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Writing qualitative IS literature reviews – Guidelines for synthesis, interpretation and guidance of research

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Abstract: The literature review is an established research genre in many academic disciplines, including the IS discipline. Although there is consensus that systematic literature reviews should be rigorous, there are only few instructional texts for compiling a solid literature review, at least with regard to the IS discipline. In response to this shortage of guides, the overall goal of this tutorial is to provide practical guidance for both students and researchers in the IS community who want to methodologically conduct qualitative literature reviews. Our tutorial differs from other instructional texts in two regards: (1) In contrast to most textbooks, we do not only cover the task of literature search and synthesis but also the challenging tasks of framing the literature review, interpreting research findings and proposing research paths. (2) We draw on other texts that provide guidelines for writing literature reviews in the IS discipline but we make strong use of examples of published literature reviews. We use an integrated example of a literature review, which guides the reader through the overall process of compiling a literature review. We additionally use further literature reviews.

Keywords: literature review; methodology; tutorial; literature synthesis; research gaps; research agenda

I. INTRODUCTION

The literature review is both an established research genre and an important research method itself in many academic disciplines, including our own IS discipline.[1] Reviews are beneficial for academics at different stages of their career and for different purposes: First, "*a literature review is the genre of paper that every researcher looks for when starting a research study*" [Rowe, 2014, p. 242]. Knowledge on what other researchers have achieved in a particular research field is essential for enhancing the body of knowledge in the respective field for at least two reasons. It "*help[s] scholars avoid 'reinventing the wheel'*" [Zorn and Campbell, 2006, p. 173] and thereby marginalizing their work. Even more important, it allows performing incremental research by building on what other researchers have done. As Baker [2000, p. 219] notes, *"[t]he evolution and creation of new knowledge proceeds generally by a process of accumulation. Thus, in presenting his new theories, Isaac Newton observed, 'If I can see further it is because I am standing on the shoulders of giants.' ".* Boote and Beile [2005, p. 3] put it in a nutshell *"A researcher cannot perform significant research without first understanding the literature in the field".* The particular importance of literature reviews is highlighted by IS researchers who argue that they facilitate theory development and research landscaping, reveal research gaps and unrecognized assumptions [Rowe, 2012,2014] and provides the foundation for research in IS [Webster, 2002, p. xiv].

Second, literature reviews are important for students both at graduate and doctoral level [Boote and Beile, 2005; Okoli, p. 2f, 36ff] in two regards. Reading literature reviews of scholars helps to get familiar with the topic of their theses in an efficient way, and also writing one themselves is usually required in order to demonstrate knowledge on a domain as Rowe [2014][2] notes: *"[A]ll PhD students do one when developing their monograph, and many of those who opt for the three essays genre, more prevailing in North America than in Europe, also perform one, albeit one, which is publishable and generally more systematic."*

The importance and the potential leverage of literature reviews has started to increase across all academic disciplines due to rapidly evolving technical developments. First, the digitization of literature and enhanced online search capabilities have improved access to publications. Second, qualitative data analysis tools, such as CATMA, NVivo and MAXQDA, add powerful analysis capabilities. These technical developments globalize literature reviews and substantially widen their scale and scope.

[1] An overview of the history of literature reviews is given by Cooper and Hedges [2009, p. 7ff] and Chalmers, Hedges and Cooper [2002].
[2] Cf. footnote no. 2.

Literature reviews occur in different forms related to different purposes [Boell and Cecez-Kecmanovic, 2014, p. 260; Okoli, p.10ff]. One dimension for classifying literature reviews draws on the purpose of the document. A literature review can be a) part of an article reporting a specific research study, b) an important type of publication in their own right (standalone reviews) when they are more than the sum of its parts (reviewed research papers) [Schwarz et al., 2007], c) part of project proposals [Baker, 2000], and d) part of a thesis (cf. comments above). These different kinds of literature follow different purposes which involve different time and space that authors have available. For example, in theoretical background sections, the literature review is usually a relatively small part of the overall article, and it is not given as much time as the data collection and analysis [Okoli and Schabram, 2010, p. 5]. However, we agree with the authors that in all kinds of literature reviews, rigor should be present through a systematic literature review and that the difference between stand-alone reviews and other kinds is only a pragmatic matter.

A second dimension for classifying literature reviews addresses the methodology and the writing style. A literature review can be purely quantitative. Typical examples are scientometric and bibliometric studies (e.g., [Sellitto, 2007, Serenko et al., 2010]). We do not consider these types of literature reviews in this tutorial. We rather cover literature reviews with a focus on the content and methodologies used in the literature. Such literature reviews can include both qualitative and quantitative elements. King and He (2005) distinguishes narrative reviews, descriptive reviews, vote counting, and meta-analysis. A narrative review (e.g., [Powell et al, 2005]) 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 (e.g., [Riedl et al., 2011]) analyzes to what extent the existing literature supports a particular proposition or reveals an interpretable pattern. As both types are mainly qualitative, we refer to these literature reviews as “qualitative literature reviews”. Vote counting (e.g., [Topi and Ramesh, 2002]) is used for drawing qualitative inferences about a focal relationship based on the outcomes of tests of hypothesis reported in individual studies. When vote counting is complemented by the consideration of effect sizes and construct reliabilities, it is regarded as meta-analysis (e.g., [Kohli and Devaraj, 2003]). We neither cover vote counting nor meta-analysis. To sum up, this tutorial addresses the composition of qualitative (IS) literature reviews.

The importance of literature reviews in the IS discipline has been acknowledged in various forms. For example, many renowned academic journals include the literature review as a welcomed genre, MIS Quarterly has even launched a “Theory and Review Department”, and IS scholars have published a few articles on literature review

methodology (e.g., [Webster and Watson, 2002; Okoli and Schabram, 2010]). However, writing literature reviews is a challenging task for a variety of reasons. First, as Fink [2010, p. xi] notes, "*each year, the results of tens of thousands of studies are printed in journals, books, magazins, and on the Web. […] How can an individual identify and make sense of the voluminous amount of currently available information […]?"*. Second, structuring and presenting literature findings is difficult [Webster and Watson, 2002, p. xiix]. Third, beyond some synthesis capabilities, authors are required to have classic systematic and analytical skills, for example, in order to identify lacks of knowledge, and even more advanced speculative abilities and intuition in order to propose paths for closing the knowledge gap [Rowe, 2012, p. 471]. Finally, the compilation of literature reviews in the IS discipline is a particularly challenging process because its interdisciplinary nature requires authors to often draw on theories from a variety of fields [Webster and Watson, 2002, p. xii f].

Undertaking a literature review is acknowledged as an important research method in itself ([Green, Johnson and Adams, 2006] cited in [Boell and Cecez-Kecmanovic, 2014, p. 260]), which does not require less academic rigor than other genres [Okoli and Schabram, 2010, p. 2]. With regard to the IS discipline, Levy and Ellis [2006] and Webster and Watson [2002] lament the fact that IS researchers tend to be unaware of the need for structure in reviews. We conclude that there is a strong need for methodological guidelines on how to conduct literature reviews in the IS discipline. However, we share the observation of Wolfswinkel, Furtmueller and Wilderom [2013] that there are only few instructional texts for compiling a solid literature review, at least with regard to the IS discipline.

In response to this shortage of guides, the goal of this tutorial is to provide practical guidance for both students and researchers in the IS community who want to conduct a literature review. In the presence of other literature on how to conduct literature reviews, we aim at avoiding "reinventing the wheel", i.e., the reproduction of what others have already published. We rather draw on their contributions; more precisely, this tutorial differs from other sources in two regards: a) There exists several good textbooks on how to write literature reviews. For example, Cooper, Hedges and Valentine [2009], Cooper [1998] and Hart [1988] provide excellent handbooks with a focus on behavioral and social scientists as audience, and Fink [2010] suggests guidelines for a general audience. In contrast to most of these textbooks, we do not only cover the task of literature search and synthesis but also the even more challenging tasks of framing the literature review, interpreting research findings and proposing research paths. b) Other IS scholars have already provided guidelines for writing literature reviews in the IS discipline, e.g. [Webster and Watson, 2002; Okoli and Schabram, 2010; Levy and Ellis, 2006]. Again, we draw on these sources but we additionally provide an example of a literature review that was published by the author in the journal EJIS. The

purpose of using this example is to guide the reader through the overall process of compiling a literature review, to illustrate general principles and to share the experience that the author has made when compiling, revising and publishing the review over a period of more than three years. We complement the use of our sample literature review with examples of other literature reviews in order to provide diversity with regard to topics, journals and authors.

The application of our tutorial is not limited to the IS discipline but can also be used in other disciplines, including applied business disciplines with a focus on IS. However, as the tutorial is published in an IS journal, we tailor the description of literature search to the needs of IS scholars by listing databases and rankings that are particularly useful for IS scholars. Furthermore, the examples of literature reviews used throughout this tutorial have been gathered from the IS literature.

Before starting with the suggestion of practical guidelines, we would like to reveal the aspired benefits of this tutorial for the reader. We provide general advice and practical examples of how to synthesize knowledge, interpret it, and guide future research in terms of providing a research agenda. As mentioned above, these tasks and related capabilities are required in the IS community. We address all kinds of reviews, be they stand-alone reviews or integrated parts of articles. However, we do not discuss literature reviews from a philosophical approach as done by Boell and Cecez-Kecmanovic [2014], who suggest a hermeneutic approach, for example. We also do not provide or apply a specific theory as done by Wolfswinkel, Furtmueller and Wilderom [2013], who apply grounded theory as methodology. We rather suggest a methodological framework.

The remainder of this tutorial is structured as follows. Section II shows the essence of literature reviews. Section III briefly introduces the literature review (on IS business value) which is used as a guiding example. Section IV shows how a literature review can be framed and structured in terms of phases, tasks and sections. Sections V to X describe the framing and each of the phases in detail, including several examples. We conclude this tutorial in Section XI with some recommendations and the limitations of our tutorial.

II. THE ESSENCE OF LITERATURE REVIEWS

When writing a literature review, authors should carefully make decisions in advance on its focus, types of outcomes, framing and phases (see Figure 1).

Focus	Outcome	Framing	Phase
Topic	Synthesis	Ad hoc	Search and assessment
Domain	Interpretation	Incremental	Synthesis
Discipline	Guidance	Conceptual	Interpretation
			Guidance
			Conclusion

Figure 1. Ontology of literature reviews

Focus

With regard to focus, a literature review can cover a chosen topic, chosen domain or chosen discipline, in ascending order of scope. For example, Powell et al. [2004] review the literature on the topic of "virtual teams", Melville et al. [2004] review the literature on the well-accepted IS domain of "IS business value" and Steiniger et al. [2009] conduct a literature analysis on fads and trends in business and information systems engineering and information systems research. The quantity of effort required for the literature review will differ depending on the focus. Our tutorial is applicable to all three types of focus.

Outcome

When writing a literature review, the authors have to be aware of the outcome their review should have. The literature does not provide a unique definition or understanding of what a literature review should do in this regard. Table 1 provides definitions of scholars with experience in literature reviews in alphabetical order. We use the various understandings in order to condense possible outcomes of literature reviews.

As Table 1 shows, most authors agree that a literature review should not only provide a synthesis of the body of knowledge but also some kind of interpretation. If we consider the identification of research gaps as a specific type of interpretation, we can condense the possible outcomes of literature reviews to three types: a) synthesis of literature, b) interpretation of literature, and c) guidance for (future) research. We do not want to (and are not able to) resolve the conflicting perspective on whether outcomes b) and c) are mandatory elements of a literature review. We leave it to the authors of prospective literature reviews to decide which outcomes they would like to assign to their review. In this tutorial, we cover all three types of outcomes.

Table 1. Definitions and Understandings of Literature Reviews

Reference	Definition/Understanding	Key function(s)
(Blaxter, Hughes and Tight, 1997, p. 110)	*"a critical summary and assessment of the range of existing materials dealing with knowledge and understanding in a given field "*	(Critical) Synthesis
(Blumberg, Cooper and Schindler, 2005, p. 11)	*"an appropriate summary of previous work. But it needs an added dimension – your interpretation."*	Synthesis, Interpretation
(Boell and Cecez-Kecmanovic, 2014, p. 258, 260)	*"literature reviews examine and critically assess existing knowledge in a particular problem domain, forming a foundation for identifying weaknesses and poorly understood phenomena, or enabling problematization of assumptions and theoretical claims in the existing body of knowledge."* *"A review of the literature in any given field shows us both where we have been and where we need to go."* [Neely and Cook, 2011, p. 82] cited	(Critical) Synthesis, Identification of research gaps, Guidance of future research
(Fink, 2010, p. 3)	*"A research literature review is 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."*	(Critical) Synthesis
(Hart, 1998, p. 27f)	Review serves the following purposes: *"1 distinguishing what has been done from what needs to be done;* *2 discovering important variables relevant to the topic;* *3 synthesizing and gaining a new perspective;* *4 identifying relationships between ideas and practice;* *5 establishing the context of the topic or problem;* *6 rationalizing the significance of the problem;* *7 enhancing and acquiring the subject vocabulary;* *8 understanding the structure of the subject;* *9 relating ideas and theory to applications;* *10 identifying the main methodologies and research techniques that have been used;* *11 placing the research in a historical context to show familiarity with state-of-the-art developments."*	Synthesis, Identification of research gaps
(Levy and Ellis, 2006, p. 183)	*"An effective literature review accomplishes [the task of knowing the current status of the body of knowledge] by: 1. Helping the researcher understand the existing body of knowledge including where excess research exists (i.e. what is already know?) and where new research is needed (i.e. what is needed to be known?). […]"*	Synthesis, Identification of research gaps
(Rowe, 2014)[3]	*"A literature review synthesizes past knowledge on a topic or domain of interest and identifies important knowledge gaps and directions. […]Literature reviews should strive at least to identify gaps and propose some research directions and not just stop at the summarizing/synthesizing stage." […] "Its synthetic character should entail an interpretation of this existing knowledge."*	Synthesis, Identification of research gaps, Guidance of future research
(Schwarz et al., 2007, p. 35)	Purposes of review articles include: *"to summarize prior research", "to critically examine contributions of past research", "to explain the results of prior research found within research streams", "to clarify alternative views of past research (not necessarily integrative)"*	(Critical) Synthesis
(Webster and Watson, 2002, p. xix)	*"A review should identify critical knowledge gaps and thus motivate researchers to close this breach. That is, writing a review not only requires an examination of past research, but means making a chart for future research."*	Synthesis, Identification of research gaps

[3] Cf. footnote no. 2.

