on filling the gap in the social science between grand theories and empirical data. Dissatisfied with solutions such as Merton’s (1968) theory of the middle range, they needed a method that could improve the generation of
useful theory from qualitative data. They argue that such a process is possible by grounding the theory in and generating it directly from data—the method of grounded theory. By taking advantage of the methods of quantitative verification such as methods of sampling, coding, reliability, and validity, they placed the discovery of the concepts and hypotheses relevant to the phenomenon of interest (Hanson, 1958) at the same level as the process of verification. The results of grounded theory can take many communicative forms, including Theory 1 (Empirical generalizations), Theory 7 (Explanation), and Theory 8 (Significant description).

Theory 7: Theory as Explanation

This is probably what most IS researchers mean by theory with a capital “T.” Within this category, explanatory theories can be philosophical (Lear, 1988), formal (Blalock, 1969), mathematically structured (Freese, 1980), deductive-nomological (Hempel, 1965), in the middle-range (Merton, 1968), constructive (van Fraassen, 1980), statistical (Salmon, 1998), portrayed as a mechanism (Glennan, 1996), or positivist case studies (Eisenhardt, 1989; Yin, 1989). Some of these theories take the form of “logically interconnected sets of propositions from which empirical uniformities can be derived,” essentially taking the shape of a closed system of propositions that offers some kind of explanation (Merton, 1968, p. 39).

Gregor (2006) considers theories that not only explain but also predict phenomena to be the commonly held view of theories in both the natural and social sciences. What distinguishes this form of theory from other theories is the need for explanations to answer the question “Why?” (Salmon, 1998). For example, propositions or laws in Theory 1 do not necessarily contain their own explanation and therefore can be explained by Theory 7. Using Hempel’s deductive-nomological form of theory, one or more Theory 1 can be part of an explanation (Theory 7)(Abend, 2008). For example, the question “Why does ice float?” can be explained with the help of a combination of laws and premises: (1) a substance with a lower density floats above the substance with a higher density, and (2) ice is less dense than water, together making up Theory 7. Another way of viewing Theory 7 as a kind of proposition is to use the term “theoretical laws” to mean that the relation concerning the concepts is not ostensibly observable and requires an elaborate “explanation” in order to make it work (Nagel, 1979). Theory 2 as models (mathematical, economic, conceptual, narrative, or otherwise) apply Theory 7 in various degrees of complexity to explain why in a limited
abstract way certain concepts or variables vary as a result of other concepts or variables. The ability to answer “why” questions are not limited to positivist approaches. All anti-positivist approaches and methods are equally if not more capable of addressing the “why” questions, especially as they pertain to meaningful social actions (Dilthey, 1883; Gadamer, 1975; Heidegger, 1977b) as we argue below.

Aristotle’s classic four causes is an example of answering the “Why?” question. For Aristotle, to say that something exists by nature is to cite its cause. This understanding of causality differs from our modern Humean understanding of an antecedent cause that is sufficient to produce an effect. For Aristotle, causality is the calculus of change. A pile of bricks changes to a house because the building of the house is the “primary source of change” often mistranslated as “efficient cause.” Similarly, the matter (often translated as the first cause—“material”) of the house is brick, “that of which the thing comes to be,” and what subsumes both material and efficient cause is form since form is the manner by which the material is organized to realize the change. The final cause, often translated as telos or “that for the sake of which,” is really for the sake of maintaining form. It is not a different cause; it is referring back to our task of understanding the reasons why nature works in certain ways to maintain the final form. In other words, as Aristotle puts it, “nature is a cause, a cause that operates for a purpose” and it is the goal of science to understand that purpose (Lear, 1988, pp. 25–38).

After Hume, most of Aristotle’s philosophical understanding of Theory 7 is subsumed by the discussion of causality as either deductive, probabilistic, teleological, or genetic. Deductive explanations consist of an axiomatic formal structure. Thus, natural occurrences such as moisture collecting on the outside of a glass of ice water, as well as social phenomena such as historical occurrences of suicide studied by Durkheim, communicate deductive explanations. They may contain premises of a statistical form, such as studies of heredity, but are nevertheless deductive because their premises necessarily imply their explanations. The premises of probabilistic explanations do not guarantee the explanation because they are only “probable” based on a statistical assumption. For example, the exact reasons why Cassius plotted the death of Caesar is unknown and can only be based on assumptions that are at best statistical generalizations of Theory 1 (perhaps a societal or psychological predisposition). Using Markus and Rowe’s (2018) sensitizing framework with 27 explanations for causality in IS phenomena, most of the conceptions of explanation including causal mechanisms, cross-boundary and internal changes, and agency-related explanations fall within probabilistic explanations of causality. Functional or teleological explanations describe one or more functions (or dysfunctions) to realize certain traits (continued)
Theory 7: (continued)

(similar to Aristotle’s final cause) or the instrumental role an action plays in achieving some goal. Typically, these include language like “in order that” or “for the sake of” and are exemplified in Markus and Rowe’s (2018) causal autonomy dimension that traces technological outcome as either an instrument of human social action or technology, or both.

Achinstein (1983) proposes a very intimate relationship between explanation and understanding by saying that the act of presenting knowledge is the illocutionary act (uttering sentences) performed with the intention of making something understandable, and defines someone understanding as someone in a complete knowledge-state with respect to the question. The explanandum (what is to be explained) need not be limited to physical entities, behaviors, or events in constant conjunction. It can include social and historical phenomena, which widens the communicative role of theory beyond Hempel and Oppenheim’s (1948) deductive nomological model of explanation. It is entirely possible that such an explanation could be an understanding of the situation (verstehen) (Dilthey, 1883). Even Salmon (1998), who is sympathetic to the positivistic sciences, states that the goal of science is “Understanding, comprehension, and enlightenment” (p. 126, original emphasis). Ontologically, Gregor (2006) agrees with this assessment that anti-positivist explanations qualify as explanatory theory, and also considers some of them capable of prediction (Type IV).

Theories that are capable of prediction need not be capable of explanation and that is why Gregor (2006) and others distinguish theories that explain from theories that predict. When Gregor (2006) describe theories that predict (Gregor Type III), she was not able to find many examples in the IS field. However, with the explosion of interest in data analytics (Abbasi, Sarker, & Chiang, 2016; Hassan, 2019), theories that only predict have come into favor (Dhar, 2013; Mayer-Schönberger & Cukier, 2013). A closer look at explanation and prediction exposes the thin line between them; for, although it is possible to predict without providing any explanation, the explanation will almost certainly offer some capabilities for predicting. Therefore, prediction is really nothing more than a description of an event, albeit one in the future, whereas explanation must be more than a description of it. Distinguishing between explanation and prediction as the goal of the research sets the stage of how modeling in theorizing is done especially in analytics. For example, choices of the volume, sample size, and variety of data required depend on whether the goal of the analysis is to predict or to explain (Shmueli, 2010).

Another version of explanation that overlaps with the next category of theories (Theory as Significant Description) is explanation as mechanism, whereby explaining why a phenomenon occurs by explaining how it
Theory 7: (continued)

occurred. Inspired by developments in the biological sciences, a mechanism is defined as an orchestrated functioning of component parts, their operations or activities, and organization that produces an outcome (Machamer, Darden, & Craver, 2000; Bechtel & Abrahamsen, 2005). It claims that the deductive-nomological model or statistical explanations are subject to Humean limitations of causality that do not really explain anything beyond constant conjunction. Instead of reducing the explanation to a set of premises or laws independent of the explanation itself (Achinstein, 1983), the correctness of the explanation requires the complete mechanism scheme with all its component parts and activities. Hedström and Udehn (2009) and Hedström and Swedberg (2010) tie this form of theory to Merton’s theory of the middle range because, like middle-range theories, mechanisms unveil the processes in natural or social systems (Bunge, 1997) at a level that allows for empirical testing, and are employed and adapted to particular situations and explanatory tasks.

