Communications of the Association for Information Systems

Volume 44

Article 1

1-2019

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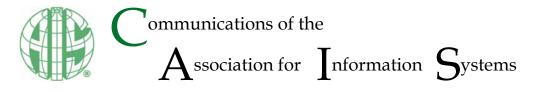
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Recommended Citation

Niederman, F., & March, S. (2019). The "Theoretical Lens" Concept: We All Know What it Means, but do We All Know the Same Thing?. Communications of the Association for Information Systems, 44(1), pp-pp. https://doi.org/10.17705/1CAIS.04401

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Research Paper

DOI: 10.17705/1CAIS.04401

ISSN: 1529-3181

The "Theoretical Lens" Concept: We All Know What it Means, but do We All Know the Same Thing?

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Abstract:

The term theoretical lens has grown in usage in business and social science research and particularly in the information systems (IS) discipline. In this paper, we question what the term really means by examining it on several dimensions in the context of its actual use. In particular, we consider 1) where the term appears in each paper, 2) how many conceptualizations of theoretical lens each paper uses, 3) the research method the paper uses, 4) the IS domain the paper considers, and 5) which underlying conceptualizations the paper actually uses. To do so, we examine the full set of actual uses in the IS journal that uses the term most frequently, the *European Journal ot Information Systems*. We conclude by discussing several further questions that these observations raise, which suggest deeper issues about better and less advantageous uses of theoretical lenses in IS research and what these issues might imply for the IS discipline.

Keywords: Theoretical Lens, Theory Building, Theory Testing, IS Research Method.

This manuscript underwent editorial review. It was received 04/29/2018 and was with the authors for 1 month for 1 revision. Mary Tate served as Associate Editor.



"When I use a word," Humpty Dumpty said in a rather scornful tone, "it means just what I choose it to mean—neither more nor less."

"The question is," said Alice, "whether you can make words mean so many things."

"The question is," said Humpty Dumpty, "which is to be master—that's all."

"What's that dish for?"

"It's meant for plum-cake," said Alice.

"We'd better take it with us," the Knight said. "It'll come in handy if we find any plum-cake."

—Generation Terrorist (n.d.)

1 Introduction

The term theoretical lens is a relatively new addition to the vocabulary researchers apply to the processes of accumulating knowledge. However, this term has begun to appear in academic writing with increasing frequency—most especially in the information systems (IS) discipline (see Table 1). A recent search of ABI Informs listed 2,590 peer reviewed papers that explicitly included the phrase "theoretical lens" (search performed on 21 February, 2018). When decomposed by journal title, six of the 13 journals with 30 or more discreet usages of the term clearly reside in the IS domain (see Table 2). These IS publications account for 237 papers or approximately 10 percent of all references to the term in the academic research literature¹.

Decade	Number of publications that use the term theoretical lens	
1970-1980	0	
1980-1990	0	
1990-2000	71	
2000-2010	693	
2010-present	1,826	
Total	2,590	

Despite its growing prevalence in the literature, the term theoretical lens is not a major element of the prevalent conceptualization of the philosophy of science, nor is it part of the standard approach to the scientific method². For example, it does not appear in the philosophical and applied views of the nature of science and scientific research presented by Popper (1962), Diesing (1991), or Mohr (1982). Nevertheless, it has rapidly gained popularity in social science, business research, and, in particular, IS research (e.g., see Table 2). As such, we need to ask how exactly the theoretical lens concept fits with traditional approaches to accumulating new knowledge through the scientific method.

In this paper, we search for or infer a common meaning (or range of meanings) for the term by examining its actual use in the context of published IS research. Since many scholars have used the term and its use has continued to grow, we contend that these actors must perceive the underlying concept to have value or at least do no harm. However, unlike other terms in the research vocabulary, we found no formal statement that clarifies its meaning or appropriate use. Thus, it seems worthwhile to investigate and to reflect on whether it makes a significant contribution to explaining the underlying domain of study.

¹ In ABI Informs, Romer, Basu, Selowsky, and Srinivasan (1992, p. 63) referred to the term the earliest. In the IS discipline, Ginsberg and Venkatraman (1995) did.

² Given the number of references to this term, we could not comprehensively examine its use; however, we could find no paper (as at April, 2018) that has distinctly and clearly defined it.

	Publication	Citations found (non- IS)	Citations found (IS)
1	Accounting, Auditing & Accountability Journal	70	
2	European Journal of Information Systems		59
3	Journal of Business Ethics	59	
4	International Journal of Operations & Production Management	43	
5	Information Technology & People		40
6	Journal of the Association for Information Systems		39
7	Journal of Supply Chain Management	38	
8	Journal of International Business Studies	37	
9	Journal of Information Technology		35
10	Information Systems Research		33
11	Information Systems Frontiers		31
12	Supply Chain Management	31	
13	Voluntas	30	
	Subtotal	308	237
	Grand total	54	5

Table 2. Appearances of the Term Theoretical Lens by Journal Title in ABI Informs (Search February 21, 2018)
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In addition to considering the nature of the term theoretical lens inductively by looking for generalizations based on patterns of its actual use, we also consider how the concept fits in the traditional natural science ideas of theory testing and theory building. Such an approach emphasizes the growth of knowledge by identifying relevant entities, proposing relationships among them, and representing these in theoretical testable statements. This is followed by predicting empirical results assuming the statements are true, observing the results, contrasting findings to predictions, and updating the statements where necessary (Popper 1962; Weber, 2012). Over time such a research cycle can be expected to produce knowledge showing its level of support and providing nuanced interpretation of contingencies, boundaries, and exceptions.

It is outside the scope of this paper to judge whether the underlying studies are "good" or "bad". A team of reviewers and editors agreed that each study had sufficient quality and made sufficient contributions to merit its publication. However, use of the term may contribute to several problems: 1) it may obfuscate some aspects of the research even while clarifying others, 2) it may have a positive effect on a particular research study but an unintended negative effect on the discipline more generally, or 3) researchers may have selected it without much reflection, and, thus, it may represent a convenient word choice rather than an important study element.

In this paper, we focus specifically on the IS domain because 1) the term appears often in IS journals, 2) IS journals—particularly those in the AIS Senior Scholars' basket of eight—emphasize work that includes a theoretical basis, and 3) as a relatively young discipline that arose alongside the development of and boom in computing, the IS discipline has a particular interest in developing new knowledge and a relatively clear history in and opportunity to experiment with and innovate new research approaches. It is outside the scope of this paper to consider whether other disciplines have used the theoretical lens concept differently.

2 Background

2.1 What is a Lens?

A lens refers to a physical or conceptual mechanism through which phenomena "come into focus". More broadly, a lens refers to something we "look through" to perceive a domain from a particular viewpoint. A lens is selected, shaped, colored, or otherwise designed to highlight a particular aspect of the viewed terrain or to produce a desired effect. For example, vision or reading glasses compensate for flaws in human eyes so that the user can see more clearly. Alternatively, it can correspond to a mapping that

transforms an exact image (e.g., a photograph) into a representation that highlights salient aspects and minimizes distracting ones (e.g., a map of trails). Such highlighting and minimizing can follow as many different "algorithms" as there are imaginable purposes for the transformed perspective.

It stands to reason that scholars might use the lens concept in the latter sense analogously to its use as a mapping device, to highlight particular aspects of the domain while downplaying or even ignoring others. As in cartography where there are many ways to structure maps, one can use different lenses in different ways to highlight varied elements of a domain. Used in this fashion, one can infer three elements at play:

- The lens itself, which serves as a transformation agent (e.g., a political map that indicates political lines of demarcation between states or countries and eliminates other details such as mountains and rivers or a particular theory emphasizes certain aspects of phenomena while downplaying others)
- A target or domain of interest, which serves as the transformation recipient (e.g., a particular geographic region or a research domain such as IT adoption, system development, or health IT), and
- An observer who looks at the space or domain with a particular purpose (e.g., to plan or understand the relationships among constructs to predict the outcomes from various possible IT interventions).