Framing

Framing a literature review refers to defining the scale, scope, the granularity, and the sensitivity of the review. In general, framing can be “ad hoc”, incremental, or conceptual, in ordinal order of abstraction. An “ad hoc” literature review does not select in advance a concept, such as a framework, model or theory, to organize the presentation of literature findings. It also does not include a structured literature search. An example is a literature review that includes a simple Google search on a topic and provides the author-centric presentation of results. In an incremental literature review, each step determines the next. For example, the result of the literature search determines the way in which the presentation of findings is structured. In a conceptual literature review, one or more concepts, such as models, frameworks or theories, are motivated and used to structure the presentation and the interpretation of findings. In our tutorial, we focus only on this type of literature reviews.

Phase

Framing a literature review has a fundamental impact on the various phases of conducting a literature review. We distinguish five phases: The phase “search and assessment” is related to how relevant literature can be acquired, the phases “synthesis”, ”interpretation” and “guidance” are related to how to achieve the corresponding outcomes of the literature review, and the phase “conclusion” is related to how to finish the literature review.

Before we provide detailed recommendations for how to conduct a literature review, in the next section we provide a sample literature review that serves as “running example” throughout the remainder of this tutorial.

III. RUNNING EXAMPLE: REVIEW OF IS BUSINESS VALUE LITERATURE

In order to illustrate the guidelines provided in the following sections, we use one literature review that covers all three outcomes (synthesis of knowledge, interpretation of knowledge, and guidance of further research) as a running example. Thereby, we strive for the coherence of illustration of all outcomes. We decided to draw on a literature review that was published by the author in 2013 in the European Journal of Information Systems (EJIS). More precisely, we draw on the reference [Schryen, 2013]. The reason for selecting this literature review is not that we regard it in any way superior over others in terms of quality, but rather because we do not only know the product – the literature review itself – but we are also familiar with the process of compiling it. We use this familiarity in order to share experience on the “dos and don’ts” when compiling, revising and publishing a literature review.

In the remainder of this tutorial, we refer to the reference [Schryen, 2013] as “the sample literature review”. It synthesizes the body of knowledge on IS business value, identifies gaps in research as one type of interpretation,

and suggests a research agenda, including research thrusts and research path, as one type of guidance. The sample literature review is structured as follows (cf. Figure 2): after the introduction, it frames IS business value research through defining the concepts of “information systems (IS)” and “IS business value”, and describing the theoretical paradigms used in IS business value research. The next section synthesizes literature findings with regard to performance measures, impact on productivity, impact on market performance, impact on accounting performance, contextual factors and lag effects. The identification of research gaps in the following section discusses ambiguity and fuzziness of the “IS business value” construct, the neglected disaggregation of IS investments, and IS business value creation process as grey box. The next section presents the research agenda by suggesting and discussing research thrusts along the previously identified research gaps. Then, the sample literature review describes potentials for further research before it concludes.

IV. STRUCTURING THE LITERATURE REVIEW

A key question when compiling a literature review is how to structure it in terms of both procedure and the final artefact, i.e., the actual literature review paper. Procedure and artefact are not independent, and we make suggestions for both.

We find a large consensus in the literature (e.g., [Webster and Watson, 2002; Cooper, 1998, Fink, 2010, Wolfswinkel, Furtmueller and Wilderom, 2013; Rowe, 2014]) that the process of conducting a literature review should include the following tasks, which we either assign to the overall process of framing or to one of the phases.

Framing

Although framing is a process that has a fundamental impact on all phases, there should be a dedicated place in the literature review where you describe it. In the beginning of your endeavor, you should state what the motivation of writing a literature review on the selected topic(s) is and how your literature review differs from other reviews that have been published (uniqueness), what the goal of your literature review is, what the scope and what the boundaries of your literature review are, and how you structure your literature review [Webster and Watson, 2002, p. xv; Wolfswinkel, Furtmueller and Wilderom, 2013, p. 3; Okoli and Schabram, 2010, pp. 7,14]. The purpose of defining and describing these attributes is threefold: i) It helps you focus on those parts of the topic and of the literature that you consider to be central for your work. ii) It provides a first introductory overview for the reader and informs him/her what s/he can expect to get and what not. iii) You can demonstrate to the reviewer already at an early stage of his/her reading that your literature review shows both relevance for scholars and/or practitioners, and rigor in terms of review methodology. We describe the process of framing the literature review in detail in Section V.

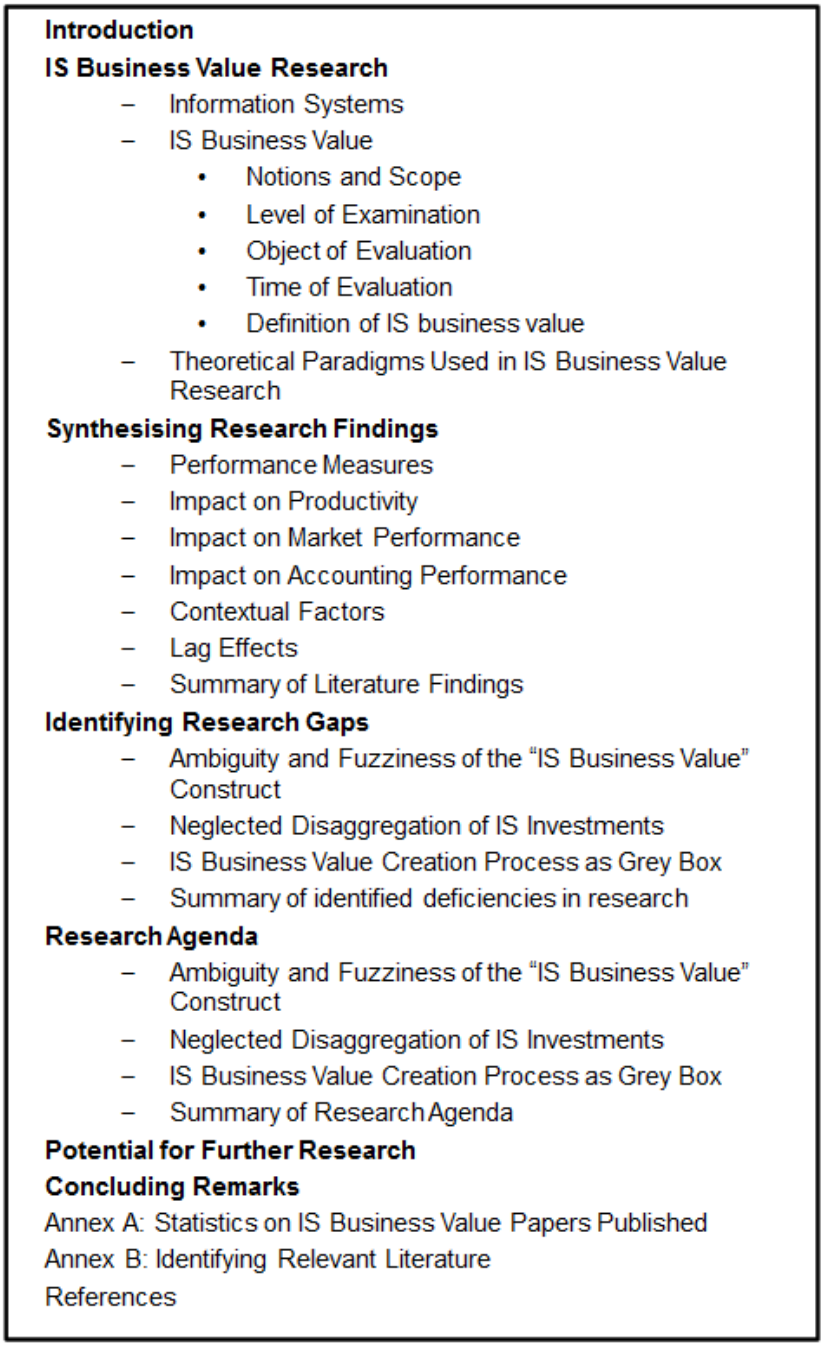


Figure 2. Structure of the sample literature review [Schryen, 2013]

Search and assessment phase

This phase includes the search of literature and the assessment of the collected articles. While the literature search process (cf. first subsection of Section VI) can be described largely independent of the topic and the goal(s) of the literature review, the assessment (cf. second subsection of Section VI) depends on the particular literature review and can thus be described only in a generic way.

Synthesis phase

The overall task of synthesizing what other researchers have found and published on the considered topic is mandatory regardless of the particular type of literature review. It includes both the description of concepts used to structure the presentation of literature findings and the actual presentation. We describe both tasks in detail in Section VII.

Interpretation phase

The benefit of a literature review should go beyond a synthesis of research findings: the literature review should be critical [Schwarz et al., 2006]. As Boell and Cecez-Kecmanovic [2014, p. 267] note, *"[c]ritical assessment […] not only reveals but also, and more importantly, challenges the horizon of possible meanings and understanding of the […] established body of knowledge."* A look at various understandings of literature reviews (cf. Table 1) shows that often the identification of research gaps is required. However, it is not necessary to reveal what is missing in the literature in order to be critical. Some authors [e.g., LePine and Wilcox-King, 2010, p. 1f; Webster and Watson, 2002, p. xix] suggest that literature reviews draw on the body of knowledge to extend current theories or to look for new theories. Both types of contributions can be merged, as Wolfswinkel, Furtmueller and Wilderom [2013] note, when the analysis of literature leads to the *"discovery of gaps in knowledge that are important for research explorations with a theory-building focus."* We identify a third type of contribution when the body of literature is viewed from a new perspective, which can (but does not have to) lead to new explanations of domain phenomena.

We subsume any of the above kinds of contributions as tasks of interpretation. While it is difficult to provide a precise description of how to accomplish the interpretation task, we present guidelines and show sample literature reviews in Section VIII.

Guidance phase

There is no consensus in the literature with regard to whether and how a literature review should guide further research. For example, while the editorial statement[4] of the Journal of Database Management notes that *"[r]esearch reviews are insightful and carefully crafted articles that conceptualize research areas, synthesize previous innovative findings, advance the understanding of the field, and identify and develop future research directions."* and Webster and Watson [2002, p. xix] argue that *"[…] writing a review not only requires an examination of past research, but means making a chart for future research"*, Rowe [2014][5] states that *"[t]he same paper does not have to explain how we can get there literally.[…] [T]his is not the essence of a literature review."* We do not adopt a normative

[4] See http://www.igi-global.com/calls-for-papers/journal-database-management-jdm/1072.
[5] Cf. footnote no. 2.

perspective on this question, i.e., we neither require a literature review to guide future research, nor do we argue that a literature review does not have to include such kind of guidance. We rather provide recommendations and examples on how such a doubtlessly valuable contribution can be achieved by authors of literature reviews (see Section IX).

Conclusion phase

The last phase when compiling a literature review concludes it by summarizing key insights, drawing implications for research and practice, and including *"limitations and the unavoidable biases that may have occurred in one or more steps of the entire process."* [Wolfswinkel, Furtmueller and Wilderom, 2011, p. 9]. We provide guidelines for drawing conclusions in Section X.

Table 2 summarizes phases, tasks and suggestions for the structure of the literature review. It should be noted that the content of is not prescriptive but descriptive in terms of what we found in many literature reviews and in articles and books on the review methodology. Although the authors of a literature review might want to adapt some of the elements, serves as a framework that has been adopted by many authors of literature reviews.

Table 2. Overview of phases, tasks and structure of a literature review

		Tasks	**Structure (recommended section)**
Framing		Motivation, Uniqueness, Goal(s), Structure (MUGS)	Introduction
		Scope and boundaries (SB)	Introduction or framing section
	Phase		
	Search and assessment	Literature search (LS)	Appendix or methodology section
		Literature assessment (LA)	
	Synthesis	Description of concepts (DC)	Synthesis section(s) or concept section
		Literature presentation(LP)	Synthesis section(s)
	Interpretation	Identification of research gaps, adoption of a new perspective, and/or theory building	Interpretation section(s)
	Guidance	Research agenda, research propositions/questions and related paths	Guiding section(s)
	Conclusion	Summary, implications for research and practice, limitations	Conclusion section(s)

Table 3 provides some examples of how reviews in the literature have been structured. It also shows that the concrete structure in terms of particular chapters of literature reviews can look different.

