



## Literature Reviews in IS Research: What Can Be Learnt from the Past and Other Fields?

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### Abstract:

Literature reviews (LRs) are recognized for their increasing impact in the information systems literature. Methodologists have drawn attention to the question of how we can leverage the value of LRs to preserve and generate knowledge. The panelists who participated in the discussion of "Standalone Literature Reviews in IS Research: What Can Be Learnt from the Past and Other Fields?" at ICIS 2016 in Dublin acknowledged this significant issue and debated 1) what the IS field can learn from other fields and where IS-specific challenges occur, 2) how the IS field should move forward to foster the genre of LRs, and 3) the best practices to train doctoral IS students in publishing LRs. This paper reports the key takeaways of this panel discussion. We provide guidance for IS scholars on how to conduct LRs that contribute to the cumulative knowledge development in and across the IS field to best prepare the next generation of IS scholars.

**Keywords:** Literature Review, Review Methodology, Research Methodology, Doctoral Training.

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## 1 Introduction

The literature review (LR) is an established research genre in many academic fields that primarily focuses on synthesizing and interpreting the body of literature in a given domain. As Garfield (1987, p. 113) notes, “[i]t is not an accident that so many of our greatest scientists have used, created, and contributed to the review literature”. The IS community has proven to be receptive to LRs. The editorial boards of major IS journals account for the importance of LRs in various forms. Among the top 40 IS journals that Lowry et al. (2013) identify, 17 journals explicitly welcome LRs as a research genre in their editorial statements and 36 journals have published at least one LR between 2000 and 2014 (Wagner, Prester, Roche, Benlian, & Schryen, 2016). *MIS Quarterly* provided the opportunity to publish “theory and review” papers in 1999 (Markus & Saunders, 2007; Watson, 2001), the *European Journal of Information Systems* recognized the need for stronger support of LRs (Rowe, 2012, 2014), *Communications of the AIS* published a special issue on LRs in 2015 (Tate, Furtmueller, Evermann, & Bandara, 2015), and the *Journal of Information Technology* recently published a debate on systematic LRs (Boell & Cecez-Kecmanovic, 2015a, 2015b; Chiasson, 2015; Oates, 2015; Schultze, 2015; Watson, 2015). IS authors have responded to the call for LRs by contributing more than 200 LRs to the above-mentioned set of top IS journals since 2000 (Paré, Trudel, Jaana, & Kitsiou, 2015; Wagner et al., 2016). An analysis of these LRs also shows that prominent reviews have received high numbers of citations; the most cited include Alavi and Leidner (2001), DeLone and McLean (2003), and Legris, Ingham, and Collerette (2003) (more than 8,000, 6,000, and 2,500 citations, respectively).

Scholars across fields largely agree that LRs must synthesize the findings of the literature (e.g., Blumberg, Cooper, & Schindler, 2005; Cooper, 1998; Fink, 2014; Webster & Watson, 2002). Some researchers, however, argue that LRs can also serve as vehicles for 1) testing theory when a sufficient amount of empirical evidence has accumulated in the literature (e.g., Cohn & Becker 2003; King & He, 2005; Okoli, 2015; Rowe, 2012, 2014), 2) identifying research gaps in order to stimulate research by substantiating a need for research and motivating researchers to close the gaps (e.g., Gall, Borg, & Gall 1996; Levy & Ellis 2006; Schwarz, Mehta, Johnson, & Chin, 2007), or 3) building theory by adapting existing theories, building new theories, or synthesizing multiple theories (e.g., Cooper, 1998; Paré, Trudel, Jaana, & Kitsiou, 2015; Rowe, 2014; vom Brocke et al., 2015; Webster & Watson, 2002). However, the IS field has not yet developed a clear picture about which new directions are fruitful for developing these contributions. The search for these new directions guided the panel “Standalone Literature Reviews in IS Research: What Can Be Learnt from the Past and Other Fields?” held at the 37th International Conference on Information Systems (ICIS) in 2016 in Dublin, and it crystallized in the following three questions, which the panel members discussed:

1. What LR approaches can the IS field learn from other fields, and which IS-specific challenges do we need to address?
2. How should the IS field move forward to foster the genre of LRs?
3. What are best practices to train doctoral IS students in publishing LRs?