Theory 8: Theory as Significant Description

Whereas Theory 7 answers the “Why” question, Theory 8 answers the “What” and “How” questions. Theory 8 communicates the significance of the components or constituents of the phenomenon often by describing an insight or pattern that lies underneath the data. Statements that seek to communicate forms of classification such as Linneaus’ (1735) classificatory system of the animal kingdom, taxonomies and typologies in management studies such as McGregor’s (1960) Theory X and Y, and Blake and Mouton’s (1964) Managerial Grid, what researchers often call “frameworks,” not only built the foundations of their respective disciplines, but also impacted practice right to this very day. The organization, embedded patterns, and consistency of the patterns declare the significance of their phenomenon of interest. In the IS field, a classic example of such theories is Gorry and Scott-Morton’s (1971) framework for MIS that supported the growth of and research in MIS for decades (Dickson, 1981; Keen, 1987) and spawned several technologies as a result (Benbasat & Konsynski, 1988; Rockart & DeLong, 1988). This meaning of theory is closest to Gregor’s (2006) Type I Theory for Analyzing, although Gregor’s ontological and epistemological categorization of Theory Type I, drawing from Fawcett and Downs (1986), excludes the findings of ethnographic, phenomenological, and hermeneutic studies that offer answers to the “what” and “how” questions. We follow Fawcett (1998), who includes the findings of these anti-positivist approaches, as

(continued)
Theory 8: (continued)

“descriptive theory.” In other words, depending on the communicative goals of the study, anti-positivist research can take the form of any theory. The source of Theory 8 can come from positivist case study methods (Eisenhardt, 1989; Yin, 1989) that answer the “what” and “how” questions, and survey research using both open-ended and structured interviews, from models or simulations that could represent the phenomenon (Theory 2) or paradigms (Theory 3). Models that are limited to describing the significance of the phenomenon captures the meaning of Theory 8. In the interpretive vein, phenomenological lived experience descriptions and hermeneutical interpretations (Kvale, 1983) and ethnographic thick descriptions of the expressions of cultures (Geertz, 1973) also communicate these forms of Theory 8.

Theory 9: Theory for Prescription

Theory for prescription or prescriptive theories take the form of theories that say what ought to be done. A good prescriptive theory needs to have explanatory power and must pass the test of utility, that is, it must work. What makes prescriptive theory different from “best practices” and benchmarking operations is its generalizability and analyzability to explain how and why prescriptions in one context work within their context, and the analysis reveals how subparts of the theory need to be adapted to fit new contexts (Clegg & Bailey, 2008). An example of research in IS that results in prescriptive theory is action research. As Baskerville and Myers (2004) describe it, “the action researcher is concerned to create organizational change” (p. 329), and this requires a theory by which the change can be made possible, a theory that William James proposed of “thought and action” (p. 331). This theory “must be explicit before the action is taken, otherwise there is a risk that the action is purposeless, and therefore meaningless” (p. 333). Theory in action research is not just limited to explaining or diagnosing the problem in action research (Baskerville & Wood-Harper, 1996); it is critical in guiding the intervention and is the result of the action, that is, it is theory grounded in action (Susman & Evered, 1978; Davison, Martinsons, & Kock, 2004).

Within social psychology and the organizational science, the notion of prescriptive theory came about as a result of efforts to narrow the increasing gap between theory and practice. Kurt Lewin (1951, p. 169) led such an effort as enshrined in his aphorism, “there is nothing so practical as a good theory,” which he wrote in 1943–44 as part of the description of field theory (Theory 6: Theory as Methodology) from which the principles of action (continued)
research were derived. In the organizational sciences, early efforts to bridge the gap between theory and practice include Argyris and Schön’s (1974) definition of prescriptive theory or a “theory of action” as taking the form “in situation S, if you want to achieve consequences C, do A” (p. 5). They relate their theory of action to theories of practice (not to be confused with Bourdieu’s (1977) theory of practice which is Theory 4: Theory as Worldview), which consists of “a set of interrelated theories of action that specify for the situations of the practice the actions that will, under the relevant assumptions, yield intended consequences” (Argyris & Schön, 1974, p. 6). They also distinguish these theories of action into “espoused theories,” which actors communicate to others, and “theories-in-use,” which governs the actual action (p. 7). They and others (Friedman & Rogers, 2009) describe models and principles on building good prescriptive theories.

The technological version of prescriptive theory is the IS field’s efforts to define a design science (Hevner et al., 2004) for artifacts. The goal of design science is to bridge the aspirations of the IS field to achieve legitimacy by adopting the approaches of the natural sciences (i.e., explanatory and predictive theory) with that of “design-related issues” (Walls, Widmeyer, & El Sawy, 1992, p. 37). Drawing from Herbert Simon’s (1981) *The Sciences of the Artificial*, the IS field’s goal in developing a class of design theories is to carry out a design process in a way that is both effective and feasible (Walls et al., 1992). Such a goal limits the IS field to the formalities and restrictions of logico-deductive structures of the natural sciences. As a form of prescriptive theories (Walls et al., 1992; Gregor & Jones, 2007), design theories can draw from multiple sources including those of the arts (Hassan, Mingers, & Stahl, 2018), architecture (Lee, 1991), and humanities. McPhee (1996) describes these two alternative paths of design theory: scientific approach to problem-solving following the natural sciences and the social approach following the human sciences. Design science in IS follows the former, while other disciplines such as art, architecture, and urban design follow a more intuitive, artistic, and idiosyncratic approach to design. Since design is a social activity involving communicative, cultural, political, ethical, and aesthetic issues, the logico-deductive prescriptive theories may not be well suited for the design of IS.
Theory 10: A Theory of Theories—Metatheory

Metatheory takes on different meanings depending on what the prefix “meta” means. Lewis and Grimes (1999) focus on applying the insights of multiple paradigms, especially metaphysical paradigms or worldviews (Theory 4) and dub it multitriangulation—the process of creating theory from combining multiple paradigms. Such a process of building these metaparadigm theories defies Burrell and Morgan’s (1979) claim that organizational paradigms are incommensurable. Metaparadigm theory building takes place after the underlying paradigmatic assumptions are reviewed and analyzed (e.g., see Gioia & Pitre 1990) and applied to cultivate varied representations of the complex phenomena (e.g., see Hassard 1991)). Ritzer (2001) defines metatheorizing as systematic theorizing from theories and views it as the reality that has taken place in sociology since its inception. The value of these metatheories is no different from theories that emerge from theorizing directly from social phenomena because their role as an overarching theoretical perspective (Ritzer, 1990) also helps us understand, explain and make predictions. Ritzer’s (1996) McDonaldization of Society combines Weber’s theory of bureaucracy, Taylor’s theory of scientific management, and Marxist and Habermasian critical theory to build a metatheory of social criticism, and predicts how McDonald’s successful model for the fast-food industry has expanded into other areas of American and global culture including retail, tax services, childcare, and higher education.

In the IS field, Mingers and colleagues (1997, 2001, 2003) have always emphasized the need for combining different methods in research (Theory 6: Theory as Methodology) that would engender metaparadigm theory building. Bostrom, Gupta, and Thomas (2009) view Adaptive Structuration Theory (DeSanctis & Poole, 1994) as an example of metatheory that combines the decision-making paradigm, socio-technical theory, and institutional theory to provide the interplay between advanced IT, social structures and human interaction. The social structures of an advanced IT supplies the spirit of the technology that can be characterized by dimensions of decision processes, leadership, efficiency, conflict management, and the formal or informal atmosphere of the system and all which help predict behaviors of individuals and teams as they interact with the advanced IT system. Niederman and March (2019) view metatheory as comprising of a set of theory instances that are related by similar characteristics. Thus, they review process and variance metatheories, network metatheories, and co-evolution metatheories that fill the pages of IS journals.
The Need for Theories

The attack on theory comes from both academics and industry. In the IS field, many authors argue against a fixation on theory. Avison and Malaurent (2014) suggest that the desperate search for, and overemphasis on, IS theory has produced uninteresting research, and Grover and Lyytinen (2015) claim that scripted research strategies that domesticate theories from other disciplines have led to the lack of boldness and originality in IS. Hirschheim (2019) argues that our research cycle has been modified creating a circular dysfunction that generates a focus on “scholarly” theory only to create more problems rather than creating knowledge that resolves problems. Much of this attack comes from “conflicting or overly narrow definitions of theory and theoretical contributions among authors, editors, and review panelists” (Markus, 2014, pp. 342, original emphasis), and hopefully going back to Aristotle’s approach to explanation that begins with definition, our in-depth description of the ten semantic meanings of theory should be sufficient to explain why these attacks require a more nuanced examination. As Gregor (2014) reminds us, it is not theory but the overemphasis on deductive logic and theory testing that slows progress toward new knowledge. And Hirschheim (2019), after his initial attack on theory, recommends focusing instead on “understanding” and “insight,” which are the goals of theories in the first place.

