

## NEW STATE OF PLAY IN INFORMATION SYSTEMS RESEARCH: THE PUSH TO THE EDGES<sup>1</sup>

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*The dominant way of producing knowledge in information systems (IS) seeks to domesticate high-level reference theory in the form of mid-level abstractions involving generic and atheoretical information technology (IT) components. Enacting such epistemic scripts squeezes IS theory to the middle range, where abstract reference theory concepts are directly instantiated or slightly modified to the IS context, whereas IT remains exogenous to theory by being treated as an independent variable, mediator, or moderator. In this design, IT is often operationalized using proxies that detect the presence of IT or its variation in use or cost. Our analysis of 143 articles published in **MIS Quarterly** and **Information Systems Research** over the past 15 years demonstrates that over 70 percent of published theory conforms to this mode of producing IS knowledge. This state of play has resulted in two negative consequences: the field (1) agonizes over the dearth of original and bold theorizing over IT and (2) satisfices when integrating theory with empirics by creating incommensurate mid-range models that are difficult to consolidate. We propose that one way to overcome these challenges is to critically examine and debate the negative impacts of the field's dominant epistemic scripts and relax them by permitting IS scholarship that more fluidly accommodates alternative forms of knowledge production. This will push IS inquiry to the "edges" and emphasize, on the one hand, inductive, rich inquiries using innovative and extensive data sets and, on the other hand, novel, genuine, high-level theorizing around germane conceptual relationships between IT, information and its (semiotic) representations, and social behaviors. We offer several exemplars of such inquiries and their results. To promote this push, we invite alternative institutionalized forms of publishing and reviewing. We conclude by inviting individual scholars to be more open to practices that permit richer theorizing. These recommendations will broaden the field's knowledge ecology and permit the creation of good IS knowledge over just getting "hits." We surmise that, if such changes are carried out, the field can look confidently toward its future as one of the epicenters of organizational inquiry that deal with the central forces shaping human enterprise in the 21<sup>st</sup> century.*

**Keywords:** Information systems discipline, research inquiry, epistemic scripts, IS theory, IT artifact, middle-range theory, theory borrowing, institutional analysis

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## Introduction

The fundamental knowledge interest that underlies information system (IS) research is this: how can an IS—as a semiotic *and* sociotechnical system—be effectively deployed in the human enterprise? Our discipline should help us orient, navigate, and behave so that information technology (IT)—various technical artifacts for capturing, processing, transmitting, and representing information—can be effectively infused into the human enterprise (Cooper and Zmud 1990). *Effective* here means any dimension of improvement in the human condition in which the uses of IT can be evaluated. By *human enterprise*, we mean any social arrangement that can be served or affected by or can serve the uses of IT, ranging from use by individuals, teams, organizational units, and organizations to use by communities, markets, industries, and societies.

IS scholars need to constantly ask how well our scholarship addresses this foundational knowledge interest in light of theory, empirics, and knowledge transfer mechanisms. Are all of these elements capable of justifying investments in the types of knowledge we produce? In this paper, we posit that our community does not perform as effectively as it could, particularly in terms of how it enables and promotes interactions between theory and empirics. We argue that key elements of scholarly inquiry—theory and data—are often too tightly coupled and linearly sequenced, to the greater detriment of the field’s intellectual mission.

To understand why this connection has come to be and what we can do about it, we examine and review dominant epistemic scripts—deeply rooted, preferred, and legitimate ways of producing IS knowledge (Boxenbaum and Rouleau 2011). These scripts embody the (implicit) cognitive templates that underpin an academic community’s collective understanding of how valid research knowledge is to be produced—in particular, how theory and empirics become interrelated during the process.

The boundary condition for our argument is theory-based work that classifies, predicts, and explains IS phenomena (Gregor 2006). This includes the vast majority of IS research, but excludes, for instance, design science research, axiomatic/analytical work, and data-driven constructionist approaches like actor–network analyses or rich ethnographies.<sup>2</sup> We argue that most published IS theory falls into this Gregor Type IV category and constitutes the main theoretical body of the field’s knowledge. We also argue that it is *mid-range*. By

<sup>2</sup>We are not implying that other research is immune from our arguments. However, since their treatment of theory is different, our focus is on positivist research.

mid-range (or middle-range) theorizing, we denote an enactment of a family of epistemic scripts that *adapt* or *borrow* (Whetten et al. 2009) grand(er) social theories originating within reference disciplines, such as economics, psychology, and sociology. We call such adapted source theories *reference theories* and the resulting (sink) theories, *mid-range theories*. The term mid-range theory for us simply denotes research models that result from borrowing abstract reference theories by transferring and specializing them within an IS context.<sup>3</sup> During this process, highly stylized<sup>4</sup> theoretical constructs from the reference theory typically get instantiated directly into the IS context without significant modification and extension<sup>5</sup> (Colquitt and Zapata-Phelan 2007). The key contribution of IS scholars in this process is to combine reference theory with some atheoretic, generic accounts of technology, represented as an investment or a perception or technology that is assumed to reside in the background.

What might make this philosophical point clearer is an example. Let’s focus on an IS scholar examining the effects of interorganizational systems using transaction cost economics theory (TCE). Per the script, he or she will instantiate TCE constructs of “asset specificity” or a “level of opportunism” (Ouchi 1980; Williamson 1975) so as to account for the effects of interorganizational systems; or he/she might borrow psychological theories such as the theory of planned behavior (Ajzen 1985) and instantiate its construct of “intention” to explain individual IT use (Davis 1989; Davis et al. 1989). In both cases, IT remains external to theorizing and is captured through a rough proxy that detects the presence of IT, which is then used to explain either the decrease of opportunism or the increase of asset specificity (Clemons et al. 1993), or becomes a general target or an antecedent of the intention (Davis 1989).

<sup>3</sup>The use of terms like *reference* and *mid-range* theory does not imply any negative connotation. In fact, these terms have served many disciplines well in generating new theoretical insights across multiple contexts. The approach reflected by these terms is commonly deployed in all applied disciplines, including any discipline in the management field or other social science fields such as communications, public administration, and so on. Yet, as we describe later, the approach can have negative consequences for any field, if carried out in excess and not done well. The term *reference theory* can be easily replaced by other terms, such as imported, exotic, or introduced theory, which have all been used (Moody et al. 2010).

<sup>4</sup>We use *stylized* in accordance with the idea of representing according to a (theoretical) style or pattern rather than according to nature or tradition (Merriam-Webster Dictionary).

<sup>5</sup>This process is not unique to the IS field. A similar argument in management scholarship is well established (Suddaby et al. 2011; Whetten et al. 2009); we sense, however, that the issue is pronounced in our field because of its unique combination of social and technical elements not found to the same extent in other management fields where the topic of the field aligns better with generic social theories.

We demonstrate through empirical analysis that such mid-range scripts dominate our scholarly inquiry and are likely to determine what we know about IS phenomena; they subsequently shape what data we heed and what theory will be cast over that data and how to explain it. This extensive use of the mid-range script has also led to noteworthy consequences—both positive and negative. On the positive side, the script has helped us build stronger theoretical logic and advanced methodological rigor. This has spawned more articles, invited more citations, and produced higher impact factors.

According to most metrics, such as the quality of our journals and conferences, the field has matured and come of age: our top journals are highly regarded and we are as well sensitized to a disciplined study as any other management field (Grover 2012; Straub and Anderson 2010). We can attribute this largely to our success in drawing upon and benchmarking our theoretical logic on reference theories (Suddaby et al. 2011). Personally, the authors of this piece are equally guilty of partaking in this success; we have benefitted from enacting the script throughout our careers and argued in multiple forums, replete with sound reasons, that drawing upon reference theories in our inquiries has significant and undeniable benefits (Grover et al. 2006; Lyytinen et al. 2007; Niederman et al. 2009).

On the negative side, some scholars are increasingly raising doubts about whether we have truly learned to understand IT use and its effects better and whether we can relate what we do understand to what we, or practitioners, truly observe and experience in practice (Hirschheim and Klein 2003). Maybe the borrowed theories make us blind to what truly happens. Maybe the script lures us into going with the familiar, the path of least resistance, and the obvious, just as a chef finds it easier to go with classic recipes for Mandarin Duck. It seems that the script provides both convenience and the gratification that comes with “ready-made problems and fashionable styles of thinking” (Shepherd and Sutcliffe 2011, p. 363), thus hindering new knowledge production.

On the one hand, when the adopted reference theory is broad, the script is likely to garner a growing number of diverging theoretical interpretations which, as a result, even when the same theory is being deployed, gradually fill IS research with incommensurate mid-level research models and confounding results. This creates profound challenges for cumulative work and decreases the efficiency of our knowledge production (Lyytinen 2009). On the other hand, when the reference theory is very narrow or narrowly interpreted and tested through precise measures, it is likely to lead to *platform research*, which repeatedly tests compatible and marginally different models, reducing the novelty of knowledge production. There is certainly a role in scientific endeavors for such

research (Kuhn 1970), but it should not be a major thrust of our work.

Indeed, this pursuit is likely to come with significant opportunity costs. IS scholars may be shying away from alternative modes of knowledge production that could yield better returns. It is also likely that the value of the mid-range script will decrease in the future as organizational life becomes littered with rich information and new technology affordances that are changing the very meaning of social life (Yoo 2010). We should, therefore, ask: Are we fulfilling our foundational knowledge interest if we continue to invest and be invested in this script? Is the extensive use of the script reaching the point of diminishing returns and becoming increasingly inadequate? Just as the “real” chefs often need to go to uncharted territory and experiment to come up with great new dishes, IS scholars may need to unshackle their bonds to the dominant script and identify, innovate, and enact alternative scripts. Simply stated, we should debate what we consider to be acceptable forms of knowledge production. We call this endeavor *the push to the edges* since it relaxes the tight-knit bond between the reference theory and data; it urges us to move toward either the local and rich data-driven inquiry or toward bold theorizing about conceptual relationships between information, IT, and the social domain.

We also observe that the mid-range script has become deeply rooted and institutionalized. It is silently accepted as the “going norm” of doing good research; sticking to it guarantees publishable (significant) results and career security. This makes it a difficult habit/norm to break. To be successful, the endeavor will invite strong interventions and leadership among editors and educators, a change in reviewer expectations, and a willingness to take risks among the sponsors and authors of research. In outlining this alternative future for IS knowledge production, we deliberately intend to be provocateurs and seek to stimulate what we believe to be an important debate.

The remainder of the paper will detail our argument for the needed change as follows. In the next two sections, we describe the current state of the art in mid-range theorizing by discussing its main content and origins and provide evidence of its popularity. This is followed by sections on the use of institutional analysis to understand what makes this script seem highly legitimate and popular and a discussion of the negative consequences of enacting it more widely. In the two subsequent sections, we describe how we need to expand our scripts by moving to the edges and we suggest practical guidelines for expanding the scripts through institutional interventions and individual initiatives. Finally, we conclude with general observations about the field’s future, particularly if we can moderate our future reliance on these scripts.

## Mid-Range Script: A Successful Recipe for Publishing in Top Journals

### *The Concept of the Epistemic Script*

Scholars in any disciplinary field, including IS, articulate theories within a constellation of relatively fixed sets of community conventions, which Kuhn (1970) called a disciplinary matrix. Recently, scholars of science studies have emphasized the institutional nature of this matrix; it conveys a set of “scripts” that underlie behavioral patterns associated with legitimate knowledge production and representation (Alpaslan et al. 2006; Donaldson 2009; Locke and Golden-Biddle 1997; Jepperson 1991). As Boxenbaum and Rouleau (2011) point out, such epistemic scripts are relatively persistent and they prescribe how theories should be formulated within the given academic tradition (DiMaggio 1997).<sup>6</sup> When presenting a new theory, IS scholars are therefore expected to enact a legitimate epistemic script to create valid new knowledge. Through the script, theoretical concepts and empirical material become interlinked while new theoretical knowledge becomes anchored, positioned, or sourced from an existing body of work (Boxenbaum and Rouleau 2011). The script helps scholars assemble their ideas in ways that either directly or indirectly convey to their peers that they have been handed a legitimate knowledge product. Essentially, epistemic scripts embody the meta-theoretical frame of reference that qualifies the knowledge product as interesting, credible, and novel.