To address these questions, a group of five panelists—Frantz Rowe, Shirley Gregor, Kai Larsen, Stacie Petter, and Guy Paré (all of whom have broad experience and substantial expertise in LRs)—contributed to a lively discussion on how the IS field can benefit from following new directions in the genre of LRs. With questions from a large audience, the panel offered new ways of improving LRs that future research needs to consider to enhance the impact of LRs in the IS field.

This report summarizes the findings of the panel discussion. In Section 2, we start with a brief background on LRs. In Sections 3, 4, and 5, we present the discussion of each of the three main questions stated above, respectively. Finally, in Section 6, we summarize the paper and discuss additional IS-specific challenges and opportunities.

## 2 Background of Literature Reviews

A review can be a part of a paper that reports a specific research study; a standalone literature review, which is an important type of publication in its own right (Schwarz et al., 2007); a part of a project proposal (Baker, 2000); or a part of a thesis. This panel focused on standalone literature reviews.

IS researchers and scholars from other fields, such as management (Alvesson & Sandberg, 2011; Zorn & Campbell, 2006), health sciences (Grant & Booth, 2009), psychology (Baumeister & Leary, 1997), and the

social sciences (Hart, 1998; Petticrew & Roberts, 2008), have all studied LRs. Unsurprisingly, this diversity in fields has led to researchers' adopting several perspectives on LRs, including definitions (Blaxter, Hughes, & Tight, 2010, p. 110; Blumberg et al., 2005, p. 11; Boell & Cecez-Kecmanovic, 2014, pp. 258, 260; Fink, 2014, p. 3; Hart, 1998, p. 27; Levy & Ellis, 2006, p. 183; Rowe, 2014, p. 243; Schwarz et al., 2007, p. 35; Webster & Watson, 2002, p. xix), purposes (Boell & Cecez-Kecmanovic, 2014, p. 260; Okoli, 2012, p. 10; Paré et al., 2015, p. 183; Rowe, 2014, p. 243), classifications (Grant & Booth, 2009; Paré et al., 2015; Rowe, 2014; Schryen, Wagner, & Benlian, 2015), argumentative strategies, and composition guidelines (Hart, 1998; Rowe, 2014; Schryen, 2015; vom Brocke et al., 2009). As it is beyond the scope of this panel report to comprehensive overview all these facets of LRs, we focus on those issues that help in framing the panel discussion and in aligning its results with insights gained from the literature. In this section, we briefly present the background of literature reviews in terms of definitions and contributions to knowledge development and types and classifications.

## 2.1 Definition of Literature Reviews and their Role in Creating Knowledge

As we mention above, the literature has suggested many definitions of literature reviews. For example, researchers have defined them as "a critical summary and assessment of the range of existing materials dealing with knowledge and understanding in a given field" (Blaxter et al., 2010, p. 110), "an appropriate summary of previous work [with] an added dimension—your interpretation" (Blumberg et al., 2005, p. 11), and "a systematic, explicit and reproducible method for identifying, evaluating and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners" (Fink, 2014, p. p.3). Schryen (2015) synthesizes various definitions for literature reviews. Despite the presence of so many definitions, scholars across fields agree that a LR's essence is not only to synthesize the findings in a literature but also to interpret these findings. The interpretation can occur in various forms, including criticizing findings and identifying research gaps.

Researchers also commonly acknowledge LRs to play a central role in the development of scientific knowledge (Webster & Watson, 2002). As we indicate above, prior research suggests that LRs create value in terms of knowledge development by summarizing, interpreting and criticizing research findings (i.e., by adopting a backward-oriented perspective on the existing body of knowledge) (vom Brocke et al., 2009; Webster & Watson, 2002). But LRs can also have an impact on succeeding research and knowledge enhancements from a forward-oriented perspective (Schryen et al., 2015; Webster & Watson, 2002). Researchers can accomplish this impact by, for example, identifying research gaps (Jennex, 2015; Müller-Bloch & Kranz, 2015), which subsequent research endeavors can then close. Such endeavors can include, for example, the development of new models or theories (LePine & Wilcox-King, 2010; Rowe, 2014), which researchers can empirically evaluate, or the development of a research agenda (Rivard, 2014; Rowe, 2014; Webster & Watson, 2002).

## 2.2 Types and Classifications of LRs

In order to structure the landscape of literature reviews, IS scholars have identified numerous distinctive dimensions and, based on these dimensions, developed several classifications of LRs. We present several classifications to frame the panel discussion.