The need of theory is in fact an intrinsically unique human need. Philosopher and behavioral scientist Kaplan (1964, p. 294) regards theorizing as “the most important and distinctive” activity for human beings: “to engage in theorizing means not just to learn by experience but to take thought about what is there to be learned … lower animals grasp scientific laws but never rise to the level of scientific theory” (p. 295). Within academia, this higher level of intellectual activity is naturally sought after. Corley and Gioia (2011, p. 12) begin their treatise on what constitutes a theoretical contribution by stating, “Theory is the currency of our scholarly realm,” and Alvesson and Sandberg (2011, p. 247) note, “as researchers, we all want to produce interesting and influential theories.” Academic priority is given first to those who can build original and interesting
theories, second to those who can use them effectively, and third to those who understand them. Even for theory creators, only when scholars outside of their disciplines acknowledge and apply their theories can they say that their theories have been fully useful (Corvellec, 2013).

The context of research matters when we consider the role of theory in our research. Classically, the context of research can be divided into two phases: the context of discovery and the context of justification; and how these two roles interact with theory is described in more detail in Chap. 5, “The Process of Information Systems Theorizing as a Discursive Practice,” by Hassan, Mathiassen, and Lowry. To add to their discussion on the context of discovery, Glaser and Strauss (1967) summarize some of the academic arguments on the role of theory in enhancing research:

1. Enabling prediction and explanation of social action and behavior
2. Providing evidence for progress in the field of study (in our case, that of IS)
3. To be useful in practical applications and provide practitioners understanding and control of situations
4. Provide a perspective on the phenomenon of interest and data to be collected
5. Guide research and provide a style for handling and conceptualizing data

Theory engenders a higher level of intellectual capability in researchers that goes beyond mimicking other people’s research or approaches or following their cookie-cutter guidelines. This kind of mimicry is what Gregor and Hevner (2013) decry in referring to how IS researchers appropriate the guidelines for design science research (Hevner et al., 2004). Research is not just a matter of retrieving and translating what is available into one’s own context. Even the menial process of summarizing an article, if done well and supported by theory, will communicate the author’s thought more clearly than the original. Ibn Rushd’s summaries of Aristotle became one of the sources that triggered the Enlightenment and the development of Western civilization out of the dark ages (Lyons, 2009). Theory is the source from which reinterpretation and corrections of previous works become possible. The continuing progress of any
discipline can only happen with the guidance from and attention to theory (Levine, 2015). An example of such important work is the step of clearly defining problems in theorizing and in asking the right questions (Hassan, Mathiassen, & Lowry, 2019). The current crisis of fake news and the weaponization of information (Waltzman, 2017; Kang & Frenkel, 2018) require novel approaches capable of stemming its corruptive impact on our democracy. Such measures and interventions begin with acknowledging that we know very little about the problem and need to start with a clear problem statement. As Merton (1996, p. 53) notes: “It requires a newly informed theoretical eye to detect long-obscured pockets of ignorance as a prelude to newly focused inquiry.”

Concerning the attack from industry, Wired Magazine’s chief editor Chris Anderson (2008) argues that with big data we no longer have to settle for imperfect models, and since the scientific method relies on models from which we test hypotheses, big data has essential made the scientific method obsolete. Extending this argument, because theory is the goal of the scientific method, theory itself becomes unnecessary. Why do we need theory when big data can already help us predict? Not surprisingly this claim has attracted much attention from both industry and academia (Mayer-Schönberger & Cukier, 2013; Kitchin, 2014). Like many highly cited pieces, the Wired editorial has taken on a life of its own, as it is interpreted and reinterpreted by many to support their own stance on the topic of theory. Some have taken the predictive power of models to the point where explanatory theory becomes no longer necessary. The model “just needs to work: prediction trumps explanation” (Siegel, 2016, p. 90). For instance, Wired Magazine (Steadman, 2013) featured how big data predicted Osama bin Laden’s location from publicly available data without any need for theories.

This argument from big data against theory is equally vacuous. First, theory is not irrelevant because even the process of collecting big data itself is based on some kind of theory (Mayer-Schönberger & Cukier, 2013). Without theory, big data itself is bereft of value. Our practical everyday life is supported and enhanced by the propositions or empirical
generalizations that we hold, our Theory 1. For instance, our understanding of viral infections and pandemics in general guide our actions in the existing COVID-19 pandemic (World Health Organization, 2020). The search for a vaccine for this novel virus begins with various theories and empirical generalizations collected from previous infections such as the Spanish flu, zika, HIV-AIDS, Ebola, and SARS viruses (Fauci, Touchette, & Folkers, 2005). In the area of data analytics, exploratory data analysis and other models such as the “flattening-the-curve” hypothesis (Anderson, Heesterbeek, Klinkenberg, & Hollingsworth, 2020) provide effective simplifications of complex real phenomena that help public health officials determine the most effective intervention strategies to reduce infection and fatalities from the COVID-19 pandemic.

Related to the issue of such intractable problems that has IT and information embedded in it, one aspect of theory that has not received attention is its connection with values (Suddaby, 2014). This axiological nature of theory or the lack thereof in regard to theory applied in IS holds back research and progress of the field in addressing such IT and information-related crises. Maximizing profits and achieving certain level of effectiveness and efficiencies or similar utilitarian goals in systems carry with them specific sets of values that are not often highlighted in IS theory. The psychologists and neuroscientists who helped Cambridge Analytica mine the private data of millions of Facebook users vetted their research through a review board and followed the necessary ethical rules, but nevertheless were not aware that the research was used for illegal and unethical use (Cadwalladr & Graham-Harrison, 2018). Other disciplines are already cognizant and actively addressing the value-laden nature of theory. In Callon’s (2007) terms, theories are performative; thus, economic theories do not just explain the economy, but they build the economy. In finance, MacKenzie (2006) showed that those Nobel-winning economic theories developed after the 1970s helped build hitherto non-existent derivative markets that became the source of several global financial crises. Theory holds the keys to addressing the crises and intractable problems society faces. Researchers and industry practitioners need to embrace the broader meaning of theory in order to realize its true potential.
Intimations of What Is to Come

The chapters in this volume are organized according to a logical sequence starting with Chap. 1, the introduction that answers the question “Why theory?” which leads to an answer to the question of “What is theory?” Chapter 2, “Theoretical, Empirical and Artefactual Contributions in Information Systems Research: Implications Implied,” by Ågerfalk and Karlsson expands on the answer to what is theory by viewing theory as various types of knowledge contributions, the ultimate goal of any research effort as well as how that research is evaluated. The authors argue that theoretical contributions are not the only possible knowledge contribution, and the other two types of contributions, empirical and artefactual, also provide useful implications for both research and practice. Instead of viewing the implications for practice as the flipside of implications for research, as is common practice, research can be viewed as a combination of practices that study other practices to develop knowledge that aims to improve the studied practice itself. Such contribution the authors call empirical contributions, which go, by their account, hand in hand with theoretical contributions. The third type of contribution, artefactual contribution, presupposes the empirical contribution, but adds the results from intervention-oriented research that introduces an artifact. Regardless of the type of contribution, the value of that contribution lies in the opportunities that it provides for both the research domain and the domain of practice.

In Chap. 3, “Theoretical Diversity in IS Research: A Causal Structure Framework,” Rowe and Markus complement their treatise published in the *MIS Quarterly* (Markus & Rowe, 2018), “Is IT changing the world? Conceptions of causality for information systems theorizing.” They offer an explanation of that article’s development and pedagogical aspects. Rowe and Markus describe how causal structure differs from the goals of theory, methods to build theory, and the techniques applied in analyzing causes. They elaborate on the need for more diversity in theoretical positions because of the multifaceted and rapidly evolving phenomena of interest to the IS field, the equally, if not more, diverse aims and goals of IS researchers, and the need to make IS research more relevant to
stakeholders. The justification behind each causal structure and its ontology, trajectory, and autonomy are given a more personal treatment with regards to how they can be useful toward building substantive and middle-range theories, as opposed to borrowing from other disciplines.

The discussion on diverse approaches offered by the causal structure framework is followed by a description of the creative nature of theory building by Rivard in Chap. 4, titled “Theory Building is Neither Art nor a Science, But a Craft.” In this chapter, developed from a paper published in the *Journal of Information Technology*, the process of building theory is contrasted against the romantic view of theory building as the artistic, detailed, and exhaustive explanation of a phenomenon to a more pragmatic, interim struggle toward stronger theories. Following this view, Rivard argues that theory building resembles a craft even more than an art or a science; thus, while demonstrating creativity and imagination as an artist does, and rigor as a scientist does, all these elements are folded into an effort that requires patience and perseverance, and an iterative process that combines acts of reading, reflecting, writing that develop erudition, motivation, definition, imagination, explanation, presentation, and contribution for the theory being developed. The ultimate goal of these iterations, Rivard explains, is to produce a cohesive whole of constructs, assumptions, boundaries, and relationships that represent the theory.