### *The Mid-Range Script for Domesticating Reference Theory in the IS Field*

While perusing IS journals and scouting out the field’s intellectual landscape, any sharp-eyed reader can readily observe that most theoretical arguments are squeezed into a middle-range position where IS scholars create mid-range abstractions of IS phenomena through the lens of (externally) adopted reference theory. This notion of middle-range theory is similar in level (but not in substance) to the idea of middle-range theory first popularized by Robert Merton (1968), who recommended that sociologists should focus on measurable aspects of reality by limiting the conceptual range of sociological theory to concepts that do not go too far from field observations. In this regard, Merton’s term middle-range is also distinct from other later uses of the term, which equate middle-range with the idea of *meso*. In the latter case,

<sup>6</sup>Despite its use in the literature, the term *epistemic script* does not have a consistent basis and conflates the activities and products of theorizing. We use the term to simply reflect on the institutionalized patterns of *how we create knowledge in our field*, indicating that the process and the evaluation of the knowledge product is scripted and formulaic.

middle-range denotes specific units of analysis that sit between macro- (e.g., society, culture) and micro- (e.g., individual) levels and can be used to synthesize and account for specific social or organizational processes (Cappelli and Sherer 1991; Rousseau and House 1994). In what follows, we use the term *mid-range theory* in a manner consistent with, although somewhat different in meaning from, Merton’s original definition. In our case, middle-range theorizing is about “domesticating” a higher-level abstract theory to a specific IS context by limiting its conceptual range into a contextualized mid-level model. This lower-level model determines a smaller range of observations for theory development and testing,<sup>7</sup> and in the IS field, it is often bounded by a specific context of IT development, use, or impact. Inevitably, such a model sits in the middle, between the high abstraction of the grand “reference” theory and the concrete data that depict the specific, contextualized IS phenomenon of interest.

Such middle-range arguments are often technically clean and rigorous, thanks to the well thought out theoretical machinery and related operationalizations of reference theory that have been mobilized. Consequently, the intellectual landscape created is smooth, with well-trodden paths and few cliffs, shadows, or uncharted territories. At the same time, moving around in this landscape can be boring, as in a routine weekend walk with few surprises, because we have seen the scenery before. We get the uneasy feeling that we do not get into the heart of the matter or the substantive questions associated with IT-related phenomena (Lee et al. 2014). Is this because the bulk of the theory that we use to understand the phenomena draws upon known forms of reference theory, which also determines the shape and geography of the theoretical landscape?

Typically, IS theories are organized in specific constellations reflecting where different IS communities camp or originate (Culnan and Swanson 1986). They range from economics (e.g., transaction cost, agency theory), to psychology (e.g., reasoned action/planned behavior), to computer science (e.g., complexity), to the sociology of communications (e.g., diffusion of technology), to sociology (e.g., structuration).<sup>8</sup> In IS,

<sup>7</sup>Merton saw the direction of creating the middle-range theories differently. According to him, they would emerge from empirical data rather than being derived from higher abstractions (such as Marxism or Parson’s functionalism, which had a significant following at that time), with the hope that ultimately they could be integrated over time into broader and valid sociological theories. Merton viewed these theories as positive indicators of the state of knowledge in the field as the field organically evolves with empirical data.

<sup>8</sup>This can be ascertained, for example, by visiting the AISWorld page ([http://istheory.byu.edu/wiki/Main\\_Page](http://istheory.byu.edu/wiki/Main_Page)), which portrays an extraordinary gallery of theoretical alternatives across these disciplines. We are not aware of any other field that appears to rely to the same extent on a theory supermarket that drives its intellectual agenda.

it appears that browsing the numerous aisles of reference theory in this marketplace and domesticating them to the middle-range has become a principal way to produce legitimate knowledge. The field, by repeatedly enacting the script, expands its landscape with a new hill now and then as new reference theories occasionally get domesticated—perhaps when they become “fads” (Abrahamsson 1991). Over time, the paths also become a little more varied and well traversed as additional combinations of theories are tried out and then tested.

As its primary creative task, the script involves lowering the abstraction level of the reference theory so that its constructs get closer to the IS phenomenon. For example, the student of IS can be asked to ponder how the studied IT phenomenon relates to such abstract concepts as *asset specificity* or *transaction costs*. Once the scholar has built a research model founded on such reference theoretical constructs, he or she can then sprinkle it with additional constructs capturing the “IT artifact” in anticipation of a reviewer’s critical question: “Where is the IT artifact?” (Orlikowski and Iacono 2001; Benbasat and Zmud 2003).<sup>9</sup> This inclusion is accomplished by expanding the instrument from reference theory with IT-related items. Next, the scholar moves to his or her favored activity: testing the theory by collecting the data and running the necessary analyses. While following this script, IS scholars seek to validate their IS theories based on data obtained by preordained instrumentation adapted from other disciplines. Any changes made are mainly incremental to the adopted instrument or construct. Typically, each stage in the script is constrained by the previous one and the opportunity for original results and thinking narrows in each stage. Following the script, scholars mostly produce knowledge that seeks to get through reviewers looking to check boxes on theory and method. The name of the game is conformity with the received theoretical insights, and the truth is largely determined by the work’s coherence with received theory and less by its novel insight, value, or utility for the field. Overall, examples of how to enact this script with dexterity are not hard to find; they are commonly taught as part of core Ph.D. courses in IS curricula.

Consider the popular technology acceptance model (TAM)<sup>10</sup>

<sup>9</sup>Lee et al. (2014) call this process “inheritance” or “refinement” in applying axiomatic theory and offer several examples of such steps associated with the use of IT as an independent variable or dependent variable in mid-range scripts.

<sup>10</sup>Straub (2012) calls TAM a “native” IS theory—and it *is* one, if we use the criterion that the theory contains IT-related variables. However, if we use the similarity of logic as the criterion—noting the exogenous nature of the IT variables in relation to the main theoretical logic of the theory—then TAM is a fair example of an extended mid-range script (as described later) followed by a significant amount of secondary borrowing via instantiation.

(Davis 1989; Davis et al. 1989) as an example of mid-range theorizing (see, for example, Benbasat and Barki 2007).<sup>11</sup> What has the TAM chronology of theory development told us about how to publish successfully in our top journals and in what sort of knowledge production one should invest? TAM was derived in the late 1980s from two influential theories of social psychology: the theory of planned behavior (TPB) (Ajzen 1985) and the theory of reasoned action (TRA) (Ajzen and Fishbein 1980). At that time, asking what explains the adoption of individual IT “productivity” tools (e.g., spreadsheets) was a relevant practical question. The benefit of using TAM in answering that question was that it came with strong theoretical foundations from psychology and could explain observable individual behaviors, such as the adoption of IT tools, by their individual cognitive or affective antecedents.<sup>12</sup> In adapting TRA to explain IT adoption and use, two beliefs were identified by a sort of theoretical extension along with a full package of instrumentation to generate testable data—as originally outlined in Davis et al.’s article. No wonder, then, that in a short time period, TAM became one of the most widely applied and validated theories in the IS field. For example, an unusually high number of citations leading to the high yearly *MIS Quarterly* ISI index in 2007 (5.83) can be mainly attributed to two papers on TAM published in *MISQ* in 2003.<sup>13</sup>

If one examines all 64 TAM articles published in the top journals through 2012 (Lee et al. 2014), one can quickly observe—with only a few exceptions—that the majority of TAM research reiterates and corroborates the predictions of imported psychological theories about the effects of cognitive states (e.g., attitudes) on the likelihood of an individual’s action (e.g., adopting a tool). At best, these studies generate new applied knowledge by embedding an abstract, largely

<sup>11</sup>This discussion in no way aims to devalue the contributions of the scholars who originally advanced TAM research or currently engage in it in novel ways. We recognize that at its inception, it had value and originality, and it continues to do so in specific research settings. Our point is rather to analyze the general pattern of knowledge production as a script that has emerged following the initial success of TAM and a host of other similar studies. In that respect, we could have also picked up other alternatives, such as transaction cost theory (Clemons et al. 1993; Malone et al. 1987), structuration theory (Orlikowski and Robey 1991), and the resource-based view (Mata et al. 1995), just to name a few others.

<sup>12</sup>Indeed, Davis et al. motivate the adoption of the theory on which TAM is based as follows: “TRA is very general, designed to explain virtually any human behavior” (Ajzen and Fishbein 1980, p. 4), and should therefore be appropriate for studying the determinants of computer usage behavior as a special case.

<sup>13</sup>We are thankful to Brian Fitzgerald for this analysis presented in an ECIS panel in 2008 in Galway. See <http://www.csis.ul.ie/staff/BF/IS-old-v-new-world.htm>. The two papers that contributed most (approximately 30% of the citations) to the impact factor were Venkatesh et al. (2003) and Gefen et al. (2003).

axiomatic TAM theory in a localized IS phenomenon. At worst, these studies are simply testing the external theories of reasoned action and planned behavior in a new context and helping to generalize these theories. Although valuable in specific study contexts, such generalization attempts might also be viewed by some as having limited value, essentially doing second-rate testing for well-known psychological theories.<sup>14</sup>

The main challenge here is that the resulting theory does not truly integrate novel features of IT and its properties in explaining the adoption phenomenon. IT remains exogenous to theorizing, while TAM in general conveys a sort of axiomatic, common sense theory of human behavior (Lee et al. 2014). TAM studies tell us very little about how and why *specific classes of IT tools and technologies* are adopted and used, or how an *IT tool* being adopted *might reflect back on the individual's intentions*.<sup>15</sup> Overall, only a precious few, truly novel theoretical ideas have come from the long legacy of TAM research—largely because of the axiomatic foundation (Lee et al. 2003) of the borrowed psychological theories.<sup>16</sup> As several scholars have noted, its prevalence has also likely preempted alternative attempts to explain IT adoption or use (Benbasat and Barki 2007; see also Ortiz de Guinea and Markus 2009).

## How Pervasive Is this Script? ██████████

We can rightfully ask: How widespread and popular is this script? Based on our own experience, while conducting and managing a large number of reviews and in talking with our colleagues, our conjecture is that this script is widely followed and it forms the intellectual strategy preferred in many Ph.D. programs and research groups. But no studies have been conducted on its prevalence. To examine this more closely, therefore, we carried out a systematic empirical analysis of the forms and extent of reference theory adoption and use in our top journals. Our main goal was to validate the knowledge claim that variants of the mid-range script are widely followed in our field and, indeed, underlie a majority of the field's theory-driven publishing. Because direct observation of whether IS researchers use the script is difficult and would demand extensive field studies and ethnographies, we con-

<sup>14</sup>Debates between Cronbach (1982) and Cook and Campbell (1979) indicated different views on the importance of external validity and testing in different contexts.

<sup>15</sup>For a similar argument, see Lee et al. (2014).

<sup>16</sup>See, for example, the *Journal of the Association for Information Systems* (JAIS) 2007 special issue on the topic.

ducted a systematic review and coding for theoretical content, construct operationalization, and treatment of IT artifacts in a representative sample of research articles in two top IS journals—*Management Information Systems Quarterly* (*MISQ*) and *Information Systems Research* (*ISR*)—during the 15-year period of 1998–2012. In particular, we collected the following data on each published piece: (1) the extent and nature of theory adoption, (2) the nature of the treatment of the IT artifact, and (3) the presence of a mid-range model. From observations in (1), we can infer with high certainty that adopted theory and its use is most likely part of enacting (often unconsciously) a mid-range script. From (2), we can see the treatment of the IT artifact and whether it has remained exogenous and weakly theorized. Finally, from (3), the presence of a mid-range research model (often in pictorial form) suggests that abstract theory has been domesticated into a testable model.

We selected these two journals because in most rankings (e.g., the *Financial Times* list), they are deemed to be the most influential and *theory-driven journals* of our field. Both journals emphasize “theory” and relevant “empirics” in their research, and they mention IT in their mission in one form or another.<sup>17</sup> Therefore, we can expect them to be serious about creating and integrating original, native theory centered on IT-related phenomena in the published work. Finally, both journals have been published for more than 20 years, so a sufficient temporal range is available for the analysis.

Next, we generated a representative sample of articles by randomly selecting every fifth research article published during the selected period. We excluded all editorials, research notes, and articles focusing on research methods, education, or the disciplinary status of the field. Hence, articles dealing solely with substantive IS phenomena from a theoretical angle formed the input for the coding process. (As noted above, we also excluded qualitative studies and design science.) Our final sample of 143 articles comprised of 75 articles in *ISR* and 68 articles in *MISQ*. (3) above—that is, that they used a model of the IS phenomena—was met by 136 of the 143 of the articles (95.1%). The sample represented all areas of IS research, and the units of analysis ranged from individuals, teams, and organizations to industries or networks. The articles approached research problems through the lenses of all of the main theoretical camps, such as information eco-

<sup>17</sup>*MISQ* states its mission as follows: “The editorial objective of the *MIS Quarterly* is the enhancement and communication of knowledge concerning the development of IT-based services, the management of IT resources, and the use, impact, and economics of IT with managerial, organizational, and societal implications.” *ISR* articulates its mission this way: “*Information Systems Research* (*ISR*) is a leading peer-reviewed international journal focusing on theory, research, and intellectual development for information systems in organizations, institutions, the economy, and society.”

nomics, behavioral studies, and others. Invariably, these articles drew from theories adopted from other disciplines.

To detect the type of scripts followed in producing the published body of work, we developed a systematic coding structure and associated rules. Appendix A describes the applied criteria in detail and outlines the process followed in building the final research database.<sup>18</sup> Table 1 summarizes the coding levels used, along with illustrations and underlying rationale. Our initial categorization of types of theory adoption drew upon Colquitt and Zapata-Phelan's (2007) analysis of levels of theory building, which distinguishes separate levels based on the degree to which theoretical novelty is included in the resulting theory. We set our levels of theory building accordingly as *instantiation*, *modifying*, and *extension* (see Table 1 for definitions). For the type of IT artifact view adopted, we examined the context of the application and the view of the IT in this context by applying Orlikowski and Iacono's (2001) criteria (see Appendix A for definitions).