Table 3. Structure of sample literature reviews							
		Tasks	**Structure**	**[sample literature review]**	**[Dibbern et al., 2004]**	**[Roberts et al., 2012]**	**[Muller and Ulrich, 2013]**
Framing		MUGS	Introduction	*1. Introduction*	*1. Introduction*	*1. Introduction*	*1. Introduction*
		SB	Introduction or framing section	*2. IS Business Value research*	*2. Conceptualization of IS Outsourcing*	*2. What Is Absorptive Capacity?*	*1. Introduction* *2. Theoretical framing*
	Phase						
	Search and assessment	LS	Appendix or methodology section	*Annex B*	*3. Research Approach of the Review*	*3. Absorptive Capacity in IS Research Appendix A*	*3. Review methodology*
		LA	Appendix or methodology section	*Annex B*	*3. Research Approach of the Review*	*3. Absorptive Capacity in IS Research*	*3. Review methodology*
	Synthesis	DC	Synthesis section(s) or concept section	*3. Synthesizing Research Findings*	*4. Literature Review and Analysis*	*3. Absorptive Capacity in IS Research*	*2. Theoretical framing*
		LP	Synthesis section(s)	*3. Synthesizing Research Findings*	*4. Literature Review and Analysis*	*3. Absorptive Capacity in IS Research*	*4. Analysis results*
	Interpretation		Interpretation section(s)	*4. Identifying Research Gaps*	*4. Literature Review and Analysis* *5. Discussion*	*3. Absorptive Capacity in IS Research*	
	Guidance		Guiding section(s)	*5. Research Agenda*	*n/a*	*4. A Framework for Investigating the Inter-action of Information Technology and Absorptive Capacity*	*n/a*
	Conclusion		Conclusion section(s)	*6. Potential for Further Research* *7. Concluding Remarks*	*6. Summary and Conclusions*	*5. Conclusion*	*5. Discussion* *6. Conclusion*

V. FRAMING

You can motivate your literature review in many ways. If there is no review available on a topic where a substantial body of literature is available, this is an excellent motivation. The question of whether the body of literature is "substantial" might be hard to answer clearly but you can search for the following indicators of maturity: a topic has been covered i) for several years by (tracks of) renowned IS conferences, ii) by one or more special issues of renowned IS journals, iii) by several articles published in regular issues of renowned IS journals, and iv) by several funding organizations or project calls. Furthermore, briefly querying literature databases (see Table 4) shows the magnitude of articles published on the topic. You can also try to support the need for writing a first literature review by citing scholars who have expressed such a need. In most cases, however, literature reviews have already been published and you have to explain in what regard your literature review differs from others. Uniqueness is given, for

example, when your review provides a new perspective on a topic and/or focusses on new or unsolved research questions. The following examples show how authors of literature reviews adopt these arguments.

> *"By and large, our knowledge has resulted from an organization-centric perspective based on internal business processes, organizational structure, and workplace practices (Bharadwaj 2000; Lichtenberg 1995; Mata et al. 1995). […] To continue advancing knowledge, however, an expanded conceptualization of IT business value is required. […]This raises new questions about how IT can be applied to improve organizational performance. For example, how do electronically connected trading partners impact a firm's ability to execute IT-based strategies for improved efficiency and competitive advantage? How does the evolving competitive environment shape IT business value? […]The review is unique among other reviews of the IT business value literature in its application of resource-based theory to analyze how IT impacts organizational performance. […] The review is also unique in its extension of the locus of IT business value to the external competitive and macro environment."* [Melville, 2004, p. 284].

> *"The business value of investments in Information Systems (IS) has been, and is predicted to remain, one of the major research topics for IS researchers […] However, as Baker et al (2008) argue, the fundamental question of the causal relationship between IS investments and business value remains partly unexplained. In addition, new IS and new IS phenomena lead to more questions over time that require addressing. IS researchers have not fully managed to identify and explain the economic relevance of IS (Fink, 2011) so that business executives and researchers continue to question the value of IS investments (Kohli & Grover, 2008). However, finding an answer to this question is regarded as fundamental to the contribution of the IS discipline (Agarwal & Lucas, 2005)."* [sample literature review, p. 139f]

In addition, the need for writing a literature review can be supported by a quantitative perspective. If no literature reviews on the topic has been published since many years in the presence of many research papers published over the past years, this can be a sufficiently strong argument. Or, if the number of papers published in the past years has declined in the presence of still unsolved important research questions, a literature review can re-stimulate researchers' efforts to solve the questions:

> *"Despite this epistemological deficiency in IS business value research, statistics on papers published in pertinent academic outlets show that after a publication peak in 2000 the numbers of published articles on IS business value declined […]"* [sample literature review, p. 140]

Having motivated the compilation of your literature review, you should precisely describe the goals and the contributions of your literature review. We use the two literature reviews referenced above in order to provide examples:

> *"The purpose of this review is to add to knowledge accumulation and creation in the IS academic discipline by summarizing what we know about IT business value and suggesting how we might learn more about what we don't know. Specifically, the objectives of this review are to (1) develop a model of IT business value based in theory and informed by existing IT business value research; (2) use the model to synthesize what is known about IT business value; and (3) guide future research by developing propositions and putting forward a research agenda."* [Melville, 2004, p. 284f]

> *"In order to reactivate researchers' interest and activities in the central field of IS business value, this paper provides a fresh perspective on the question of how IS investments create business value. […] its contribution is threefold: it provides a synthesis of key research findings, it identifies gaps in research, and it shows paths for overcoming the current research limitations by providing a research agenda."* [sample literature review, p. 140]

As it is common practice in IS research papers, the reader should be informed about the structure of the literature review. We provide a graphical presentation of such a structure at the end of this section. In this regard, literature reviews do not differ from other research papers. However, for the sake of comprehensiveness, we provide two examples:

> *"[…] we begin by introducing terminology and delineating the scope of the research stream. Next, we review theoretical paradigms and modeling approaches employed in prior research. We then develop an integrative model of IT business value using the resource-based view of the firm as a principal theory base. The model provides a basis for structuring our review of accumulated knowledge, for identifying gaps in knowledge, and for developing propositions to guide future research. We conclude by summarizing the findings and limitations of our analysis and by proposing an agenda for future research."* [Melville, 2004, p. 284f]

"The next section frames IS business value research, as it is understood in this work. Subsequently, we synthesise key research findings before we identify research gaps. This is followed by the presentation of a detailed agenda for future IS business value research. Then we discuss the potential for further research and present concluding remarks." [sample literature review, p. 140]

Either before explaining the structure of your literature review or afterwards in a separate section, you should state what the scope and what the boundaries of your literature review are. As Webster and Watson [2002, p. xv] note, it is important to provide elaborate definitions of your key variables and constructs, and to set boundaries of your work (e.g., level(s) of analysis[6], temporal[7] and contextual limitations[8], the scope of your review, certain contexts (e.g., types of occupations, organizations, or countries) and time periods[9]). You should also state what literature and fields you will draw upon [Schwarz et al., 2007, p. 29]. In the sample literature review, a separate section is used to describe the constructs "information systems", "IS business value" in terms of level of examination (individual level, firm level, industry level and economy level) , object of examination (IS assets and non-IS assets) and time of evaluation ("*ex post*"), and finally the theoretical paradigms used in IS business value research. The review provides a definition of IS business value as the central construct of the review:

"Drawing on the aforementioned multiple facets of IS research, we define: IS business value is the impact of investments in particular IS assets on the multidimensional performance and capabilities of economic entities at various levels, complemented by the ultimate meaning of performance in the economic environment." [sample literature review, p. 141]

Another example can be found in [Fullerton and Ness, 2010, p. 52], who provide a separate section for the elaboration of "information technology flexibility" (ITF) beginning with

"Before discussing ITF, an understanding of the flexibility component of IT is required. Merriam-Webster [8] defined flexible as 'characterized by a ready capability to adapt to new, different, or changing requirements' (p. 1). Another commonly used term within the IT field is agility [14]. Merriam-Webster [1] described agile as 'having a quick resourceful and adaptable character' (p. 1). Since flexibility and agility are defined similarly, the two words will be used interchangeably."

[6] The level of analysis can be individual, firm, branch, or/and national level.
[7] For example, a literature review on the impact of IS investments on the stock market may consider only those studies which analyze short term effects.
[8] A contextual limitation occurs, for example, when only specific IS investments, such as those in customer relationship management systems, are analyzed.
[9] Some reviews analyze only that part of the literature that has been published during a specific time period.

In their literature review “Framing the frameworks: A review of IT governance research”, Brown and Grant [2005] clearly acknowledge the importance of providing definitions of key concepts by naming their second section “What is IT governance?”. We recommend following the idea of Melville, Kraemer and Gurbaxani [2004], who conceptualize the construct “IT artifact” as shown in Figure 3.

Tool IT is a tool intended to generate value, whether productivity enhancement, cost reduction, competitive advantage, improved supplier relationships, etc. Specific intention for IT is often unknown. Studies of specific system and implementation contexts enable examination of tool view assumptions.
Proxy IT is operationalized via proxies such as capital stock denominated in dollars. Wide range of potential proxies exists, but few have been adopted. Adoption of diverse proxies enables triangulation and enhances accumulated knowledge.
Ensemble Assessment of IT business value generation in rich contexts, often using case or field studies. Organizational structure and co-innovations such as workplace practices may be included as moderators or mediators of value.
Nominal IT is not conceptualized and appears in name but not in fact. Abstraction enables model precision at the expense of generality.

*Adapted from Orlikowski and Iacono (2001). Computational conceptualization is not applicable to IT business value research and is omitted from the table.

Figure 3. Representation of the key concept “IT artifact” [Melville,Gurbaxani and Kramer, 2004, p. 286].

Although the literature reviews shown above use a separate section to define scope and boundaries, many literature reviews integrate this part into other sections, including the introductory section.

VI. SEARCH AND ASSESSMENT PHASE

The search and assessment phase includes the literature search task and the literature assessment task. These tasks can be performed largely sequentially although it might become necessary to revisit phases based on results of a task completed later. For example, when reading an article (evaluation) it might become useful to have a look at further references included in this article which were not regarded important when first scanning the reference section (backward search). We now describe each of the tasks.

Literature search

The literature search belongs to those tasks of a literature review that are well described in the review methodology [Rowe, 2012, p. 470]. We recommend the cyclic literature search process[10] shown in Figure 4.

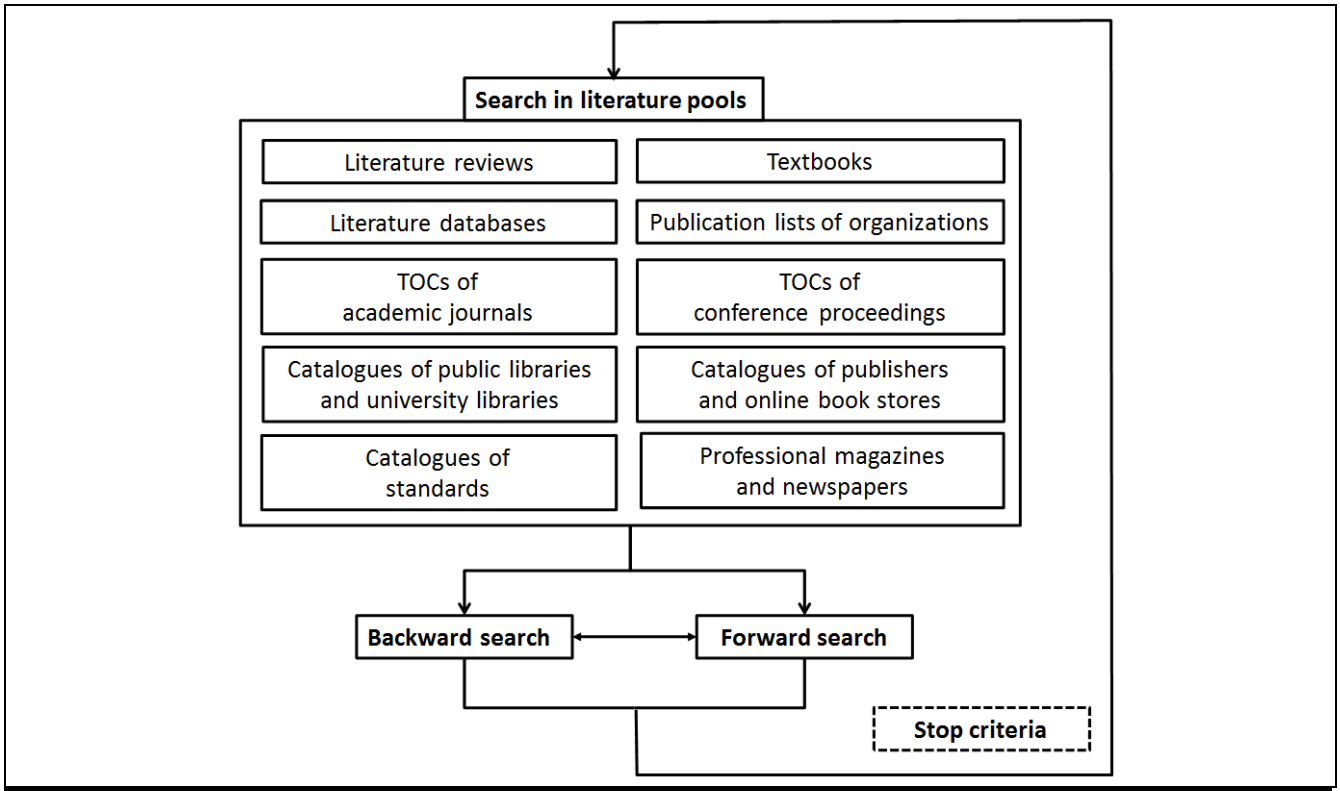


Figure 4. Cyclic literature search process

A good starting point for your literature search are textbooks and literature reviews of other scholars. These usually contain comprehensive reference sections and include many seminal works in a field. There are several more types of literature pools you can use for your search, including literature databases, publication lists of organizations, catalogues of public and university libraries, online catalogues of various publishers and of online book stores, the table of contents (TOCs) of renowned academic journals and conference proceedings, catalogues of standards provided by standardization organizations, and articles and studies published in professional magazines (e.g., Business Week, CIO magazine, Computerworld, Forbes, Fortune, Harvard Business Review, Industry Leaders Magazine, Money Week Sloan Management Review, WIRED), by companies (e.g., IBM, Forrester Research, Gartner, SAP, Strategy& (formerly Booz & Company)), and in newspapers (e.g., Financial Times, Wall Street Journal, New York Times, Washington Post). We subsequently describe how you can use each of these literature pools for your literature search.