The detailed processes of building theory and discursive practices presented by Rivard are elaborated in Chap. 5, “The Process of Information Systems Theorizing as a Discursive Practice,” by Hassan, Mingers, and Lowry. The authors reintroduce the stage of theorizing, the context of discovery, that is neglected by most researchers in IS who spend most of their efforts within the context of justification. They argue that exciting theories are the result of efforts within the context of discovery where the intuitive leaps, mistakes, and happy accidents that litter this stage result in creative and serendipitous discoveries. The authors develop a framework for this stage of theorizing consisting of foundational and generative theorizing practices. The former enacts the discourse, problematizes the phenomenon, leverages paradigms, and bridges with practice. The latter applies various processes of analogizing, metaphorizing, mythologizing, modeling, and constructing the research framework to support
the constructions of creative and exciting theories. What their framework provides is freedom from the need to borrow from the reconstructions of other disciplines instead, to be inspired creatively by them, and consequently connect with other disciplines in a meaningful way.

The following four chapters offer examples of how such creative theorizing takes place in different domains, specifically in digitization (Chap. 6, “Theorizing Digital Experience: Four Aspects of the Infomaterial,” by Kreps), design science (Chap. 7, “Design Science Theorizing,” by Goldkuhl and Sjöström), IS Strategy (Chap. 8, “Recontextualizing IT-Rich Theories: Illustrations from IS strategy,” by Moeini, Galliers, Simeonova, and Wilson), and organizational politics and business process transformation (Chap. 9, “Pluralist Theory Building: A Methodology for Generalizing from Data to Theory,” by Müller, Mathiassen, and Saunders). In Chap. 6, Kreps introduces the notion of infomateriality that provides a philosophical grounding for digitizing in the twenty-first century where IT and people are mangled in an intimate relationship. Drawing from the oeuvre of philosopher Henri Bergson, Kreps argues for the condition of society where the exchange of information and the digital tools with which society undertakes it have become constitutive of the physical context in which it exists. He merges this understanding of the blurred distinction between mental and physical with Grover’s four aspects of the digital—(1) embeddedness, (2) decoupling, (3) representation, and (4) generativity—to provide insights from the experiences of an ongoing digitization project aimed at capturing human digital experiences.

In the domain of design science, Goldkuhl and Sjöström lament the ambivalence that design science shows toward theory and offers a solution in the form of “practical theory,” which is not limited to domain-specific knowledge but includes knowledge to support the inquiry and design process itself. Such a theory does not distinguish between utility of a theory toward building an artifact in a specific domain and the methods and the experience of building, what they call “instrumentalities,” that are applied to build that same artifact. The authors eschew the practitioner-theorist dualism and consider design as a process of inquiry. They propose several types of practical theory that are not necessarily exhaustive, but nevertheless produce the elements of a theory in progress that emerge
out of the alternation between situational design inquiry and theorizing, that are capable of grasping the complexity and detail of lived experience.

Chapter 8, “Recontextualizing IT-Rich Theories: Illustrations from IS strategy,” by Moeini, Galliers, Simeonova, and Wilson emerged from the authors’ experience of distilling theories from the IS strategy domain. To the authors, borrowing theory can be useful especially if their constructs, configurations, and logic can be modified and successfully recontextualized. Consequently, even the black-boxed IT artifact, when properly reconceptualized, will add value to IS strategy studies by highlighting its taxonomic nature, its system-specific nature, its subcomponents, its more holistic attributes, its different functionalities, and its limitations and goals, all which contribute to better specification of the strategic role that IT artifact plays. The authors demonstrate how IS strategy studies accomplish the construct and relationship recontextualization in terms of specification and distinction.

Within the domain of organizational politics and business process transformation in Chap. 9, “Pluralist Theory Building: A Methodology for Generalizing from Data to Theory,” Müller, Mathiassen, and Saunders propose a pluralist theory building process that leverages the power of multiperspective inquiry. This theory building methodology involves moving between description and theory, and between single and multiple perspectives through four iterative steps with specific deliverables: create perspective accounts, synthesize multiperspective account, create theory fragments, and synthesize pluralist theory. In this chapter, they provide insights into the challenges involved in using the methodology and the activities in which researchers may engage to address these challenges. By drawing from Mingers’ pragmatic approach to pluralism and Lee and Baskerville’s generalization framework, they offer a useful methodology of abstracting theory from empirical studies.

The final two chapters move the discussion on theorizing into a more philosophical level. Chapter 10, “Revitalizing thoughts on Theory, Theorizing, and Philosophizing in Information Systems,” by Haj-Bolouri connects theory to philosophy via the notion of kernel philosophy, drawing an analogy from the notion of kernel theories in design science. Kernel philosophy forms the integral part of theorizing by encouraging IS scholars to question the significance of data collected and the
assumptions taken, underlying epistemologies and boundaries erected, and includes ethical considerations for the research. As part of the theorizing space within the space of inquiry, kernel philosophy feeds into the process where the theory is actualized out of the research project. Chapter 11, "Reviving the Individual in Information Systems Theorizing," is by Taxén. He identifies the nexus between the individual, social, and material elements of the phenomenon of interest and ties them together through the process of communalization. This process forms a communal infrastructure comprising the individual, with his or her neurobiological factors and the social, institutionalized factors, which together enable or constrain the actions performed. Using this perspective, all the under-theorized elements—the IT artifact, information, and systems—are given new avenues for advancing IS theorizing.

Conclusion

The IS field has remained in its comfort zone of borrowed legitimization, derivative research, and half-hearted defense of its identity for too long. Serious efforts are required to take the field out of its doldrums into a new phase of advancement, not for its own sake but because the world requires it. Peter Drucker once commented to Markus (1999, pp. 200–201), “The problem with your field, is that you haven’t figured out that it’s about information, not about technology.” The role of information and systems may have been one of novelty when Daniel Bell (1973) and Peter Drucker (1969) wrote about them half a century ago. Today, information and systems are turning the world upside down, becoming both the engine of economic growth and, at the same time, helping to divide and rip our society apart. As Galliers (2003, p. 346) noted:

Narrowly focused, reductionist … thinking that assumes that the whole is no greater than the sum of the parts, that individual components of a complex entity will interact one with another in exactly the same way when certain of those components are taken out of the equation, that systems do not exhibit emergent properties—such thinking is unlikely to lead to the kind of insights that would emerge from a more systemic approach.
The field cannot wait for another half a century to take on its responsibility as custodians of information and of systems, as well as of the associated technologies. The road ahead needs to be clear and unambiguous and the necessary tasks to be undertaken cannot be accomplished without a clear answer to the question of why it needs to exist as a field of study beyond its service to its members. The answer to this question lies in its concepts and its theories that the field declares to the world. Fortunately, its subject matter remains current and is ever changing, providing the necessary opportunities for the field to realize its true potential.

References

Abbasi, A., Sarker, S., & Chiang, R. (2016). Big data research in information systems: Toward an inclusive research agenda. *Journal of the Association for Information Systems, 17*(2), i–xxxii. https://doi.org/10.17705/1jais.00423

Abend, G. (2008). The meaning of “theory”. *Sociology Theory, 26*(2), 173–199.

Achinstein, P. (1983). *The nature of explanation*. New York: Oxford University Press.

Ågerfalk, P. J. (2014). Insufficient theoretical contribution: A conclusive rationale for rejection? *European Journal of Information Systems, 23*(6), 593–599.

Alexander, J. C. (1982). *Positivism, presuppositions, and current controversies, theoretical logic in sociology*. Berkeley, CA: University of California Press.

Alvesson, M., & Sandberg, J. (2011). Generating research questions through problematization. *Academy of Management Review, 36*(2), 247–271.

Anderson, C. (2008). The end of theory. *Wired, 16*(7), 71.

Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingsworth, T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet, 395*(10228), 931–934.

Argyris, C., & Schön, D. A. (1974). *Theory in practice: Increasing professional effectiveness*. San Francisco, CA: Jossey-Bass Publishers.

Avison, D., & Malaurent, J. (2014). Is theory king?: Questioning the theory fetish in information systems. *Journal of Information Technology, 29*(4), 327–336.

Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review, 14*(4), 496–515.

Bacon, F. (1620). *Novum Organum*. London.
Banville, C., & Landry, M. (1989). Can the field of MIS be disciplined? *Communications of the ACM, 32*(1), 48–60.