Next, we pretested the coding system with several trial "training" articles (not included in the final sample) and three reviewers in order to calibrate the rules and ensure adequate reliability of the coding. We revised the definitions of each level several times for clarity until we could systematically determine the type of theory used and adoption involved by identifying a set of criteria that clarified the nature of the application of the selected theory to the IS context. We also made a distinction between borrowing that took place directly from the reference discipline (primary) and indirectly through other papers in the IS field that had initially borrowed and conceptually extended the theory (secondary).

Once the criteria had been stabilized, a single coder carried out the primary coding. During the coding, if the coder was unsure how to use the categorization, all three coders reviewed the article's abstract, research model, and the hypotheses, results, and discussion sections before coming to a consensus. When necessary, the coding rules were also revised.<sup>19</sup> To assess coding reliability, the three coders coded three rounds of random samples of 10 articles each until an adequate level of agreement was achieved. In the end, the level of agreement among the three coders with regard to the

<sup>18</sup>A common repository was created in the form of an Excel table, where each identified article was coded for the following categories: (1) theory borrowing level; (2) unit of analysis; (3) specific IT phenomenon studied; (4) underlying view of IT; (5) rationale for selecting a view of IT (to trace the evidence for choice); (6) source theories identified and named (if any); (7) source theory's unit of analysis (checked from the original source); (8) Google Scholar citation count (to evaluate whether the type of theory has any effect on citing patterns); and (9) type of research method followed.

<sup>19</sup>During coding refinement, the main disparity occurred between the categories of instantiation and modifying, which was subsequently corrected by revising the coding definitions.

primary and secondary borrowing was 100%. To measure the reliability of the coding for the type of borrowing, we used Fleiss' Kappa (1971), which was calculated as 0.831, indicating an acceptable level of agreement.

Note that our final assessment of theory adoption and use is richer, but also stricter, than previous personal assessments (e.g., Straub 2012). It is richer in that it is grounded in a detailed model of variations of middle-range theorizing derived from Colquitt and Zapata-Phelan. Our levels indicate distinct ways in which a receiving native IS theory absorbs or is founded on constructs borrowed from the reference theory. In our case, we can systematically argue whether an IS theory is closer to an extension or whether it is truly unrelated to any reference theory.<sup>20</sup> Our analysis is also stricter in that it is based on the rigorous and systematic coding of an extensive sample of articles, thereby systematically revealing how IT phenomena are treated in the context of IS theorizing and whether the logic and constructs used in the IS context are similar or go beyond the conceptual logic of the source theory. See Appendix B for illustrations of the extension papers that are closest to native theories in our schema.

Our results are summarized in Table 2. Overall, we found that in 71% of the published research, IS scholars had borrowed directly from reference discipline theory (i.e., primary borrowing), constituting a one-directional flow of ideas whereby the scholar adapts the model to the IS context. This number has slightly decreased in the past five years, but primary borrowing still accounts for the vast majority of the work. Our analysis also shows—as expected from following the mid-range script—that most published IS theory is located at the instantiation level of theory primary borrowing (see Table 2), accounting for 55% of the cases. About 24% of the published works engage in varying degrees of modification to the constructs, configuration, or logic. Only 17% of the published works added new constructs and conceptualizations beyond their reference theories and extended the theory to the IS context. Indeed, we found that in such cases, the scholars took the specific nature of the IT artifact embedded context into account and sought to modify and expand the borrowed constructs. We found no study that had wholly new constructs, configurations, and logic—in other words, a truly indigenous IS theory. Nor did we find any works where scholars challenged the reference theory based on the evidence acquired in the IS context.<sup>21</sup>

<sup>20</sup>Straub (2012, p. v) defines native theory quite loosely as one that "must in some fashion be IS-specific, perhaps even including the IS artifact among its key variables."

<sup>21</sup>Perhaps such work can be found in other journals and our results are biased due to our sampling from journals that nearly always expect careful theory testing/validation. It is well known that developing and validating a totally genuine theoretical position is difficult to do in the space of a single article.

**Table 1. Types of Theory Borrowing in IS Research<sup>†</sup>**

Theoretical Adaptation	Characterization <sup>‡</sup>	Degree of Change	Example	Rationale
<i>Instantiation</i>	There are no or very minor changes in constructs, configurations, or logic from the borrowed theory.	None—although some relabeling and operationalization adjustments may be involved.	Hong, S., and Tam, K. 2006. "Understanding the Adoption of Multipurpose Information Appliances: The Case of Mobile Data Services," <i>Information Systems Research</i> (17:2), pp. 162-179.  Subramani, M. 2001. "The Impact of E-Commerce Announcements on the Market Value of Firms," <i>Information Systems Research</i> (12:2), pp. 135-154.	Application of TAM in a new context with minimal changes in constructs, configurations, or logic.  Technology is abstracted away to a specific market event (i.e., an announcement) and there is thus very little IT-specific theorizing or new theory development. The announcement is "E-commerce announcements," which really is not a new construct, just a specific type of announcement.
<i>Modifying</i>	The model modifies constructs, configurations, and/or logic from the borrowed theory to the IS context. Unlike instantiation, the constructs need to be modified (e.g., a construct like "asset specificity" (AS) in transaction cost economics (TCE) is used to study outsourcing but modified to "system specificity").	Minor to major, depending on whether only the constructs are modified (minor) to adapt to the context or whether changes in logic are involved too (major). If the construct is totally recast so that it is a new conceptualization that requires the recasting of the theoretical logic, then it is "extending."	Nidumolu, S., and Knotts, G. 1998. "The Effects of Customizability and Reusability on Perceived Process and Competitive Performance of Software Firms," <i>MIS Quarterly</i> (22:2), pp. 105-137.  Bharadwaj, A. 2000. "A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation," <i>MIS Quarterly</i> (24:1), pp. 169-196.	Subtly adapts each construct to the context. The adapted variables are related to each other in new ways.  Makes resource-based view (RBV) constructs IT-specific and tests them using econometric data. No change in logic or configuration—as relationships entirely consistent with RBV.
<i>Extending</i>	Some new constructs and (therefore) new conceptual relationships need to be added to the model and theory as a result of extending them. These typically seek to clarify specific conditions when the abstract constructs of the theory will apply.	Typically moderate to major changes depending on the number of new constructs conceptualized and configured with new logic.  If all constructs, configurations, and logic are new, then this would not be considered borrowing and would be a new theory, falling outside this schema.	Rivard, S., and Lapointe, L. 2012. "Information Technology Implementers' Responses To User Resistance: Nature And Effects," <i>MIS Quarterly</i> (36:3), pp. 897-920.  O'Leary, M., and Cummings, J. 2007. "The Spatial, Temporal, and Configurational Characteristics of Geographic Dispersion in Teams," <i>MIS Quarterly</i> (31:3), pp. 433-452.	Develops new "response to resistance" constructs, which fundamentally change the logic of the underlying model.  Reconceptualizes geographic dispersion using multiple dimensions. Shows how dimensions relate to each other to form an overall geographic dispersion construct.

<sup>†</sup>Most of the examples Straub (2012) offers as native IS theories would indeed be located in the "extending" category—for example, DeLone and McLean (1992), Dennis et al. (2008), DeSanctis and Poole (1994), and Saunders et al. (2011). Appendix B provides illustrations of papers in this category and the rationale.

<sup>‡</sup>Constructs, configuration, and logic parallel Whetten's (1989) description of the what, how, and why of theory.



**Table 2. Theory Adoption and Use in Published IS Articles**

Theory Borrowing	Total	IT View	Total
Instantiation	54.55% n = 78	Computational	11.89% n = 17
Modifying	23.78% n = 34	Ensemble	11.19% n = 16
Extending	17.48% n = 25	Nominal	30.77% n = 44
		Proxy	24.48% n = 35
		Tool	21.68% n = 31
Could not classify		4.2% (n = 6)	
<b>Total N</b>		<b>143 (100%)</b>	

Our analysis finally revealed that the dominant treatments of the IT artifact are in line with recent comprehensive empirical analysis of the IT artifact in the IS research corpus (Akhlaghpour et al. 2013), as well as with our theoretical expectations. About 31% of the papers adopted the nominal view, where IT was not explicitly present in the theoretical logic of the model. If we include the proxy view (where IT is viewed as a perception or investment category), we cover more than 50% of all papers. Such treatments of IT show that IS scholars largely share the theoretical assumptions of reference theories that regard IT as external to their main theoretical interest. It is also important to note that the choice of the treatment itself was seldom theorized in the studied articles, while the IT construct was exogenously added to the research model. For example, the IS strategy studies adopted a nominal view of IT as a general background resource, the behavioral theories of IT use adopted a proxy view of having an intention to use a system or technology “X,” and the studies on interorganizational systems perceived IT as moderating a well-established theoretical relationship. The ensemble view was, as expected, the least common, which suggests that IS scholars do not frequently examine IT holistically as an embedded phenomenon in the study context.

Overall, our results indicate that most of the published IS research is involved in testing directly instantiated or slightly modified reference theory using a mid-range model (95.1% of the articles). Only moderate levels of novel theoretical development or varying granular treatments of the IT artifact were observed. Our analysis thus supports the claim that IS discourse is founded mostly on “outsourced” reference theory by following the mid-range script. Why is this so? To answer this question, we will examine the usefulness and ease of use (pun intended) of this script for an individual scholar and the conditions favoring its wider institutional prevalence.

## Why Is the Script So Popular?

### *Strong Individual Incentives to Adopt the Mid-Range Script*

When viewed from the vantage point of an aspiring IS scholar, the popularity of adopting the mid-range script is not surprising. First, most scholars (and reviewers) deem following the script a highly (and perhaps the only) legitimate way to generate valid IS knowledge, as confirmed by our analysis, thus creating a strong mimetic pressure. Second, the script is useful, because the ready adoption of reference theories typically offers relatively general, yet powerful and parsimonious theoretical logic (e.g., TAM), which the scholar can then apply flexibly across multiple study contexts. In this regard, following the script offers ample opportunities for amassing a strong publishing record. Third, the script is easy to use, because the theories often come equipped with well-packaged instrumentation and a transparent, repeatable analysis route. Fourth, the script is relatively safe in producing publishable results; our field demands significance, and the script largely reproduces past results related to reference theory. Fifth, the script minimizes Type I reviewing errors when reviewers are scrutinizing papers to find reasons to reject it.<sup>22</sup> Overall, the mid-range script is deemed legitimate, lowers rejection risk, and offers a reasonably easy way to formulate acceptable theory with better prospects of publishability. Most IS scholars are rational decision makers and figure out early on that the best way to survive the ruth-

<sup>22</sup>In our opinion, the recent push toward constructive reviewing (Straub 2008) to minimize Type II errors (or the probability that “good” papers are not rejected) is a highly positive and wholesome development. However, our editorial experience indicates that most reviewers, particularly inexperienced ones, still aggressively minimize Type I errors, looking for reasons to reject papers.

less scrutiny of reviewers (and editors) is to make this form of knowledge production their *modus operandi* (Lyytinen et al. 2007).

### ***Institutional Conditions that Reproduce the Script***

There are also powerful institutional forces (logics) that make the grip of the mid-range script strong—especially given the weak paradigmatic status of the field.<sup>23</sup> First, those who benefit from the current status quo are not subjected to strong feedback mechanisms to do otherwise. Second, most IS scholars have yet to acquire higher levels of confidence in their own research that can only be achieved through significant intellectual victories (Bernstein 1983).<sup>24</sup> Due to the accumulated cognitive inertia and established mimetic and normative pressure, only meager support and appreciation can be found for alternative forms of theorizing; therefore, scholars are likely to have only weak motivations to engage in changing the script.

There are two primary conditions why actors in a relatively strongly institutionalized field such as Information Systems are likely to continue to follow certain behaviors despite their potential ineffectiveness (DiMaggio and Powell 1983; Jepperson 1991). Institutional theorists would argue that IS scholars do so because (1) the established cognitive dependencies constrain the scholar's current thinking and (2) institutional pressures (mimetic, normative) constrain the ways in which research results get published and thereby justified, as discussed above. These factors are highly interdependent, generating strongly interlocked institutional logic (Figure 1) that excludes alternative forms of knowledge production and related genres of knowledge dissemination. Next, we review the elements of this institutional dynamic in more detail.

<sup>23</sup>We use the term weak paradigm consistent with its use in Glick et al. (2007), who describe it in the context of the organizational sciences as the disagreement between members of the field about phenomena, theories, methodologies, and basic research questions. Taylor et al. (2010) also found evidence that while the field had moved to a polycentric status, it still was not a strongly paradigmatic field.

<sup>24</sup>Scholars in weak paradigm fields disagree on what constitutes good knowledge. Therefore, creating and identifying knowledge products—ones that would be widely considered to be exemplars in how to go about solving unique research problems in the field—is tougher, and such criteria therefore are often sought from outside. Because of mid-range theorizing, much of the puzzle solving in the IS field is governed by paradigms adopted from without.