[10] Cyclic literature search processes are also described by Wolfswinkel, Furtmueller and Wilderom [2011] and by Boell [2014, p. 259], who considers different aspects of the search process as an “inner hermeneutic loop”.

Querying literature databases requires selecting appropriate bibliographic or article databases, and choosing search terms. While some databases (e.g., the AIS Electronic Library (AISeL)), are appropriate for most IS literature reviews, others, such as the IEEE Xplore Digital Library, may be more relevant for topics that are related to information and communication technology. Table 4 provides a list of online databases which we deem appropriate for the literature search in the IS discipline. Please notice that this list is neither intended to be exhaustive nor intended to be a list of mandatory databases. We advise the authors of literature reviews to also identify and search further databases which cover articles of non-IS disciplines that are important for the topic to be reviewed. However, we believe that Table 4 covers those literature databases that are most relevant for our discipline.

Table 4. Literature databases for IS literature reviews

Database	URL	Provider
AIS Electronic Library (AISeL)	http://aisel.aisnet.org/	Association for Information Systems (AIS)
INFORMS Conference Presentation Database, INFORMS ACI Database	https://www.informs.org/Find-Research-Publications/Searchable-Databases	Institute for Operations Research and the Management Sciences (INFORMS)
International Federation for Information Processing (IFIP) - Digital Library	http://dl.ifip.org/	International Federation for Information Processing
EBSCO host*	http://search.ebscohost.com http://www.ebscohost.com/	EBSCO Information Services
Web Of Science	http://wokinfo.com	Thomson Reuters
ScienceDirect	http://www.sciencedirect.com/	Elsevier
Scopus	http://www.scopus.com/	Elsevier
ABI/INFORM	http://www.proquest.com/products-services/abi_inform.html	ProQuest
JSTORE	http://www.jstor.org/	Ithaka Harbors
Google scholar	http://scholar.google.de/	Google
Microsoft Academic Search	http://academic.research.microsoft.com/	Microsoft
IEEE Xplore Digital Library	http://ieeexplore.ieee.org	Institute of Electrical and Electronics Engineers (IEEE)
ACM Digital Library	http://dl.acm.org/	Association for Computing Machinery (ACM)
*EBSCO host provides access to a variety of databases, including Business Source Premier, EconLit and MLA International Bibliography		

In addition to the online databases listed in Table 4, also catalogues of public libraries and university libraries should be accessed; most of these are accessible online. With regard to books, the online catalogues of various publishers and of online book stores can be searched.

Once appropriate literature databases are identified and selected, the next task is to define search strings that are appropriate to identify the relevant literature [Wolfswinkel, Furtmueller and Wilderom, 2011, p. 4]. The definition of appropriate search strings is crucial as it determines to what extent relevant literature is not found and irrelevant

literature is found. A good starting point is to take the keywords of those articles that you have already identified.[11] Another option is to draw on taxonomies that are appropriate for the topic of the literature review. For example, taxonomies of keywords are provided by IEEE (http://www.computer.org/portal/web/publications/acmtaxonomy) and by ACM (http://www.acm.org/about/class/class/2012). You can also use the AISworld web site on "Theories Used in IS Research Wiki" [Larsen et al., 2014], which provides for numerous theories the categories "Main dependent construct(s)/factor(s)" and "Main independent construct(s)/factor(s)". The mentioned references are only starting points for keywords, which you have to combine appropriately in order to generate search strings. Many literature databases allow building logical search strings which consist of expressions of keywords joined with logical operators. (and, or, not). For example, in the sample literature review (p. 168) the search string *('IT' OR 'information technology' OR 'IS' OR 'information systems') AND ('value' OR 'investment' OR 'productivity' OR 'competitive' OR 'performance' OR 'measurement' OR 'evaluation' OR 'profit' OR 'efficiency')"* was used. There is no correct or incorrect list of search strings, and you will probably have to play with it a bit until you find the final list of search strings. Asking more experienced scholars can help to identify these.

Beyond the definition of search strings, you also have to choose the time period of your search. Often there is no convincing reason why you should limit the period but in special cases temporal constraints can help to limit the number of results. Such a special case occurs, for example, when you intend to provide a bibliographic study of articles published in a specific time period.

Finally, you have to choose the dimensions of your search: you can apply your search string(s) to titles, key words, abstracts and full texts of publications. You can also look for specific authors (cf. the discussion in the next paragraph). It can be useful to search for publications of authors who have published important articles on the topic you intend to review. As in the case with defining search strings, you probably will have to play with combinations in order to identify appropriate search patterns.

During the search process, often several publications published by specific authors and their organizations occur. In particular, literature reviews and textbooks reveal corresponding names. These organizations presumably have expertise in the topic under review so that it seems promising to look up the publication lists of these organizations and of the affiliated authors.

[11] We assume that each author of a literature review is aware of some relevant articles even before s/he starts conducting a systematic literature search.

One should also look up the table of contents of renowned academic journals and conference proceedings as you might miss finding relevant literature for at least three reasons: first, catalogues may show errors, such as typos in titles of articles. In a case like this, applying your search string will probably not result in identifying these articles. We refer to this kind of error as "syntactical error". Second, "semantic errors" can occur when publications that are important for your literature review do not show those keywords you used for your search. Third, relevant articles are not included in literature databases.

Several lists of renowned IS journals have been provided; see, for example, [AIS Senior Scholars' Basket of Journals, 2011; Hardgrave and Walstrom, 1997; Katerattanakul and Han, 2003; Lowry et al., 2004; Mylonopoulos and Theoharakis, 2001; Peffers and Ya, 2003; Rainer and Miller, 2005; Walstrom and Hardgrave, 2001; Whitman et al., 1999]. However, on the one hand, not all journals listed are relevant for your search. We recommend that you first have a look at the editorial statements and then decide whether you look up their tables of contents or not.[12] On the other hand, some journals that are relevant for your literature review are non-IS journals. As Webster and Watson [2002, p. 4] note, *"Because IS is an interdisciplinary field straddling other disciplines, you often must look not only within the IS discipline when reviewing and developing theory but also outside the field."* The respective list of non-IS journals that you deem relevant depends on the topic of your literature review and the academic fields covered. We suggest following two search paths: 1. You can draw on journal rankings, either on those which focus on the IS discipline but which also cover non-IS journals (e.g., [Rainer and Miller, 2005])[13] or on those of neighbor disciplines (e.g., German Handelsblatt ranking, Financial Times Survey of Top Business Schools 2006/2010, University of Queensland Journal Rating 2007)[14]. 2. A second good starting point for identifying relevant non-IS journals is to look up the references of articles which you already identified as appropriate. We discuss this element of literature search below as "backward search". For example, in the sample literature review, the author searched the following non-IS journals [p. 168f]: Academy of Management Review, American Economic Review, Organization Science. The first journal is included in the ranking of Rainer and Miller (2005), the others were selected because the analysis of the reference sections of IS research papers identified several articles on IS business value published in these journals.

Similarly, you should also look up proceedings of IS conferences and non-IS conferences. With regard to IS conferences, Table 5 lists several often cited rankings. However, we do not claim that this list is complete.

[12] Unsurprisingly, most of the IS journals are covered by at least one literature database. Levy and Ellis [2006, p. 186] provide a list of ISWorld's top 50 ranked MIS journals and their electronic availability in terms of inclusion in literature databases.
[13] An overview of several IS journal rankings is provided on the AIS website (http://aisnet.org/?JournalRankings).
[14] An overview of many journal rankings with a focus on management is provided in the "Journal Quality List" (http://www.harzing.com/jql.htm).

Regarding non-IS conferences, the appropriateness of conference rankings for an author largely depends on the topic and the related academic disciplines of his/her literature review. For example, an author of a literature review on human-computer interfaces might want to consult rankings of computer science and information technology journals, while an author of an literature review on the economics of IS might want to lookup economics and business rankings. Table 6 shows rankings of conferences on topics which are often touched in IS literature reviews. Due to the many disciplines that are relevant for IS research, this list is incomplete. The authors of literature reviews are advised to look for more or other pertinent conference (and journal) rankings in those non-IS fields that are addressed in their literature review.

Table 5. Rankings of IS conferences

Provider/Author	URL
Chuan Chan et al. (2006)	--
Hardgrave and Walstrom (1997)	--
Walstrom and Hardgrave (2001)	--
Lamp, J. (School of Information and Business Analytics, Deakin University). Data is supplied by the Australian Research Council.	http://lamp.infosys.deakin.edu.au/era/?page=cfordet&selfor=0806
Fang, F. (School of Computing, National University of Singapore)	http://www.comp.nus.edu.sg/~fangfang/conference.htm
German VHB	http://vhbonline.org/service/jourqual/jq2/
German WKWI/GI	http://gcc.uni-paderborn.de/www/WI/WI2/wi2_lit.nsf/0/549991b84925b9d5c12573d200360077/$FILE/Orientierungslisten_WKWI_GIFB5_ds41.pdf

Table 6. Rankings of non-IS conferences of selected disciplines

Provider/Author	Discipline	URL
School of Business and Economics, FAU, Germany	information technology, computer science	http://www.wi2.uni-erlangen.de/_fileuploads/research/generic/ranking/index.html
Lamp, J. (School of Information and Business Analytics, Deakin University). Data is supplied by the Australian Research Council.	information and computing sciences, engineering and technology	http://lamp.infosys.deakin.edu.au/era/?page=cforsel10
American Economic Association	management, business, economic	http://www.aeaweb.org/rfe/conferences.php

Another stream of literature may come from catalogues of standards provided by standardization organizations. For example, the National Institute of Standards and Technology (NIST) provides standards for several domains including information security, cloud computing, and smart grids; the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C) develop Internet standards, and the Object Management Group (OMG) suggest standards for a wide range of technologies, such as business process modeling and software process engineering.

We recommend that you consider the web sites of publishers and of online book stores. A search in their catalogues often results in a list of textbooks, which are excellent starting points for both literature research and introduction into a domain or topic.

Finally, we suggest that you consider professional magazines and newspapers if you deem these appropriate. However, as Levy and Ellis [2006, p. 185] note, *"[a]lthough not totally unacceptable, use of such sources (i.e. professional magazines, newspapers, etc.) should be restricted to factual information due to the low theoretical background and application dependency."*

Having conducted a search in the previously described way, you will get a first list of publications, which probably misses published material that is relevant for your literature review. For example, it might happen that articles written by scholars of domains not considered in your search are missing. In order to mitigate this deficiency, we recommend that you conduct a forward search and a backward search. Webster and Watson [2002, p. xvi] describe these processes as follows: *"Go backward by reviewing the citations for the articles identified […] to determine prior articles you should consider. Go forward […] to identify articles citing the key articles identified […]. "* The forward search is supported by some literature databases, including Google Scholar and Web of Science. You can find additional information on forward and backward search in [Levy and Ellis, 2006, p. 190ff].

Both procedures "forward search" and "backward search" usually lead to additional publications, and therefore they trigger continuing forward search and backward search. They can also trigger revisiting previously used literature pools and/or searching additional ones. For example, if you find a review article on the topic of your literature review and the reference section of this review article includes references to a particular conference series or journal, then you might want to look up the conference proceedings or table of contents, respectively. Overall, the literature search process becomes cyclic as shown in Figure 4.

The final question we would like to address in the description of the literature search process is when to stop the cyclic literature search. A literature review will probably never be complete in terms of relevant[15] publications as other scholars have noted:

[15] The decision of when a reference is relevant or not for a specific literature review is largely subjective. We suggest the following procedure that considers both relevance and quality of a research paper: If a paper is not in the scope of the review as it should have been defined prior to searching the literature, then you should not include it. Often, this decision can be made after reading the abstract. Otherwise, you should further inspect the paper to see if it is really in the scope of your literature review and if it shows a high quality in terms of rigorous methodology, soundness of results and clarity of results presentation. Usually, articles published in highly renowned journals show high quality.

"Of course, you will miss some articles. If these are critical to the review, however, they are likely to be identified by colleagues who read your paper either prior to or after your submission." [Webster and Watson, 2002, p. xvi]

"[A] literature review is indeed never complete: […] That being said, a good review must be a richly competent coverage of a well-carved out niche in the literature." [Wolfswinkel, Furtmueller and Wilderom, 2013, p. 3].