2.2 What do We Mean by Theory?

Before examining the relationship between lenses and theory, we must specify what we mean by theory. Scholars have used the term in a wide range of ways with many varied definitions in the scientific method tradition. Gregor (2006), for example, references Doty and Glick (1994) for minimally defining theory as statements that: "meet three primary criteria: 1) constructs must be identified, 2) relationships among these constructs must be specified, and 3) these relationships must be falsifiable (that is, able to be tested)" (p. 615). Gregor goes on to describe five types of theory that each focus on a particular goal: 1) analysis/description, 2) explanation, 3) prediction, 4) prediction and explanation, and 5) design/action. She also succinctly summarizes an alternative view of theory categorization as follows:

Markus and Robey (1988) also distinguished theory partly in structural terms, considering (1) the nature of the causal agency (technological, organizational or emergent); (2) the logical structure (whether variance or process theory); and (3) the level of analysis. The first dimension defines the adoption of a particular theoretical stance, rather than a meta-theoretical dimension. The third dimension of level of analysis is related to the degree of generality of a theory. As such, it is a possible candidate for classifying theory, potentially giving a two-dimensional classificatory schema. (p. 621)

In this study, we use the term theory in the minimal sense that Doty and Glick (1994) describe as a common denominator but acknowledge that one can apply the term in multiple alternate ways for varied purposes. We see theory as having an important role within a cycle of scientific method where it states general relationships between entities which can generate predictions of what will be found in the empirical world. These predictions can be tested by comparing them to actual observations. Where predictions are fulfilled, the theoretical statements gain support; where some of the predictions are fulfilled they gain partial support and when the predictions are not fulfilled they raise a variety of possibilities, including that the theoretical statements are not helpful, true, or valid or that some additional explanations, contingencies, or understandings are needed (see, e.g., Popper, 1962; Lakatos, 1970). This is, of course, a simplified version of how knowledge accumulation occurs in practice as various theoretical formulations may compete with one another, become overshadowed and re-emerge, and/or succumb (or elevate) with the availability of more accurate measurement instruments (Feyerabend, 2010; Hawking, 2017).

One also needs to distinguish theory from metatheory (e.g., Niederman & March, forthcoming). In our view, metatheory pertains to structured approaches to different types of theory. For example, the most commonly used metatheory in the IS discipline has the name "variance theory" (Mohr, 1982), which, following Weber (2012), carefully defines a set of constructs and examines how levels of an independent variable affect the level of a dependent variable. In more complex forms, this style of theory can lead to complex nomological networks of constructs. It has the strong tactical advantage of being quite highly refined in methodology and approaches for evaluation. It tends to have difficulties 1) handling change over time; 2) handling complex relationships, such as direction of influence; and 3) applying to the complex processes that often characterize IS phenomena. One type of metatheory is what Mohr (1982) has termed

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2.3 How Does the Lens Concept Relate to Theory?

As we noted in Section 2.1, the term lens implies three elements: the lens or transforming device itself, the observation target, and the observer. The term theory could relate to lens in terms of:

- The lens or transforming device itself (in other words, a theory is the mechanism through which 1) an observer examines aspects of the targeted object);
- The observer who has a theory in mind to test by observing the target much as a plumber will 2) have a theory regarding a leaking pipe and add a dye to the fluid running through the pipe (as a kind of lens) to find the spot of the leak (e.g., the dye acts as a lens by changing the color of the water and, thus, highlights the leak location);
- The observation target without a particular theory in mind to identify the components of the 3) target, organize into categories attributes of the target, and propose the nature of relationships among these components and/or attributes.
- The process of theorizing such that observers may consider their own preconceptions, one or 4) more sources of "lens" or filtering, and the various effects and possible theories they could derive in the domain.

Thus, relative to these logical ways to use a lens, the term theoretical lens does not necessitate that the lens itself is a theory (though many readers would obviously and likely reasonably understand the term in that way); rather, it necessitates that the procedure of using a lens (regardless of whether it includes theory or not) contributes in one of several ways to theorizing. One can conceivably use something other than a theory to transform unorganized data into a theory (a sort of "theory-creating lens") or in reverse to decompose empirical data as organized in conformance with a theory for reorientation into a new and different pattern. For example, Tan, Pan, Lu, and Huang (2015) use a taxonomy of "IS capabilities to construct a theoretical lens that serves as 'a complicated sensing device to register a complicated set of events' (Weick, 2007, p. 16)" (p. 252). In contrast, Rajagopalan and Spreitzer (1997, p. 49) "develop a framework that represents a promising beginning toward building a theory of strategic change" by using "the perspective of three theoretical lenses: the rational, learning, and cognitive lenses".

These approaches to using a theoretical lens as a transformative or filtering device allow one to illuminate relationships that a kind of information overload that comes from too many undifferentiated details might otherwise mask. However, its use also raises the scepter of unintended consequences and potential distortions of meaning in undesired ways if not approached with some care. Such unintended consequences may manifest themselves not via any observable flaw in any particular study but via the accumulation of material that collectively harms a research discipline because the theoretical lens filters out potentially relevant aspects of a phenomenon. For example, using a strictly economic view of IS phenomena may filter out aspects related to organizational power and professional development.

Even before looking at how researchers actually use a theoretical lens in practice, we can anticipate several risks based on the logical ways they might use one. By considering such possible risks, we can scan the literature for signs of them while examining the particular ways researchers implement the concept.

The first risk pertains to an author failing to explicitly detail the way in which they use the term. This means the reader must sort through the author's possible implications and intentions. In such a case, the reader may not clearly see how the author uses the theoretical lens, what specifically comprises it, or how the author conduct the transformation. We contend that, if scholars uniformly apply the term theoretical lens, readers could learn inductively from many examples what the term means in practice. On the other hand, if scholars vary in how they use the term in separate instances, readers will experience greater difficulty in assessing and interpreting a study's contribution. For example, if an author uses a specific theory as a theoretical lens to develop a study but omits key elements of the theory, it may hinder readers' ability to understand how the theory contributes (or doesn't) to understanding of the phenomenon.

The second risk pertains to an author's potentially obscuring the theory-building and theory-testing processes used. As Shaw (2017) points out, hypothesizing after one knows the results, which he calls *HARKing*, involves both ethical and pragmatic issues. While theory building based on searching among results may help one to create theory, it may be deceptive or problematic if one masks it as theory testing.

The third risk pertains to an author's shifting attention from the domain of interest to the theoretical lens itself. This may create an impression that a study explains domain phenomena even though it actually shows that the theory holds in the IS domain. For example, if one uses transaction cost and/or agency theory as a theoretical lens, one might focus on economic considerations and find results that statistically concur with predictions but that do not account for cultural or environmental contingencies. With that said, using transaction cost and/or agency theory in such a case does not represent an incorrect choice; rather, these theories may only describe economic behavior in the IS environment rather than fully describing the behavior and dynamics that exist in such an environment. Such would be apparent, for example, in cultures where economic behavior reflects values other than profit maximization, such as employment maximization (see, e.g., Newman & Zhao, 2008). Using transaction cost and/or agency theory as a theoretical lens in such environments would likely lead to false or at least incomplete conclusions by constraining the phenomena to which the researcher attends.

The fourth risk involves an author's invoking a particular theory as a lens without using it in any significant way in a study. Using a theoretical lens that supports neither theory testing nor theory building may suggest that the author has simply transferred theory from one domain to another without significantly examining the appropriateness of doing so or the degree to which such a transfer helps either domain.

2.4 The Theoretical Lens Relative to Scientific Method

Popper (1962) describes the process of accumulating new scientific knowledge as a cycle of theorizing (constructing testable statements about relationships among entities in a domain), making predictions, assuming them to be true, observing actual events and results as they occur in the empirical world, and reflecting on the relationships between predictions and outcomes (i.e., whether the outcomes support, refute, or partially both support and refute the predictions) as they pertain to the posed theory. As a result researchers can maintain, discard, or update theories and thus contribute to knowledge within a discipline. Of course, such a description overly simplifies the process since each step has many wrinkles and subtleties. However, it does not explain how the role of a theoretical lens fits into this process.

Furthermore, it remains unclear how one can use a theoretical lens to either build or test theory. If, for example, one uses structuration theory (Giddens, 1984) as a lens, which essentially means that one uses the interplay of agency and structures as inputs to specific actions in a domain, then the observation that that one can structure data in following this categorization only shows that one can in fact use the theory as a lens. It does not support structuration theory as either "true" or a true representation of the domain because it served as the mechanism for transformation; rather, it suggests a tautology: a bit like saying that using a trail-oriented map will show the trails in a geographic area. It can be tested as to whether or not it shows that the lens produces the intended effect but not that the effect meaningfully explains anything other than the selected aspect of the domain. Optimistically, it may also suggest that trails do exist in the area (or do not if one argues for funding to build them), which can have an alternative sort of value. Correspondingly, using structuration theory as a lens may examine a phenomenon as resulting from the enactment of norms and values in agent initiated actions, but it does not show that this perspective covers the range of elements relevant to that phenomenon or that other perspectives might not provide better predictions or explanations of what is observed. Most importantly, it does not test structuration theory per se: it assumes it to be true (or at least useful) and that, if conscientiously applied will create the pre-intended results. It may, however, generate new theory if 1) the modified view of the domain shows marked differences from the source theory, 2) one reveals additional aspects of the domain by focusing on specific characteristics, or 3) one uncovers new entities or relationships in the domain.