Baskerville, R., & Myers, M. D. (2004). Special issue on action research: Making information system research relevant to practice. *MIS Quarterly, 28*(3), 329–335.

Baskerville, R. L., & Myers, M. D. (2002). Information systems as a reference discipline. *MIS Quarterly, 26*(1), 1–14.

Baskerville, R. L., & Wood-Harper, A. T. (1996). A critical perspective on action research as a method for information systems research. *Journal of Information Technology, 11*, 235–246.

Becher, J. J. (1703). *Physica subterranea*. Spirensis, Germany: Lipsiae.

Bechtel, W., & Abrahamsen, A. (2005). Explanation: A mechanist alternative. *Studies in History and Philosophy of Biological and Biomedical Sciences, 36*(2), 421–441. https://doi.org/10.1016/j.shpsc.2005.03.010

Bell, D. (1973). *The coming of the post-industrial society: A venture in social forecasting*. New York: Basic Books.

Benbasat, I., & Barki, H. (2007). Quo vadis TAM? *Journal of the Association for Information Systems, 8*(4), 211–218.

Benbasat, I., & Konsynski, B. (1988). Introduction to special section on GDSS. *MIS Quarterly, 12*(4), 588–590.

Benton, T., & Craib, I. (2001). *Philosophy of social science: The Philosophical foundations of social thought*. New York: Palgrave.

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality*. New York: Anchor Books.

Bertalanffy, L. v. (1968). *General systems theory: Foundations, development, applications*. New York: George Braziller.

Bertens, H. (1993). The postmodern weltanschauung and its relation to modernism: An introductory survey. In J. Natoli & L. Hutcheon (Eds.), *A postmodern reader* (pp. 25–70). Albany, NY: State University of New York Press.

Bichler, M., Frank, U., Avison, D., Malaurent, J., Fettke, P., Hovorka, D., et al. (2016). Theories in business and information systems engineering. *Business Information Systems Engineering, 58*(4), 291–319.

Blake, R. R., & Mouton, J. S. (1964). *The managerial grid: Key orientations for achieving production through people*. Houston, TX: Gulf Publishing Co..

Blalock, H. M. (1969). *Theory construction: From verbal to mathematical formulations*. Englewood Cliffs, NJ: Prentice-Hall.

Blaug, M. (1997). *Economic theory in retrospect*. Cambridge, UK: Cambridge University Press.
Boland, R. J. (1985). Phenomenology: A preferred approach to research on information systems. In E. Mumford et al. (Eds.), Research methods in information systems (pp. 193–200). North-Holland: Elsevier Science Publishers B. V.

Bostrom, R. P., Gupta, S., & Thomas, D. (2009). A meta-theory for understanding information systems within sociotechnical systems. Journal of Management Information Systems, 26(1), 17–47.

Boulding, K. E. (1955). Notes on the information concept. Exploration, 6, 103–112.

Bourdieu, P. (1977). Outline of a theory of practice. Cambridge, UK: Cambridge University Press.

Brentano, F. C. (1874). Psychology from an empirical standpoint. London: Routledge.

Bunge, M. (1997). Mechanism and explanation. Philosophy of the Social Sciences, 27(4), 410–465.

Burrell, G., & Morgan, G. (1979). Sociological paradigms and organisational analysis. London: Heinemann.

Burton-Jones, A., McLean, E. R., & Monod, E. (2015). Theoretical perspectives in IS research: From variance and process to conceptual latitude and conceptual fit. European Journal of Information Systems, 24(6), 664–679. https://doi.org/10.1057/ejis.2014.31

Byron, K., & Thatcher, S. M. B. (2016). Editors’ comments: “What I know now that I wish I knew then”—teaching theory and theory building. Academy of Management Review, 41(1), 1–8.

Cadwalladr, C., & Graham-Harrison, E. (2018). How Cambridge Analytica turned Facebook “likes” into a lucrative political tool. The Guardian.

Callon, M. (2007). What does it mean to say that economics is performative. In D. MacKenzie, F. Muniesa, & L. Siu (Eds.), Do economists make markets? On the performativity of economics. Princeton, NJ: Princeton University Press.

Charles, D. (2000). Aristotle on meaning and essence. Oxford, UK: Oxford University Press.

Clegg, S., & Bailey, J. R. (2008). Prescriptive theory. In International encyclopedia of organization studies. SAGE.

Collins, R. (1986). Weberian sociological theory. New York: Cambridge University Press.

Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the academy of management journal. Academy of Management Journal, 50(6), 1281–1303.
Copi, I. M., & Cohen, C. (2001). *Introduction to logic*. New York: Prentice-Hall.

Corley, K. G., & Gioia, D. A. (2011). Building theory about theory building: What constitutes a theoretical contribution. *Academy of Management Review, 36*(1), 12–32.

Corvellec, H. (2013). Why ask what theory is? In H. Corvellec (Ed.), *What is theory? Answers from the social and cultural sciences* (pp. 9–24). Copenhagen: Liber CBS Press.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 318–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003.

Davison, R. M., Martinsons, M. G., & Kock, N. (2004). Principles of Canonical action research. *Information Systems Journal, 14*, 65–86.

Delone, W. H., & McLean, E. R. (1992). Information system success: The quest for the dependent variable. *Information Systems Research, 3*(1), 60–95.

Dent, E. B. (1999). Complexity science: A worldview shift. *Emergence, 1*(4), 5–19. https://doi.org/10.1207/s15327000em0104_2

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use—adaptive structuration theory. *Organization Science, 5*(2), 121–147.

Dhar, V. (2013). Data science and prediction. *Communications of the ACM, 56*(12), 64–73.

Dickson, G. W. (1981). Management information systems: Evolution and status. In M. C. Yovits (Ed.), *Advances in Computers* (pp. 1–37). New York: Academic Press.

Dilthey, W. (1883). *Introduction to the human sciences*. Princeton, N.J.: Princeton University Publishers.

Dilthey, W. (1957) *Philosophy of existence: Introduction to Weltanschauungslehre* (W. Kluback and M. Weinbaum, Trans.). New York, NY: Bookman Associates.

DiMaggio, P. (1995). Comments on “What Theory Is Not”. *Administrative Science Quarterly, 40*(3), 391–397.

Doty, D. H., & Glick, W. H. (1994). Typologies as a unique form of theory building: Toward improved understanding and modeling. *Academy of Management Review, 19*(2), 230–251.

Drucker, P. F. (1969). *The age of discontinuity: Guidelines to our changing society*. New York: Harper & Row.
Dubin, R. (1969). *Building theory*. New York: The Free Press.
Duhem, P. (1906). *The aim and structure of physical theory* (P. Wiener, Trans.). Princeton, NJ: Princeton University Press.
Durkheim, E. (1895). *Les règles de la méthode sociologique* (*The rules of the sociological method*). Paris: F. Alcan.
Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532–551.
Fauci, A. S., Touchette, N. A., & Folkers, G. K. (2005). Emerging infectious diseases: A 10-year perspective from the National Institute of Allergy and Infectious Diseases. *Emerging Infectious Diseases, 11*(4), 519–525. https://doi.org/10.3201/eid1104.041167
Fawcett, J. (1998). *The relationship of theory and research*. Philadelphia: F. A. Davis Company.
Fawcett, J., & Downs, F. S. (1986). *The relationship of theory and research*. Norwalk, CT: Appleton-Century-Crofts.
Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior*. Reading, MA: Addison-Wesley.
Fishbein, M., & Ajzen, I. (1977). *Belief, attitude, intention and behavior*. Reading, MA: Addison-Wesley.
von Fraassen, B. C. (1980). *The scientific image*. Oxford, UK: Clarendon Press.
Freese, L. (1980). Formal theorizing. *Annual Review of Sociology, 6*, 187–212.
Friedman, V. J., & Rogers, T. (2009). There is nothing so theoretical as good action research. *Action Research, 7*(1), 31–47. https://doi.org/10.1177/1476750308099596
Gadamer, H.-G. (1975). *Truth and method* (2nd ed.). New York: Continuum Publishing Group.
Gadamer, H.-G. (1976). *Philosophical hermeneutics*. Berkeley: University of California Press.
Gadamer, H.-G. (1998). *Praise of theory: Speeches and essays*. New Haven, CT: Yale University Press.
Galliers, R. D. (2003). Change as crisis or growth? Toward a trans-disciplinary view of information systems as a field of study: A response to Benbasat and Zmud’s call for returning to the IT artifact. *Journal of the AIS, 4*(6), 337–351.
Geertz, C. (1973). *The interpretation of cultures*. New York, NY: Basic Books.
Giddens, A. (1976). *New rules of sociological method: A positive critique of interpretive sociologies* (2nd ed.). New York: Basic Books.
Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Berkeley: University of California Press.
Gilbert, W. (1893). *On the loadstone and magnetic bodies and on the great magnet the earth*. New York: John Wiley & Sons.