### **Cognitive Conditions**

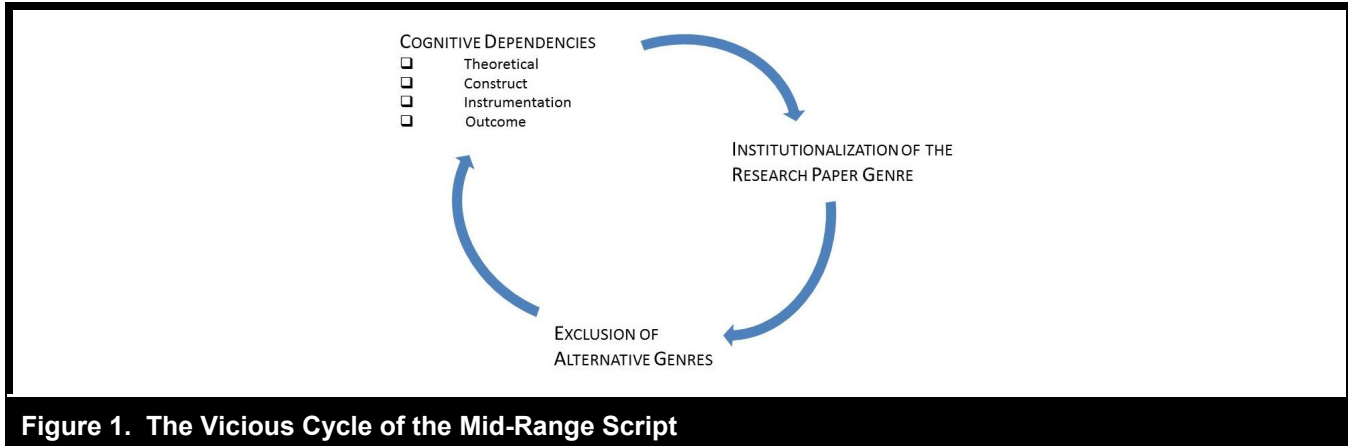
The adopted and deeply entrenched frames originating from reference theory create blinders with respect to the construction of original IS knowledge that would fall outside the established cognitive boundary conditions. The tendency to go with what is known and assumed, despite the presence of strong contradictory evidence, is well known in science studies (Chia 1998; Chinn and Brewer 1993). We note the following effects on scholarly cognition that result from the reliance on the mid-range script.

***Theoretical Dependencies:*** What we currently know about an IS phenomenon is dictated largely by inherited and adopted reference theory. This inheritance designates how we account for any new IS phenomenon; virtually no negative signals are made available that would allow for observing or explaining the phenomenon *differently* because of the practice of seeking to corroborate imported theories (Chia 1998). Seeing and explaining the phenomenon differently is not likely because of the way the tests are formulated and the data instrumented. In addition, contrarian results would not be believed by reviewers, and therefore, would be ignored by journals (Chia 1998). Thus, the script blocks out fresh theoretical framings that look outside the ordinary and leads to “gap spotting” within existing theoretical frames (Alvesson and Sandberg 2011, p. 247).

***Construct Dependencies:*** Uses of reference theory create a base of accepted knowledge categories and constructs. This epistemic platform fosters incremental construct formulation, because research gains its credibility by drawing upon the existing baseline model. Only constructs that fit with the existing theoretical logic can be integrated with the current body of theory through incremental modifications and extensions.

***Instrumentation Dependencies:*** As noted, what we can measure largely determines what we can study. Thus, accepted forms of measurement constrain theorizing and block out theorizing that does not fit with the current data corpus. The current instrumentation determines what counts as credible data and leads scholars to ignore opportunities to generate new and novel data sets that may not be aligned with existing theory (Lyytinen 2009).

***Outcome Dependencies:*** The substantive traffic between reference theories and IS studies moves in one direction only. The reference theory is considered to be immutable. This was vindicated in our analysis; we did not find cases where the adopted theory was challenged or debated. Therefore, as we benchmark the success of an IS study based on the predictions



**Figure 1. The Vicious Cycle of the Mid-Range Script**

from the adopted theory, the failure to observe results consistent with the predictions is always attributed to the fault of our method before any calls for a revision of the reference theory. This situation reflects strong outcome dependencies in the cognitive framing of research: the empirical results are rarely viewed as refutations of the theory—effectively closing off the advancement of knowledge.

### Institutionalized Forms of Codifying Knowledge

Over time, the script has also legitimized a specific way of communicating research as manifested in the current conventions of how to write a research article. The format of research writing should honor the following expectations of textual coherence (1) by motivating the research through gaps and linear theoretical coherence (Locke and Golden-Biddle 1997); (2) by exposing and building a theoretical basis through a literature review synthesizing a reference theory; (3) by formulating a research model by contextualizing the reference theory into a middle-range research model where IT is treated as a proxy (or nominal view), and by serving as an independent variable (IV), a mediator, or a moderator; (4) by selecting a method that builds on external, well-established instruments; and (5) by focusing on the implications of relatively high-level issues that address social elements as recommended by reference theory.

The demand for such coherence also cultivates strong expectations regarding the style of theorizing, the shape and size of the model, and the nature of the constructs, creating strong mimetic pressure toward preferred forms of knowledge representation and production. These persistent expectations naturally make the work of reviewers, editors, and readers lighter; they can relate what they know to what is being written about with less cognitive effort. Deviations from this

genre, where other types of knowledge claims are being argued and vindicated, are viewed with suspicion (Grover 2013; Lyytinen et al. 2007). Over time, cycles of mid-range knowledge production reinforce the legitimate status of this genre, which is further amplified by the normative pressures and financial incentives set up by research agencies, deans, and department heads, as well as pressure from other disciplines.

### Negative Consequences of the Script ■

We acknowledged above that the script has had several positive effects for the field and has significantly improved the field's theoretical and empirical rigor. But, as the field has progressed, several negative consequences have become increasingly apparent. First, we will describe the general adverse effects it has had on the type of theory we are producing. Second, we will note how it results in under-theorizing about the IT artifact. Finally, we will discuss how it has generated an uneven way in which theory and empirical material are related and used in research.

#### *Inadequate Diversity in Theorizing*

Making the script a common institutional norm tilts the state of play toward incremental and imitative theorizing, that is, a field refines and expands knowledge mostly by identifying and matching (new) reference theory and associated instrumentation. First, this creates a false sense of *new* findings while, in fact, the repeated findings accumulate only small variations over the current, already known knowledge corpus. Time and again, IS scholars have found, for example, the same TAM significant relationships between intention, useful-

ness, and IT individual adoption. This should come as no big surprise. After all, the crux of the theories underlying these studies has already been widely established. In fact, after such extensive testing we should expect that the correlations predicted by the reference theory will be significant, the betas high, and the  $R^2$ 's sizable.<sup>25</sup> Finding something else might be a real scientific discovery—and thus interesting!

Second, following the script demands relatively modest, genuine theoretical thinking after the initial theory assimilation where the necessary IT-related adjustments were made. Explaining the theory and its value to the audience is also relatively straightforward, because of the common ground. We can rightfully ask, as did Alvesson and Gabriel (2013), where does novelty enter into this closed and somewhat formulaic process? In fact, the script tends to weed out original, risky, and bold theorizing, which does not easily lend itself to strong empirical results in its early stages due to significant challenges in construct definition and operationalization. As a consequence, original theory is more likely to be rejected because of the lack of contribution vis-à-vis existing (reference) theory or because of complex and alien conceptualization.<sup>26</sup> Moreover, formulating novel theory is something that lies outside the comfort zone of many IS scholars. At most, ambitious scholars take an integrative approach by cherry picking and integrating constructs from multiple theories or placing theories in competition in the hope of constructing a more innovative model. No wonder we hear complaints about a persistent paucity of truly novel IS theory.<sup>27</sup>

Third, the mid-range script often undermines the finesse of theoretical discourse in the source discipline. As senior editors, the authors have observed that IS researchers often accept the reference theory uncritically. The review process is likely to ignore the origins or justification of the proposed

<sup>25</sup>It would be fair to acknowledge that later in the TAM stream, numerous researchers challenged TAM's status as a strong, robust theory (see the April 2007 issue of *Journal of the Association for Information Systems* for a series of critiques of TAM; also see also Sharma et al. 2009).

<sup>26</sup>Some support for this argument could be based on Kuhn (1970), who describes normal periods of science as puzzle solving where scientists draw on solutions to familiar puzzles and follow established rules. Novelty and new puzzles are rejected.

<sup>27</sup>This consequence is not only about the lack of such theories, but also about the form of such theories. For example, Lee et al. (2014) observe that 64% of all the theoretical relationships expressed and tested in their sampled data of IS articles were concerned with obvious and common sense claims that had little theoretical surprise or specificity. Moreover, only 15% of the papers were free of axiomatic theorizing.

reference theory, its underlying assumptions, the cogency of its logic, or any controversy in the reference discipline itself.<sup>28</sup>

Fourth, IS scholars are largely shielded from the onerous task of creating new and original constructs and related instruments when operationalizing their IS-related theory, especially when it comes to IT artifacts. Alas, in our opinion, construct and instrument development is not highly respected and pursued in our field; it is deemed risky and not recommended to any serious doctoral student as an independent venture (i.e., in dissertations). Many journals do not publish construct-related work, and publishing such pieces often turns out to be an uphill battle.

Finally, the mid-range script leads to the satisficing of knowledge production as it seeks to cater to the needs of diverse stakeholders. Most published works seek to improve knowledge creation *and* transfer *and* change in practice on the basis of empirics and theory and disciplinary identity (Grover et al. 2008; King and Lyytinen 2004; Lyytinen and King 2004). Consequently, the needs of varying stakeholders remain sub-optimized as reflected in the constant tension between perpetual rigor and relevance and the implicit calls for mimetic conformance to either of them.

### ***Inadequate Treatment of the IT Artifact***

The unique feature of our field pertains to the treatment of information technology. How IT is conceptualized as a *technical* element within the human enterprise remains the main distinguishing research question for our field. For us, the IS field is fundamentally a relational field of inquiry—it bridges the social and information (semiotic) domains with technology constructs (e.g., Lee 2010; Lyytinen 1987). It needs to treat these constructs in ways that recognize mutual dependencies and forms of embedding and to conceptually characterize varying forms of mediation across the domains in rich ways (e.g., Burton-Jones and Straub 2006). Therefore, we need to cut deeper in our inquiry into these forms of embedding that reaches beyond whether IT is a proxy or tool or whether it is treated as an independent, dependent, or moderator variable (Benbasat and Zmud 2003). Our quest for theorizing asks how we can conceptualize the IT constructs and their dimensions in theoretically rich ways and how we can relate these to other constructs in other domains—including social facts and structures, or properties and processes related to information and informing.

<sup>28</sup>See, for example, the adaptation of structuration theory to the IS field (Jones and Karsten 2008).

The concepts adopted from reference theory are currently articulated outside the context of IT without a deep concern for critical dependencies or forms of mediation. We might just as well try to examine the social without assuming the presence of material capabilities in the world or study information without assuming the presence of any material that determines how information is represented, stored, or processed. In a similar vein, our notions of *information* and *social* remain highly abstract, and typically relate either to latent elements in social behaviors (e.g., capabilities) or virtual things inside the human mind (e.g., intention); our work is mostly devoid of relationships to the material side of IT. To wit, if we want to address the fundamental questions of our field, we need to ask how we can treat the IT construct in richer ways in our theorizing.

However, because of the separation of concerns that comes with the current mid-range scripts, IT constructs in our field have remained relatively low level, simple, crude, and fast changing, making cumulative theorizing difficult (Burton-Jones and Straub 2006). Instead of developing deeper, sustainable theories around IT, many studies fall into the trap of tracking fast-changing technology fads to justify their importance. This reactive stance has led to difficulties in building interactional and evolutionary theories about IT, and how evolving IT capabilities and affordances relate to the changes in the structures and dynamics within the social and informational domains. Specifically, in Table 3 we note that current mid-range scripts conceptualize IT as an exogenous force, with no specific, clear, or consistent basis for building IT constructs, and frail logic tying them to the social context. This leads to weak theorizing. While there are some studies that show promise, overall, due to our weak treatment of the IT artifact, our ability to differentiate our research space from that of the reference disciplines is underwhelming. In the end, perhaps because of the growing gap between the rich ways of using IT and its representation and measurement, the mid-range script, as currently practiced, is at the point of diminishing returns.

### ***Inadequate Freedom in Relating Theory and Empirics***

As IS scholars follow the mid-range script they indubitably generate some useful knowledge. However, as noted, this knowledge remains satisfying in nature. It draws upon broad abstractions, yet it tries to be close to and account for the local and specific IT phenomena. This creates a dilemma. On the one hand, if the reference theory is instantiated into the IT context (i.e., “as is”) with associated well-defined constructs and instrumentation, then the novelty of knowledge construction is lacking and the as-is theory is essentially being tested

as an IT context. This can easily lead to a platform for incremental research (like TAM) that contributes little to our novel understanding of the IT phenomena. On the other hand, if the reference theory is abstract and can be flexibly adapted to the IT context, then these varied adaptations may not conform to a consistent interpretation of the theory. In effect, each instantiation may invite a new interpretation and a slant to fit it into a unique context, where the existence of a unique context (e.g., type of system or type of use context) remains the primary motivation to do the study. Thereby, the mid-range models become increasingly incommensurate and remain idiosyncratic across different IS studies, researchers, and contexts.