Of course, one must recognize that building and testing theory does not represent the single goal of all research work (Wiesche, Jurisch, Yetton, & Krcmar, 2017). While establishing theory has value in creating generalizations that one may apply in specific instances, simply better understanding a research domain also potentially has significant value. For example, describing the intricacies of implementing an ERP system differs from a set of theoretical statements that predict particular outcomes from technical, individual, or organizational inputs. Nevertheless, studies that describe ERP system implementation may provide significant value for those who need to create such systems. Similarly, design science research

(DSR) does not necessarily originate with theory but often focuses on developing artifacts that solve problems.

Thus, this study rests on the premise that the term theoretical lens has gained widespread use without a clear sense of the range of meanings it can take on or how it fits with the traditional view of scientific research. As such, we consider the following research questions (RQ):

- **RQ1**: What, if any, systemic differences exist in how IS researchers apply the term theoretical lens as presented in their published research?
- **RQ2**: Based on these uses, how can we view the idea of a theoretical lens relative to the theorizetest research cycle in the traditional scientific method?

We discuss RQ1 relative to several dimensions of potential differentiations in usage in Section 4. We discuss RQ2 in Section 5.

3 Method

In order to examine these questions, we performed an extensive literature review. This approach represents an appropriate method since the theoretical lens concept is an artifact of the research literature, resides in this literature, and will likely see use in the future in this arena. This method follows an inductive approach in which one extracts key information from each paper and arranges it into emergent patterns. Toward this end, we follow a slightly modified version of the seven-step process that Rowe (2014) prescribes and Table 3 summarizes. We modified the process to take advantage of data in an unpublished pilot study. Specifically, we examined the data for accuracy and, on the few occasions when the study had not reported key aspects, added details to the accumulated coded material. With the exception of updating this previously collected data, the current study replicates as exactly as possible the method that Rowe (2014) proposes.

Table 3. Seven-step Literature-review Process (Following Rowe, 2014)

	Step
1.	Select a research question.
2.	Select bibliographic or paper databases, websites, and other sources.
3.	Choose search terms.
4.	Apply practical screening criteria (e.g., a study's language, funding, and setting).
5.	Apply methodological screening criteria by examining each study to ensure its appropriate use of the theoretical lens concept.
6.	Do the review: reliable and valid reviews involve using a standardized form for abstracting data from papers, training reviewers (if more than one) to do the abstraction, monitoring the quality of the review, and pilot testing the process.
7.	Synthesize the results. One may descriptively synthesize literature review results. In a descriptive synthesis, reviewers interpret a review's findings based on their experience and the quality and content of the available literature.

First, we selected the research questions as we describe above. We did so primarily based on finding nothing in the literature on research methods that presents recommended approaches to, definitions of, and cases that show usage for the theoretical lens concept in detail. We see this absence of discussion as a significant gap in our IS discipline's research infrastructure. We believe it is critical that the concepts, tools, and understandings are as clearly laid out as possible.

Second, we performed a search in ABI Informs, which indexes most of the AIS Senior Scholars' basket of eight journals, many other prominent IS journals, and journals from other disciplines.

Third, we chose "theoretical lens" as the search term. We applied this term across all possible usage locations in the papers in the database. We chose this term because it represents our exact focus in this study. In this paper, we do not focus on contrasting how research has used this term with other terms that may resemble it, such as theoretical framework; rather, we focus on determining what scholars intend when they use the term itself.

Fourth, the initial search in ABI Informs revealed that more than 2,000 papers across numerous academic disciplines have used the term theoretical lens (see Table 1). By examining the uncovered papers by

publication, we found a disproportionate number in the IS domain. We selected the journal with the largest number of papers that use the term, the *European Journal of IS*, to investigate as an initial framework-building exercise. As a member of the Senior Scholars' basket of eight, the journal publishes high–quality research and has a positive standing in the IS academic community. However, focusing on a single journal presents a trade-off: the results may contain a systematic judgment bias from the journal; however, they are also less likely to include variance resulting from divergent journal policies.

Fifth, we carefully read each paper (59 in total) and found no reason to exclude any. Note, however, that some papers in this sample—specifically, editorials—refer to theoretical lens as used in prior research or as a conceptual entity without actually using it in a research study. We left these papers in the sample because they also may show how scholars understand the term in a research context. However, we excluded one paper from our analysis because it included the term theoretical lens only in the title of a paper it referenced; as such, some tables in this paper that report on our findings pertain only to the other 58 papers in the sample.

Sixth, we recorded our observations in a spreadsheet: we represented each paper in a row and each "attribute" of interest in a column. Note that we made a special effort to identify and extract clear definitions of the term theoretical lens as it appeared in each paper; however, we observed no definitions for the term. In all cases, authors applied the term as if its meaning were clear. To be fair, the authors did not obscurely use the term given the context in which they did so, but these contexts varied significantly from paper to paper. We derived attributes of each paper from reading each one. In most cases, each paper had clear values for each attribute that we could directly observe. For the most part, for example, we could record and count the number of theories, frameworks, methods, or other conceptualizations that a paper used as sources for the lenses it referred to in a straightforward manner. Attributes of interest included the part of the paper that referenced the term theoretical lens, number of conceptualizations used for the lens, and the supporting references, if specified in the papers, for these lenses.

Finally, seventh, we analyzed the range of findings for each dimension. We further considered the overall significance of the range of findings across the dimensions.

4 Findings

In order to examine systematic differences in how IS researchers apply the term theoretical lens, we examined its use in several dimensions: 1) where the term appears in each paper, 2) how many distinct conceptualizations of theoretical lens each paper uses, 3) the research methods the paper uses, 4) the IS domain the paper considers, and 5) which underlying conceptualizations the paper actually uses. As we note above, these dimensions emerged from our reading the individual papers.

4.1 Where did the Term Theoretical Lens Appear in Each Paper?

The first dimension we investigated pertains to where each paper used the term theoretical lens (see Table 4). We found that, as a whole, the papers referenced the term across all their sections but somewhat more frequently at the beginning rather than at the end (see Table 3). We handled papers that used the term in multiple sections as two distinct categories of use: 1) those papers with early and late references and 2) those papers with two late references³.

It does make sense that authors would use a theoretical lens to introduce and define their study or to position it in the literature. Oddly, few authors returned to the concept later in their paper or commented on it in their concluding remarks. They rarely reflected on the quality of the theoretical lens per se or what it enabled or any limits it imposed. It also makes sense that authors would use the theoretical lens concept in a methodology section. In the case of grounded theory, the theoretical lens idea may appear after authors have collected data and seek some outside theory that resembles their findings. In other cases, authors could also understandably introduce the theoretical lens concept as a way to explain or justify the particular categories into which they have sorted data as part of the analysis process in grounded theory studies.

³ Such combinations do not represent all possible combinations; rather, they represent only those combinations that we observed. Additional investigations could conceivably reveal additional combinations.

Location	Table 4. Location of References to "Theoretical Lens" References	Frequency
Beginning		·······································
DeginingBattleson, West, Kim, Ramesh, and Robinson (2016), Weiner, Remus, Heumann, & Mähring (2015), Tsohou, Karyda, Kokolakis, & Kiountouzis (2015), D'arcy & Herath (2011), Datta & Chatterjee (2008), Light (2007), Cousins, Robey, & Zigurs (2007), Kumar & Stylianboiu (2014), Vaast & 		11
Introduction	Hsu, Lin, & Wang (2015), Tyworth (2014), Abraham, Boudreau, Junglas, & Watson (2013), Buth (2012), Krell, Matook, & Bohde (2011), Chan, Hackney	
Abstract	Chen & Sharma (2015), Battacherjee & Park (2014), Doolin & Mcleod (2012)	3
Introduction, conclusion	Park, Keil, Kim, & Bock (2012), Onita & Dhaliwal (2011),	2
Literature background	Duan, Grover, & Balakrishnan (2009)	1
Research question	Anderson, Vance, Kirwan, Eargle, & Jenkins (2016)	1
·	Subtotal	28
Middle		
Methodology	Schlichter & Rose (2013), Berente, Gal, & Yoo (2010), Arnott (2004), Huang, Pan, & Ouyang (2014)	4
Body of the work	Prasopoulou (2017), Rowe (2014), Birks, Fernandez, Levina, & Nasirin (2013), Lyytinen & Newman (2008) (note all were essays)	
Analysis	Parks, Xu, Chu, & Lowry (2017), Madon (2017)	2
Data analysis	Koch, Gonzalez, & Leidner (2012), Van Akkeren & Rowlands (2007)	2
Results	Paré, Bourdeau, Marsan, Nach, & Shuraida (2008)	1
	Subtotal	13
End		
Discussion	Liu, Li, Goncalves, Kostakos, & Xiao (2016), Cho, Mathiassen, & Nilsson, (2008), Phang, Kankanhalli, Ramakrishnan, & Raman (2010), Boland & Lyttinen (2017)	4
Conclusion	Zhang, Luo, Akkaladevi, & Ziegelmayer (2009), Bansal, Zahedi, & Gefen (2015)	2
References	Jensen & Aanestad (2007)	1
	Subtotal	7
Multiple (early and late)		
Introduction and implications	Shih, Lai, & Cheng (2017)	1
Introduction, body of paper	Lyytinen & Damsgaard (2011)	1
Introduction, lit review	Hsu (2009)	1
Introduction, literature review, conclusion	Hekkala & Urquhart (2013)	1
Introduction/background	Lange, Mendling, & Recker (2016)	1
Introduction/part of framework	Love & Hirschheim (2017)	1