Gioia, D. A., & Pitre, E. (1990). Multiparadigm perspectives on theory building. *The Academy of Management Review, 15*(4), 584–602.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York, NY: Aldine de Gruyter.

Glennan, S. S. (1996). Mechanisms and the nature of causation. *Erkenntnis, 44*(1), 49–71. [https://doi.org/10.1007/BF00172853](https://doi.org/10.1007/BF00172853)

Goes, P. B. (2013). Editor’s comment. Commonalities across IS silos and interdisciplinary information systems research. *MIS Quarterly, 37*(2), iii–vii.

Gorry, G. A., & Scott Morton, M. S. (1971). A framework for management information systems. *Sloan Management Review, 13*(1), 55–70.

Gray, P. (2003). Introduction to the debate on the core of the information systems field. *Communications of the AIS, 12*(1), p. Art. 42.

Gregor, S. (2006). The nature of theory in information systems. *MIS Quarterly, 30*(3), 611–642.

Gregor, S. (2014). Theory—Still king but needing a revolution! *Journal of Information Technology, 29*(4), 337–340.

Gregor, S., & Hevner, A. R. (2013). Positioning and presenting design science research for maximum impact. *MIS Quarterly, 37*(2), 337–355.

Gregor, S., & Jones, D. (2007). The anatomy of a design theory. *Journal of the AIS, 8*(5), 312–335.

Grover, V. (2012). The information systems field: Making a case for maturity and contribution. *Journal of the Association for Information Systems, 13*(4), 254–272.

Grover, V., & Lyytinen, K. (2015). New state of play in information systems research: The push to the edges. *MIS Quarterly, 39*(2), 271–296.

Grover, V., Lyytinen, K., & Weber, R. (2012). Panel on native IS theories. In *Special Interest Group on Philosophy and Epistemology in IS (SIGPHIL) Workshop on IS Theory: State of the Art*. Orlando, FL, Dec 16–19.

Hallberg, M. (2013). Looking at theory in theory of science. In H. Corvellec (Ed.), *What is theory? answers from the social and cultural sciences* (pp. 65–87). Copenhagen: Liber CBS Press.

Hambrick, D. C. (2007). The field of management’s devotion to theory: Too much of a good thing? *Academy of Management Journal, 50*(6), 1346–1352.

Hanson, N. R. (1958). *Patterns of discovery: An inquiry into the conceptual foundations of science*. London: Cambridge University Press.
1 Introduction: Why Theory? (Mis)Understanding the Context...

Harré, R. (1970). _The principles of scientific thinking_. Chicago, IL: University of Chicago Press.

Harré, R. (1976). The constructive role of models. In L. Collins (Ed.), _The use of models in the social sciences_ (pp. 16–43). Boulder, CO: Westview Press, Inc..

Hassan, N. R. (2011). Is information systems a discipline? Foucauldian and Toulminian insights. _European Journal of Information Systems, 20_(4), 456–476.

Hassan, N. R. (2014). Paradigm lost … paradigm gained: A hermeneutical rejoinder to Banville and Landry’s “Can the Field of MIS be Disciplined?”. _European Journal of Information Systems, 23_(6), 600–615.

Hassan, N. R. (2019). The origins of business analytics and implications for the information systems field. _Journal of Business Analytics_. Taylor & Francis, _2_(2), 118–133. https://doi.org/10.1080/2573234x.2019.1693912.

Hassan, N. R., Mathiassen, L., & Lowry, P. B. (2019). The process of information systems theorizing as a discursive practice. _Journal of Information Technology, 34_(3), 198–220.

Hassan, N. R., Mingers, J., & Stahl, B. (2018). Philosophy and information systems: Where are we and where should we go? _European Journal of Information Systems_. Taylor & Francis, _27_(3), 263–277. https://doi.org/10.1080/0960085X.2018.1470776.

Hassan, N. R., & Mingers, J. C. (2018). Reinterpreting the Kuhnian paradigm in information systems. _Journal of the Association for Information Systems, 19_(7), 568–599.

Hassard, J. (1991). Multiple paradigms and organizational analysis: A case study. _Organization Studies, 12_(2), 275–299.

Hedström, P., & Swedberg, R. (2010). Social mechanisms: An introductory essay. In _Social mechanisms: An analytical approach to social theory_ (pp. 1–31). Cambridge, UK: Cambridge University Press.

Hedström, P., & Udehn, L. (2009). Analytical sociology and theories of the middle range. In P. Hedström & P. Bearman (Eds.), _The Oxford handbook of analytical sociology_ (pp. 25–47). New York: Oxford University Press.

Heidegger, M. (1977a). _Basic writings from being and time to the task of thinking_. New York: Harper & Row.

Heidegger, M. (1977b). _The question concerning technology, and other essays_. New York: Harper & Row.

Heidegger, M. (1982). _The basic problems of phenomenology_. Bloomington, IN: Indiana University Press.

Heidegger, M. (1999). _Ontology–The hermeneutics of facticity_. Bloomington, IN: Indiana University Press.
Held, D. (1980). *Introduction to critical theory: Horkheimer to Habermas*. Berkeley, CA: University of California Press.

Hempel, C. G. (1965). *Aspects of scientific explanation and other essays in the philosophy of science*. New York: Free Press.

Hempel, C. G., & Oppenheim, P. (1948). Studies in the logic of explanation. *Philosophy of Science, 15*(2), 135–175.

Hesse, M. B. (1966). *Models and analogies in science*. Notre Dame, IN: University of Notre Dame Press.

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly, 28*(1), 75–105.

Hirschheim, R. (2006). Special research perspectives issue on the IS core/identity debate. *Journal of the Association for Information Systems, 7*(10), 700–702. https://doi.org/10.17705/1jais.00105

Hirschheim, R. (2019). Against theory: With apologies to feyerabend. *Journal of the Association for Information Systems, 20*(9), 1340–1357. https://doi.org/10.17705/1jais.00569

Hirschheim, R., Dennis, A. R., & Willcocks, L. (2019). Panel presentation. In *SIGPHIL@ICIS Workshop on the Death of Theory in IS and Analytics, Munich, Germany, Dec 15–16*. Special Interest Group on Philosophy in Information Systems (SIGPHIL).

Holmström, J. (2005). Theorizing in IS research: What came before and what comes next? *Scandinavian Journal of Information Systems, 17*(1), 167–174.

Holmström, J., & Truex, D. (2011). Dropping your tools: Exploring when and how theories can serve as blinders in IS research. *Communications of the Association for Information Systems, 28*(1), 283–294, Article 19.

Homans, G. C. (1974). *Social behavior: Its elementary forms*. New York: Harcourt Brace Jovanovich, Inc..

Husserl, E. (1911). Philosophy as rigorous science. In Q. Lauer (Ed.), *Phenomenology and the crisis of philosophy*. New York: Harper and Row.

Isaac, J. (2020). Theorist at work: Talcott Parsons and the Carnegie Project on theory, 1949–1951. *Journal of the History of Ideas, 71*(2), 287–311.

Jaccard, J., & Jacoby, J. (2010). *Theory construction and model-building skills: A practical guide for social scientists*. New York, NY: The Guilford Press.

James, W. (1890). *The principles of psychology*. New York: Henry Holt and Company.

Jones, M. (1999). Structuration theory. In W. Currie & B. Galliers (Eds.), *Rethinking management information systems* (pp. 103–135). Oxford: Oxford University Press.
1 Introduction: Why Theory? (Mis)Understanding the Context…

Kang, C., & Frenkel, S. (2018). Facebook says Cambridge Analytica harvested data of up to 87 million users. *New York Times*. Retrieved March 3, 2019, from https://www.nytimes.com/2018/04/04/technology/mark-zuckerberg-testify-congress.html.

Kaplan, A. (1964). *The conduct of inquiry: Methodology for behavioral science*. San Francisco: Chandler Pub. Co..

Karahanna, E., Davis, G. B., Mukhopadhyay, T., O’Keefe, B., Watson, R. T., and Weber, R. (2002). Information systems’s voyage to self-discovery: Is the First stage the development of a theory? In *International Conference on Information Systems (ICIS)*. Barcelona, Spain.

