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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 a) what the IS field can learn from other fields and where IS-specific challenges occur, b) how the IS field should move forward to foster the genre of LRs, and c) what best practices are to train doctoral IS students in publishing LRs. This article reports the key takeaways of this panel discussion. Guidance for IS scholars is provided on how to conduct LRs that contribute to the cumulative knowledge development within 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 disciplines whose primary purpose is to synthesize and interpret 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 as identified in the study of Lowry et al. (2013), 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" articles 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 received high numbers of citations, with the LRs of Alavi & Leidner (2001), DeLone & McLean (2003) and Legris, Ingham, & Collerette (2003) being the most cited ones (more than 8,000, 6,000 and 2,500 citations, respectively).

There is consensus amongst scholars across fields that synthesizing the findings of the literature is a mandatory contribution of LRs (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) theory testing 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) theory building by adapting existing theories, building new theories or synthesizing multiple theories (e.g., Cooper 1998; Paré et al. 2015; Rowe 2014; vom Brocke et al. 2015; Webster & Watson 2002). However, the IS field has not yet developed a clear picture of which new directions are fruitful for the development of these contributions. The search for these new directions was the guiding idea of 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) 2016 in Dublin, and it crystallized in the following three questions, which were discussed during the panel:

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?

In order to address these questions, a group of five panelists, namely Frantz Rowe, Shirley Gregor, Kai Larsen, Stacie Petter, and Guy Paré, all of whom having 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. Sections 3, 4, and 5, respectively, present the discussion of each of the three main questions stated above, before the paper concludes with a short summary, additional IS-specific challenges and an outlook.

2 Background of Literature Reviews

A review can be a part of a paper reporting 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.

LRs have been studied not only by IS researchers but also by scholars of other disciplines, 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). Unsurprisingly, the diversity of disciplines has led to the adoption of 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), and 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 provide a comprehensive overview of 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 the following, 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 mentioned above, the literature has suggested many definitions of literature reviews. For example, they have been defined 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), *"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); a synthesis of various definitions of LRs is provided by Schryen (2015). Despite the presence of so many definitions, scholars across fields agree that the essence of a LR is not only to synthesize the findings within a literature but also to interpret these findings. The interpretation can occur in various forms, including criticizing findings and identifying research gaps.

LRs are also commonly acknowledged to play a central role in the development of scientific knowledge (Webster & Watson, 2002). As indicated 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). This can be accomplished, for example, by identifying research gaps (Jennex, 2015; Müller-Bloch & Kranz, 2015), which can then be closed in subsequent research endeavors. Such endeavors can be related to the development of new models or theories (LePine & Wilcox-King, 2010; Rowe, 2014), which can be empirically evaluated, or to 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, they have developed several classifications of LRs. The following classifications are useful to frame the panel discussion:

Rowe (2014) distinguishes reviews according to the goals they pursue. He distinguishes reviews that aim at 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 aiming at testing (mostly meta-analyses) gather empirical evidence and determine aggregate effect sizes.

The typology proposed by Paré et al. (2015) 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, with the attributes including scope of questions, search strategy, nature of primary sources, explicit study selection, quality appraisal and methods for synthesizing/analyzing findings.

The classification of Schryen et al. (2015) is knowledge-oriented and suggests the classification of 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.

LRs have also been classified according to the techniques used in the LR. For example, King & 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 focusing 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. Vote counting is used for drawing qualitative inferences about a focal relationship based on the outcomes of hypothesis tests reported in individual studies. When vote counting is complemented by the consideration of effect sizes and construct reliabilities, it is regarded as meta-analysis, which is considered by Hunter & Schmidt (2014) as the most rigorous statistical approach to aggregating empirical evidence, allowing 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 disciplines, such as medicine and psychology, of the existence of several types of LRs and can consider what is needed 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, two new types of LRs, scoping and realist reviews, were introduced.

Meta-analyses represent one type of LR that the IS field is supposed to be relatively familiar with. Still, Franz Rowe highlights 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, n.d.). While the majority focuses on IS evaluation and IS usage, as Franz Rowe argues, important other research streams in the IS discipline miss the opportunity to look back to what the streams have produced. For example, it appears there is only one meta-analysis in IS value and decision support systems, and none in IS security, outsourcing, or business process management. In addition to the lack of meta-analyses in terms of amount, there is a lack in terms of quality. Therefore, the panelists agree that there is still much that IS scholars can learn to more adequately perform meta-analyses.