Table 4. Location of References to "Theoretical Lens"

References	Frequency
Ravishankar, Pan, & Myers (2013)	1
Subtotal	7
Cao, Mohan, Xu, & Ramesh (2009)	1
Subtotal	1
No distinct references	2
Subtotal	2
Grand total	58
	Ravishankar, Pan, & Myers (2013) Subtotal Cao, Mohan, Xu, & Ramesh (2009) Subtotal No distinct references Subtotal

4.2 How Many Theories, Frameworks, Methods, or Other Conceptualizations did Authors Use for the Theoretical Lens?

We subdivided the papers that referenced theoretical lens by the number of different conceptualizations they used (see Table 5). We do so because we believe that studies that use a single conceptualization qualitatively differ from those that use two or more. Studies that use two or more conceptualizations would likely either compare/contrast them or they would blend the conceptualizations such that they use pieces from each one to formulate a bricolage that pertains to the IS domain. In contrast, studies that use a single conceptualization would likely focus on shaping the study content to suggest a match between theory constituents and domain elements. We also observed several papers that referenced the term theoretical lens without specifying any particular underlying conceptualization. We grouped these as having "zero" sources relative to the other papers. These papers were all essay or editorial papers and referenced the term theoretical lens in to explain how a paper in a special issue used its theoretical lens. In no cases did the authors digress to explain or define what they meant by the term theoretical lens specifically.

Table 5. Number of Theories, Frameworks, Methods, or Other Conceptualizations Referred to as Theoretical Lens by Paper

Number of conceptualizations	References	Frequency
Two or more	Chen & Sharma, (2015), Duan et al. (2009), Paré et al. (2008), Datta & Chatterjee (2008), Parks et al. (2017), Hsu et al. (2015), Tsohou et al. (2015), Koch et al. (2012), Chan et al. (2011), Lyytinen & Damsgaard (2011)	10
One exactly	 Shih et al. (2017), Arnott (2004), Prasopoulou (2017), Boland & Lyytinen (2017), Liu et al. (2016), Lange et al. (2016), Anderson et al. (2016), Battleson et al. (2016), Bansal et al. (2015), Wiener et al. (2015), Huang et al. (2014), Bhattacherjee & Park, (2014), Gregory & Keil (2014), Kumar & Stylianou (2014), Tyworth (2014), Schlichter & Rose (2013), Ravishankar et al. (2013), Hekkala & Urquhart, (2013), Abraham et al. (2013), Vaast & Walsham (2013), Park et al. (2012), Doolin & Mcleod, (2012), Ruth (2012), Mola & Carugati (2012), D'arcy & Herath (2011), Krell et al. (2011), Lewis et al. (2011), Onita & Dhaliwal, (2011), Holmström & Sawyer (2010), Rodón & Sesé (2010), Phang et al. (2010), Berente et al. (2010), Cao et al. (2009), Zhang et al. (2009), Hsu, (2009), Cho et al. (2008), Cho & Mathiassen, (2007), Van Akkeren & Rowlands, (2007), Jensen & Aanestad, (2007), Light (2007), Cousins et al. (2007), Madon (2005), Lin & Silva (2005) 	43
Zero	Love & Hirschheim (2017), Warkentin, Charles-Pauvers, & Chau (2015), Rowe (2014), Birks et al. (2013), Lyytinen & Newman (2008), Doherty & King (2005)	6
	Total	59

Clearly, papers that used a single conceptualization quantitatively differed from those that use multiple conceptualizations given that more than 80 percent of the papers used only one conceptualization.

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Further, based on reading the papers, we also found a qualitative difference. In general, when a paper used multiple lenses, the authors made a greater effort to either contrast the quality of theory to predict results in the IS domain or to weave pieces from multiple theories to create a sort of emergent generally implicit theory tailored to the IS environment. Not surprisingly, the studies that used a single theoretical lens did not do either.

4.3 What Research Methods did Papers that Referenced a Theoretical Lens Use?

It seems reasonable to consider that a theoretical lens concept would be a by-product of a particular type of methodology (see Table 6). For example, researchers might expect that experiments would specify a theoretical lens to explain why they tested a subset of constructs while holding (or ignoring) a different subset as constant. Similarly, in designing a survey, the theoretical lens that a researcher chooses might explain why the researcher selected particular constructs, levels of analysis, or subsets of a larger population. For more qualitative and interpretive research, if researchers explicitly state the theoretical lens they adopted, they provide more information to the reader about how they view the domain and their approach to investigating the questions of interest. The distinction is at best a subtle one between using a method as a 'theoretical lens' versus just applying the method to gather and analyze their data.

Method	References	Frequency
Case	Chan et al. (2011), Van Akkeren & Rowlands, (2007), Arnott, (2004), Huang et al., (2014), Gregory & Keil (2014), Doolin & Mcleod (2012), Mola & Carugati (2012), Lewis et al. (2011), Hs, (2009), Jensen & Aanestad (2007), Madon (2005), Lin & Silva (2005), Cho & Mathiassen (2007)	13
Case—longitudinal	Onita & Dhaliwa (2011), Schlichter & Rose (2013)	2
Case multiple	Battleson et al. (2016), Cao et al. (2009), Cousins et al. (2007), Tyworth (2014)	4
Case study, interpretive	Holmström & Sawyer (2010), Cho et al. (2008), Koch et al. (2012), Light (2007)	4
case study, longitudinal	Rodón & Sesé (2010)	1
	Case subtotal	24
Essay/editorial	Love & Hirschheim (2017), Rowe (2014), Birks et al. (2013), D'arcy & Herath (2011), Lyytinen & Damsgaard (2011), Lyytinen & Newman (2008), Datta & Chatterjee (2008), Doherty & King (2005), Warkentin (2015)	9
Essay and fictionalized discussion	Boland & Lyytinen, (2017)	1
Essay/memoir	Prasopoulou (2017)	1
	Essay subtotal	11
Survey	Shih et al. (2017), Lange et al. (2016), Wiener et al. (2015), Chen & Sharma, (2015), Bhattacherjee & Park (2014), Park et al. (2012)	6
	Survey subtotal	6
Grounded theory	Parks et al. (2017), Abraham et al. (2013)	2
Grounded theory case	Hekkala & Urguhart (2013), Berente et al. (2010)	2
Grounded theory/lit review	Vaast & Walsham (2013), Kumar & Stylianou (2014)	2
	Grounded theory subtotal	6
Archival—Internet	Phang et al. (2010), Ruth (2012),	2
Archival/financial study	Duan et al (2009)	1
	Archival subtotal	3

Table 6. Methods Used in the Analyzed Studies

Method	References	Frequency
Experiment	Bansal et al. (2015), Zhang et al. (2009)	2
	Experiment subtotal	2
Action research	Tsohou et al (2015)	1
Co-word analysis	Liu et al. (2016)	1
Ethnography	Ravishankar et al. (2013)	1
Eye-tracking, observations	Anderson et al. (2016)	1
Focus group study	Krell et al. (2011)	1
Interpretive study based on interviews	Hsu et al. (2015)	1
Literature review	Paré et al. (2008)	1
	Miscellaneous methods subtotal	7
	Grand total	59

The data show that researchers used theoretical lenses that spanned various research methodologies but not in equal numbers (see Table 5). Unsurprisingly, we found many case studies and essays that referenced a theoretical lens possibly because *EJIS* tends to publish a high percentage of case study papers. Further, we found a substantial (though infrequent) number of experiment, survey, and archival data studies that referenced a theoretical lens. Somewhat surprisingly, we found only one action research and not a single design science paper that referenced a theoretical lens. This finding suggests that scholars that use these methods may not concern themselves as much with traditional views of theory usage, though we believe that both methods (i.e., action research and DSR) can effectively help researchers to build theory—especially if 1) they can recommend the methods that they use to build artifacts for other types of artifact building and/or 2) they can propose principles for more effective design in a particular category of artifacts (e.g. data analytic algorithms, security features, or IS personnel policies/practices) to test their generality in or across such categories (Niederman & March, 2012).

We found no evidence that the number of sources for lens content or their placement in a study depended on the method that researchers used. We found, however, that grounded theory and archival searches tended toward theory building rather than theory testing and, therefore, that authors were more likely to introduce the theoretical lens in the latter part of the process to organize findings or compare findings to the extant literature.