Rowe (2014) distinguishes reviews according to the goals they pursue. He distinguishes reviews that focus on describing, understanding, explaining, and testing. Descriptive reviews tend to adopt a systematic methodological approach, summarize extant research using existing categories, and identify areas that might benefit from further research. Purely descriptive reviews are often considered to be atheoretical. Reviews for understanding and explaining are the types of reviews that contribute to theory building. Finally, reviews that focus on testing (mostly meta-analyses) gather empirical evidence and determine aggregate effect sizes.

The typology that Paré et al. (2015) propose includes nine archetypes of LRs: narrative reviews, descriptive reviews, scoping/mapping reviews, meta-analysis, qualitative systematic reviews, umbrella reviews, theoretical reviews, realist reviews, and critical reviews. Each of these "ideal profiles" represents a unique combination of attribute values; these attributes include the scope of questions, search strategy, nature of primary sources, explicit study selection, quality appraisal, and methods for synthesizing/analyzing findings.

Schryen et al.'s (2015) knowledge-oriented classification classifies LRs in terms of six epistemological contributions: synthesis, adoption of a new perspective, theory building, theory testing, identification of

research gaps, and provision of a research agenda. Aggregating these contributions to bundles, the authors suggest five archetypal epistemological types of LRs: gap-spotting reviews, perspectival reviews, theory-building reviews, theory-testing reviews, and combined theory-building and theory-testing reviews.

Researchers have also classified LRs according to the techniques they use. For example, King and He (2005) suggest drawing on a qualitative-quantitative continuum that ranges from narrative and descriptive techniques to vote counting and meta-analysis. A narrative review presents verbal descriptions of studies and focuses on theories and frameworks, elementary factors, and their roles and/or research outcomes regarding a hypothesized relationship. A descriptive review analyzes to what extent the existing literature supports a particular proposition or reveals an interpretable pattern. One uses vote counting to draw qualitative inferences about a focal relationship based on the outcomes of hypothesis tests reported in individual studies. When one complements vote counting by considering effect sizes and construct reliabilities, it is regarded as meta-analysis, which Hunter and Schmidt (2014) consider as the most rigorous statistical approach to aggregating empirical evidence in that it allows authors to assess and correct for statistical artifacts, such as publication bias, and measurement errors.

### 3 What LR Approaches Can the IS Field Learn from other Fields, and Which IS-specific Challenges Do we Need to Address?

#### 3.1 LR Approaches the IS Field Can Learn from other Fields

The IS field can learn from other fields, such as medicine and psychology, about the existence of several types of LRs and can consider what it needs to appropriately apply these types to IS phenomena. As an example, the panel discussed meta-analyses in IS research and how replication studies can improve their applicability. Moreover, the panel discussed two new types of LRs: scoping and realist reviews.

Meta-analyses represent one type of LR that the IS field should be relatively familiar with. Still, Franz Rowe highlighted the wide variety of untapped opportunities—provided that extant research on a phenomenon is suitable to meta-analysis, (i.e., primarily of a quantitative and positivist type of research). Currently, there are around 50 meta-analyses on IS-related phenomena with an unequal distribution across subjects (Kepes & Thomas, Forthcoming). While the majority of these meta-analyses focus on IS evaluation and IS usage, as Franz Rowe argued, important other research streams in the IS field miss the opportunity to look back to what the streams have produced. For example, only one meta-analysis seems to exist in IS value and decision support systems, and none do so in IS security, outsourcing, or business process management. In addition to the lack of meta-analyses in terms of number, we also lack quality meta-analyses. Therefore, the panelists agree that IS scholars can still learn much to more adequately perform meta-analyses.

In particular, Stacie Petter emphasized the challenges in drawing sound conclusions from meta-analyses in the IS field. The medical field shows that meta-analyses require a sufficient amount of empirical studies investigating the relationships between constructs in a careful and relatively homogeneous way. In contrast, the IS field has constructs that are labeled similarly or even equally but that have completely different items and are measured in very different contexts, which produces other potential moderators that could influence the relationships. For instance, a study that evaluated the success of an ERP system might have a very different outcome compared with a study that evaluated the success of medical systems.

To overcome these limitations, Stacie Petter called for improved care, consistency, and clarity when conceptualizing constructs and documenting measures in use. The prerequisite to build on quantitative studies is to publish all results including, for instance, correlation matrices and reliability indices. In addition, and equally importantly, we need to replicate our research to actually see if these results hold true over and over again. This practice is a prerequisite to applying meta-analysis techniques and evaluating the strength of effects over time. For that purpose, the Association for Information Systems (AIS) has recently launched the journal *AIS Transactions on Replication Research* (TRR) with the mission to report IS replication studies “until scientific consensus is reached”<sup>1</sup>.