To illustrate this claim, we provide two examples, although there are certainly many more. Alagheband et al. (2011) recently conducted an assessment of the use of transaction cost theory (TCT) in IT outsourcing research. They found that the results were so mixed as to make it impossible to consolidate cumulative knowledge of TCE in outsourcing. In their analysis of empirical (mid-range) outsourcing models, Alagheband et al. found that “not all the TCT concepts have been used as conceptualized in TCT (e.g., behavioral uncertainty) and not all the TCT relationships have been taken into account” (p. 136). They provide numerous examples where researchers had interpreted the logic of TCT differently for their study context, and also illustrate several cases where these key constructs were interpreted and measured in diverse ways, making them incommensurable.<sup>29</sup>

In another recent paper, Roberts et al. (2012) reviewed Cohen and Levinthal’s (1990) conceptualization and operationalization of absorptive capacity in IS research. They examined 98 articles that had borrowed this concept and found that the concept had been inconsistently conceptualized either as an asset or a capability across the studies. Absorptive capacity had been used at different levels of analysis and had been operationalized in various and inconsistent ways. They also found that most studies invoked a nominal view of the IT artifact, resulting in “missed opportunities to offer more grounded insights into IT-related phenomena” (p. 639). They concluded that because of these diverse conceptualizations, the absorptive capacity construct has remained “ambiguous and underutilized” (p. 644).

Figure 2 illustrates how mid-range theory lies between the high abstraction needed for theoretical use and the low abstraction in the practical context within which our phenomena occur. In many cases, when the variations may be legitimately nuanced adaptations of the reference theory, our

<sup>29</sup>Meta-analysis can help in some cases, but fundamental conceptualizations need to be consistent at some level (Glass et al. 1981; Hunter et al. 1982).

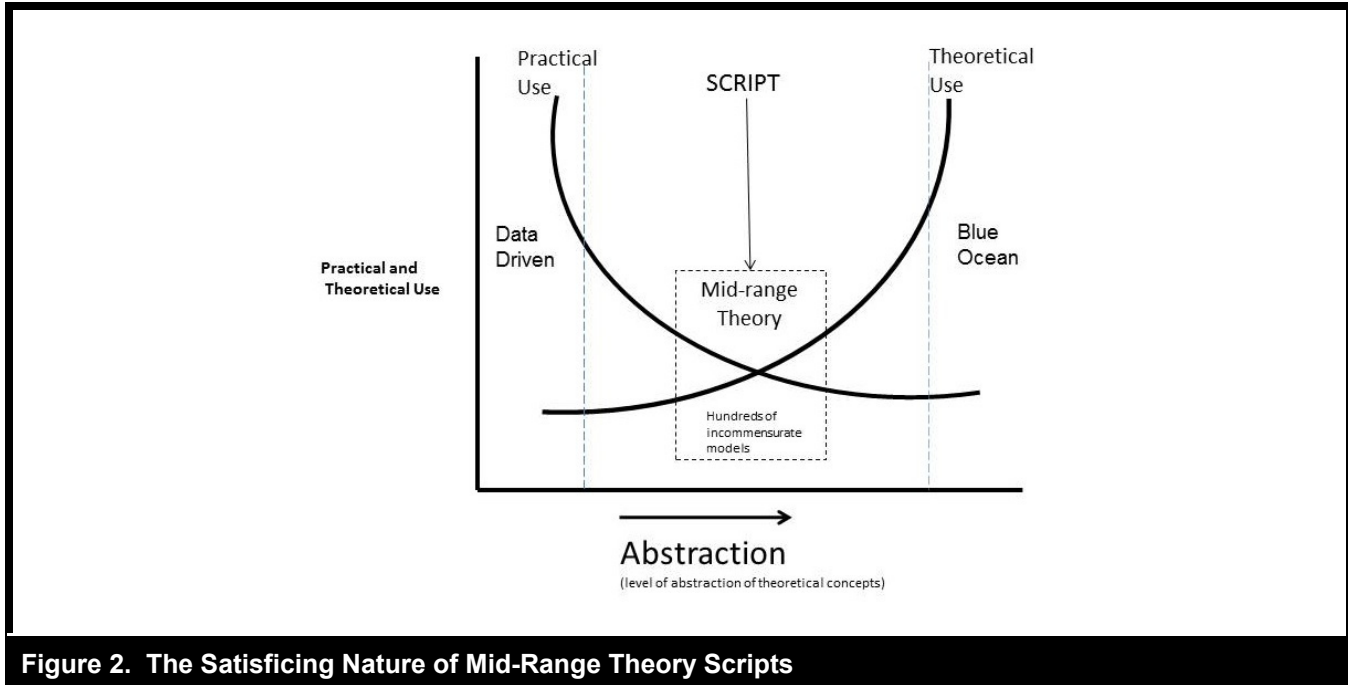
**Table 3. Theorizing About the IT Artifact**

Treatment of IT Artifact in Current Mid-range Scripts	Problems for Richer Theorizing	Directions for Improving Treatment of IT
<i>Treat IT primarily as an exogenous force in our theorizing.</i>	<ul style="list-style-type: none"> <li>IT has the potential to generate multiple and deep effects on other domains (and vice versa).<sup>a</sup> IS scholars currently study this by testing mid-range models and treating IT in these models in static terms, such as perceptual measures of IT as an indicator of value. This way of resolving the treatment of an IT artifact is partially due to the need to address problems of endogeneity.<sup>b</sup></li> <li>Other available alternatives are rarely examined, which invites theorizing on how and why IT becomes richly embedded in the context and how this generates effects.</li> </ul>	<ul style="list-style-type: none"> <li>El Sawy (2003) recommended four ways an IT construct can be treated as (1) external, (2) imposed, (3) connected, or (4) embedded. He promotes creating better conceptualizations of embedded IT constructs where the IT is seen to be entangled with the social context (e.g., IT identity).</li> <li>Recent work on sociomateriality, if made scalable and generalizable, could be one step in the right direction of how to deal with embeddedness.<sup>c</sup></li> </ul>
<i>Low level of abstraction reflected in practice, such as a specific portal or a DSS.</i>	<ul style="list-style-type: none"> <li>These constructs, often used in models, have weak or no logic in applying taxonomic principles, so that building strict causal or evolutionary models is difficult (Bunge 1998).</li> <li>These constructs are idiosyncratic to the context and offer good IT “stories,” but they are difficult to generalize.</li> <li>Often, IS scholars treat the IT artifact as nominal (i.e., the presence or absence of the system) or in a way that is inconsistent across studies.</li> </ul>	<ul style="list-style-type: none"> <li>Work on developing strong and richer taxonomic principles for representing IT and its affordances so instantiations of IT can transcend contexts.</li> <li>Several multidimensional views of IT effects offered by the classic DeLone-McLean model (DeLone and McLean 1992), the Burton-Jones and Gallivan (2007) model of IS use, or Dennis et al.’s (2008) representation of IT attributes in communication are examples of richer attempts to theorize around the IT construct in taxonomic ways.</li> </ul>
<i>High levels of abstraction by reducing IT to a few basic high-level functions, such as storage, processing, and communication capability, and general changes in any of such capacities such as its quality or cost.</i>	<ul style="list-style-type: none"> <li>These functions, whereas useful in understanding the generic functions of IT as a general purpose technology alone, seldom make good constructs because of the inability to benchmark them well and the presence of complex interactions between them.</li> <li>Sometimes terms are so abstract that without specific affordances or capabilities of IT we cannot build powerful theory.</li> <li>Sometimes scholars seek to overcome this problem by relegating these functions into specific families of IT artifacts that are labeled with specific terms—such as a DSS or a portal. By doing so we are back to the problems described in the row above.</li> </ul>	<ul style="list-style-type: none"> <li>Work on identifying constructs that can represent variation in observable artifacts along well-defined dimensions based on a broader ontology of information technology.</li> </ul>
<i>Maintaining inconsistent views of IT and its interactions with the context.</i>	<ul style="list-style-type: none"> <li>Developing rigorous higher abstractions such as “digital capabilities” requires advances in formulating systematic building blocks (e.g., IT features and their aggregations) that underlie the observed behaviors and the associated effects of digital technologies. Currently, such concepts and taxonomies are largely non-existent.</li> <li>Often, concepts (like digital capabilities) are idiosyncratically conceptualized for each piece of research—with somewhat arbitrary relationships and abstraction levels—often using the language of the specific system described.</li> </ul>	<ul style="list-style-type: none"> <li>Engage in the conceptualization of IT-based constructs founded on features and their inter-relationships that can be used consistently across technologies, including emerging technologies.</li> <li>Build logic on how feature sets can interact with contexts in a value (or capability) hierarchy.</li> <li>See Markus et al. (2002) and Shen et al. (2014) for some kernels of these ideas.</li> </ul>
<i>Failure to connect abstract constructs from social or domains to IT constructs with powerful, immutable logic.</i>	<ul style="list-style-type: none"> <li>Logics that relate IT constructs to constructs in other domains have never been consistent or well developed, as shown by the dominance of nominal or proxy views.</li> <li>Consequently, we do not have a basic understanding of <i>what it is</i> about IT use that on the one hand can generate higher rents while, on the other hand, can be subject to commoditization. Likewise, IT can centralize structures, but can just as easily decentralize them.</li> </ul>	<ul style="list-style-type: none"> <li>Work on filling the middle with richer IT constructs by tying higher-level abstract IT concepts to specific contextual (social) transformations.</li> <li>Work to demarcate these logics at a more fundamental level—one that relates to specific sets of IT capabilities and their unique appropriations in context—without which it would be difficult to develop more powerful theories within IS.</li> </ul>

<sup>a</sup>Or rather, interactions to avoid our being called either technology determinists or social constructivists.

<sup>b</sup> Endogeneity issues occur when the exogenous variable could be endogenous.

<sup>c</sup> See, for example, the call for papers for the *MIS Quarterly* special issue “On Sociomateriality of Information Systems and Organizing” (35:1), 2011, p. 258.



**Figure 2. The Satisficing Nature of Mid-Range Theory Scripts**

overall knowledge suffers from nearly impossible attempts to consolidate hundreds of partially or wholly incompatible models that straddle the tension between the abstract theory and the tangible IT context in a different way. Naturally, balancing tensions is a tall order and, in its current form, generates too much local satisficing. In our opinion, the mid-range script alone is therefore less likely to lead to the sort of strong evidence that helps address the central questions of our field.

As a result of the dominance of the script, two alternative, valuable forms of research common in many disciplines have been weakened and largely driven out of our published research: (1) data-driven research and (2) blue ocean theorizing.<sup>30</sup> These streams correspond to the left and right edges in Figure 2. While limited, Appendix C provides illustrations of exemplary research falling into the left edge, right edge, and mid-range categories.

*Data-Driven Research:* Data-driven, inductive research emphasizes the interpretation of patterns inherent in (new) empirical data. It aims to discern regularized empirical patterns of importance, and thereby to influence the intellectual framing of what we need to know (Corley and Gioia 2011; Helfat 2007). Overall, it strives to (1) discover empi-

rical regularities—what Helfat (2007) calls “stylized facts”; (2) invite new constructs that tap into these important and emerging empirical phenomena; and (3) create surprises by identifying trends and facts that challenge our current beliefs—including dominant theories. It invites us to focus on the unexpected and be open to things for which we have no adequate categories and explanations. As Helfat (2007, pp. 185) notes, “we need research directed toward uncovering empirical regularities....Only then are we in a position to build theory that in turn can serve as the basis for more refined tests and extensions.”<sup>31</sup> For example, several studies have indicated that organizational size predicts IT-related innovativeness (Gregor 2006), but little theory exists to support this claim. In effect, this suggests that organizational size could be a surrogate for several dimensions that influence IT-related innovation, including variety of resources, organizational structuring, or economies of scale. Recognizing such possibilities could then invite new forms of theorizing about IT-related innovation drivers. Although these forms of research are fundamental to the advancement of all basic disciplines, publishing anything that falls within “pure” empirical genres in our top journals is difficult. Sharp-eyed reviewers are apt

<sup>30</sup>Straub (2009) pushes the concept of blue oceans as breakthrough ideas, but indicates that although the ideas tread new ground, they do not have to be Einsteinian.