4.4 Which IS Topics did Studies that Used a Theoretical Lens Address?

It stands to reason that some IS topics might be more amenable than others to using a theoretical lens (see Table 7). For example, researchers might draw from a large number of extant theories to use as a theoretical lens for behavioral topics, such as theories from reference disciplines including sociology, psychology, and communications, whereas they would be less likely to use the theoretical lens concept when studying technical topics since studies on technical topics often focus more on presenting descriptive findings from a particular domain. Further, the theoretical lens term would likely be used equally with either new or older topics. Newer topics may lend themselves to the search for theory or models to transfer to the IS domain from outside as a way of imposing an initial order. Older topics may lend themselves to contrarian views represented by varying the selected lens from any that have become standard or normal for use in the domain.

Somewhat unexpectedly, papers that considered relatively more technical topics, such as information system development and ERP implementation, used the theoretical lens concept equally as often as they used it with less technical topics such as privacy and social networks (see Table 6). Similarly, we found no pattern between topic age and use of the theoretical lens concept, and, among the topics that papers used the concept with more frequently, we found that the papers had a generally spread out publication date (e.g., security papers that used the concept had a publication date that ranged from 2009 to 2017). We expect that the frequency with which papers that focused on various types used the theoretical lens

concept more reflects the popularity of topics in general rather than some topics' lending themselves more or less to the concept's use.

IS domain/topic	References	Frequency
	Shih et al. (2017), Anderson et al. (2016), Tsohou et al (2015), D'arcy	6
Security	& Herath (2011), Zhang et al. (2009), Hsu (2009)	0
Interorganizational system	Hekkala & Urquhart, (2013), Hsu et al. (2015), Wiener et al. (2015), Lyytinen & Damsgaard (2011), Rodón & Sesé (2010)	5
Discipline reflection	Liu et al. (2016), Rowe (2014), Doherty & King (2005), Birks et al. (2013)	4
Development	Boland & Lyytinen, (2017), Doolin & Mcleod (2012), Onita & Dhaliwal (2011)	
E-commerce	Park,et al. (2012), Phang et al. (2010), Datta & Chatterjee (2008)	3
Health IS	Abraham et al. (2013), Cho & Mathiassen, (2007), Van Akkeren & Rowlands, (2007)	3
Outsourcing	Lewis et al. (2011), Duan et al (2009), Ravishankar et al. (2013)	3
Social networks	Chen & Sharma, (2015), Vaast & Walsham (2013), Koch et al. (2012)	3
Agile development	Cao et al. (2009), Cho et al. (2008)	2
Cloud	Battleson et al. (2016), Bhattacherjee & Park, (2014)	2
IS foundational theory	Lyytinen & Newman (2008), Paré et al. (2008)	2
Privacy	Bansal et al. (2015), Parks et al. (2017)	2
Cross culture	Warkentin (2015)	1
Crowdsourcing	Love & Hirschheim (2017)	1
DSS	Arnott (2004)	1
E-Government	Chan et al. (2011)	1
Enterprise architecture management	Lange,et al. (2016)	1
ERP	Berente et al. (2010)	1
ERP, health care	Jensen & Aanestad (2007)	1
Flexibility	Kumar & Stylianou (2014)	1
Implementation	Krell et al. (2011)	1
IS department structure	Tyworth (2014)	1
IS project management	Gregory & Keil (2014)	1
IT sourcing	Mola & Carugati (2012)	1
Online community	Light (2007)	1
Organizational systems/agility	Huang et al. (2014)	1
Project implementation	Lin & Silva (2005)	1
Requirements engineering	Holmström & Sawyer (2010)	1
System implementation	Schlichter & Rose (2013)	1
Teams/groups	Cousins et al. (2007)	1
Telecenters in developing countries, global IS	Madon (2005)	1
Wearables/Internet of Things	Prasopoulou (2017)	1
Web commerce	Ruth (2012)	1
	Total	59

Table 7. Frequency of IS Topics in the Analyzed Studies

4.5 Which Theories, Frameworks, Methods or Other Conceptualizations did Papers Use as Sources for their Theoretical Lenses?

From even a quick initial glance (see Table A1 in the Appendix), one can see that the number of sources the papers referenced as a theoretical lens almost matched the total number of papers. The papers referenced such a diverse range of sources as to represent a microcosm of content and approaches to behavioral science. Moreover, few of these conceptualizations recurred or showed the immediate prospect of coalescing around a smaller subset of sources.

We found the same theoretical lens in multiple papers only three times. First, two papers used structuration theory (or three if the category includes "adaptive structuration theory", which extends the original conceptualization). Second, two other papers used technological frames, another conceptualization that proposes a set of categories for analysis of IS phenomenon. Third, one paper used socio-technical theory and another used socio-materiality. Granted there are significant differences between the two, they seem related enough to point out that the paper used both. This large number of concepts used as theoretical lenses may reflect the breadth and richness of the IS discipline, but, alternatively, it may suggest that the discipline has no strong identity and grasps for agreement relative to both central tendency and boundaries.

4.5.1 Theoretical Lens Types

Overall, scholars formulated their theoretical lenses from a surprisingly wide array of conceptualizations, including many that are *not* "theory" (see Appendix 1) as Weber (2012), Gregor (2006), or Gregor and Jones (2007) define it. Following Weber's (2012) terminology, one would more accurately term some conceptualizations frameworks or models, such as lists of categories, taxonomies, or typologies, which do not in and of themselves constitute explanations or predictions (e.g., episodic change, management styles, and strategic contradiction) largely by not defining relationships among the categories and not framing specific propositions. In our sample, papers that tested theory did so only when they: 1) considered multiple theories as contenders for best fit with the data collected or 2) used multiple theories to accumulate selected constructs from each in order to cobble together a new model for testing. The latter generally described how well the constructs fit into the new model but did not justify why they left other constructs out. We observed no instance in which authors threw all constructs of multiple theories "into the mix" with the data collected used to determine which constructs to keep and which to abandon.

This type of conceptualization resembles the categories in a model or taxonomy, but, rather than comprising definitions and examples of each category, comprises a set of questions for researchers to use to find the values related to each question/category. Thus, this type of conceptualization resembles a general interview protocol or template. For example, in Orlikowski and Gash's (1991, 1994) technology frame approach, posing questions on a series of topics can elicit responses that shed light on a topical area. As a result, the selected lens involves examining the domain of interest in terms of how each category shows up in the data or, more actively, sorting the data based on these categories. This approach can serve as an effective way to examine the domain itself and consider, for example, social, technical, and communication aspects both singly and as they interrelate in terms of the specific way they manifest in that domain. For example, one may apply such a template to influences of the organizational context and technical details for an analytics project or for an embedded self-driving automobile. The nuanced differences between cases may illuminate how actions may produce alternative results in different environments while also illuminating the detailed relationships in a given domain. On the other hand, it may be difficult to use such a lens in the traditional scientific propose-test knowledge-creation model. In buying into the categorization scheme, the researcher accepts as given the initial categorization model rather than to test its completeness and the contribution of each component. On the positive side, one can see how the model provides an opportunity for comparison across technologies or domains by providing a common investigation framework, on the negative side it tends to assume the value of the framework which could elevate relatively inconsequential components and render invisible ones not included.

In at least one case (i.e., Kumar & Stylianou, 2014), authors used the theoretical lens concept to refer to a whole methodology for collecting, analyzing, and presenting data. Specifically, they referenced grounded theory as the theoretical lens. However, they did not clarify how grounded theory acts as a theoretical lens. These authors likely referenced grounded theory as their theoretical lens to explain that they viewed the theory not only as a method in the sense of procedural steps that one can apply in a study but also a

sort of paradigm and philosophical lens. From the way they used the theoretical lens concept in their paper, one can infer that they meant to invoke not only the steps but the "spirit" of theory building.

In other cases, authors conceptualized theoretical lens in an even broader and more general way, such as with the supply chain and power dependency approach (Lyytinen & Damsgaard, 2011), evolution (Arnott, 2004), post-colonial theory (Ravishanka et al., 2013), and information processing (Huang et al., 2014). In such cases, the theoretical lens seemed to say something about the general context of the study without focusing on particular theories or predictions. For example, one might be tempted to consider information processing as a sort of "metatheory" that can use in in principle to generate a more specific theory for the particular domain. We found no explicit evidence that papers used the term in this way.

Although, no logical reason exists for why the source content for a theoretical lens need be a "theory" in the in the strictest meaning of the term as we note above (see, e.g., Weber, 2012; Gregor, 2006; Gregor & Jones, 2007), one might expect some advantage in choosing a theory rather than a different sort of conceptualization as a theoretical lens source. However, we did not find a discernable pattern for whether a specific theory yielded "better" overall results relative to other conceptualizations. Logically, it is difficult, perhaps impossible, to "test" a theoretical lens that does not use a well-defined theory as a base unless the authors transformed the "implicit theory" of the original conceptualization into explicit statements for testing. For example, one could test Lewin's (1947, 1951) change model (unfreeze, change, refreeze) to verify that organizational change actually does go through these stages and/or whether strict and intentional adherence to the model produces more effective or efficient change results. By the same token, we would think that using such a conceptualization as a theoretical lens could result in theory building. A theoretical lens using this model could potentially indicate how different ways of unfreezing, change, or refreezing lead to better or worse results for the overall change based on inductive observations.