However, Shirley Gregor pointed out that evaluating support for knowledge claims in meta-analyses should not be restricted to analyzing studies that all use the same method (Olbrich, Frank, Gregor, &

<sup>1</sup> <http://aisel.aisnet.org/trr/>

Rowe, 2017). For instance, many IS studies test claims based on TAM in cross-sectional surveys. Cross-sectional surveys, though, have limitations because they can rarely tell one anything about cause and effect. In evidence-based medical research, surveys are regarded as a weak form of evidence and a lower form than randomized control trials. Thus, it is desirable to gather evidence from studies that exhibit a range of research approaches. According to Hempel (1966), support for a hypothesis depends on not only the quantity of favorable evidence but also the variety of the evidence. Triangulation of evidence and, thus, more variety mean stronger support.

In addition to meta-analyses, Guy Paré highlighted two new types of LRs proposed outside of IS but with relevance and value for our field. The first type is scoping reviews as proposed by Arksey and O' Malley (2005) about 12 years ago. This paper has been cited almost 2,500 times so far, but, although researchers have applied it in various fields, they have not done so in IS yet. Scoping reviews are aligned with a positivist tradition and focus on providing an initial indication of the size and nature of what has been published on an emerging topic. Because there are many new topics being investigated in IS (compare the discussion on moving targets in Section 3.2 below), scoping reviews may be particularly relevant for advancing IS knowledge. They are descriptive, not explanatory, in nature. Compared to meta-analyses, scoping reviews focus more on the research questions themselves and less on the results. Scoping reviews focus on identifying the gaps in terms of what has been studied and what needs to be investigated in the future by developing a detailed research agenda that has implications relevant for both research and practice. One of the originalities of this approach is that, beyond the traditional steps of search, screen, extract data, and synthesize, at the very end, methodologists propose to validate the findings and the research agenda using focus groups with experts in the field (i.e., with practitioners). This step should ensure that what the person doing the review proposes to organize and orient future work on the topic of interest is relevant for practice. Although some reviews in IS are similar in spirit to the scoping review, none has used the formal methodology that Arksey and O'Malley originally proposed.

The second type of LR Guy Paré suggested focuses on theory building; we all know how important theory is in IS, and most theoretical reviews that exist are based on Webster and Watson's (2002) recommendations. However, some formal methodologies are more interpretive in nature and also focus on theory building. One of these methods is the realist review as proposed by Pawson, Greenhalgh, Harvey, and Walshe (2005) in the sociology and social policy field. Realist reviews focus on developing an in-depth understanding of complex interventions, such as the implementation of IS that has context-specific implications for business processes, structure, strategy, and so on. The typical research question one asks in realist reviews is "under which circumstances does a specific intervention work for whom, how, and why?". We often also ask the same basic question in IS. In contrast, the typical question that one asks in a meta-analysis is "what works?". So, a realist review has no preference for quantitative or qualitative evidence because both types of evidence have merit. Realist reviews focus on investigating and identifying the underlying mechanisms and contextual conditions that explain why a specific intervention, such as a CRM or an ERP system in our field, would bring some outcome for an individual, group, or organization.

Overall, the panelists provided complementary viewpoints on what we can learn from other fields. Their recommendations address three types of literature reviews (namely, meta-analyses, scoping reviews, and realist reviews). As for meta-analyses, the panelists referred to the medical field and recommended that, even though the IS field has used them, we need improvements in reporting IS research and extending the scope of meta-analyses to a broader set of IS domains and enhancing methodology. As for scoping and realist reviews, Guy Paré pointed to the fields of sociology and social policy and highlighted the usefulness of adopting these types, which researchers in the IS field have scarcely used.

### 3.2 IS-specific Challenges We Need to Address

Despite the value that the IS field can reap from new types and formal methods of LRs used in other fields, IS scholars who conduct LRs must not ignore the challenges specific to IS. Shirley Gregor highlighted two of these challenges.