In particular, Stacie Petter emphasizes the challenges in drawing sound conclusions from meta-analysis 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 labelled similarly or even equally, but which have completely different items and are measured in very different contexts. This produces other potential moderators that could influence the relationships. For instance, a study evaluating the success of an ERP system might have a very different outcome compared with a study evaluating the success of medical systems.

To overcome these limitations, Stacie Petter calls 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.*" [1]

[1] http://aisel.aisnet.org/trr/

However, Shirley Gregor points out that evaluating support for knowledge claims in meta-analysis should not be restricted to analysis of studies that all use the same method (Olbrich, Frank, Gregor, & Rowe, 2017). For instance, there are many IS studies testing claims based on TAM in cross-sectional surveys. Cross-sectional surveys, though, have limitations because they can rarely tell us 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 not only on the quantity of favorable evidence, but also on the variety of the evidence. Triangulation of evidence and thus more variety mean stronger support.

In addition to meta-analyses, Guy Paré highlights two new types of LRs proposed outside of IS, but with relevance and value for our field. The first is scoping reviews as proposed by Arksey & O' Malley (2005) about 12 years ago. This article has been cited almost 2500 times so far, but, although it has been applied in various fields, it has not been applied in IS yet. Scoping reviews are aligned with a a positivist tradition and the goal is to provide an initial indication of the size and nature of what has been published on an emerging topic. As 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. One of the main objectives is to identify 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 as well as the research agenda using focus groups with experts in the field – with practitioners. This step should ensure that what has been proposed to organize and orient future work on the topic of interest is relevant for practice. Although there are some reviews in IS that are similar in spirit to the scoping review, none has used the formal methodology that was proposed in 2005.

The second type of LR Guy Paré suggests aims at 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, there are formal methodologies that are more interpretive in nature and also aim at theory building. One of these methods is the realist review as proposed by Pawson, Greenhalgh, Harvey, & Walshe (2005) in the sociology and social policy field. The goal of realist reviews is to develop an in-depth understanding of complex interventions. One example of complex interventions is the implementation of IS that have context-specific implications for business processes, structure, strategy, etc. The typical research question asked in realist reviews is "under which circumstances does a specific intervention work for whom, how, and why?" This is the same basic question that we also often ask in IS. By contrast, the typical question that is being asked in a meta-analysis is "what works?" So, there is no preference for quantitative or qualitative evidence because a realist review sees merits in both types of evidence. The main goal is to investigate and identify 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, a group, or an organization.

Overall, the panelists provide 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. Regarding the former type, the panelists refer to the medical field and recommend that, albeit the IS discipline has made use of meta-analyses, improvements in reporting IS research and extending the scope of meta-analysis to a broader set of IS domains and enhancing methodology are necessary. With regard to the latter types, Guy Paré points to the fields of sociology and social policy and highlights the usefulness of adopting these types, which have hardly been used in the IS discipline.

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 disciplines, IS scholars conducting LRs must not ignore the challenges specific to IS. Shirley Gregor highlights two of them.

First, the phenomena in IS are moving targets. Thus, a challenge is that terms used 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. There is the need to account for this shifting terminology when reviewing articles 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 aim at solving the same or similar problem (e.g. improving decision making). This practice enables the investigation of the lineage of the systems in each class and the study of their capabilities over time, including older forms of system that address the same end. Often, we will find commonalities in the underlying knowledge, even though the technologies vary. As one example, we see research results concerning explanations generated by business intelligence and big data systems that echo what was previously discovered for knowledge-based systems (e.g., (Gregor & Benbasat, 1999), without any acknowledgement that this is the case. 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 not only about publishing papers, but – as Shirley Gregor suggests – it is about producing (design) knowledge for people to act on. That is 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, behavioral work that has studied the capabilities of a recommendation agent leading to the desired outcomes needs to be considered. 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 are producing new knowledge and our results will likely not be published. It is important to include design knowledge in reviews as well as 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) [2]. 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 take into account.

Table 1. Summary of Recommendations for Question 1

What the IS field can learn:	
Meta-analysis	To increase the credibility of meta-analysis in IS, studies using a variety of approaches (e.g., randomized controlled trials as well as surveys) are desirable.
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.
IS-specific challenges:	
Moving targets	Synthesize knowledge on systems that aim at similar goals, but might have been labelled 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.