4.5.2 **Promising Theoretical Lens Sources**

Perhaps as a growing number of papers reference the theoretical lens construct over time, we will see patterns in the type of lenses studies use and the types of theories they examine emerge. We could envision, for example, Giddens' (1984) structuration theory becoming associated with relationships between individuals and groups as moderated, influenced, guided, or determined by technology. In contrast, we can envision agency, transaction, and institutional theories becoming allied with formal interactions, contracts, and economic arrangements. Scholars might expect each type of theoretical lens to produce orthogonal results relative to group-individual interactions. As such, scholars will need to integrate and explain such results, particularly when they contradict one another yet exist in parallel.

We found the fact that some papers used socio-technical theory and socio-materiality theory as theoretical lenses to be particularly encouraging as each focuses on the concurrent relationships among humans, technologies, and tasks. We find research that uses socio-technical and socio-materiality approaches illuminating in regard to developing an understanding of the complexities and relationships in an IS domain or relative to a particular system but are somewhat perplexed relative to the idea of how they may be used as a "theoretical lens". When scholars consider these approaches as theories, they may directly apply their definitions and relationships, such as notions of synergy, hierarchy, equifinality, and requisite variety, to a domain. Scholars may examine the domain in terms of phenomena that illustrate each characteristic. They may go further to show how such elements manifest in the domain, how one may simplify the domain if one considers it as an example of this sort of system, and, perhaps, show where elements in the domain do not concur with the definition for the theoretical lens source. In using the theoretical lens concept in this way, one may neither test nor build theory but rather transfer it into the domain of interest. In other words, one might say: "We accept the socio-technical perspective and will transform the domain according to that view by highlighting the elements consistent with that view and letting other elements remain hidden". With such a study, authors may count on readers to agree on the source's value or present arguments to persuade the reader as to the relevance, appropriateness, and potential value contained in or implied by the source. Thus, the source's initial and argued credibility will represent important factors for readers to evaluate the contribution that the research makes. Ironically, authors who poorly conceptualize a theoretical lens source may in principle provide great value by 1) illuminating its own inadequacy and allowing scholars to reshape and augment it in a positive way or 2) showing unusual but illuminating views of the domain that prove valuable despite the flaws in the source conceptualization. For example, authors could use an outdated and debunked theory from a reference discipline to illuminate phenomena in an IS domain even if research in its original domain demonstrates that it has various problems.

We felt some dismay and surprise in finding only one reference to the Delone and McLean success model (1992) and one to the Davis (1986)/Venkatesh and Davis (2000) technology acceptance model (TAM) among the theoretical lens sources. Further, we found no references to the Goodhue and Thompson (1995) task-technology fit model. We anticipate seeing researchers take advantage of such IS domain-specific theories and frameworks as a theoretical lens to view a wide range of IS-specific phenomena. On the other hand, considering the vast number of papers based on TAM, in particular, it is clear that the theoretical lens concept is not needed to further explore IS theory within the domain.

4.5.3 Lens Sources and Theory

When scholars import theory into the IS domain via using it a theoretical lens, they seldom do so to robustly test the underlying theory itself. One starting point for theory testing in IS would involve following Yin's (2003) case-selection technique in which one presumes that a particular theory from, for example, communications, economics, or psychology would *not* work in the IS domain and then tests to see if it in fact does. The technique supposes that the theory's interaction with technology and the array of contingencies that it introduces would likely render the domain too complex for more than the barest minimum of statistically significant percentage of instances. For example, we found as much with the unfolding model of turnover (Niederman, Sumner, & Maertz, 2007)—a strongly demonstrated theory in human resource management, that did not explain the observations in IT human resource management. Of course the opposite logic—that behavioral truths are universal and should apply in IS across all domains—also represents a worthy starting point for testing theory. Should results prove consistent with predictions, one adds support to the idea that the theory covers IS phenomena in its boundary. One would need to additionally show that the theory covers the full range of the domain's facets to satisfactorily support such an explanation. But one would seemingly not need to involve a theoretical lens to perform or enhance such testing.

In some cases, external theory may completely explain such intersection topics, but we think it more likely that the introduction of technology will introduce new contingencies. For example, we can imagine communication theories that "explain" virtual group behaviors but remain silent when it comes to situations in which one can manipulate technologies during the course of a meeting or workflow activity. Communication theories would not have much to say about the question of how the ability to manipulate virtual team applications affect outcomes, but IS managers or designers would have much interest in it. Theories that accurately predict communication behaviors may be appropriate and valuable in an IS context, but we need to guard against thinking that such theories explain the full range of IS concerns as this example illustrates.

We maintain that the reality of IS phenomena in practice is a complex of interactions between technological advances and human behavior and attitude. Technologies change people's behavior and people change technological features or invent new affordances to accommodate their needs. Neither can be left unaccounted for in realistic IS research. We contend that few external theories address this interdependence. Therefore, both the selection of the outside theory *and* the recognition of the incompleteness of this theory to explain the entire IS phenomenon become very important and should be examined as part of a research process.

5 Discussion

In this study, we examine the term theoretical lens as research papers actually use it. In doing so, we made several observations.

The term continues to grow in use: we see no reason to believe that researchers will less frequently use this term in the near future. Thus, it seems particularly timely to investigate how they use the term in practice.

The term has not been used consistently: although the meaning of the term is often reasonably straightforward to infer in particular studies, the fact that across many studies such inference would lead to varied interpretations suggests that collectively there is no single (or even defined set) of clear meanings. This lack of clarity interferes with the readers' ability to discern with clarity what the authors' intentions are in choosing to use the term.

The term is often used with implicit rather than explicit meaning: we found no evidence that any scholars have defined the term theoretical lens in any formal way. With that said, given the many ways in which papers used the term, we do not know whether any single definition would adequately cover them all. Still, in this paper, we inductively identify various ways that scholars have actually used the term to prove an initial explanation about what they mean when they use it.

The sources that the papers used for the theoretical lenses themselves varied widely and included both theory and non-theory conceptualizations: a vast array of different intellectual content has been used as a theoretical lens, including theory, metatheory, frameworks, models, and even methods. However, we do not know if a limit or boundary on what one can use as a source for a theoretical lens exists. One would assume that, if scholars used a particular conceptualization as a theoretical lens but it failed to produce an interesting enough vision of the domain (in terms of highlighting some and excluding other components), a journal would not likely publish it⁴.

Further, there is no evidence to conclude that using theory rather than some other conceptualization, changes the value of the underlying study or its results. Sources that the papers used as a theoretical lens varied from a very specific reference such as Weick's (1989) sensemaking to a broad body of knowledge such as social action in the sense of sociotechnical and socio-material views (Boland & Lyytinen, 2017). Thus we argue against the seeming fetish in information systems journals that requires studies to be "theory-based" in order to be worthy of publication.

While papers used the term in many diverse ways, a handful of categories emerged that could cover similar uses: specifically, we found at least three distinct ways that papers used the term. First, they used the term when invoking frameworks or broad theories as a kind of metatheory in order to generate specific theories. One can interpret such generation as applying a framework such as Orlikowski's (2007) technological frames to observe how phenomena in a domain relate to each of their categories and possibly to consider interactions between these phenomena.

Second, they used the term to "explain" patterns observed in the data after the fact. That is, researchers observed patterns in a domain that resembled the patterns in an extant theory (frequently from outside the IS domain) in a post hoc analysis. We believe that using the term in this way has problems in principle because: 1) it misses the point that starting with the theory and testing it in the IS domain may or may not have revealed support and 2) it tends to imply that nothing unique or different about IS phenomena, that the IS discipline need not exist because extant theory from elsewhere can sufficiently explain all IS phenomena.

Third, they used the term theoretical lens to reference theory that the paper never really focused on. We found that papers that used the term in this way referenced some well-known theory in their introductory section(s) to position the study but then ignored it in developing or explaining their results (i.e., papers did not use test, assess or extend the original theory or use it to illuminate the domain or to add knowledge to the IS discipline). We have mixed feelings about this usage. On the one hand, it seems an unnecessary and potentially misleading way to use the term theoretical lens. On the other hand, reviewers and editors may have mandated that authors use it in this way to provide a "theoretical underpinning" even for a paper that had significant value as an empirical examination of a topic area. The editors and reviewers apparently felt that the papers we reviewed had sufficient value in total to merit publication.