Keen, P. G. W. (1980). MIS research: Reference disciplines and a cumulative tradition. In E. McLean (Ed.), *International Conference on Information Systems (ICIS)* (pp. 9–18). Philadelphia, PA: ACM Press.

Keen, P. G. W. (1987). MIS research: Current status, trends and needs. In R. Buckingham et al. (Eds.), *Information systems education: Recommendations and implementation* (pp. 1–13). Cambridge: Cambridge University Press.

Kilduff, M., Mehra, A., & Dunn, M. B. (2011). From blue sky research to problem solving: A philosophy of science theory of new knowledge production. *Academy of Management Review, 36*(2), 297–317.

Kitchin, R. (2014). *The data revolution: Big data, open data, data infrastructures & their consequences*. Thousand Oaks, CA: SAGE Publications.

Klein, H. K., Hirschheim, R. A., & Nissen, H.-E. (1991). A pluralist perspective of the information systems research arena. In H. K. Klein, R. A. Hirschheim, & H.-E. Nissen (Eds.), *Information systems research: Contemporary approaches and emergent traditions*. North Holland: Elsevier Science Publishers.

Koontz, H. (1961). The management theory jungle. *The Journal of the Academy of Management, 4*(3), 174–188.

Kuhn, T. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.

Kvale, S. (1983). The qualitative research interview: A phenomenological and a hermeneutical mode of understanding. *Journal of Phenomenological Psychology, 14*(2), 171–196.

Landry, M., & Banville, C. (1992). ‘A disciplined methodological pluralism for MIS research’, *Accounting, Management and Information Technology, 2*(2), 77–97.

Larson, C. J. (1973). *Major themes in sociological theory*. Philadelphia, PA: D. McKay Co..
Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford, UK: Oxford University Press.

Lavoisier, A. L. (1777). *Mémoires de l’Académie Royale des Sciences*. Paris: Royal Academy of Sciences.

Lear, J. (1988). *Aristotle: The desire to understand*. New York: Cambridge University Press.

Lee, A. S. (1991). Architecture as a reference discipline for MIS. In H.-E. Nissen, H. K. Klein, & R. Hirschheim (Eds.), *Information systems research: Contemporary approaches and emergent traditions* (pp. 573–592). Amsterdam: Elsevier North-Holland.

Lee, A. S. (2014). Theory is king? But first, what is theory? *Journal of Information Technology, 29*(4), 350–352.

Levine, D. N. (2015). *Social theory as a vocation: Genres of theory work in sociology*. New York: Transaction Publishers.

Lewin, K. (1951). *Field theory in social science: Selected theoretical papers*. New York, NY: Harper & Row.

Lewis, M. W., & Grimes, A. J. (1999). Metatriangulation: Building theory from multiple paradigms. *Academy of Management Review, 24*(4), 672–690.

Liddell, H. G., & Scott, R. (1889). *An intermediate Greek-English Lexicon*. Oxford, UK: Clarendon Press.

Liedman, S.-E. (2013). Beholding, explaining, and predicting—The history of the concept of theory. In H. Corvellec (Ed.), *What is theory? Answers from the social and cultural sciences* (pp. 25–47). Copenhagen: Liber CBS Press.

Lim, S., Saldanha, T., Malladi, S., & Melville, N. P. (2013). Theories used in information systems research: Insights from complex network analysis. *Journal of Information Technology Theory and Application, 14*(2), 5–46.

Linnaeus, C. (1735). *Systema naturae*. Paris: M.A. David.

Lyons, J. (2009). *The house of wisdom: How the Arabs transformed western civilization*. New York: Bloomsbury Press.

Lyytinen, K., & King, J. L. (2004). Nothing at the center? Academic legitimacy in the information systems field. *Journal of the AIS, 5*(6), 220–246.

Lyytinen, K., & King, J. L. (2006). The theoretical core and academic legitimacy: A response to professor Weber. *Journal of the AIS, 7*(10), 714–721.

Lyytinen, K., & Klein, H. K. (1985). The critical theory of Jurgen Habermas as a basis for a theory of information system. In E. Mumford, et al. (eds.), *Research Methods in Information Systems, Proceedings: IFIPWG 8.2 Colloquium, Manchester, 1–3 September, 1984, Amsterdam: North Holland*. North Holland: Elsevier Science Publishers B. V.
Machamer, P., Darden, L., & Craver, C. F. (2000). Thinking about mechanisms. *Philosophy of Science, 67*(1), 1–25.

MacKenzie, D. (2006). *An engine, not a camera: How financial models shape markets*. Boston, MA: MIT Press.

March, S. T., & Smith, G. F. (1995). Design and natural science research in information technology. *Decision Support Systems, 15*, 251–266.

Markus, M. L. (1999). Thinking the unthinkable: What happens if the IS field as we know it goes away? In W. Currie & B. Galliers (Eds.), *Rethinking management information systems*. New York: Oxford University Press.

Markus, M. L. (2014). Maybe not the king, but an invaluable subordinate: A commentary on Avison and Malautrent’s advocacy of “theory light” IS research. *Journal of Information Technology, 29*(4), 341–345.

Markus, M. L., & Robey, D. (1988). Information technology and organizational change: Causal structure in theory and research. *Management Science, 34*(5), 583–598.

Markus, M. L., & Rowe, F. (2018). Is IT changing the world? Conceptions of causality for information systems theorizing. *MIS Quarterly, 42*(4), 1255–1280.

Markus, M. L., & Saunders, C. S. (2007). Editorial comments: Looking for a few good concepts…and theories…and theories…for the information systems field. *MIS Quarterly, 31*(1), iii–vi.

Marx, K. (1866). *Capital* (Vol. 1). Hamburg: Otto Meissner.

Masterman, M. (1970). The nature of a paradigm. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the growth of knowledge: International colloquium in the philosophy of science* (Bedford College, 1965) (pp. 59–89). London: Cambridge University Press.

Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think*. New York: Houghton Mifflin Harcourt.

McGregor, D. (1960). *The human side of enterprise*. New York: McGraw-Hill.

McPhee, K. (1996). *Design theory and software design*. Edmonton, Alberta, Canada: Department of Computing Science, The University of Alberta.

Merton, R. K. (1945). Sociological theory. *The American Journal of Sociology, 50*(6), 462–473.

Merton, R. K. (1968). Sociological theories of the middle range. In *Social theory and social structure* (pp. 39–72). New York: Free Press.

Merton, R. K. (1996). *On social structure and science* (P. Sztompka, ed.). Chicago, IL: The University of Chicago Press.
Michels, R. (1915). *Political parties: A sociological study of the oligarchical tendencies of modern democracy* (E. Paul and C. Paul, Trans.). New York: The Free Press.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage Publications.

Mills, C. W. (1959). *The sociological imagination*. New York: Oxford University Press.

Mingers, J. (2001). Combining IS research methods: Towards a pluralist methodology. *Information Systems Research, 12*(3), 240–259.

Mingers, J. (2003). The paucity of multimethod research: A review of the information systems literature. *Information Systems Journal, 13*(3), 233–249.

Mingers, J., & Brocklesby, J. (1997). ‘Multimethodology: Towards a framework for mixing methodologies’, *Omega. International Journal of Management Science, 25*(5), 489–509.

Mohr, L. B. (1982). *Explaining organizational behavior*. San Francisco CA: Jossey-Bass Publishers.

Moody, D., Iacob, M.-E., & Amrit, C. (2010). In search of paradigms: Identifying the theoretical foundations of the IS field. In *European Conference on Information Systems*. June 6–9, Pretoria, South Africa.

Mueller, B., & Urbach, N. (2017). Understanding the why, what, and how of theories in IS research. *Communications of the Association for Information Systems, 41*(Art 17), 349–388.

Mumford, E., Hirschheim, R., Fitzgerald, G., & Wood-Harper, A. T. (1985). Research methods in information systems. In *Proceedings: IFIP WG 8.2 Colloquium, Manchester, 1–3 September, 1984*. North Holland: Elsevier Science Publishers B. V.

Nagel, E. (1979). *The structure of science: Problems in the logic of scientific explanation*. Indianapolis, IN: Hackett Publishing Company.

Newton, I. (1687). *Philosophiae Naturalis Principia Mathematica (The mathematical principles of natural philosophy)*. London: Joseph Streater for the Royal Society.