First, the phenomena in IS are moving targets. Thus, the terms one uses to refer to the same class of systems may change over time. For example, a classic concern in IS is systems that support or augment human decision making. Over time, we have called such systems expert systems, knowledge-based systems, business intelligence, recommendation agents, robo-advisors, and, today, smart machines. One needs to account for this shifting terminology when reviewing papers that address the same central problem. To deal with this challenge, Shirley Gregor suggests building LRs around classes and

subclasses of systems that we identify as addressing classic concerns—concerns that focus on solving the same or similar problem (e.g., improving decision making). This practice enables one to investigate the lineage of the systems in each class and the study of their capabilities over time, which includes older forms of system that address the same end. Often, we can find commonalities in the underlying knowledge even though the technologies vary. As one example, we see research results that echo what researchers previously discovered for knowledge-based systems (e.g., Gregor & Benbasat, 1999) without any acknowledgement of this fact. Consequently, to avoid intellectual laziness, a literature review in our field needs to look back in time to see what research on prior technologies of the same class of system has found.

Second, as in medicine, our research is about not only publishing papers but also—as Shirley Gregor suggested—producing (design) knowledge for people to act on, which explains why IS may need different types of reviews that include a focus on the capabilities of the systems under review. This suggestion applies to both the behavioral and design science paradigms. For instance, if we have a design problem, such as how to build a better recommendation agent to increase revenue, we need to review what others have already found concerning this design challenge. In addition to other design knowledge, we need to consider behavioral work that has studied the capabilities of a recommendation agent that lead to the desired outcomes. In performing design science research, if we do not account adequately for past design work, we may waste research effort because we cannot show when we produce new knowledge, and our results will likely not be published. It is important to include design knowledge in reviews and work that informs design. A model that is helpful in structuring design knowledge is the PICO model—population, intervention, comparatives, and outcomes—from medicine (Richardson, Wilson, Nishikawa, & Hayward, 1995)<sup>2</sup>. The PICO model accounts for the intervention and, thus, the technology.

Table 1 summarizes the key issues which future research in the IS field should consider.

**Table 1. Summary of Recommendations for Question 1**

<b>What the IS field can learn</b>	
Meta-analysis	To increase the credibility of meta-analyses in IS, we need studies that use a variety of approaches (e.g., randomized controlled trials and surveys).
Scoping review	Perform scoping reviews (Arksey & O' Malley, 2005) to provide an initial indication of the size and nature of what has been published in emerging IS topics. Derive and validate a research agenda with experts from practice.
Realist review	Perform realist reviews (Pawson et al., 2005) to investigate and identify the underlying mechanisms that explain how and why complex interventions, such as system implementations, work in specific contexts.
<b>IS-specific challenges</b>	
Moving targets	Synthesize knowledge on systems that focus on similar goals but might have been labeled differently over time by building LRs in IS around classes and subclasses of systems that address classic IS concerns.
System capabilities-centered reviews	Perform system capabilities-centered LRs in both the design and behavioral science paradigms that account for the technology features that allow goals to be achieved.

<sup>2</sup> One can both compare and contrast the PICO model with the CMO model (context, mechanism, outcome) of the realist review (see Pawson et al., 2005).

## 4 How Should the IS Field Move Forward to Foster the Genre of LRs?

Open ontologies and taxonomies of IS knowledge are valuable supplements that the IS field can use to develop LRs in academia, and calls for an interpretive, philosophical stance and the argument that the IS field should focus on advancing theory for understanding through LRs complement this assertion.

Kai Larsen argued that the static nature of traditional, paper-based LRs limits their capacity to overview the latest hot-off-the-press findings and aggravates the problem of discordant naming of constructs because one cannot correct these issues after publication. Traditional LRs do not cover papers published after a journal has accepted a LR for publication, and one cannot expect a LR to completely cover papers published during the peer-review process. Consequently, a synthesis pertains to the years leading up to a few months or even years before a LR's date of publication, and, with every year the LR has existed, it excludes yet more papers. Further, authors who write LRs need to address naming issues in that the literature sometimes refers to the same real-world phenomena with different construct names. The problems that construct identity fallacies raise ("a construct pair references the same or different phenomena and are given dissimilar or identical names, respectively"; Larsen & Bong, 2016, p. 530) are evident, and they result from authors' feeling pressured to publish new research insights and resorting to renaming existing constructs. These practices cause tremendous problems for scientific progress in any field, and fixing these issues incurs costs. For example, in the health sciences, the National Institute of Health (NIH) invests substantial amounts of money—and Australia, Canada, and Europe set aside a part of their medical research budgets—to fixing discordant construct naming practices.