Although your literature review article will never be complete in the aforementioned sense, this insight does not help much from an operational perspective.[16] Levy and Ellis [2006, p. 192] provide a good recommendation on when to stop your literature search process: *"Leedy and Ormrod (2005) noted that one common rule of thumb is that the search is near completion when one discovers that new articles only introduce familiar arguments, methodologies, findings, authors, and studies. Thus, when reading a new literature piece, if one 'will get the feeling that 'I've seen this (or something similar to it) before' (Leedy & Ormrod, 2005, p. 82), it may suggest that the literature search is near completion. The end of the search can also be indicated when no new citations are discovered and articles cited in newly discovered literature have already been reviewed."*

Finally, you should provide a description of your literature search process. We deem it not important to describe each single iteration of the process but you should describe which literature pools, keywords, time periods, journals, proceedings etc. you used and how many documents you finally selected for further investigation. The main purpose of this description is to make the search process *"reproducible by others who would follow the same approach in reviewing the topic."* [Okoli and Schabram, 2010, p.1] The level of precision of your documentation should be aligned with this goal. We suggest that you provide the information in the Appendix as this is done in [Melville, Kraemer and Gurbaxani, 2004; sample literature review], or often in a separate methodology section (see, for example, [Aguirre-Urreta and Marakas, 2008; Aksulu and Wade, 2010[17]; Arnott, Pervan and Dodson, 2005; Beaudry and Carillo, 2006; Corley II, Jourdan and Ingram, 2013; Grahlmann et al., 2012; Miaskiewicz and Monarchi, 2008]. A good example of a detailed description of the literature search process can be found in [Muller and Ulrich, 2013] (cf. Figure 5) although the description does not explicitly show the cycles of the search process.

[16] Baker [2000, p. 219] provide an economically-based suggestion on when to stop the literature search process: "*[…] one should invest in acquiring a new information relevant to the solution of a problem to the point where the marginal cost of another 'bit" of information is equal to the marginal value of the enhanced knowledge and understanding acquired."*

[17] The authors use both a separate methodology subsection and the Appendix to describe the literature search methodology.

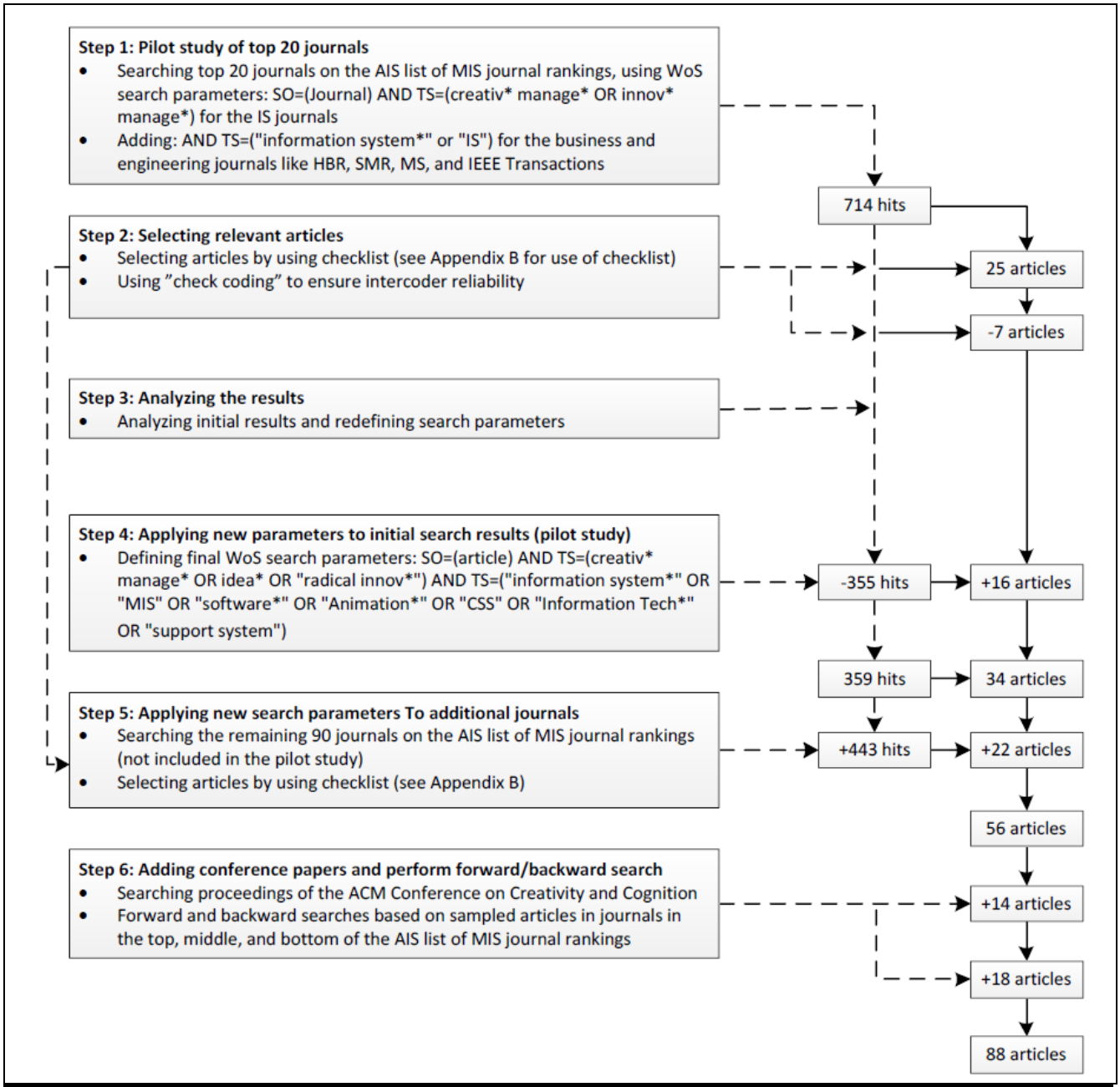


Figure 5. Description of the literature search process [Muller and Ulrich, 2013, p. 179]

Literature assessment

Once you have finished your literature search process, you need to acquire and evaluate the literature. While you should have stored much of the relevant literature during the search process, a certain part of the literature is usually not available, for example, because you do not have access rights, books are neither available online nor in local libraries. However, usually abstracts of articles and summaries, table of contents or excerpts of books (e.g., on books.google.com) are available. Based on this piece of information, you should decide whether to acquire the literature or not. With regard to books, universities usually cooperate with other national or university libraries, and you need to wait a few days or weeks until you get the literature. With regard to articles, white papers, standards etc.

we recommend that you contact colleagues and friends at other organizations, you can also purchase selected articles either from the publishers – this is often expensive – or you order these articles form literature services, such as subito (*www.subito-doc.de).* A further option is to directly contact the author(s) of publications and ask for their manuscripts. The experience of the author of this tutorial is that using the aforementioned options to acquire full texts of literature only a very small part of the relevant literature cannot be acquired.

The acquisition of literature can be conducted in parallel with the evaluation in terms of quality and fit. Especially when you work in a team of authors, you should define practical screening criteria in order to strive for consistency.

With regard to quality, you need to define quality criteria which is often difficult as quality is hard to define sharply. However, setting up a catalogue of minimal requirements is useful and often possible. For example, you can require surveys to use samples with a minimum size (data requirement). You can also require laboratory experiments to describe the laboratory setting reproducibly, use case studies to describe completely the relevant factors in their units of analysis, such as organizations, cities and nations, and econometric studies to test the validity of assumptions of used statistical tests (methodology requirements). You can also define more formal quality requirements on publications, such as the availability of a separate literature review or of a separate and lengthy discussion of results. To sum up, we recommend that you agree with all authors on a set of requirements classified along data requirements, methodology requirements and formal requirements, among others. It might be useful to define different quality criteria or/and different levels of quality criteria depending on the type of publication. For example, studies published in journals or in conference proceedings should demonstrate rigor in terms of methodology and/or theory while publications in magazines should focus on applicability and relevance in practice.

Beyond quality requirements, publications also need to have a good fit with the scope of your literature review (adequacy). This scope should have been defined prior to searching literature (cf. Section “Framing”). For example, you can use the levels of analysis (e.g., individual, organizational, industrial, national), temporal constraints (e.g., if you review the literature with regard to empirical findings of a specific time period), or contextual limitations (e.g., inter-organizational focus, geographical focus, gender focus). When multiple persons are involved in the evaluation, it might be useful to apply a pilot test, for example on a subset of the identified literature, in order to achieve a consistent understanding of what “fit” means. In the presence of more than one evaluator, the evaluation team

should finally apply an inter-coder reliability check[18]. Wolfswinkel, Furtmueller and Wilderom [2013, p. 5] suggest that "*a minimum of 90% overlap as a standard of article selection among at least two coders*" should occur; however, to our best knowledge there is no consensus in the literature review methodology how large the value should be. We suggest that you define three classes by means of two limits a and b: Literature where less than a % of the evaluators argue for inclusion, should not be included; literature where more than b % of the evaluators argue for inclusion, should be included; all other contributions need a further discussion of the evaluators.

In order to assess the quality and the fit of the found literature, we recommend that the evaluators first read the abstract and then decide whether the paper should be excluded or whether this decision is postponed until the full paper is analyzed.

VII. SYNTHESIS PHASE

Once the literature has been searched and evaluated, the finally selected publications contain the body of knowledge which you need to present to the readers. This task is regarded as one of the key contributions of your literature review as Okoli [2012, p. 34] notes: *"[B]y far the most important step in any literature review is the synthesis of the studies that have been located and included for review."* Conducting this part is not straightforward and, according to our experience, often done in an inappropriate way, especially when less experienced scholars or students write a literatrure review. The goal of a literature synthesis should be to classify and make sense of various research pieces within broad categories [Rowe, 2014], or, as Levy and Ellis [2006, p. 20] remark, *"[…] to assemble the literature being re-viewed for a given concept into a whole that exceeds the sum of its parts."* There is certainly not only one single way how to accomplish this task. The way you synthesize the literature is always written from a particular perspective [Hart, 1998, p. 25] and thus inherently includes interpretation. However, from the author's point of view, this part of the literature review should be mainly descriptive.

There is a large consensus in the literature that the synthesis of the body of knowledge should be presented concept-centric, rather than chronological or author-centric. The used concepts determine the organizing framework of the review [Webster and Watson, 2002]. Adapting the matrix approach of Salipante [1982], [Webster and Watson, 2002] oppose and visualize the author-centric and the concept-centric approaches (Table 7 and Table 8).

[18] An inter-coder reliability check ensures to achieve a predefined level consistency. For example, a reference may finally be included only if at least two out of three authors agree that the reference should be included.

Table 7. Author-centric vs. concept-centric presentations [Webster and Watson, 2002, p. xvii]

Concept-centric	**Author-centric**
Concept X … [author A, author B, …]	Author A … concept X, concept Y, …
Concept Y … [author A, author C, …]	Author B … concept X, concept W, …

Table 8. Concept Matrix [Webster and Watson, 2002, p. xvii]

Articles	**Concepts**				
	A	B	C	D	…
1		x	x		X
2	x	x			
…			x	x	

The disadvantage of adopting an author-centric approach lies in the "he said/she said" problem; i.e.*,"the writer tells us what each source says but does not convey the relationships among the sources."* [Zorn and Campbell, 2006, p. 175]. Being consistent with the above suggestion, Rowe [2014][19] stresses that *"a literature review does not have to integrate all the knowledge elements provided by the literature into an overall logic", "but a set of coherent macro-concepts".* In the literature, various interpretations and instantiations of concepts have been suggested, including theories, models and theoretical frameworks.[20] Levy and Ellis [2006, p. 196f] provide a long list of constructs which can be used as concepts or as components to build concepts. [21] A list of theories used in IS research can be found in the "Theories Used in IS Research Wiki" [Larsen et al., 2014]. Further suggestions for using or building concepts are provided by Boell and Cecez-Kecmanovic [2014, p. 266]. In many literature reviews, the descriptions of used concepts are embedded in a separate section. For example, Beaudry and Carillo [2006] provide a separate section to describe activity theory, and Melville, Kraemer and Gurbaxani [2004] provide a section on a resource-based IT business model.

To sum up, literature findings should be synthesized around concepts, which can either be new or already been used, and which can be coherent and follow an overall logic or are not fully connected to each other. It is also possible to synthesize the literature from different perspectives in order to provide complementary views on the literature. For example, Jasperson et al. [2002] use technology lenses and power lenses to examine the interrelationships among power on one side and IT impacts, deployment or development, management or use on the other side.

[19] Cf. footnote no. 2.
[20] These notions and their differences have been discussed intensively (and inconsistently) in the literature. A brief overview is given by Schryen [2010a].
[21] Levy and Ellis [2006, p. 196ff] distinguish between concepts and constructs. However, the subtle differentiation is not of importance in our context.

We now provide a couple of examples of concepts that have been used in literature reviews to structure the presentation of literature findings. We first provide the concept used in our sample literature review: a synthesized IS business value model (see Figure 6). This model is a synthesis of four models suggested in the literature and an example for a new concept used to structure the literature review. The findings of the literature are presented along model constructs; i.e., results are presented and summarized (see Figure 7) along the constructs "performance measures", "impact on productivity" as most intensively studied process performance measure, "impact on market performance", "impact on accounting performance", "contextual factors", and "lag effects".