The papers rarely made an effort to incorporate the theoretical lens concept or usage with an explicit theory-building and theory-testing scientific process model: few papers used the theoretical lens concept to test theory. However, as an exception, some papers contrasted multiple sources of theoretical lens content with gathered data. In such cases, the authors implicitly tested each theory simultaneously to assess how well it fit with empirical observations. On the other hand, using a theoretical lens naturally supports theory building, particularly if the data one has gathered show unanticipated relationships among a domain's components. However, authors used the theoretical lens concept mostly in a more ambiguous way to transfer theory; in doing so, they assumed the theory's or other theoretical lens content's validity and, thus, that they could borrow its terminology or concepts (e.g., as in borrowing "synergy" from systems theory).

We continue to have concerns about the cumulative effect that the many and various ways papers have used the theoretical lens concept may have on the IS discipline: in Section 2.2, we note several

⁴ A study that focused on discovering such a boundary would likely need to examine not only published but also rejected manuscripts to look for a decision rule.

risks associated with using the theoretical lens concept. However, determining the degree to which these risks have appeared in the papers we examined falls outside the scope of this study for two reasons. First, the potential problems likely exist at the discipline level, whereas we focus on particular papers here. Any given paper may address questions that intersect the IS and its referent disciplines without manifesting negative consequences, but, if papers in the discipline at large neglected a large swath of IS-focused research questions, we might not realize it. Second, rather than observable aspects of the discipline, these negative consequences likely represent opinions and judgments that rely heavily on the community's preferences and values. However, we continue to urge vigilance and reflection as to whether IS research adequately and effectively serves the IS discipline's diverse range of stakeholders. For example, we have concerns with research that uses a theory while implicitly assuming its validity or even value just because a previous paper or papers-particularly in a reference discipline-have published it (not that we do not have faith in other disciplines' reviewers; rather, we do not know what effects that a discipline's interests and goals have on the research from another discipline with its own interests and goals, and we recognize that authors could potentially mistranslate terms and concepts across disciplines). We urge scholars to remain healthily skeptical on the content they use as content for their theoretical lenses even when they use it to create new and useful observations.

Further, we do not know whether the authors for the papers in our sample found anomalies in the domain data relative to what might they might have predicted based on the content in the theoretical lens. For example, if a researcher found equifinality and requisite variety but no synergy, what does that say about the range over which systems theory can and should be applied? Perhaps synergy does not represent a fundamental part of the system definition but rather a characteristic that varies in quantity depending on the nature of the system and how one uses it in particular instances.

We suggest viewing the target domain for the transfer of theory from reference disciplines as the area of common interest between IS and the reference discipline (see Figure 1). Theories are created within a discipline to understand and predict phenomena of interest to that discipline. Thus, for example, questions about trust-related behavior in general would pertain to the social psychology discipline. Questions about computer-mediated environments pertain to the IS discipline. Questions about trust in computer-mediated environments are of a common interest to both disciplines. Theories from social psychology may or may not provide an adequate theoretical lens for the study of these questions. For example, social science theories may lack constructs to represent the mediating impacts of technology on trust. Lacking these constructs a study may fail to even gather the data needed to understand the IS phenomena.

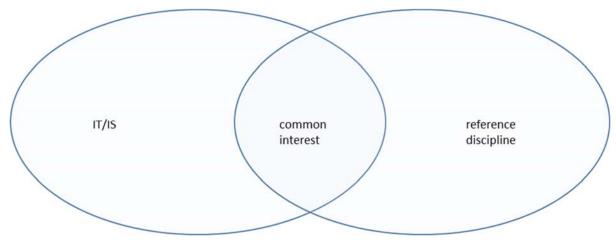


Figure 1. IS Reference Discipline Venn Diagram

5.1 Initial Recommended Minimal Expectations for Theoretical Lens Use

Below, based loosely on observing how academic papers have used the theoretical lens concept, we suggest some tactics that we think will help clarify the theoretical lens concept to readers and, perhaps, allow authors to more effectively, directly, and effectively apply it in their work. We propose the following tentative guidelines.

5.1.1 Clarification

Authors should describe both why they selected a particular theoretical lens and why they did not select others. This description has special importance when they use a theoretical lens as a basis to gather data. We also think that, in some cases, no theory or combination of theories will account post hoc for the actual data one has gathered. In other words, after one exhausts extant theories, new questions will likely arise.

Authors should explicitly detail not only how they identify a theory, framework, or method that they apply as a theoretical lens but also whether they reference it in whole or in part. If in part, they should clearly explain why some parts were omitted. If a theory is applied with the suggestion that the IS domain functions like the reference discipline in this particular, both similarities and differences should be explained.

5.1.2 Application

Authors should decide how they will use a theoretical lens and whether or not they actually need one to begin with. We do not mean to suggest that authors should simply use the concept but not use the term; rather, we suggest that, in designing and presenting their work, they should intentionally explain how they use the theoretical lens concept in their work⁵. Authors should clearly and explicitly explain how they use theory relative to traditional methods: they should explain whether they test, build, or transfer theory from one domain to another.

5.1.3 Formal Use

IS publications contribute to the IS discipline via both better explaining particular IS problems and constructing more general theory that can provide prediction for future instances (e.g., Wiesche et al. 2017). Reviewers and editors should not hold every study to contribute to both purposes.

We do not intend to become the "theoretical lens police". Evaluating research contributions involves many other criteria. We simply view clarity regarding the way in which scholars use the theoretical lens concept as 1) an important effort to fine-tune or bring into focus another aspect of what can be cloudy and ambiguous in absorbing the lessons of published work and 2) a perspective from which one can examine a sample of theory-oriented work that can illuminate innovative ways to use theory to advance knowledge.

5.2 Future Research and Limitations

As with any study, ours has several limitations. Clearly, examining papers from only one publication source introduces the potential for bias associated with the culture, norms, and practices of that particular journal. However, we somewhat offset the bias in that we examined papers in the journal that most frequently used the term and focused on qualitatively (rather than quantitatively) analyzing the differences in the way papers used it as an early step toward developing a typology or taxonomy.

A second limitation concerns our coding and reviewing procedure: the first author coded the data, but the second reviewed most of the studies. This is normal practice in grounded theory studies (Urquhart & Fernandez, 2013) where some researchers even frown upon studies in which multiple authors perform the coding. However, we recognize the potential room for unintended bias or systematic error to appear in our findings.

Future research should consider whether IS has unique or unusual aspects that trigger researchers to use the theoretical lens concept more frequently relative to other business and social science disciplines. Scholars might also examine the nature of the theories and frameworks they use as theoretical lenses in terms of their origins and migration between disciplines. Does a theory's migration across academic silos strengthen individual theories and/or to narrow their number by eliminating the least robust? Does theory migration across silos strengthen, weaken, or have mixed effects on both the donor and target disciplines?

Perhaps most importantly, philosophers of science might consider whether the theoretical lens concept represents a net contribution to the IS discipline. We found examples in which authors used the theoretical lens concept to contrast theories, to organize questions or research findings based on extant theory, and

⁵ We have heard anecdotes about scholars who have used a grounded theory approach, for example, but hesitated to use the term grounded theory in case any proponent of a particular version would not acknowledge the legitimacy of flavors alternate to the one they prefer.

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to structure the approach to an investigation. However, to the extent that publishing in the IS discipline, particularly in the most prestigious journals, *requires* one to reference "theory", using a theoretical lens could conceivably address that requirement without requiring one to engage in building or testing theory. Using a theoretical lens in this way provides "cover" for authors who, in their papers, focus primarily on describing a domain given that many reviewers and editors view such papers as lacking a sufficient contribution. One expects that such use may do little harm as it allows substantive but less valued knowledge to enter the common body; however, it seems superfluous at best and deceptive at worst. It raises the question about why papers that illuminate important aspects of working with information systems would not in and of themselves represent satisfactory candidates for publication.

6 Conclusion

From the increasing frequency with which authors use the term theoretical lens, it seems apparent that the term has begun to enter our research vocabulary. Based on analyzing papers from *EJIS*, we conclude that researchers have heterogeneously used the term and that it involves multiple meanings.

In our study, we focused on discovering how research papers actually use the term. We investigated this term according to several concrete indicators, such as where the term appears in each paper, how many conceptualizations each paper uses as theoretical lenses, which method the paper uses in the overall research study, the IS domain the paper considers, and which underlying conceptualizations the paper actually uses as sources for the theoretical lenses. Based on analyzing a subset of papers from a single leading journal with papers that most frequently used the term, we make a set of basic conclusions. We hope this study encourages other researchers to formally define this term, more precisely use it, and additionally consider the long-term effect of adding it to their research repertoire.

We also identify several risks that pertain to applying the term particularly relative to the traditional scientific approach of theory building and testing. We hope that, with this paper, we move toward initiating a collective understanding about the ways in which one can apply theoretical lenses to IS research.