We could address these challenges—as Kai Larsen contended—by developing alternatives to the paper-based way of aggregating knowledge through traditional LRs. In this regard, the IS field has made considerable progress compared to other behavioral and social sciences. For example, Steven Alter's work provides "a systems analysis and design method for business professionals" based on an integrated body of work (BoW) systems theory (Alter, 2013, p. 74). Jingjing Li has developed TheoryOn (Li, Larsen, & Abbasi, 2016), a construct-based search engine that automatically extracts content out of papers, integrates it, shares it through the TheoryOn system, and visualizes nomological networks from the papers and how they fit together. Michael Wade has developed the IS theory wiki<sup>3</sup>, which 135,000 people use every year; Bernard Fallery has developed a similar website for the francophone community (1,500 users per month)<sup>4</sup>. Roland Müller has developed theory maps and some approaches for breaking down and integrating them (Müller, 2015). Kai Larsen is developing an inter-nomological network<sup>5</sup> that contains about 80,000 constructs that one can search for and integrate with one's own work. Similar projects outside IS include gene ontologies from the health sciences and Frank Bosco's metaBUS project<sup>6</sup> in the organizational behavior field. The metaBUS project has developed a database that contains a million effect sizes (i.e., relationships between constructs and variables). It is complemented by a taxonomy of all the constructs, which allows to understand how constructs relate to each other. Further, the project has implemented a meta-analytic framework, which allows users to analyze automatically meta-analytic correlations in the organizational behavior field. These projects illustrate new approaches to fostering aggregation of scientific knowledge in IS, and many of them, such as metaBUS, also demonstrate the value of supplementing LRs with technology capable of providing ad hoc analyses for new queries based on large, open ontologies.

Most of these novel approaches to aggregating scientific knowledge depend on open access to large volumes of papers, and researchers face legal risks of copyright infringement when they initiate similar large-scale projects. If we can address these challenges, tremendous opportunities to create a more up-to-date body of IS knowledge emerge. In addition, design-oriented IS researchers have the skills to advance automated tools and approaches for analyzing vast amounts of research data by, for example, employing textual analytics. Furthermore, open access to research papers and work materials of LRs creates synergies with training in review methodology. For instance, doctoral students could learn from high-quality LRs by replicating or extending them, and, at the same time, they could contribute their results back to the IS body of knowledge.

Frantz Rowe contended that a contribution to theoretical knowledge remains the sine qua non for advancing IS knowledge through LRs in top journals. While descriptive reviews can be useful even if they

<sup>3</sup> <http://istheory.byu.edu/>

<sup>4</sup> <http://sietmanagement.fr/>

<sup>5</sup> <http://inn.theorizeit.org/>

<sup>6</sup> <http://metabus.org/>

do not meet the publication standards at top journals, authors can offer greater value through taking an interpretive or philosophical stance in a theoretical review. These theoretical reviews for understanding and explaining pay attention to the assumptions and the epistemological foundation of theories that might not be fully reflected in a descriptive review or a large ontology that aggregates constructs from heterogeneous bodies of literature. The distinction between reviews that focus on understanding and reviews that focus on explaining might not be evident at first sight. To elaborate on this distinction, Georg Henrik von Wright (1971) provides a striking account grounded in the philosophy of science. He distinguishes the Galilean tradition, which considers only efficient causes or causes that explain *what happens*, from the Aristotelian tradition, which considers also final causes, reasons, or intentionality that explain *why things happen*. One can achieve better understanding by engaging in a hermeneutic circle when searching and interpreting the literature (i.e., going from the meaning of a phenomenon, or from the past, to the whole reciprocally (von Wright, 1971))—an approach consistent with Klein's and Myers' (1999) view of the hermeneutic circle. Prospective authors of LRs in information systems should, therefore, reflect on their respective phenomena from an epistemological viewpoint and advance theory for better theoretical understanding.