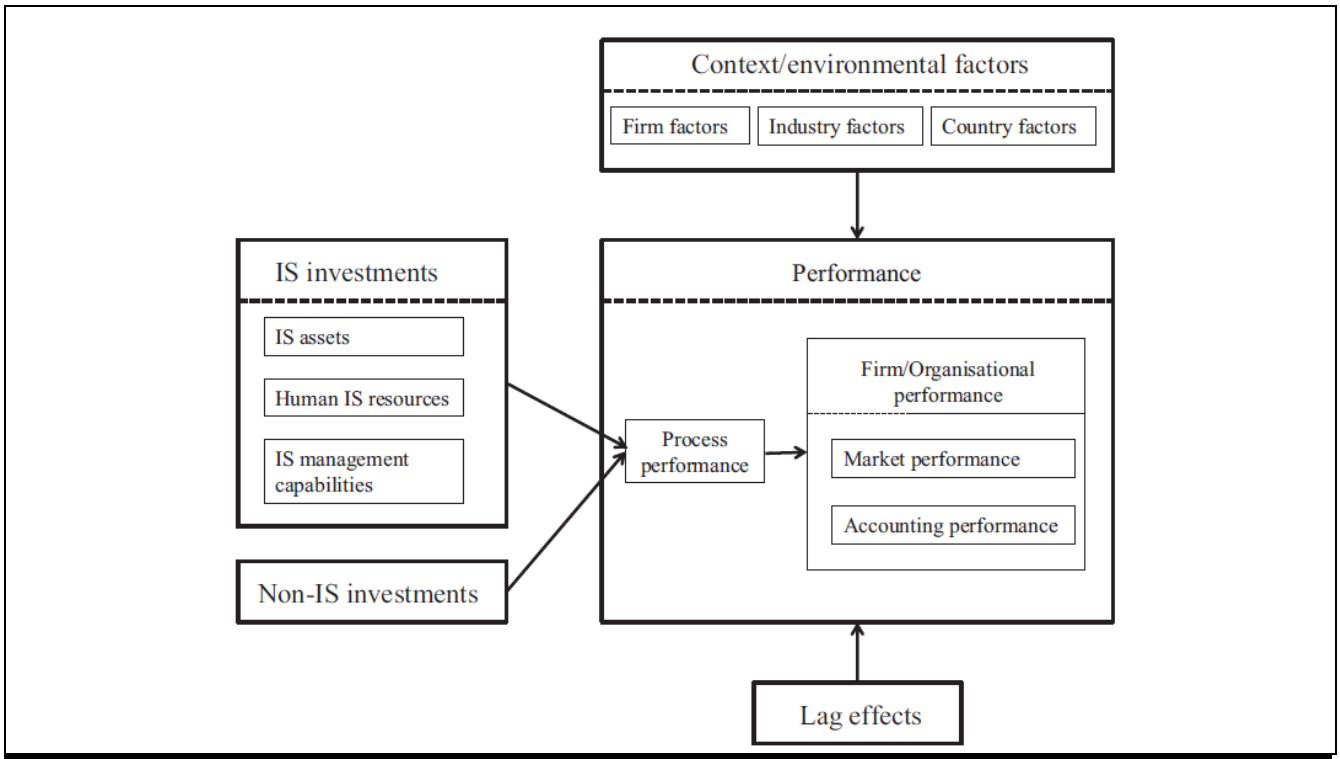


Figure 6. IS business value model: [sample literature review, p. 144]

A different perspective on the same topic (IS business value) is adopted by Melville, Kraemer and Gurbaxani [2004] who use a resource-based view (see Figure 8). The authors present literature findings along the model constructs "focal firm", "competitive environment" and "macro environment" and summarize findings in terms of propositions. Figure 9 shows an excerpt of the findings, with 1A, 1B, 2A and 2B being focal firm propositions.

The literature review of Zhang and Li [2005] on the intellectual development of human-computer interaction research is a good example of structuring the presentation of literature findings along research questions as concepts. Figure 10 shows an excerpt of the research questions. The presentation of literature findings is comprehensive (26 pages) and not summarized in tables or figures. Thus, we leave it to the interested reader to look up this paper and find out the detailed results for each of the research questions.

Area	Key literature findings	Literature
Performance measures	Many empirically investigated economic measures, including productivity, capacity utilisation, product quality, consumer welfare, various profit ratios and market-oriented measures. Widely adopted classifications are (1) the model of DeLone and McLean and (2) the classification that distinguishes between process performance and firm performance. The impact of IS investments on firm performance is intermediated by process performance.	Brynjolfsson & Hitt, 1996, Brynjolfsson & Hitt, 2000, Barua *et al*, 1995, Thatcher & Oliver, 2001, Thatcher & Pingry, 2004a, Thatcher & Pingry, 2004b, Thatcher & Pingry, 2007, Barua *et al*, 1995, Bharadwaj *et al*, 1999, Lin, 2009, Chen & Lin, 2009 (1) DeLone & Mclean, 1992, Seddon, 1997, DeLone & McLean, 2003, (2) Barua *et al*, 1995, Dehning & Richardson, 2002, Melville *et al*, 2004 Barua *et al*, 1995, Dehning & Richardson, 2002, Kim *et al*, 2006, Lee *et al*, 2004, Mooney *et al*, 1995, Shin, 1997, Soh & Markus, 1995
Impact on productivity	Early studies did not find a positive correlation between IS and productivity at firm level, industry level or economy level. More recent studies draw a more positive picture of the impact on productivity: productivity paradox has been resolved at firm level; major impact of IS investments on national productivity and economic growth.	Brynjolfsson & Yang, 1996, Baily, 1986 Jorgenson & Stiroh, 1995, Roach, 1987, Berndt & Morrison, 1995, Roach, 1991, Loveman, 1994 Aral *et al*, 2007, Brynjolfsson & Hitt, 1996, Brynjolfsson & Hitt, 2000, Kelley, 1994, Lin & Shao, 2006a, Neirotti & Paolucci, 2007, Menon *et al*, 2000, Shin, 1997, Stiroh, 2002, Swierczek & Shrestha, 2003, Devaraj & Kohli, 2000, Dedrick *et al*, 2003, Jorgensen, 2001, Jorgenson & Stiroh, 2000, Oliner & Sichel, 2000, Lee *et al*, 2011
Impact on market performance	No positive correlation between IS investments and Total Shareholder Return (TSR). Impact of IS investments on stock market reactions is largely determined by the particular type of IS. Positive correlation between IS investments and Tobin's q.	Tam, 1998, Brynjolfsson & Hitt, 1996 Dos Santos *et al*, 1993, Im *et al*, 2001, Richardson & Zmud, 2002, Dehning *et al*, 2003 Bharadwaj *et al*, 1999, Brynjolfsson & Yang, 1999, Brynjolfsson *et al*, 2002
Impact on accounting performance	IS investments positively affect (1) Return on sales and (2) Operating income to employees. Positive impact on (1) Return on assets, (2) Return on investment and (3) Return on equity seems to depend largely on lag effects, contextual factors and the level of IS investments compared to total assets.	(1) Bharadwaj, 2000, Dehning & Stratopoulos, 2002, Kim *et al*, 2009, Santhanam & Hartono, 2003, Zhang, 2005; (2) Bharadwaj, 2000, Santhanam & Hartono, 2003 (1) Bharadwaj, 2000, Dehning & Stratopoulos, 2002, Hitt & Brynjolfsson, 1996, Kim *et al*, 2009, Peslak, 2003, Rai *et al*, 1997, Santhanam & Hartono, 2003, Stratopoulos & Dehning, 2000, Tam, 1998; (2) Hayes *et al*, 2001, Mahmood & Mann, 2005, Peslak, 2003, Stratopoulos & Dehning, 2000; (3) Alpar & Kim, 1990, Beccalli, 2007, Peslak, 2003, Rai *et al*, 1997, Shin, 2006, Stratopoulos & Dehning, 2000, Tam, 1998
Contextual factors	Contextual factors can be divided into firm, industry and economic factors. Alignment of IS with a firm's core competencies and business planning and close ties between IS investments and upper management are crucial for enhanced firm performance. (1) Industry factors and (2) macro-economic factors are addressed only rarely.	Barua *et al*, 1996, Bharadwaj, 2000, Davern & Kauffman, 2000, Dehning & Richardson, 2002, Ko & Osei-Bryson, 2004, Melville *et al*, 2004, Zhu *et al*, 2004 Chari *et al*, 2008, Dos Santos *et al*, 1996, Floyd & Wooldridge, 1990, Li & Ye, 1999, Ravichandran & Lertwongsatien, 2005 (1) Lin & Shao, 2006a, Sircar *et al*, 2000, Lim *et al*, 2004, Melville *et al*, 2007, (2) Kim *et al*, 2009, Swierczek & Shrestha, 2003, Zhu *et al*, 2004
Lag effects	Mismeasurement of IS investment impact may be rooted in the ignorance of effects delayed by years.	Kauffman & Weill, 1989, Stiroh, 2002, Weill & Olson, 1989, Brynjolfsson & Hitt, 1998, Jain, 2005, Mahmood & Mann, 2005, Oz, 2005, Santhanam & Hartono, 2003, Das *et al*, 2011

Figure 7. Summary of literature findings grouped by constructs of IS business value model [sample literature review, p. 145]

More examples can be found in [Aksulu and Wade, 2010], who analyze proprietary and open source systems through the lens of systems theory, in [Beaudry and Carillo, 2006], who review the customer-centered B2C literature through the lens of activity theory, in [Brown and Grant, 2005], who use a conceptual framework for IT governance research, in [Demirhan, 2005] who apply an IT investment framework in their literature review, in [Dibbern et al., 2004], who draw on a stage model of IS outsourcing, and in [Jetu and Riedl, 2012], who apply a conceptual model of project team success to review the literature.

VIII. INTERPRETATION PHASE

The interpretation of the body of knowledge belongs to the most creative tasks of a literature review. Most common types of interpretation are the identification of research gaps, the adoption of a new perspective on the body of literature, and the analysis of literature in terms of suggesting of or contributing to a new theory. These types of contributions sometimes overlap.

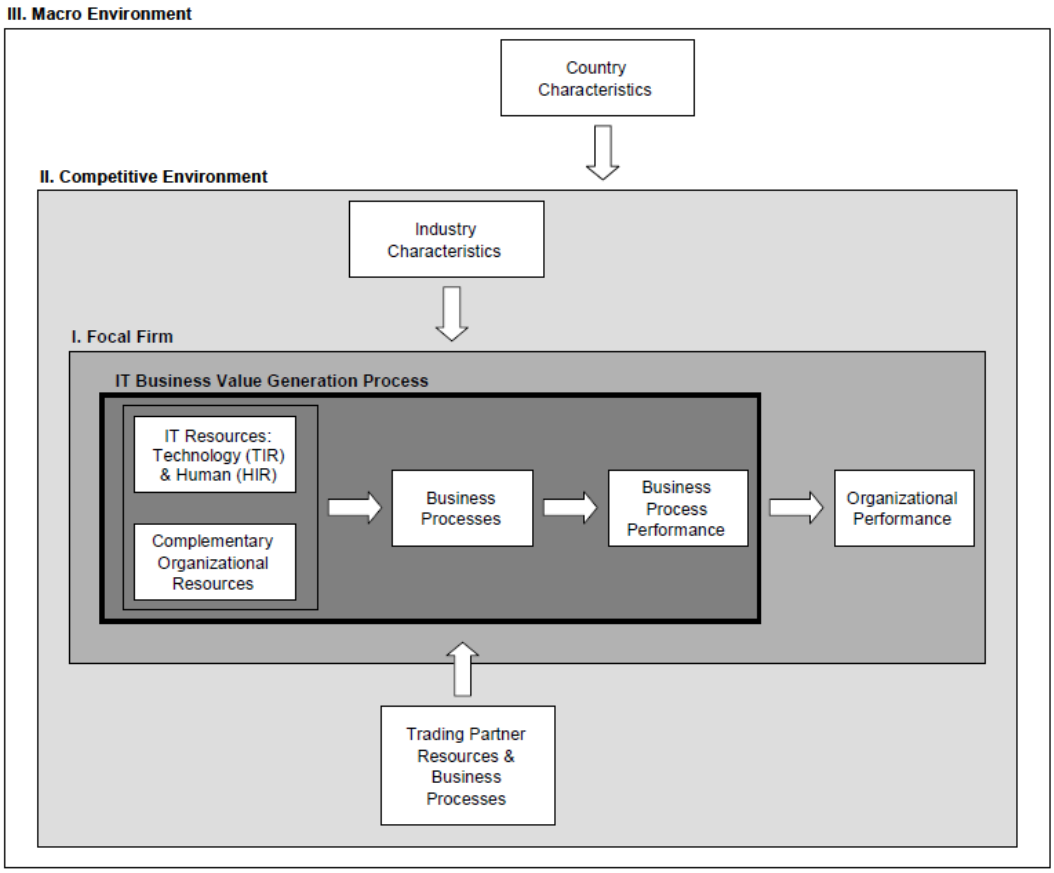


Figure 8. Resource-based view as concept in a literature review on IS business value model [Melville, Kraemer and Gurbaxani, 2004, p. 293]

1A	The IT resource—including both technology and human expertise—creates economic value for a focal firm by conferring operational efficiencies that vary in magnitude and type depending upon the organizational and technological context.
1B	Human IT expertise complementary to technological IT resources may create temporary competitive advantages that underlie performance differences among firms.
2A	Certain organizational resources are complementary to the IT resource in the generation of IT business value for the focal firm; the existence and magnitude of the complementarity between any two specific instantiations of these resources varies depending upon the organizational and technological contexts.
2B	The greater the inimitability of rare organizational resources that are complementary to IT and lacking substitutes, the greater the degree to which the focal firm can obtain a sustained competitive advantage.

Figure 9. Summary of literature findings grouped by constructs of IT business value model (excerpt) [Melville, Kraemer and Gurbaxani, 2004, pp. 300, 305, 309]

Identification of research gaps

The identification of research gaps helps to find unchartered territories of research and goes thereby a step beyond the synthesis of research. While the former refers to what needs to be done, the latter is related to what has been done ([Hart, 1998, p. 27] cited in [Baker, 2000, p. 221]). The ultimate goal of the identification and presentation is pointing to future directions of research (cf. [Zorn and Campbell, 2006, p.173]) and motivating researchers to close

the gaps [Webster and Watson, 2002, p. xix]. Research gaps can appear in different forms; for example, certain aspects/phenomena may have been overlooked, research results may be inconclusive or contradictory, and knowledge related to the targeted problem may be inadequate [Boell and Cecez-Kecmanovic, 2014, p. 267].