<sup>31</sup>We do not deny the presence of such forms of research work in our publishing. These needs are catered to occasionally by issues and opinion pieces in *MISQ*, *ISR*, and *J AIS* on research perspectives, and in some recent special issues (e.g., the 20<sup>th</sup> anniversary issue in *ISR*). Our point is that this form is not valued enough nor does it take on a prominent role in our research ecology.

to immediately note the lack of theory and proclaim: “Off with the manuscript!” Little credence is given to the salience of results, although such curious correlations (akin to a *Freakonomics*<sup>32</sup> inquiry) derived through sound methods or observations of practice might actually be harbingers of important organizational problems and subsequent novel theoretical development; explaining the data could have strong pragmatic implications.<sup>33</sup>

*Blue Ocean Theorizing:* Due to the dominance of the mid-range script, expectations concerning theory writing focus mainly on how to synthesize *existing* theory by engaging in gap spotting (e.g., *MISQ*'s “Theory and Review” section<sup>34</sup>). Similar patterns are considered to be a necessary part of a Ph.D. education, if any discussion of theory is to be carried out. Simply put, in most cases, theoretical work is equated with literature review and synthesis. This excludes armchair speculation, thought experiments, and the novel formulation of ideas that could generate alternative ways of interpreting what we know (as data or theory) or provide directions for generating new theories that may invite new types of data.<sup>35</sup> This is what Weick (1989) called theoretical imagination.

Many times, despite the novelty of theorizing, theoretical blue ocean articles get rejected because of the author's inability to empirically validate the results. Again, sharp-eyed reviewers are apt to note the lack of testing and shout either “Off with the paper!” or “Where is the data?” Or worse, when the armchair thinking is truly novel and cannot be easily related to what has been written about theory on the topic in the past,

<sup>32</sup>This comes from Levitt and Dubner (2002), where a well-known University of Chicago economist using econometric models seeks to understand local and common sense behaviors.

<sup>33</sup>Our field would not have published work that parallels studies finding a correlation between smoking and lung cancer in the medical field. Editors and reviewers would demand theory of what makes “smoking dangerous” rather than publish important empirical results.

<sup>34</sup>We clearly see some limited progress as journals like *MISQ* and *J AIS* advocate theory development. However, our point is that we need a change in mindset about what counts as theorizing to begin to offset the normative script.

<sup>35</sup>Critics could argue that opening this door would yield more two-by-twos in the name of theory. Our contention is that novel theory building is challenging work and is not for everybody. But the theorists among us should not be precluded from trying it simply because it falls outside the comfort zone of current normative expectations. There are some illustrations of innovative theory in IS that fall under our “extending” level. For instance, recent theoretical articles, including McKinney and Yoos (2010) and Mingers and Walsham (2010), provide examples of higher-level theorizing by integrating or engaging primarily with reference theories. Other examples can be found in Appendix B.

the reviewers will ask why the ideas are not anchored in the existing literature. Ironically, doing so would likely have prevented the emergence of these ideas in the first place! Overall, the exclusion of blue ocean theorizing maintains the vicious cycle of rewriting, recycling, and retesting existing reference theory.

## How to Expand the Script? ██████████

Let us reiterate our case. Our criticism is not levied against reference theories or borrowing as such. They are useful and necessary scholarly activities and will remain so for many study contexts and research questions in the IS field (see Truex et al. 2006 Whetten et al. 2009). However, we do believe that in *primarily* following this script, and permitting it to become highly repetitive and institutionalized, we have reached a point where our research has become formulaic to a large extent, and we often miss the novelty and foresight needed to achieve scientific breakthroughs. In a sense, this repetition is the cost of our past success. Nevertheless, the IS discipline has come of age, and it does not need to rely *exclusively* on the theoretical or methodological life support of deploying extramural reference theory. We therefore invite the community to enrich our methodological and conceptual arsenal with alternative strategies of theorizing and knowing as discussed above.

At the same time, we emphasize that by doing so, we can also strengthen the way we draw on reference theory so as to create powerful markets of ideas (Lyytinen and King 2004). In the following sections, we note what we believe the field should engage in to achieve such change. We also note that overcoming current institutional inertia is not easy. Therefore, we follow the discussion of expanding the script by suggesting some pragmatic mechanisms that could help in realizing this aspiration.

## *Be Open to Working on the Right Edge*

In the mid-range script, the innovation currently occurs at the level of the applied, mid-level model modifications, although we observed limited incidents of significant extensions (see Appendix B).<sup>36</sup> Therefore, we need to unleash the theorists among us to build new, innovative IS theories. Developing novel theories is difficult and requires keen observations of anomalous data, a disciplined imagination (Weick 1995),

<sup>36</sup>This dearth of research is also backed by Lee et al. (2014), who found that most studies tested obvious and common sense relationships between the constructs.



thought experiments, and ways of examining phenomena through diverse lenses. As Dubin (1978) suggests, “every good theorist is an inveterate collector of facts, with an especially well-developed sensitivity to their interrelationships” (p. 238). Not everyone can navigate up and down through these abstraction ladders.

A review of the significant and novel extensions we found during our literature review (see Appendix B) offers some guidance on how this can be done. One strategy is to sensitize established constructs to the IS context and review their explanatory potential, revelatory power, or tensions (Lamb et al. 2003). Another is to reconfigure existing constructs into a new configuration logic that offers variant explanations to already established IS relationships (Ragu-Nathan et al. 2008). A third strategy is to theorize at a richer and different level the nature of the IT construct itself in relation to well-known and established dependent variables (such as communication effectiveness) by using novel and taxonomic ways of conceptualizing IT features relevant for the study context (Dennis et al. 2008).

One reason we see so little of this type of work (around 17% of all published pieces) is that current attempts to engage in such theorizing are often stymied by present institutional norms of grounding everything in the literature or subjecting all proposed ideas to empirical testing. Accordingly, there are few possibilities to open up space in our top journals for ideas that retroductively or abductively engage in theoretical sense making based on practice-based evidence (Ochara 2013). Often, initial theoretical guesses or sketches may be challenging to evaluate and they may even be wrong, but we feel that their benefit of stimulating discourse will far exceed the potential cost of being wrong. One example of this is that as early as 1979, Richard Nolan formulated an abstract and complex process theory of IT innovations using preliminary budget data from a small number of companies. This theory later stimulated numerous empirical tests and dialogue among academics and practitioners. Although the theory has never been fully validated empirically, numerous concepts and explanations were introduced as a result of his sketch, which played a pivotal role later and shaped our thinking about the adoption and management of IT.

To unleash richer theory commensurate with the emerging nature of contemporary IT organizational phenomena, we specifically need to increase the variance in our epistemic scripts toward the right end of Figure 2—this is the space where we promote unfettered theorizing about IT and related phenomena. We need to allow greater liberties to build and abstract independent accounts of observed behaviors—accounts that are free from the need to justify them by recourse to reference theory or from the need to immediately

validate them through testing.<sup>37</sup> Suddaby (2010) refers to the tension between the “umbrella advocates,” who see constructs as “large buckets, loosely defined because this [image] better captures the inherent complexity and messiness of the world we study” and the “validity police” who see constructs as “small buckets, narrowly defined in order to bring more scientific rigor and validity to the study” (Suddaby 2010, p. 354). The latter buckets limit the utility of the theory promulgated by the former. Such unfettered theorizing naturally does not exclude the obligation that ideas are motivated and explained cogently or that they are not conjoined with (future) discussions about how to develop new measures to account for new constructs. Indeed, such demands offer ways to feed new insights into theorizing (Galison 1997).

As noted, the IS field makes theorizing around its core phenomena even more difficult due to the lack of versatile and well-developed IT constructs, as well as by the challenge in benchmarking the novelty in the theory. To theorize we need to move beyond Benbasat and Zmud’s (2003) focus on putting the IT construct in the central place within a nomological net. Making IT relevant and pivotal for our theorizing around organizations and decisions is not just a game of inventing some new, required constructs of IT artifacts in readily established theoretical narratives. If the concept of IT remains poorly developed and theorized, this perspective does not move us very far. Ironically, the tension between competing reference theories and the breaking down of assumptions in these theories based on IT phenomena can provide fertile ground for new theory development. Accordingly, we need to continually develop and advance contextual theories and sound typologies of IT and information. Further, in this paper, we note several criteria for how to advance such thinking.

### ***Be Open to Working on the Left Edge***

As a field in which the dynamics of IT innovation and use catalysts constantly change in human enterprise, we should be keen and acute observers of practice independent of prior theoretical baggage. Pure observation, description, and identification of patterns are valid modes of research and initial steps for rich and robust theorizing (Weick 1995). Unfortunately, in order to succeed in our top journals, heavy-duty theory remains a pivotal consideration, which precludes us from rigorous reporting on facts and, in the end, arguably stymies the development of richer theory (Hambrick 2007; Helfat 2007).

<sup>37</sup>Several such ideas and strategies are already noted in Dubin (1978), who discusses “the limitation of proof orientation” of theory (p. 242).

We argue that three kinds of empirical work need to be fostered, all of which would struggle for acceptance if we stick with our current insistence on the mid-range script. The work includes descriptions of the world “as-is,” of the world as it “will be,” and of the “curious world.” The world as-is is a reference to rich descriptive accounts of IT-related phenomena that could potentially help in identifying appropriate constructs and encourage the development of richer theory in relevant problem domains. We argue that good as-is descriptive work can create a foundation for theory that might be superior to generating another mid-level model that is superficially integrated with the phenomenon being studied. The world as it will-be is particularly important for the IT field, where experimenting occurs in everyday practice while companies and individuals seek to create new, innovative options for using IT dynamically. This is one key cognitive aim of much of the computer science and design science thinking, but it should not be precluded only to include the study of technical artifacts. Therefore, insightful work that highlights exemplar IT uses can provide foresight regarding future IT-related solutions and problems, can alert us to new research opportunities, and help us identify what we should be theorizing about. This focus not only allows us to be on the forefront of IT-driven change, but also allows for the framing and theoretical development of why cutting-edge ideas work or do not work. Corley and Gioia (2011) likewise emphasize the importance of will-be descriptions, which they call pre-science, when they note that “the best way to predict the future is to influence the conversation about what it could or should be” (p. 24). Our current scripts would view such pre-science as theoretically inadequate for our top journals.

Finally, the curious world refers to unexpected findings that have no immediate theoretical explanation or findings where hypothesized relationships were not confirmed. Such work would rarely be published without associated theory, and even then it is a true uphill battle. But why? If empirical work is done well and meets all our methodological criteria of sampling, effect size, validity, bias, and control, curious or unexpected results about interesting or well-known phenomena should be published. Such work can spawn more directed theoretical development in the future (Hambrick 2007). Isn't this development what we want? Unfortunately, our current proclivity would be to relegate such work to the category of a “fishing expedition” or “nonsignificant findings” and it would never see the light of day.

To conclude, pure empiricism should be fostered in our field toward inductive, descriptive, purely empirical, and pre-science work on the left edge of Figure 2. Theoretical development can succeed with (rather than precede) interesting results, contrasting with what is expected in a typical middle-range paper. Subsequent investments in new instrumentation

would yield fresh, positive evidence for theorizing, negative evidence that might suggest giving up some current theories, and would build up extensive data sets to validate commensurate theory over time (Lyytinen 2009). Consequently, we need to appreciate and work extensively with empirical specialists that have a deeper understanding of (especially) digital data acquisition, provenance, and analysis.

### ***Enrich the Mid-Range Theory***

Our critique of the outcomes of the mid-range script should not be mixed with the benefit that accrues from *engaging in more effective use of reference theories*. Our key argument is not to disbar the script, but to locate its potentially valuable role in the market of ideas better. The current use of reference theory is mainly reductionist, that is, we reduce an IS problem to a set of well-established constructs and their relationships adopted from reference theory. In contrast, if and when we draw from reference theories, we should therefore treat them as malleable and embed them, as well as their assumptions and debates, carefully into the IS context by seeking incessantly to *falsify* or to *enrich* the theory. Hence, interactions between the context and the theory should not be one-way traffic—top-down—but should involve dynamic, two-way interactions of blending and tensions (Oswick et al. 2011). We need to go beyond examining how the reference theory can be instantiated or modified into a model with additional IT constructs. We need to ask how the studied phenomenon influences the nature of the constructs adapted to the IS context or the whole theory itself. Such inquiries should reflect good practice and be a part of the review expectations. This would result in richer and more dynamic engagement between the context and the theory and result in greater fidelity between the mid-range theory and the phenomena. In the end, it would also help the field to contribute back to the reference discipline.

Finally, the mid-range position leads to a product view of theory, as exhibited in the idea of theory supermarkets and a straightforward food chain thinking of building theories for our field. As suggested in Figure 2, if we orient ourselves more toward the left and right edges of epistemic scripts, we will engage in more dynamic interactions in our constructions of data and theory. This increased dynamism will foster a *process* view of theory as data patterns, reference theory, and blue ocean theory constantly interact to explain interesting phenomena. Alternatively, through passionate and bold theorizing and armed with fuller, more extensive, and more nuanced empirics, we can generate richer data and theory and engage in faster knowledge production cycles—cycles that feed back into stronger mid-range theorizing.

## How Can We Do It?

Given our logic so far, how do we expand current epistemic scripts when they have such a deeply rooted institutional foundation? Currently, our top-level journals and their gatekeepers often view theory as a goal in itself. It is the basic construct of knowledge in the field, and it defines the identity of the field (Weber 2006). This mindset has been cultivated over years through the emulation of what are thought to be more rigorous reference disciplines. Stopping or turning the train around, given the aura of respectability that has purportedly been attributed to theory, will be extremely difficult. Many scholars believe that the way to build better research products is only by following the current script. We argue that although quality research has indeed been produced using narrow metrics such as citations, a broader question is at stake. Are we conducting research that is really helping us understand complex IS phenomena and the important questions of our time? We believe that, in this regard, we could do much better. Scholars in the past have expressed concerns with the current status of the discipline, and so there is receptivity to assessing how we can improve (e.g., King and Lyytinen 2006).