Specifically, Frantz Rowe highlighted methods that probe extant literature to gain novel insights from a theoretical viewpoint and that one can consider as reviews for understanding. The first method is a critique, and one exemplar is Guido Schryen's (2013) paper on the business value of IT. Central to his review is Figure 3 (p. 151) with which he critically considers the interdependency between the deficiencies he identifies (what we know in Figure 1 and Figure 2) and the systemic<sup>7</sup> critique. Going from the parts to the whole allows him to generate six research thrusts and a rich research agenda. The second method is problematization, which focuses on theoretical schools, or levels, of analysis. An exemplar is the review of Patrick Besson and Frantz Rowe (2012), who use a conceptual framework to highlight that researchers have particularly neglected the dimensions of inertia, governing agency, and failure to understand information systems-enabled organizational transformation. The last method is problematization at an ontological and epistemological level. Alavi and Leidner's (2001) paper that discusses knowledge and knowledge systems exemplifies such a paper. These three ways of probing the field of what we know can be very rich, and, in the final case (problematization at an ontological and epistemological level), it does not have to be systematic. In summary, Frantz Rowe highlights the words systemic, not systematic, and problematization to better understand the phenomena that we study—a preferred way for developing the field and, in particular, LRs.

Overall, the key recommendations of the panelists (see Table 2 for summary) complement each other. While one stream of suggestions relates to overcoming issues associated with data (covered body of literature is not topical, access to publications is insufficient) and ontology, another stream addresses (epistemological and philosophical) opportunities of theoretical reviews to enhance the understanding and explaining of IS phenomena.

**Table 2. Summary of Recommendations for Question 2**

<b>How the IS field should move forward to foster the genre of LRs</b>	
Open ontologies and taxonomies	Develop and use open ontologies and taxonomies of IS knowledge as a valuable supplement that the IS field can use to develop LRs. Shared ontologies are also useful to address problems of discordant construct naming practices and to provide an overarching view of the body of knowledge in our field.
LRs for understanding	Advance IS reviews focus on understanding by, for example: 1) Developing a systemic critique 2) Problematizing issues relating to theoretical schools or levels of analysis, or 3) Problematizing issues at an ontological and epistemological level.

<sup>7</sup> Not to be confused with systematic.

## 5 What are the Best Approaches to Train Doctoral IS Students in Publishing LRs?

In order to prepare doctoral IS students for publishing LRs, they should be familiarized with different review types, receive training with different review methodologies, and learn to evaluate a LR's quality. Recognizing that we should not require every doctoral student to publish a review, those students who develop LRs will benefit from teaming up and from using open materials from previous LRs. Ultimately, they need to be prepared to write LRs that are methodologically rigorous, relevant, interesting, novel, and creative.

Increasing complexity and diversity of the IS field poses new challenges for authors to conduct high-quality research. Understanding and competently applying adequate research methodologies requires solid doctoral training and more exposure to research methods in general. For literature reviews, Guy Paré has developed and taught a doctoral seminar that covers three main objectives:

- 1) To develop an in-depth understanding of the various types and approaches of literature reviews (e.g., Paré et al., 2015), their strengths, their limitations, and how a literature review differs from other forms of journal papers, such as conceptual and bibliometric papers.
- 2) To develop an in-depth understanding of the critical steps involved in a review process, an overview of how one can distinguish the review types, and knowledge of the challenges that are specific to each type.
- 3) To develop an understanding of how to assess the quality of various forms of review processes, including concepts such as systematicity, transparency, rigor, and relevance (Paré et al., 2016; Templier & Paré, 2015).

Both IS students in particular and business students in general (e.g., those from accounting, organizational behavior, human resources, strategy, and marketing) should find this seminar to be relevant. In particular, doctoral students who write their theses based on a combination of single essays and who hope to publish their initial review paper would find structured training in review methodology to be useful.

While researchers broadly agree on the importance of solid doctoral training in review methodology, Stacie Petter contended that such agreement does not mean that every doctoral student should necessarily publish a review. Depending on the type of research that a doctoral student pursues, a review might not fit into the thesis. Nevertheless, being familiar with the review methodology and being able to distinguish and evaluate different types of reviews benefits students when, for example, they develop related work sections of an empirical paper and when they serve as a reviewer for (standalone) review manuscripts.

The panelists and the audience also raised additional thoughts. First, students could gain hands-on experience by reproducing and extending the methodological steps of prominent reviews if these reviews report their review procedures transparently. Compared to developing a review manuscript from scratch, this approach would be more efficient, and students could compare their results to a review that has already been peer reviewed and published. Second, we should keep in mind that the quality of most review types derives not only from a rigorous methodology but also from relevance, novelty, and interestingness. We should not neglect the importance of creativity and imagination when we train doctoral students: developing high-quality reviews and publishing them in top journals requires more than disciplining ourselves. Finally, developing solid LRs should be, like most scientific endeavors, a collaborative effort. Working in a team is more fun and allows authors to incorporate different viewpoints before submitting the manuscript. It also enables the author team to leverage diverse skills and types of knowledge. Reviews of interdisciplinary topics would benefit greatly from building a diverse team of authors and leveraging expertise from different backgrounds.