RQ1	What constitutes the intellectual substance?
	RQ11: What are the contexts of studies? RQ12: What are the research areas or subject topics? RQ13: What topics are often co-studied? RQ14: What are the research methods? RQ15: What methods are often used to study what topics? RQ16: What are the levels of analysis? RQ17: To what extent does the HCI sub-discipline consider IT as a research component? RQ18: To what extent does the HCI sub-discipline consider individual characteristics?*
RQ2	What are the relationships with other disciplines?
	RQ21: What are the disciplines contributing to the HCI studies? RQ22: What contributing disciplines are often co-cited in HCI studies? RQ23: What disciplines are often used to support what subject topics?

Figure 10. Research questions as concepts in a literature review (excerpt) [Zhang and Li, 2005, p. 234]

Two challenges occur when research gaps are focused by authors of literature reviews: (1) How can gaps be identified in a methodological way? (2) How should gaps be expressed and presented? With regard to the first question, we have not found explicit recommendations in the literature. Based on our own experience in writing literature reviews, we suggest that, analogously to the synthesis of literature, you select and apply a concept-centric perspective. The concept(s) used to identify research gaps can be identical to those used for the literature synthesis but may also be different as Rowe [2014][22] notes, "*there are two types of categories related to two types of structural dimensions: those that help mapping the literature and those that help analyzing it. They are not necessarily the same."* With regard to the second question, it has become good practice to condense research gaps in research questions, hypotheses or propositions. We now provide some examples of the identification and presentation of research gaps, and we explain how each of the cited literature reviews has addressed the two challenges mentioned above.

Again, we start with the sample literature review. The author uses the same model (cf. Figure 6) for both the synthesis of literature findings and the identification of research gaps. He identifies three areas in which further research is required and details these with specific deficiencies in research and related literature (cf. Figure 11). Based on these deficiencies, the author develops research questions along the research gaps (cf. Table 9).

[22] Cf. footnote no. 2.

Research gaps	*Deficiencies in research*	*References*
Ambiguity and fuzziness of the 'IS business value' construct	• Discussion on IS business value frays into many lines of thought and loses track of the 'IS value' construct. • Market-oriented capabilities and internal capabilities are out of the scope of value consideration. • Understanding of value lacks the consideration of the environment. • Subjective preferences of stakeholders are disregarded.	Alshawi *et al* (2003), Ayal & Seidmann, 2009, Barua *et al*, 1995, Bhatt & Grover, 2005, Bresnahan *et al*, 2002, Davern & Wilkin, 2010, Dedrick *et al*, 2003, Dehning & Richardson, 2002, Kohli & Grover, 2008, McAfee, 2002, Oz, 2005, Soh & Markus, 1995, Sylla & Wen, 2002
Neglected disaggregation of IS investments	• Only little is known about the relative performance contributions of different types of IS investments and whether different IS investments impact different aspects of firm performance. • Empirical results of different studies are hard to compare (danger of comparing apples with pears). • Impact of specific IS assets on strategic and resource-oriented position of firms is hardly understood. • Synergies and complementarities of IS assets are not identified.	Aral & Weill, 2007, Bharadwaj *et al*, 1999, Cho & Shaw, 2009, Mahmood & Mann, 1993, Melville *et al*, 2004, Mutch, 2010, Orlikowski & Iacono, 2001, Rai *et al*, 1997, Sircar *et al*, 2000, Weill, 1992
IS business value creation process as grey box	• Time-variant relationships between IS assets and complementary capabilities remain unclear. • Value generation process still needs to be uncovered. • Time issues in creating competitive value are not sufficiently addressed. • Explanations of unanticipated consequences of IS are still required. • No theory on IS business value exists.	Aral & Weill, 2007, Avison *et al*, 2006, Avgerou, 2000, Avgerou, 2001, Bhatt & Grover, 2005, Dedrick *et al*, 2003, DeSanctis & Poole, 1994, Kane & Alavi, 2007, Leonardi, 2007, Markus & Robey, 2004, Mutch, 2010, Nelson, 2007, Orlikowski, 1996, Pinsonneault & Kraemer, 2002, Rai & Tang, 2010, Rowe, 1994, Whittington *et al*, 1999, Zammuto *et al*, 2007

Figure 11. Research gaps [sample literature review, p. 150]

Table 9. Research questions, based on [sample literature review, p. 159]

Research gaps	**Research questions**
Ambiguity and fuzziness of the 'IS business value' construct	How can we yield a comprehensive, consistent and precise understanding of the multifaceted construct 'IS business value'?
	How can the assessment of (internal and competitive) business value account for the context of evaluation, and in particular the firm, industry and country environment and the preferences of evaluators?
Neglected disaggregation of IS investments	How can total IS investments be disaggregated conceptually and empirically such that the impact of different types of investments on the economic performance of a firm can be determined?
	How can the disaggregation of total IS investments account for synergies and complementarities of IS assets?
IS business value creation process as grey box	How, why and when do IS assets, IS capabilities and socio-organisational capabilities affect each other and jointly create internal value?
	How, why and when do IS assets, IS capabilities and socio-organisational capabilities jointly create competitive value, thus performing a value creation process?

We use as second example the literature review of Powell, Piccoli and Yves [2004], who provide a literature review on virtual teams. The authors identify important areas that have remained underresearched by drawing on the same framework which is structured around inputs, socio-emotional processes, task processes, and outputs and which they use for their literature synthesis (cf. Figure 12).

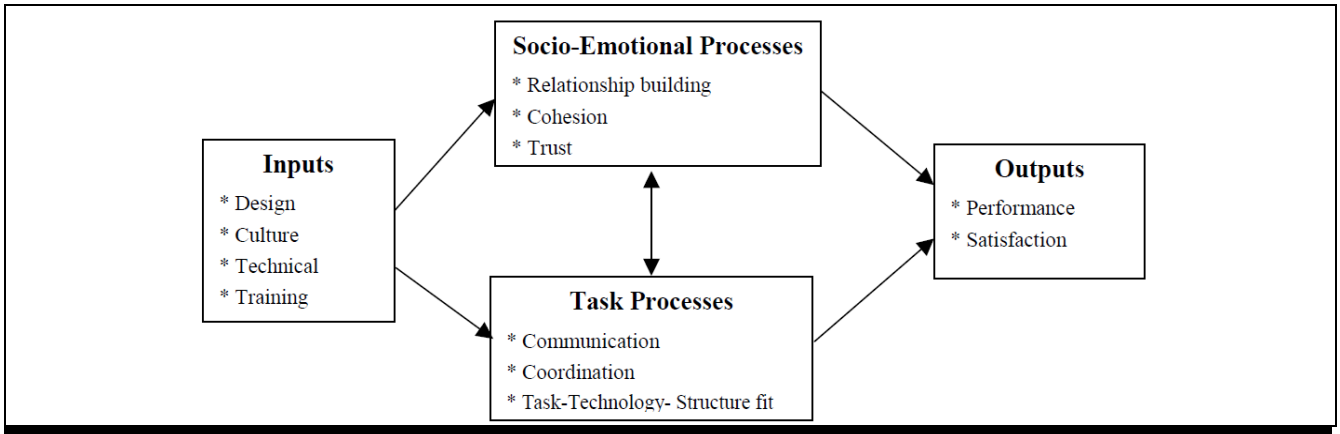


Figure 12. Framework for both literature synthesis and identification of research gaps [Powell, Piccoli and Yves, 2004, p. 8]

Based on the four underresearched areas, the authors suggest many partially connected research questions (cf. Table 10).

Table 10. Research questions, based on [Powell, Piccoli and Yves, 2004]

Under-researched areas	Research questions
Inputs	What projects are virtual teams best suited to work on?
	What is the appropriate size and skills composition for virtual teams approaching different project types?
	Do task and socio-emotional processes develop differently in different types of virtual teams? If so, how?
	Are antecedents for team effectiveness different for long-term virtual teams versus short-term virtual teams?
	Are antecedents for team effectiveness different depending on the type of task the virtual team is accomplishing?
	Are autonomy and self-direction the team structures best suited for virtual teams?
	Under what circumstances (e.g., team size, type of project, duration and team composition) does autonomy hinder team effectiveness in the virtual environment?
	Do traditional managerial control mechanisms remain applicable in the virtual environment? If so, what are the most appropriate managerial controls (formal versus informal)?
	Can informal control mechanisms be used when teams rarely meet FtF and are short-lived?
	Can a set of behaviors that promote effectiveness of a wide range of virtual teams be identified? How can these behaviors be effectively enforced in virtual teams?
	Who should be a member of a virtual team? If a manager has several people to choose from, how does he or she decide which employee to place on the virtual team?
Socio-emotional processes	Which, if any, socialization activities foster trust in different types of virtual teams? What can a manger or team leader do to foster swift trust? Is swift trust observed or even needed in long-term virtual teams?
	How is diversity is treated in virtual teams. In the leaner environment of virtual teams, where some diversity may not be known, will diversity affect virtual teams in the same way it does traditional teams? Can cohesion be manipulated successfully in a virtual team in a manner similar to that employed with a traditional team? Can team leaders minimize deep-level diversity to improve cohesion?
	What is the meaning of social identity in virtual teams. Do virtual team members identify with their team as a social entity or do they remain tangential to it? What are the characteristics and behaviors of virtual teams that have been able to achieve significant levels of social identification? Are virtual team members able to perform satisfactorily even when they do not identify with the team? What types of managerial intervention foster increased social identity? Are there identifiable processes of adaptation that enable virtual teams to overcome the limitations of the virtual environment?

Table 10. (cont'd) Research questions, based on [Powell, Piccoli and Yves, 2004]	
Under-researched areas	**Research questions**
Task processes	Is it feasible to deconstruct virtual team projects so as to enable the object-oriented model? Does the decoupling process successfully reduce coordination challenges? What type of tasks and projects are most amenable to such deconstruction? What available technology can be used to enable the decoupling process without sacrificing the essence of teamwork?
	What interventions can be used to limit the negative effect of time dispersion? Is training and sensitizing of virtual team members sufficient to overcome the limitations associated with time dispersion?
	What team norms facilitate the reclaiming of time? What adaptive processes and structural work arrangements are best suited to incorporate time differences into the team's social structure?
	Under what circumstances a caretaker is instrumental in reducing process losses? What are the traits of successful caretakers? What portfolio of technologies do successful caretakers employ, and under what contingencies do they employ them? Does the role of the caretaker change based on the type of virtual team being assembled? Do the potential benefits of caretaker intervention differ depending on the timing of the intervention? Do early interventions contribute to improve virtual team trust? Can the caretaker contribute to create and enforce early norms that lead to effective interaction – enabling to depart the team after a time?
	What can a team leader or caretaker do to manage conflict in virtual teams? Besides the use of process structures, are their other strategies that can be implemented to increase positive conflict while decreasing negative conflict?
Outputs	What are the determinants of team viability in the virtual environment? What socio-emotional and task processes foster team viability? What is the process by which these antecedents of team viability operate?
	What are the determinants of virtual team member viability and the process by which it can be fostered?

Further literature reviews which identify research lacks are provided by Dibbern et al. [2004], who note unresolved issues, knowledge gaps in information systems outsourcing, Kohli and Grover [2008], who suggests four themes of future research on the business value of information technology, Roberts et al. [2012], who identify limitations in the IS field's use of absorptive capacity, and Alavi and Leidner [2001], who suggest research questions on knowledge management and knowledge management systems.

Adoption of a new perspective

An interpretation of literature findings can also be conducted through the analysis of the literature from a previously not adopted, potentially completely new perspective. Such a perspective is inherently concept-centric and can be based on concepts that are, in principle, appropriate for structuring a literature review. Similarly to reviews which identify research gaps, the concepts used for structuring the literature findings and for interpreting the findings can be identical or different. An example of a review with an identical concept is that of Jasperson et al. [2002], who review the literature on the relationships between power and information technology impacts, development or deployment, and management or use. The authors apply two sets of lenses separately to examine the literature findings: one set of lenses includes the technological imperative, organizational imperative, and emergent perspectives, and is used to understand the causal structure between IT and organizational power. A second set of

lenses includes the rational, pluralist, interpretive, and radical perspectives, and it is used to focus on the role of power and different IT outcomes. Table 11 shows these lenses. Then, the authors draw on the same sets of lenses to discuss the similarities and differences that occur when the two sets of lenses are simultaneously applied. The results are summarized in Table 12.

Theory building

Some authors, such as LePine and Wilcox-King [2010], see reviews as vehicles for theory development suggesting of or contributing to a new theory. Wolfswinkel, Furtmueller and Wilderom [2011, p. 8] concur and argue that "*[…] theory building is one of the increasingly important outcomes when using Grounded Theory to review a carved-out segment of literature."* Although there is no consensus in the literature on what exactly a theory is [Sutton and Staw, 1995], in the context of the interpretation of the literature we find the understanding of Gregor [2006, p. 620] appropriate, who argues that all theories contain "means of representation" (physical representation by words, logic, diagrams, tables etc.), "constructs" (phenomena of interest), "statements of relationship", and "scope" (degree of generality of the statements of relationships). This wide understanding does not require a theory to have an explanatory component. Gregor [2006] further suggests five different types of theories: theory for analyzing (type I), theory for explaining (type II), theory for predicting (type III), theory for explaining and predicting (type IV) and theory for design and action (type V).

A literature review can suggest or at least contribute to a new theory when it interprets the body of knowledge from a perspective that has not been adopted before. In this regard, the contribution to a new theory can be considered a subtype of the adoption of a new perspective.