To overcome institutional inertia, we need to make a strong case regarding the need for change in how the field produces knowledge. This will require a multilevel approach as stakeholders at the individual level as well as the collective (institutional) level must commit to change and foster change in their behaviors. We presume that current behaviors are largely rational; individual scholars work as the existing institutional structures demand and institutions that are symbiotically linked to individuals work to achieve and signal normative and accepted standards of good research. Change would inherently be gradual, involving a cultural shift propelled by a recognized need to close the gap between “getting published” and creating “good knowledge.” Of course, it is our hope that this work, along with other forums, can foster such recognition and ultimately change the isomorphism in existing practices.

### **Individual Stakeholder Guidance**

So what should individuals do in order to deviate from the script? The script demands that individuals engage in certain accepted norms in their conduct of research. These behaviors and their rationality in getting published are summarized in the first two columns of Table 4. They encompass much of what we have discussed in this paper—a formulaic approach to building research papers using reference theories adapted to mid-range models, navigating review processes, and building careers. These behaviors, while conducive to getting

published and securing academic success, are often detrimental to creating good knowledge (see column 3 of Table 4) because they mask interesting outcomes and stifle creative thinking as the researcher goes through the script. How individuals can challenge these norms is difficult, and would require unconventional behavior, which is difficult for most, but particularly for junior faculty in the field. The last column of Table 4 describes possible behaviors, such as focusing on the importance of practical and social problems as the sole motivator for the research; treating adapted theories not as immutable, but as malleable; building research; aggressively reporting and interpreting nonsignificant results; and challenging the reviewers that enforce the orthodoxy of reference theory (e.g., Gioia 2004). Of course, such unconventional behaviors would not be rational, because they would often lead to nonproductive outcomes and career cul-de-sacs under our current regime. Therefore, it is important that such behaviors are fostered and valued by our institutional collective—our representations of editors, conferences, organizers, and research programs.

### **Collective Stakeholder Guidance**

The most immediate path to foster change in individual behaviors would be to convince the field to expand the scripts and aggressively promote them through a variety of forums. Changing mindsets is not easy, and the field has to recognize that there is a real line between conforming research and nonconforming research, where conformance is based on practices that are diminishing in their utility. Organizing tracks around nonconforming research, setting up pre-ICIS sessions, having editors write editorials on the trade-offs, pushing the tenets of creative research in doctoral consortia are some of the means to get the message out.

For example, editorial policies need to be tweaked for increased flexibility in what is deemed acceptable research. Theorists could work without the baggage of testing everything they imagine and empiricists could work on topics that describe, forecast, or reveal salient empirical results without a call for a tightly knit theory. For instance, *MISQ* should truly open up its “Research Note” category to valid and interesting empirical findings that can stimulate future theoretical development.<sup>38</sup> Its “Theory and Review” section could

<sup>38</sup>The “Research Note” section does allude to this when it indicates in its description “important contributions of an empirical nature that relate to topics that appear frequently in the *MIS Quarterly* and other top journals.” However, based on our observation of published research notes in the journal, this to date has been interpreted as methodological improvements to existing research. We could not find any recent paper that just reports on interesting empirical results in an attempt to stimulate theory development. We trust that *MISQ* editors would welcome such contributions, however.

**Table 4. Individual Stakeholder Guidance**

<b>Behavior that tends to follow the Script</b>	<b>Why this behavior is rational for getting Published</b>	<b>Why this behavior may be detrimental to good Knowledge</b>	<b>Recommendation: Modified Behavior</b>
Identify a research problem and position it in a research gap in the literature.	It follows the genre of the typical paper and emphasizes “what we need to know” by examining deficiencies in the literature.	Most literature can be slanted to position any research that is being done. Often, the problems addressed in the gaps are trivial and reflect the researcher’s investments.	Place far more emphasis on translating the research problem into a practical problem and emphasizing the importance of the practical problem. Literature should be secondary, with an emphasis on “what it can and cannot provide” to the research problem.
Search out and present a “relevant” reference discipline theory to study the research problem.	It gains instant credibility as an organizing lens and allows the problem and hypotheses to be efficiently structured according to the lens.	There is no clear criteria on theory selection, and often the adoption of constructs, configuration, logic, and measures merely makes the IS field a new testing ground for the reaffirmation of theory.	Delineate the theoretical assumption and boundary conditions before selecting the theory. Be far more aggressive in challenging the theory or developing new concepts in light of the IS phenomena being studied. Be less inclined to jump straight to a theory to tell you how to think, but be more inclined to build on first principles.
Build a research career on one (or limited) theories and methods.	Creates institutional effects that lock one into efficient approaches for implementing the script.	It stifles creative thinking—and forces researchers to follow scripts almost blindly to get published.	Do self-assessments and periodically diversify research topics, theories, streams, and methods—doing things that are interesting, different, and valuable, rather than what you know.
Interpret the results with respect to the theory and hypotheses—largely working toward a presentation that supports the reference theory or its adaptations.	Lies within the norms of acceptable research, since non-support of a borrowed theory raises issues with reviewers and casts aspersions on methodology. It also follows the genre of “completing the loop” in papers from theory to implications for theory.	It reinforces what we largely know. It masks interesting outcomes because they challenge and provoke, and make the research difficult to assess through scripted norms.	Aggressively interpret results that counter theory. Consider the IS phenomena in reinterpreting constructs, configurations, and logic of theory. Propose future research studies to examine this.
Satisfy reviewers, which is more critical than making a broader contribution to business or society.	Reviewers tend to look for scripts and minimize Type 1 errors (by finding flaws in papers). Therefore, in order to get published, satisfying reviewers is paramount.	Often, reviewers layer the papers with a series of revisions that reflect diverse reviewer viewpoints. The authors’ contribution gets compromised as these views get “accommodated” in the revisions.	Challenge reviewers’ that force conformance or new reference theory if a cogent case can be made that it will hurt the paper’s message.

encourage fewer reviews and more creation of theories. Its “Research Commentary” section could seek out empirical examinations of future problem and opportunity domains. Similarly, special issues could be set forward not only on vertical topics, but also on the nature of research (some dimension of nonconformance) where variation in communication content, style, and format is welcomed.

While these changes can help in the short run, there are broader issues, like how the field might recognize and evaluate good theory without taking umbrage in its testing. Similarly, we do not have adequate frames to identify and make sense of interesting and salient results. In areas with a

long tradition of measurement, such as TAM, identifying a different result and exploring it might be feasible. However, in most areas, our results are not easy to benchmark against widely recognized and consistent knowledge. To find surprises, we need to know what we know and do not know and constantly seek to establish a more stable background against which key counterintuitive findings can be detected. Furthermore, in cases of results departing from expectations generated by the reference theory, our current review processes do not give them credence, casting aspersions on our methods (Straub 2008), particularly when we use incommensurate measures or measures that involve perceptions collected across multiple contexts.

To change this we need to change the culture of reviewing. Consider a matrix in which papers fall into four boxes based on the dimensions of strong and weak on theory, and strong and weak on method. A reasonable review decision for papers that are assessed as strong-strong (truly rare!) and weak-weak (very common) is self-evident. However, papers in the gray zone that are strong on theory but weak on method tend to get rejected, while papers that are strong on method but weak on theory may not (Straub 2008). In the latter case, the review process is often used to overlay and develop suitable reference theory in its narrative to elevate the paper to an acceptable level. Thus, going multiple rounds on theoretical development is not unusual. But even after this process, the theory, rather than being invigorating, has been massaged to an acceptable level of consistency and clarity with the life support of reference theories. Methodologies are usually complete and sound, and unless new data collection is needed, they often require only a few tweaks for improved clarity. We therefore end up publishing papers that satisfy, that is, ones that might not have particularly interesting theory but that rest on rigorous methods and show strong results. Papers with potentially great theory are rejected too often because reviewers rely on tests and, therefore, strong results. In this way, we prioritize the credibility of non-interesting results before interesting results with lower credibility.

Altering this balance requires a re-evaluation of priorities. We need to recognize and practice different trade-offs between theory and method, such as a trade-off where strong theory partially or weakly tested could still be an important contribution. Such a change requires the consideration of these issues in doctoral programs, consortia, conferences, editorial board meetings, and tenure committees. For instance, stimulating debate on panels at major conferences on what comprises a good review and publicizing what recipients of outstanding reviewer awards do well, especially in promoting novel theory, can all help. Might not guidelines for reviewers and editors include greater emphasis on judgment and contribution regarding whether the paper has broad appeal and something interesting to say through original ideas and presentation? If so, it may be necessary to compromise on the tightness of the methodology. Discussion of alternate forms of knowledge verification, like industry data and expert opinion, can be debated and trade-offs and acceptable standards modulated. Also, for certain papers, during the submission process, authors can be asked to specify a special set of criteria upon which they want their paper to be judged. Table 5 describes script behaviors, their rationality, and their corresponding behaviors that could facilitate such changes in our institutions. As scholars, when we recognize the problem, we can chip away at these institutional barriers more easily through a series of interventions. We realize that these paths still seem painfully generic and perhaps unsatisfactory be-

cause they do not resolve the issues overnight. However, we see this akin to a cultural change, which rarely comes fast and easy.

If we can make progress on the individual and collective fronts, it will benefit the field, better utilizing our human (intellectual) capital and broadening our knowledge ecology. In a dynamic and complex interactional field such as IS, we need to make sure we keep philosophers, theoreticians, empiricists, methodologists, and technology entrepreneurs within our active research networks and value their unique contribution. A flexible system gives them opportunities to unleash their potential rather than being constrained by a mid-level script. Consummate empiricists can measure, test, and analyze without being burdened by retrofitting theory. The theorist can think more about fundamental concepts and big buckets rather than worrying about empirics. These diverse scholars can build on each other's work by providing them with varying forums of interaction.

This approach will undoubtedly lead to tensions, but it will also generate less myopic and more systemic views of the interactions between the domains in Figure 2. Over time, this complementarity will invoke new epistemic scripts, offer superior and faster feedback to scholars, and create a broader knowledge ecology—one that relaxes institutional norms enough to allow the people in the field to publish work on the edges. Indigenous blue ocean theories could spawn mid-range theory as these scripts become interrelated. Brute empiricism could be published with its unsettling results, while follow-up papers could retrofit theoretical explanations to these papers, resulting in superior theories. Even in mid-range theories, two-way interactions and blending between the mid-range theory and the reference discipline theory can be accomplished, increasing deeper thinking about the IT phenomena and its idiosyncratic theoretical manifestation.

## Conclusion

In this paper, we have deliberately tried to be provocative. Yet, despite the negative premise of our argument—the bad idea of misplaced over-borrowing—this essay is not yet another voice in the “anxiety discourse” (King and Lyytinen 2004; Grover et al. 2009). We are proud of our field's legacy. Indeed, our field has come a long way. By traditional metrics that evaluate rigor and the impact of research, verifiable progress has been made (Grover et al. 2006; Grover 2012). Much of this progress can be attributed to our faithful and skillful use of reference theory and the subtle learning that comes through emulating research standards in the reference disciplines. However, the very success of this approach is

**Table 5. Collective Stakeholder Guidance**

<b>Behavior that tends to follow the Script</b>	<b>Why this behavior is rational for managing the System</b>	<b>Why this behavior may be detrimental to good Knowledge</b>	<b>Recommendation: Modified Behavior</b>
Conformance to “more established” disciplines is respected and adds credibility to the work.	Allows the field to draw on “credible” theories that create a credible and efficient way to organize a phenomenon.	Closes the cycle on innovative thinking, because the links between reference discipline ideas and the data on IS phenomena are fairly tight.	Change culture and mindsets in the field by engaging in forums. Organize panels and tracks around the topic of “nonconforming research.” Set up pre-ICIS sessions (perhaps in meetings like IS Philosophy special interest group). Have editors-in-chief of Association for Information Systems’ “basket” journals write editorials on the needs and trade-offs of doing this. Engage doctoral students into the trade-offs of conformance vs. independent voice in doctoral programs.
The inclusion of both theory and empirics in the same paper.	Follows the norms of acceptable research papers—based on imitating top journal practices in other disciplines.	Shackles theorists who must accommodate empirics and shackles empiricists who must accommodate theory—resulting in a paper that satisfies.	Change editorial policies to be open to alternate kinds of research and aggressively promote these alternative genres. Set up special issues, not only on content (topic) but also on the nature of research (e.g., pure data research with no theory). Have forums that discuss the “unit of contribution” for knowledge production.
Reviewing practices that promote the minimization of Type 1 errors (preventing “bad” papers from being accepted).	Reviewers, often recently trained in methodology, find it easier to identify problems—particularly methodological—and reject papers.	Papers that could have a profound impact on knowledge often do not get recognized and are rejected, possibly due to technical flaws. Incremental knowledge contributions that cover the basis in terms of methodology (e.g., validity and reliability) get accepted.	Doctoral programs, consortia, conferences, editorial board meeting, and tenure committees can consider review and contribution issues. Stimulate debate on “good reviews” in panels at major conferences. In outstanding reviewer awards, articulate and publicize what the reviewer does well. Have a mix of both senior and junior reviewers on review teams. Restrict revisions to two so that papers do not get embroiled in an endless series of layering. Include practitioner oriented researchers on review panels.
The standard research paper genre is well understood and within the comfort zone of most researchers in the field.	Creates efficiencies in writing and reviewing papers, as the deviations are easy to note and challenge.	Often, research has to be retrofitted into a format that suboptimizes its contribution.	Editors should encourage the submission of papers that may follow (or experiment with) a different format. Journals can set up categories for such research. Promote genres with the IS-organizational problem at the forefront. Allow authors to specify the criteria on which they want their research to be reviewed.
Value is placed on grounding any knowledge claims in the literature.	Creates “comfort” for editorial teams, since grounded ideas are considered to have more credibility.	Forces literature grounding behaviors that compromise and constrain independent thought and ideas—and generates large reference lists that create an illusion of validity.	Work on creating a culture through discussion and debate in forums—where alternate forms of the verification of knowledge claims have credibility (e.g., data from industry, expert interviews) on which theorizing can be built.

what compelled us to write this paper. Our well-deserved admiration for mid-range theory has straddled the disconnect between the abstract and the testable; the interesting and the mundane; the generalizable and the idiosyncratic. In trying to bridge these disconnects, we currently handle neither extreme well, and, as a consequence, we might be compromising our long-term future.