Niederman, F., & March, S. T. (2019). Broadening the conceptualization of theory in the information systems discipline: A meta-theory approach. *Data Base for Advances in Information Systems, 50*(2), 18–44. https://doi.org/10.1145/3330472.3330476

Nissen, H.-E., Klein, H. K., & Hirschheim, R. A. (1991). *Information systems research: Contemporary approaches and emergent traditions*. North-Holland: Elsevier Science Publishers B. V.
1 Introduction: Why Theory? (Mis)Understanding the Context...

Orlikowski, W. J., & Robey, D. (1991). Information technology and the structuring of organizations. *Information Systems Research, 2*(2), 143–169.

Orlikowski, W. J., & Scott, S. V. (2008). Sociomateriality: Challenging the separation of technology, work and organization. *The Academy of Management Annals, 2*(1), 433–474.

Oswick, C., Fleming, P., & Hanlon, G. (2011). From borrowing to blending: Rethinking the processes of organizational theory-building. *Academy of Management Review, 36*(2), 318–337.

Parsons, T., & Shils, E. A. (1962). *Toward a general theory of action*. Cambridge, MA: Harvard University Press.

Pfeffer, J. (2014). The management theory morass: Modest proposals. In J. A. Miles (Ed.), *New directions in management and organization theory* (pp. 457–468). Newcastle, UK: Cambridge Scholars Publishing.

Popper, K. R. (1959). *The logic of scientific discovery*. New York: Basic Books.

Quine, W. V. (1951). Main trends in recent philosophy: Two Dogmas of empiricism. *The Philosophical Review, 60*(1), 20–43.

Ramsey, F. P. (1965). Theories. In R. B. Braithwaite (Ed.), *The foundations of mathematics and other logical essays* (pp. 212–236). London: Routledge & Kegan Paul.

Ravitch, S. M., & Riggan, M. (2012). *Reason and Rigor: How conceptual framework guides research*. Thousand Oaks: Sage.

Riemer, K., & Johnston, R. B. (2014). Rethinking the place of the artefact in IS using Heidegger’s analysis of equipment. *European Journal of Information Systems, 23*(3), 273–288.

Riemer, K., & Johnston, R. B. (2017). Clarifying ontological inseparability with Heidegger’s analysis of equipment. *MIS Quarterly, 41*(4), 1059–1081.

Ritzer, G. (1990). Metatheorizing in sociology. *Sociological Forum, 5*(1), 3–15.

Ritzer, G. (1996). *The McDonaldization of society*. Thousand Oaks, CA: Pine Forge Press.

Ritzer, G. (2001). *Explorations in social theory: From metatheorizing to rationalization*. London, UK: Sage.

Rockart, J. F., & DeLong, D. W. (1988). *Executive support systems*. Homewood, IL: Dow Jones-Irwin.

Rosenblueth, A., & Wiener, N. (1945). The role of models in science. *Philosophy of Science, 12*(4), 316–321.

Rynes, S. (2002). From the editors. *Academy of Management Journal, 45*(2), 311–313.
Salmon, W. C. (1998). *Causality and explanation*. New York: Oxford University Press.

Sandberg, J., & Alvesson, M. (2020). Meanings of theory: Clarifying theory through typification. *Journal of Management Studies*. https://doi.org/10.1111/joms.12587

Sandberg, J., & Tsoukas, H. (2011). Grasping the logic of practice: Theorizing through practical rationality. *Academy of Management Review, 36*(2), 338–360.

Sarker, S., & Lee, A. S. (2002). Using a positivist case research methodology to test three competing theories-in-use of business process redesign. *Journal of the AIS, 2*(1), p. Art. 7.

Schleiermacher, F. (1978). *Hermeneutics: The handwritten manuscripts* (H. Kimmerle, Ed., J. Duke, Trans.). New York: Oxford University Press.

Schutz, A. (1954). Concept and theory formation in the social sciences. *Journal of Philosophy, 51*(9), 257–273.

Schutz, A. (1961). *Collected papers vol. 1: The problem of social reality* (M. Natanson, ed.). The Hague: Martinus Nijhoff.

Shepherd, D. A., & Suddaby, R. (2017). Theory building: A review and integration. *Journal of Management, 43*(1), 59–86.

Shepherd, D. A., & Sutcliffe, K. M. (2011). Inductive top-down theorizing: A source of new theories of organization. *Academy of Management Review, 36*(2), 361–380.

Shmueli, G. (2010). To explain or to predict? *Statistical Science, 25*(3), 289–310. https://doi.org/10.2139/ssrn.1351252

Siegel, E. (2016). *Predictive analytics: The power to predict who will click, buy, lie, or die*. New York: Wiley.

Simon, H. (1981). *The sciences of the artificial*. Boston, MA: The MIT Press.

Siponen, M., & Klaavuniemi, T. (2019). How and why “theory” is often misunderstood in information systems literature. In *Proceedings of the International Conference on Information Systems (ICIS 2019)*, Munich, Germany Dec 15–18. Association for Information Systems (AIS).

Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations*. Glasgow: Edwin Cannan.

Steadman, I. (2013). Big data, language and the death of the theorist (Wired UK). *Wired UK*. Retrieved September 27, 2019, from http://www.wired.co.uk/news/archive/2013-01/25/big-data-end-of-theory.

Straub, D. (2012). Editorial: Does MIS have native theories. *MIS Quarterly, 36*(2), iii–xii.
Suddaby, R. (2014). Editor’s comments: Why theory? *Academy of Management Review, 39*(4), 407–411.

Suddaby, R., Hardy, C., & Huy, Q. N. (2011). Where are the new theories of organization? *Academy of Management Review, 36*(2), 236–246.

Suppe, F. (1977). *The structure of scientific theories*. Urbana, IL: University of Illinois Press.

Suppe, F. (2000). Understanding scientific theories: An assessment of developments, 1969–1998. *Philosophy of Science, 67*(Supplement), S102–S115.

Suppes, P. (1967). What is scientific theory? In S. Morgenbesser (Ed.), *Philosophy of science today* (pp. 55–67). New York: Basic Books.

Susman, G. I., & Evered, R. D. (1978). An assessment of the scientific merits of action research. *Administrative Science Quarterly, 23*, 582–603.

Sutton, R. I., & Staw, B. M. (1995). What theory is not. *Administrative Science Quarterly, 40*(3), 371–384.

Swedberg, R. (2014). *The art of social theory*. Princeton, NJ: Princeton University Press.

van de Ven, A. H. (1989). Nothing is quite so practical as a good theory. *Academy of Management Review, 14*(4), 486–489.

Walls, J. G., Widmeyer, G. R., & El Sawy, O. (1992). Building an information systems design theory for vigilant EIS. *Information Systems Research, 3*(1), 36–59.

Walsham, G. (1995). Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems, 4*(2), 74–81.

Waltzman, R. (2017). The weaponization of information: The need for cognitive security. Santa Monica, CA: The RAND Corporation.

Weber, M. (1930). *The protestant ethic and the spirit of capitalism* (R. H. Tawney, ed.). London: G. Allen & Unwin, Ltd.

Weber, M. (1947). *The theory of social and economic organizations*. New York, NY: Free Press.

Weber, R. (2003). Editor’s comments: Theoretically speaking. *MIS Quarterly, 27*(3), iii–xii.

Weber, R. (2006). Reach and grasp in the debate over the IS core: An empty hand? *Journal of the AIS, 7*(10), 703–713.

Weber, R. (2012). Evaluating and developing theories in the information systems discipline. *Journal of the AIS, 13*(1), 1–30.

Weick, K. E. (1989). Theory construction as disciplined imagination. *Academy of Management Review, 14*(4), 516–531.
Weick, K. E. (1995). What theory is not, theorizing Is. *Administrative Science Quarterly, 40*(3), 385–390.

Weick, K. E. (1999). Theory construction as disciplined reflexivity: Tradeoffs in the 90s. *The Academy of Management Review, 24*(4), 797–806. https://doi.org/10.1503/cmaj.1032006

Whetten, D. A. (1989). What constitutes a theoretical contribution? *Academy of Management Review, 14*(4), 490–495.

Whetten, D. A., Felin, T., & King, B. G. (2009). The practice of theory borrowing in organizational studies: Current issues and future directions. *Journal of Management, 35*(3), 537–563.

Wisdom, J. O. (1972). Scientific theory: Empirical content, embedded ontology, and weltanschauung. *Philosophy and Phenomenological Research, 33*(1), 62–77.

World Health Organization. (2020). *Coronavirus disease 2019 (COVID-19) situation report—73.*

von Wright, G. H. (1971). *Explanation and understanding.* Ithaca, NY: Cornell University Press.

Yin, R. K. (1989). *Case study research: Design and methods.* Newbury Park, CA: Sage Publications.