Finally, even though researchers have increasingly begun to use the term theoretical lens, it remains a relatively small part of the research vocabulary. We do not know whether the term has had a significant impact on the overall thrust of IS research. However, given its growth in usage, we might ask what we can infer about the IS discipline from its increased use. From a pessimistic viewpoint, given the vast array of theory and the large number of topics in the IS discipline, one could argue that it represents a loosely configured constellation of independent issues; that it constitutes a kaleidoscope of bits and pieces that researchers have not integrated in any meaningful way. In other words, that it reflects social science generally without a clear distinction and identity—that it lacks firm and stable theory and findings much as Mohr (1982) described organizational behavior.

These opposing views return one to the long-unresolved debate about the nature of the discipline: whether one can better define it in a narrow way as a discipline that studies primarily how IS operates in organizations or as a broader area which considers any application of computing technology how it is used by humans and, in turn, what effects on humans individually and collectively it creates.

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Appendix

Lens content ⁶	Paper by first author and date (full	Lens source (full reference in
Adaptive structuration theory	reference in references)	references) Jones & Karsen (2008)
Adaptive structuration theory	Cho et al. (2008)	Henderson & Venkatraman (1993)
Alignment	Onita & Dhaliwal, (2011)	Mckeen & Smith (2003)
Analysis of supply chains,	Lyytinen & Damsgaard (2011)	Christopher (1998)
dependency analysis	Lyythen & Damsgaard (2011)	Emerson (1962)
		Porter (1985) Callon (1986)
ANT, structuration, contextualism	Tsohou et al. (2015)	Latour (1987)
		Pettigrew (1987)
		Giddens (1984)
		Ashforth & Kreiner (1999)
Boundary theory, theory of positive emotions	Koch et al. (2012)	Ashforth, Kreiner, Clark, & Fugate (2007), Fredrickson (2004)
		Fredrickson & Branigan (2005)
Collective action perspective	Cho & Mathiassen (2007)	Van De Ven & Hargrave (2004)
		Van De Ven (2005)
Concept of control transmission		Ouchi (1978)
	Wiener et al. (2015)	Ouchi (1979)
		Ouchi (1980)
		Delone & Mclean (1992)
Delone and McLean's success model	Lange et al. (2016)	Delone & Mclean (2003)
		Delone & Mclean (2004)
Deterence theory	D'arcy & Herath (2011)	Beccaria (1963)
Dimensions of power	Hekkala & Urquhart, (2013)	Hardy & Leiba-O'Sullivan (1998)
Dressage	Berente et al. (2010)	Foucault (1977)
Dual-task interference	Anderson et al. (2016)	Jenkins & Durcikova (2013)
Elaboration Likelihood Model	Bansal et al. (2015)	Petty & Wegener (1999)
Enchanted materialism	Prasopoulou (2017)	Bennett (2001)
Episodic change	Krell et al. (2011)	Lewin (1947)
		Brockner (1992)
		Keil, Truex, & Mixon (1995)
Escalation of commitment	Park et al. (2012)	Staw (1976)
		Staw (1981)
		Whyte (1986)
Excelution:	Arres ett. (200.4)	Courbon (1996)
Evolution	Arnott (2004)	Courbon, Grajew, & Tolovi J (1978)
Evolutioner : sauch dia mi	Abrohom et al. (2012)	Cosmides & Tooby (1994)
Evolutionary psychology	Abraham et al. (2013)	Cosmides & Tooby (2000)

Table A1. Theoretical Lens Content and Sources

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⁶ Note that papers, which did not reference a particular theoretical lens as content for the study, but only discussed the concept of theoretical lenses in general, are not included in this table.

i able A	1. Theoretical Lens Content and S	
		Cosmides, Tooby, & Barkow (1992)
Expectation-confirmation theory		Chiu, Hsu, Sun, Lin, & Sun (2005)
	Ruth (2012)	Oliver (1977)
		Oliver (1980)
Frames analysis	Hsu, (2009)	Orlikowski & Gash (1994)
Genres	Vaast & Walsham (2013)	Orlikowski & Yates (1994)
		Orlikowski & Yates (2002)
Grounded theory methodology	Kumar & Stylianou (2014)	Corbin & Strauss (1990)
		Strauss & Corbin (1990)
Hospitality	Jensen & Aanestad, (2007)	Derrida (1996)
		Derrida & Dufourmantelle (2000)
Information economics, transaction cost economics, and institution-based trust.	Datta & Chatterjee (2008)	based on a wide range of readings rather than a particular stated theory
Information processing perspective	Huang et al. (2014)	Galbraith (1973)
Institution theory	Liu et al. (2016)	Björkman, Fey, & Park (2007)
		Battilana & Dorado (2010)
	Mola & Carugati (2012)	Boisot (1986)
Institution theory		Boisot & Child (1996)
		Martinsons (2008)
Institution theory and organizational legitimacy theory as basis for building own framework	Hsu et al. (2015)	no direct references
LEARNING theory (classical, operant,	Chen and Sharma, (2015)	Lorge (1936)
and social)		Hovland, Janis, & Kelley (1953)
Management styles	Gregory & Keil (2014)	Quinn (1988)
Many	Paré et al. (2008)	many
Macculinity studies	Light (2007)	Beasley (2005)
Masculinity studies		Carrigan, Connell, & Lee (1985)
Media naturalness	Phang et al. (2010)	Kassarjian (1981)
		Kock (2004)
		Kock (2005)
Migration theory	Bhattacherjee & Park (2014)	Lee (1966)
Organizational identity	Tyworth (2014)	Whetten (2006)
Postcolonial theory	Ravishankar et al. (2013)	Quayson (2000)
		Young (2001)
Privacy calculus,	Shih et al. (2017)	Keith, Thompson, Hale, & Lowry (2013)
		Kim & Son (2009)
Privacy calculus, balance theory	Parks et al. (2017)	Xu, Teo, Tan, & Agarwal (2009)
		Lewin (1951)
		Heider (1946)
Resource-based view, enactment	Chan et al. (2011)	Penrose (1959)
		Weick (1979)
recourse baced new, endealient		

Table A1. Theoretical Lens Content and Sources

		Weick (2001)
		Weick, Sutcliffe, & Obstfeld (2005)
		Wernerfelt (1984)
Send and respond framework	Battleson et al. (2016)	Haeckel (1999)
		Haeckel (1999)
Sensemaking	Lewis et al. (2011)	Weick (1989)
		Weick (1995)
Social action in the sense of sociotechnical and sociomaterial	Boland & Lyytinen (2017)	none
Social actor model	Van Akkeren & Rowlands (2007)	Lamb & Kling (2003)
Social construction of technology	Holmström & Sawyer (2010)	Bijker (1997)
		Bijker & Law (1992)
		Bijker, Hughes, Pinch, & Douglas (1987)
Sociology of governance	Madon (2005)	Kjaer (2004)
		Kooiman (2003)
		Rhodes (1997)
		Rose (1999)
Socio-materiality	Doolin & Mcleod (2012)	Orlikowski (2007)
		Star (2010)
		Star & Griesemer (1989)
Stage of memory theory	Zhang et al. (2009)	Atkinson & Shiffrin (1968)
Strategic contradiction	Cousins et al. (2007)	Smith & Tushman (2005)
Structuration	Schlichter & Rose (2013)	Giddens (1990)
Structuration	Rodón & Sesé (2010)	Giddens (1979)
		Giddens (1984)
Structuration	Cao et al. (2009)	Poole & Desanctis (1990)
Technological frames	Lin & Silva (2005)	Orlikowski & Gash (1991)
		Orlikowski & Gash (1994)
Transaction cost, resource dependency, institutional, diffusion of innovation	Duan et al. (2009)	Teng, Cheon, & Grover (1995)
		Ang & Cummings (1997)
		Loh & Venkatraman (1992a)
		Loh & Venkatraman (1992b)
		Hu, Saunders, & Gebelt (1997)
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Table A1. Theoretical Lens Content and Sources

About the Authors

Fred Niederman serves as Shaughnessy Endowed Professor at Saint Louis University. His PhD is from the University of Minnesota in 1990. He serves as senior editor for *Journal of AIS* and as a Department Editor for ICT on the editorial board of *Project Management Journal*. He has published peer reviewed studies in numerous top journals including M*IS* Quarterly, Journal of AIS, Journal of Strategic Information Systems, and Journal of MIS. He serves on the editorial boards for the DATABASE for advances in MIS, Communications of AIS, AIS Transactions on Replication Research, Human Resource Management, and Journal of International Management. He has edited or co-edited numerous special issues on a wide variety of topics including "Breakthrough Ideas" for *Communications of the Association for Information Systems*. His areas of research interest include: IS personnel, IS project management, philosophy of science applied to IS, qualitative IS research methods, effects on IS of mergers and acquisitions, global IS, and group collaboration and teams. He is proud to be counted as a member of the "circle of compadres" for the KMPG PhD Project.

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