[2] The PICO model can be both compared and contrasted with the CMO model (context, mechanism, outcome) of the realist review (see Pawson, Greenhalgh, Harvey, & Walshe (2005)).

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

To foster the genre of LRs in the IS field, open ontologies and taxonomies of IS knowledge are a valuable supplement to the scholarly development of LRs. This perspective is complemented by calls for an interpretive, philosophical stance and the argument that the IS field should focus on advancing theory for understanding through LRs.

Kai Larsen argues that the static nature of traditional, paper-based LRs limits their capacity to provide a current overview of the latest hot-off-the-press findings and it aggravates the problem of discordant naming of constructs, because these issues cannot be corrected after publication. Traditional LRs do not cover papers published after the LR was accepted for publication and a complete coverage of papers published during the peer review process of the LR manuscript cannot be expected either. Consequently, a synthesis pertains to the years leading up to a few months or even years before the LRs date of publication and with every year the LR has been available, there is another annual production of papers that is not covered. Another issue, authors of LRs have to address, is that in the literature the same real-world phenomena are sometimes referred to by different construct names. The problems raised by *construct identity fallacies*, ("*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 are driven by authors feeling pressured to publish new research insights and resorting to renaming existing constructs. These practices cause tremendous problems for scientific progress in any discipline and fixing these issues incurs costs. For example, in the health sciences, the National Institute of Health (NIH) invests substantial amounts of money and parts of the budgets for Australia's, Canada's and Europe's medical research are allocated to fixing discordant construct naming practices.

These challenges – as Kai Larsen contends – could be addressed by developing alternatives to the paper-based way of aggregating knowledge through traditional LRs. In this regard, the IS discipline 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*" that is 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 articles and how they fit together. Michael Wade has developed the IS theory wiki[3], which is used by 135,000 people every year; Bernard Fallery has developed a similar site for the francophone community (1,500 users per month)[4]. 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[5], containing about 80,000 constructs that are searchable and integratable. Similar projects outside IS are gene ontologies from the health sciences and Frank Bosco's metaBUS project[6] 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 allowing users to understand how constructs relate to each other. On top, a meta-analytic framework has been implemented, which allows users to analyze automatically meta-analytic correlations in the organizational behavior field. These projects illustrate not only new approaches to fostering aggregation of scientific knowledge in IS, but many of these projects, 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 are contingent on open access to large volumes of papers, and researchers face legal risks of copyright infringement when they initiate similar large-scale projects. If these challenges can be addressed, there are tremendous opportunities of creating a more up-to-date body of IS knowledge. In addition, design-oriented IS researchers have the skills to advance automated tools and approaches for analyzing vast amounts of research data, for example, by 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.

[3] http://istheory.byu.edu/
[4] http://sietmanagement.fr/
[5] http://inn.theorizeit.org/
[6] http://metabus.org/

Frantz Rowe contends 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, but possibly 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 aiming at understanding and reviews aiming at explaining might not be evident at first sight. To elaborate on this distinction, Georg Henrik von Wright (1971), in "Explaining and Understanding", 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 allows *understanding why things happen*. Better understanding can be achieved 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 Myer's (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 can be considered as reviews for understanding. The first method is a critique and one exemplar is Guido Schryen's paper that he published on the business value of IT at the *European Journal of Information Systems* (2013). Central to his review is Figure 3 (p. 151), which allows him to critically consider the interdependency between the deficiencies identified earlier in the paper (what we know is summarized in Figure 1 and Figure 2) and the systemic[7] 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 particularly neglected dimensions of inertia, governing agency and failure for understanding information systems enabled organizational transformation. The last method is problematization at an ontological and epistemological level. A typical paper is the review of Maryam Alavi and Dorothy Leidner that discusses knowledge, and knowledge systems (2001). These ways of probing the field of what we know, can be very rich, and in the latter case, it does not have to be systematic. In summary, Frantz Rowe highlights the words systemic, not systematic, and problematization for better understanding of the phenomena that we study – a preferred way for developing the field and in particular LRs.