To put it bluntly, if IS *exclusively* follows reference disciplines in its theorizing, what will the role of the IS discipline be in the overall disciplinary ecology?<sup>39</sup> We also need to ask whether the important questions in the IS discipline can be

<sup>39</sup>See Weber (2006b).

addressed by relying *exclusively* on theories that originate from reference disciplines. For us, if the answer to both questions is yes, we should pack our bags and move to the departments wherein our reference disciplines reside. Or, papers like this could fall into our own trap of setting up a subfield of introspective research whose purpose is to decry our research as scripted and lacking indigenous theoretical insight. If the answer to both questions is no, then we need to begin to explore what sorts of new scripts can lead to more genuine theorizing and how to modify our current scripts to accommodate this need.

It is healthy for scholars in our field to engage in this debate. Based on our analysis, we argue that we can do better by being bolder in our theorizing and more innovative and rigorous in our treatment of data. If shifts can be accomplished in our ways of knowing, we posit that the future of the IS discipline is bright and it can become one of the epicenters of inquiry dealing with the central forces that continue to shape human enterprise in the 21<sup>st</sup> century.

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## NEW STATE OF PLAY IN INFORMATION SYSTEMS RESEARCH: THE PUSH TO THE EDGES

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## Appendix A

### Coding Procedures

In this appendix, we describe the procedure followed for coding articles including sampling frame, scheme, process, and validation.

#### **Sampling Frame**

Every fifth article in *MISQ* and *ISR* between 1998 and 2012 was sampled for coding. Editorials, research notes, and research method articles were not considered. Further, articles that focused on design science, IS teaching/education, or the disciplinary state of the field were excluded. Articles that focused on substantive IS phenomena were the input to the coding process, whether approached theoretically or empirically.

#### **Coding Scheme**

The coding scheme covered the following three aspects: (1) type of study, (2) treatment of the IT artifact, and (3) form of theoretical borrowing. Further details are provided below.

**Type of study** was classified as one of the following: analytical modeling, content analysis, econometrics, experiment, Delphi studies, longitudinal panel data, meta-analysis, qualitative, simulation, survey, or pure theory.

**Treatment of the IT artifact** was classified per Orlikowski and Iacono's (2001) typology: tool, proxy, ensemble, computational, and nominal view. Here *tool* is defined as the engineered artifact expected to do what its designers intend it to do; *proxy* conceptualizations is defined as the focus on one or a few key elements in common that are understood to represent or stand for the essential aspect, property, or value of the information technology captured through some set of surrogate (usually quantitative) measures—such as individual perceptions, diffusion rates, or dollars spent; the *ensemble* view suggests that the IT artifact is only one element in a “package,” which also includes the components required to apply that technical artifact to some socio-economic activity; the *computational* view concentrates expressly on the computational power of information technology and is interested primarily in the capabilities of the technology to represent, store, retrieve, and transmit information,

thereby supporting, processing, modeling, or simulating aspects of the world; in the *nominal* view, IT artifacts are not described, conceptualized, or theorized and technology is essentially absent, constituting neither an independent nor a dependent variable in that technology is the omitted variable here.

**Form of theory borrowing** was coded in several steps. First, we asked whether the borrowing was primary (directly from outside of IS) or secondary (adopted from a theory already conceptually developed for the IS domain)? Second, what was the degree of change involved in the borrowing of the theory: none, small (changes to a single construct), medium (changes to multiple constructs and therefore also relationships), or large (modifies underlying logic)? Third, was such borrowing done in the manner of instantiation, modification, or extension (as defined in Table 1)? Determining the form of borrowing was done by examining the type of change in the constructs, configurations, and logic that the borrowed theory went through as it was applied within the research domain of each paper.

## **Coding Process**

A coding process was developed and refined through three reviewers categorizing random subsamples of articles independently and then discussing discrepancies. Once high inter-rater reliability was obtained, one reviewer read each article and coded according to the coding scheme. Two additional reviewers well versed in theory in the field served as consultants to resolve issues in coding the articles. For instance, one of the issues to be resolved was to refine the distinction between instantiation and modification. Examples of coded papers are provided in Table 1.

## **Validation**

Discussions across the three coders resolved discrepancies. In addition, the three coders coded a random set of 10 articles independently. The level of agreement among the three coders with regard to primary and secondary borrowing was 100%. To measure the reliability of coding for the type of borrowing and treatment of the IT artifact, we used Fleiss' kappa, which was calculated as 0.831 for type of borrowing and as 0.735 for treatment of the IT artifact, indicating acceptable levels of agreement.

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# Appendix B

## Existing Research Exemplars of Extension

Citation	Description	Treatment of IT	Reference Theory	Primary Borrowing	Classification	Magnitude	Rationale
Lamb, R., and Kling, R. 2003. "Reconceptualizing Users as Social Actors in Information Systems Research," <i>MIS Quarterly</i> (27:2), pp. 197-236.	Theory paper reconceptualizing the concept of "user" as a social actor whose social interactions are infused with IT use.	Ensemble	Labeling theory, Institutional theory, Structuration	Yes	Extending	Major	<ul style="list-style-type: none"> <li>✓ Using a clear, borrowed frame, the authors look at data and are able to reconceptualize a central construct, thereby essentially adding a whole new way of seeing users.</li> <li>✓ While there is no change in configuration, the paper offers a total perspective reversal with regard to how social actors are seen in the IS context.</li> </ul>
Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., and Tu, Q. 2008. "The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation," <i>Information Systems Research</i> (19:4), pp. 417-433.	Examines the effect of technostress on job satisfaction and organizational and continuance commitment.	Proxy	Transaction-based theory of stress	Yes	Extending	Major	<ul style="list-style-type: none"> <li>✓ Theorizes the nomological network of stress in IT contexts and creates a very specific conceptualization (and measurement) of technology-related stress.</li> <li>✓ Offers a unique configuration between various technology and stress-related constructs.</li> <li>✓ Situates stress deeply embedded in a technology context.</li> </ul>
Dennis, A. R., Fuller, R. M., and Valacich, J. S. 2008. "Media, Tasks, and Communication Processes: A Theory of Media Synchronicity," <i>MIS Quarterly</i> (32:3), pp. 575-600.	Builds the media synchronicity construct/theory.	Ensemble	Communication/Media richness theory	Yes	Extending	Major	<ul style="list-style-type: none"> <li>✓ Theorizes critical features of digital technology so as to understand the material basis of media synchronicity—not just practices or perceptions. Goes beyond media richness by recognizing specific features of digital technologies.</li> <li>✓ Relates the new media synchronicity construct to more well-known constructs.</li> <li>✓ Focuses on a rich representation of the IT artifact, which has a central role, and ties it with different logic to communication outcomes.</li> </ul>

# Appendix C

## Illustrations and Examples of Genres

	Research Approach	Illustrative Research Projects	Examples from Literature That Have Some Attributes of This Genre
Opening to the Right: Blue Ocean Theorizing	<p><i>Powerful and internally consistent conjecture where both the constructs and logic are developed indigenously or through new powerful analogies. The theorist can loosely base such work on observations and antinomies, or use data as illustrations or thought experiments. This is largely a creative endeavor.</i></p>	<p><b>Project:</b> Development of a typology that illustrates levels of embeddedness by integrating social and material properties of IT.</p> <p><b>Project:</b> Develop the concept of “information volume” as a salient property of information that restructures its boundaries based upon contextual conditions.</p>	<p>Nolan (1979) plotted a small sample of IT department budget data and developed a descriptive and prescriptive “stages of growth” theory that explained how organizational computing would evolve through the tensions between management slack and control.</p> <p>Dennis et al. (2008) proposed media synchronicity theory. It draws loosely upon media richness literature, but articulates a novel view of media properties, including several original constructs that focus on achieving successful communication processes through rich technology (media) capabilities that influence synchronicity.</p>
<b>Enriching Mid-Range Theory (Script)</b>	<p><b>Current:</b>  <i>Instantiation: A model is built that applies constructs, configurations, and/or logic from the external theory to an IS context. The flow is one way between the external theory and IS.</i></p> <p><i>Modifying: The model modifies constructs, configurations, and/or logic drawn from an external theory (or theories) to conceptualize an IT-based phenomenon. The external theory (and constructs) are locally adapted to IS.</i></p> <p><b>Desirable:</b>  <i>Extension: The model adds new constructs, and therefore possibly also new configurations and/or logics to the external theory in order to capture an IT-based phenomenon. Thereby, the model extends understanding of the source theory for the IT context.</i></p> <p><i>The flow is two way between the external theory and IS and (IS challenges assumptions of external theory).</i></p>	<p><b>Project:</b> Examination of the governance of open source software. Use the constructs and logic of transaction cost economics to predict governance structure. Constructs (e.g., asset specificity) are simply adopted to the software context (e.g., the asset specificity of the software).</p> <p><b>Project:</b> Using multiple social theories (e.g., social response theory), develop a model of IT artifact appropriation with specific constructs on how users can make choices regarding IT functionality.</p> <p><b>Project:</b> Project starts with the resource based view (RBV) and presents a model that demonstrates that IT resource homogeneity and combinability (not heterogeneity, as described by RBV logic) among clusters of networked firms is a source of competitive advantage for the cluster. RBV logic is thereby modified under certain IT-based phenomena.</p>	<p>Teo et al. (2003) drew from institutional theory to examine various institutional constructs and their prediction of the intention to adopt financial electronic data interchange.</p> <p>Tanriverdi et al. (2007) drew from modular systems theory and built a model for predicting and explaining sourcing mechanisms based on the level of IT modularity and IT detachability.</p> <p>DeSanctis and Poole (1994) blended institutional and decision-making perspectives to generate unique insight into the implementation and impacts of information technologies.</p> <p>Swanson (1994) used the IS environment to significantly expand the classic dual core theory of administrative and technical innovations to include the IS core in his tri-core model of IS innovation. This was later expanded by Lytinen and Rose (2003) to a quad core model.</p>

	Research Approach	Illustrative Research Projects	Examples from Literature That Have Some Attributes of This Genre
<b>Opening to the Left: Data-Driven Research</b>	<p><i>The World as It Is: Rich descriptive accounts of IT phenomena to facilitate the identification of constructs for theory development.</i></p> <p><i>The World as It Will Be: Accounts of exemplar firms or phenomena that can provide foresight regarding future IT-related problems, alert us to research opportunities, and help us identify what we should be theorizing about.</i></p> <p><i>The Curious World: Rigorously conducted empirical work with curious empirical findings that have no immediate theoretical explanation.</i></p>	<p><b>Project:</b> Study of the corporate use of social media, decisions, budget, governance, users, technologies, attitude, conflict, successes, failures, and impacts.</p> <p><b>Project:</b> In-depth study of company where the CEO took over the role of the CIO and created a unique committee for strategic IT governance.</p> <p><b>Project:</b> Empirical study that demonstrates that usage <i>declines</i> when technology interfaces are simplified, contrary to the expectation that ease of use fosters greater usage.</p>	<p>Wattal et al. (2010) presented a largely descriptive study of data and patterns on the use of social media and presidential elections that opened directions for future research.</p> <p>Posey et al. (2013) facilitated theory development in IS security research by developing a taxonomy of protective behaviors enacted by organizational members to protect information assets based on interview and survey data.</p> <p>Gordon et al. (2010) empirically examined the market value of voluntary disclosures concerning information security and suggested avenues for future empirical and theoretical work.</p> <p>Barley (1986) examined the adoption of computer tomography scanners in two hospitals and found that the effects of the same technology were different.</p>

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