While the panelists agreed that doctoral training on LRs could be improved (Table 3 summarizes the key suggestions on how improvement may be accomplished), they had different perspectives on the relevance of LRs for doctoral students. For example, one panelist argued that a publishable LR might not evolve from every doctoral student's thesis.

**Table 3. Summary of Recommendations for Question 3**

<b>The best approaches to train doctoral IS students in publishing LRs</b>	
Knowledge of different types of LRs	Doctoral students should be familiarized with different review types (Paré et al., 2015; Rowe, 2014).
Ability to apply review methodologies	Training should encompass different review methodologies by, for example, replicating published LRs that transparently describe their methodological steps.
Competence in reviewing LRs	Prepare the next generation of researchers to serve also as competent peer reviewers of LRs.
Qualities that LRs should have	High-quality LRs should feature 1) methodological rigor; 2) relevance, novelty, and interestingness; 3) creativity and imagination; and 4) impactfulness.

## 6 Concluding Remarks

Altogether, the panelists and participants of ICIS 2016 highlighted the importance and relevance of advancing LRs in the IS field. To enhance future review endeavors, they first mentioned what the IS field can learn from other fields in terms of LR approaches. They presented two new types of LRs relevant for IS scholars. First, scoping reviews (Arksey & O' Malley, 2005) can help researchers review emerging IS topics. Second, realist reviews (Pawson et al., 2005) can help researchers review the underlying mechanisms of how and why complex interventions, such as IS implementations, work in specific contexts. In addition, to increase the applicability and quality of meta-analyses to IS phenomena, the fields of health and psychology show the necessity of carefully testing relationships between constructs in replication studies (e.g., by applying randomized controlled trials).

Moreover, LRs in IS must not neglect IS-specific challenges. The panel members raised two. First, IS research studies moving targets. Therefore, we need build LRs in IS around classes and subclasses of systems that represent classic IS concerns. Those classes synthesize knowledge on systems that share similar or equal capabilities but might have been labeled differently over time. Second, reviews should produce design knowledge for others to act on. Therefore, LRs of design-oriented and behavioral studies should focus one system capabilities.

In addition to these two challenges, we see further IS-specific challenges that LRs need to address. A third challenge arises from the nature of the IS field as a socio-technological field that has connections to many neighboring fields, including computer science, social sciences, medical and health sciences, and engineering sciences. This broad set of connections results in a large diversity of foci that LRs can adopt based on the particular neighboring fields the reviews cover. The diversity of foci refers to the publication outlets that one has to search, the methodologies and theories that the literature has adopted, the philosophical approaches it has used, and so on. LRs need to account for these particularities of the covered neighboring fields, which makes it impossible, and also not advisable, to provide universally applicable recommendations. A fourth challenge concerns the above-mentioned ontological issues. In the IS literature, researchers sometimes use different construct names to refer to the same real-world phenomena, which makes it challenging to synthesize and interpret the body of literature with semantic accuracy. The various connections to neighboring fields, which may have their own ontologies (and ontological issues), further complications the issue.

Building on the issues that the panel raised, the panelists and the audience discussed how the IS field should move forward to foster the genre of LRs. The IS field can benefit from reviews that focus on understanding by, for example, developing systemic critique, by problematizing issues related to theoretical schools or levels of analysis, or by problematizing issues at an ontological and epistemological level. To foster the scholarly development of LRs, we also need to develop open ontologies and taxonomies of IS knowledge. Shared ontologies should also help to reduce problems of ambivalent construct labeling practices.

Finally, the panel members discussed how we should train our doctoral students in publishing LRs. We should not only teach the distinct types of LRs (Paré et al., 2015; Rowe, 2014) but also convey the ability to apply the respective review methodologies. For example, students could replicate or update published LRs that transparently describe their methodological steps. A sound training of the types and formal

methods of LRs will, in turn, help to educate the next generation of researchers for serving as competent peer reviewers.

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<sup>8</sup> <http://gepris.dfg.de/gepris/projekt/315925033?language=en>

<sup>9</sup> <http://gepris.dfg.de/gepris/projekt/321298175?language=en>

<sup>10</sup> <http://gepris.dfg.de/gepris/projekt/327130595?language=en>

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