Overall, the key recommendations of the panelists, summarized in Table 2, are complementary. 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

How the IS field should move forward to foster the genre of LRs:	
Open ontologies and taxonomies	Develop and use open ontologies and taxonomies of IS knowledge as a valuable supplement to the scholarly development of 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 discipline.
LRs for understanding	Advance IS reviews aiming at understanding, for example (1) by developing a systemic critique, (2) by problematizing issues relating to theoretical schools or levels of analysis, or (3) by problematizing issues at an ontological and epistemological level.

[7] 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 the quality of a LR. 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. The first one is 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, like conceptual articles and bibliometric articles. The second objective is to develop an in-depth understanding of the critical steps involved in a review process, an overview of how the review types canbe distinguished and knowledge of the challenges that are specific to every single type. The final objective is 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, Tate, Johnstone, & Kitsiou, 2016; Templier & Paré, 2015). This seminar is not only relevant to students in information systems, but more generally to all business students, including from accounting, organizational behavior, human resources, strategy and marketing. In particular, structured training in review methodology would be useful for doctoral students who write their thesis based on a combination of single essays and aim at publishing their initial review paper.

While there is broad agreement on the importance of solid doctoral training in review methodology, Stacie Petter contends that this does not mean that every doctoral student should necessarily publish a review. Depending on the type of research pursued by a doctoral student, 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 they develop related work sections of an empirical paper and when they serve as a reviewer for (standalone) review manuscripts, for example.

The panelists and the audience raised additional thoughts. First, students could gain hands-on experience by reproducing and extending the methodological steps of prominent reviews if the review procedure is reported 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. The importance of creativity and imagination should not be neglected 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 not only more fun, it also allows authors to incorporate different viewpoints before submitting the manuscript, and it 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 there is consensus among the panelists that doctoral training on LRs could be improved – Table 3 summarizes the key suggestions on how improvement may be accomplished –, there are different perspectives on the relevance of LRs for doctoral students. For example, one panelist argues that a publishable LR might not evolve from every doctoral student's thesis.

Table 3. Summary of Recommendations for Question 3

The best approaches to train doctoral IS students in publishing LRs:	
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, for example, by replicating published LRs that provide a transparent description of the methodological steps.
Competence in reviewing LRs	Prepare the next generation of researchers also for serving as competent peer reviewers of LRs.
Qualities that LRs should have	High quality LRs should be characterized by (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 highlight the importance and relevance of advancing LRs in the IS field. To enhance future review endeavors, the panelists first discussed what the IS field can learn from other fields in terms of LR approaches. Two new types of LRs relevant for IS scholars are presented. First, scoping reviews (Arksey & O' Malley, 2005) can help to review emerging IS topics. Second, realist reviews (Pawson et al., 2005) can help to 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 us the necessity of carefully testing relationships between constructs in replication studies, for instance, by applying randomized controlled trials.

Moreover, LRs in IS must not neglect IS-specific challenges. The panel raised two of them. The first challenge is that IS research is studying moving targets. Therefore, it is important to 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 to act upon. Therefore, it is important that LRs of design-oriented and behavioral studies are system capabilities-centered.

In addition to these two challenges, we see further IS-specific challenges that LR need to address. A third challenge arises from the nature of the IS field as a socio-technological discipline which is connected to many neighboring disciplines, 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 that are covered. The diversity of foci refers to the publication outlets that have to be searched, the methodologies and theories that have been adopted in the body of literature, the philosophical approaches that have been used, and so on. LRs need to account for these particularities of the covered neighboring disciplines, which makes it impossible, and also not advisable, to provide universally applicable recommendations. A fourth challenge is related to the above-mentioned ontological issues. In the IS literature, the same real-world phenomena is sometimes referred to by different construct names, which makes it challenging to synthesize and interpret the body of literature with semantic accuracy. This issue is further complicated because of the various connections to neighboring disciplines, which may have their own ontologies (and ontological issues).

Building on the issues raised in the panel, it was discussed how the IS field should move forward to foster the genre of LRs. The IS field can benefit from reviews aiming at understanding, for example, by 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 supplement the scholarly development of LRs, it is also important 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 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 provide a transparent description of 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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[8] http://gepris.dfg.de/gepris/projekt/315925033?language=en
[9] http://gepris.dfg.de/gepris/projekt/321298175?language=en
[10] http://gepris.dfg.de/gepris/projekt/327130595?language=en

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