We now provide several examples of literature reviews which show how diverse theoretical contributions of reviews can be. The first example is the literature review of Jasperson et al. [2002] (cf. previous subsection). As described above, the authors adopt a new perspective on the literature by discussing similarities and differences that occur when different sets of lenses are simultaneously applied. Based on this discussion, the authors develop propositions that can be interpreted from multiple perspectives and refer to these as "metaconjectures" (cf. Table 13).

A second example of a literature review that contributes to theory building is the work of Soh and Markus [2005]. The authors review models on IT business value (cf. Figure 13), analyze the models with regard to process and variance theory characteristics (cf. Table 14), and finally suggest a new process theory (cf. Figure 14) by synthesizing the models and resolving some of their contradictions. The new process theory can serve as a platform for future research.

Table 11. Technology lenses and power lenses as concepts [Jasperson et al., 2002, pp. 406f]

Lens	Definition
Technological	"Views technology as an exogenous force which determines or strongly constrains the behavior of individuals and organizations" (Markus and Robey 1988, p. 585). The technological imperative is also called *technological determinism* because technology is considered a determinant, or strong driver, of organizational outcomes (Orlikowski 1992; Pinsonneault and Kraemer 1993).
Organizational	"Assumes almost unlimited choice over technological options and almost unlimited control over the consequences...human actors design information systems to satisfy organizational needs for information. Thus, information technology is the dependent variable in the organizational imperative, caused by the organization's information processing needs and the manager's choices about how to satisfy them" (Markus and Robey 1988, p. 587). The organizational imperative, also called *managerial choice* or *strategic choice*, emphasizes that individuals choose how and when to apply IT to accomplish work in the organization (Orlikowski 1992; Pinsonneault and Kraemer 1993).
Emergent	"The uses and consequences of information technology emerge unpredictably from complex social interactions" (Markus and Robey 1988, pg. 588). The emergent perspective is typified by studies applying the structurational model of technology (Orlikowski 1992; Orlikowski and Robey 1991). The emergent perspective views the introduction of IT into an organizational setting as a catalyst, initiating a series of reciprocal causes and effects from which the use of the technology and the organizational outcomes arise (Orlikowski 1992; Pinsonneault and Kraemer 1993).

Lens	Definition
Rational	Structural power that focuses on authority, information, and expertise as bases of power; emphasizes rational decision making. Power is viewed in terms of an objective reality in which there is an objectively identifiable, ordered set of optimal goals for the organization (Bradshaw-Camball and Murray 1991).
Pluralist	Power that assumes *objective* definitions of power and that conflict is the norm; development, prioritization, and execution of organizational goals is an explicitly political process involving conscious negotiation based on control of resources and information. Power viewed in terms of an objective reality in which there are objectively identifiable sets of optimal goals for each participant in an organization (Bradshaw-Camball and Murray 1991).
Interpretive	Power is based on the ability to control access to and direct the construction of organizational realities. Power that "assumes that reality is socially constructed... [and] that the parties involved exert influence by constructing the meaning of what others experience" (Bradshaw-Camball and Murray 1991, p. 382).
Radical	Power and politics are outgrowths of social structures, such as class, racial, gender, or institutional structures, that exist outside any particular organization. Political activity, broadly defined, involves either maintaining or undermining (and ultimately overthrowing) existing power structures (Bradshaw-Camball and Murray 1991).

Table 12. Summary of Differences Across Lenses as result of interpretation [Jasperson et al., 2002, p. 415]

Lens	Differences
Technological Imperative	
Rational	Information technology use can alter short-term power bases and create greater equality of participation; however, there is no evidence of lasting effects on legitimate power. Information technology does not alter goals since they are fixed and superordinate.
Pluralist	Information technology use allows for the possibility of competing goals and leads to technology's potentially lasting impact on both formal and informal power.
Interpretive	Language and symbols are used to communicate the value of IT to the organization. The power outcomes are organizationally focused and long-term. The manipulation of language and symbols creates a perception that there is a common goal.
Radical	Information technology is a powerful force that causes changes in organizational and societal structures.
Organizational Imperative	
Rational	Information technology reinforces existing formal decision structure. Focus is on why managers make the choices they do about decision structures.
Pluralist	Organizational actors may use IT to subvert rational power processes or to maintain or enhance formal and informal power positions.
Interpretive	Manipulation of language and symbols to define IT and thereby exercise power and construct social reality about appropriate decisions, structures, and goals.
Radical	Information technology is the powerful driver that is used by a class to change the deep structures of society.
Emergent Perspective	
Rational	Decision-making structures change in response to IT use and IT supporting those structures change accordingly.
Pluralist	Focus on how the less powerful attain subgroup outcomes and resist IT implementation. The goals of the organizational stakeholders are important for understanding organizational power.
Interpretive	Proactive and reactive use of IT to construct social reality about the IT.
Radical	Information technology evolves over time to change society's deep structures and to have its use shaped by the dominant class in that society.

More examples of literature reviews that contribute to theory building are the reviews of Joseph et al. [2007], who propose a theoretical model of IT turnover, including propositions for future research, and Leidner and Kayworth [2006], who develop a theory of IT, values and conflict as well as propositions concerning three types of cultural conflict and the results of these conflicts.

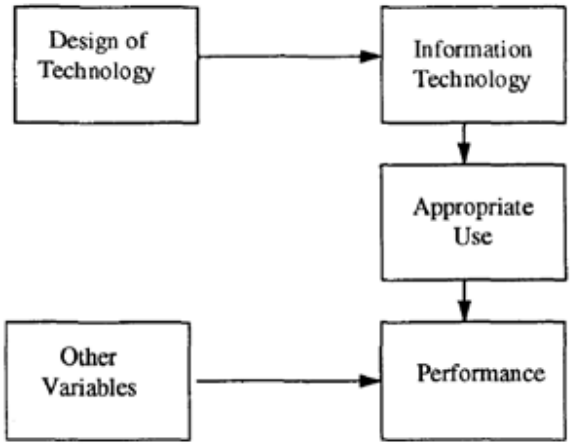
Table 13. Research propositions (metaconjectures) [Jasperson et al., 2002]

Area	Metaconjecture
IT Impact	IT use can moderate the effects of externally based power differentials on the distribution of participation in a group, organizational, or interorganizational decision-making process.
	IT use can only moderate the effects of external power structures on participation in group, organization, or interorganizational decision making on a temporary basis.
	Once power-altering IT has been introduced, it takes some time for the organization to reach a new equilibrium state. The indicators of IT's impact on a new equilibrium state are evidenced by new power structures, language, and symbols.
IT management	Top management's failure to exercise formal authority leads to more prevalent exercises of influence behavior in IT decisions by other parties.
	In situations where the IT function and/or developers lack formal authority or resources, there is greater emphasis placed upon generating acceptance of a formal methodology which in turn alters the formal structures of authority.
	In organizations or groups where the IT function and/or developers have high levels of formal authority or resources, there is less emphasis on educating top management and more on negotiating.
IT development	Top management support has more impact on project success in development environments characterized by resource conflict.
	Top management support has more impact when there is uncertainty about the importance of IT generally or the project specifically.

IX. GUIDANCE PHASE

Guiding future research can occur in different forms and levels of detail. Several authors provide some brief suggestions for further research in their concluding remarks. Others point to future research directions in more detail without embedding their recommendations in a coherent concept. For example, Zhang and Li [2005, p. 274ff] show future directions for the HCI sub-discipline by drawing on their previously proposed research questions. The authors group their recommendations by "ad hoc opportunistic research vs. long term, theoretically-oriented research", "pluralistic methods, dominating methods, and multi-methods" and "general MIS journals, specific HCI in MIS journals, and general HCI journals". Another example is the literature review of Riedl [2013], who uses the previously identified research questions and underrepresented topics to suggest three domains for future research on the biology of technostress: theory and methods, design science and engineering, and health and coping strategies.

A third group of authors draw on a coherent concept, often labeled "framework" or "research agenda", in order to guide future research. For example, the author of the sample literature review suggests an IS business value research agenda (cf. Figure 15) based on the previously identified research gaps (cf. Figure 11). The research agenda is detailed with the suggestion of research thrusts and research paths regarding discussion how these thrusts may be answered in future research (cf. Table 15). Roberts et al. [2012] use the limitations identified based on their literature synthesis (cf. Table 16) to propose a research agenda by providing a framework for investigating the interaction of information technology and absorptive capacity (cf. Figure 16).



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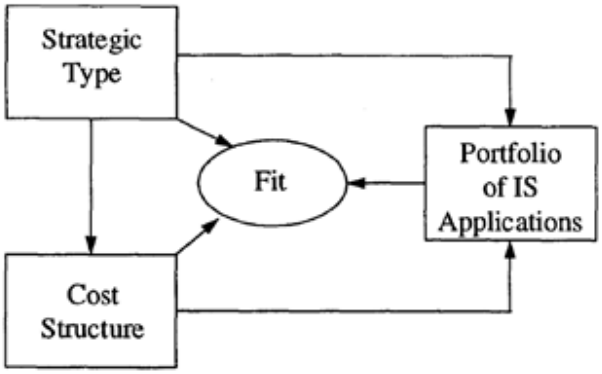

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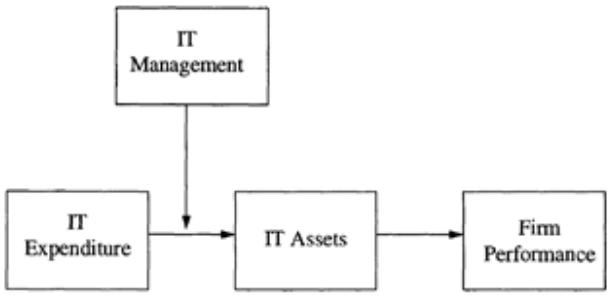

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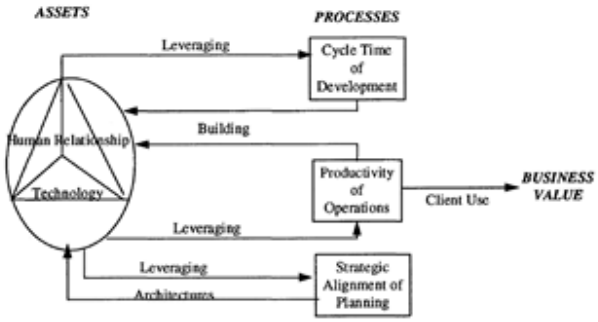

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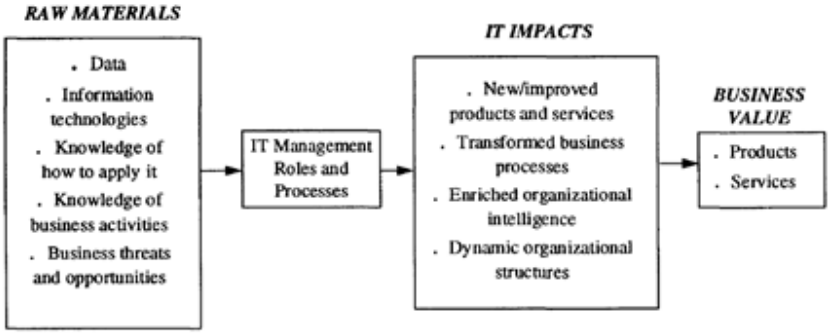

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Figure 13. Models of IT business value [Soh and Markus, 2005, pp. 31, 33f]

Table 14. Analysis of IT business value models [Soh and Markus, 2005, pp. 35]

Criteria	Lucas	Grabowski & Lee	Markus & Soh	Beath, Goodhue & Ross	Sambamurthy & Zmud
Outcome	Organizational performance (variable)	Organizational performance (variable)	Quality IT assets (discrete intermediate outcome) Improved organizational performance (discrete outcome)	Improved business processes (discrete intermediate outcome) Business value (variable)	IT impacts (intermediate variable outcome) Business value (variable)
Logical Form	If IT is not well designed, then appropriate use will not result (P) If appropriate IT use, then increased organizational performance (V)	If there is a poor fit among strategic type, cost structure and portfolio, then decreased organizational performance (P)	Without IT spending, there will be no IT assets (P) Without quality assets, no improvement in organizational performance (P)	Without high quality assets, no improved business process (P) Without improved business processes, no increase in business value (P)	Without raw materials, no IT impacts (P) Greater IT management competencies, greater IT impacts (V) Greater IT impacts lead to greater business value (V)
Assumptions	Good IT design may not lead to increased performance because it may be inappropriately used (P) Organizational performance will increase with more appropriate use of well designed IT (V)	Increased organizational performance may not occur even if there is a fit because of competitor actions (P)	Quality IT assets may not occur even with IT spending; effective conversion is dependent on management processes (P) Quality assets may not lead to improved performance, due to competitor actions (P)	Increase in business value may not occur even with quality IT assets and improved business processes because of process losses, and lack of use (P)	IT impacts may not occur with availability of raw materials, dependent on IT management processes (P) IT impacts occur when there are effective management processes (V) Business value results when there are favorable IT impacts (V)
Role of Time	Sequential ordering of IT design and implementation then use (P)	Not considered	Sequential ordering of IT spending, management processes, and IT assets (P)	Sequential ordering of IT assets, process improvement, and use (P)	Sequential ordering of raw materials, management processes, and IT impacts (P)

Note: (P) and (V) refer to process and variance characteristics respectively.

It is common in all of the aforementioned literature reviews that the authors achieve logical coherence in their reviews by using their literature synthesis to identify research needs and to subsequently suggest recommendations on how to address these needs. We recommend that authors of a literature review adopt the logic of this flow when they suggest a research agenda.

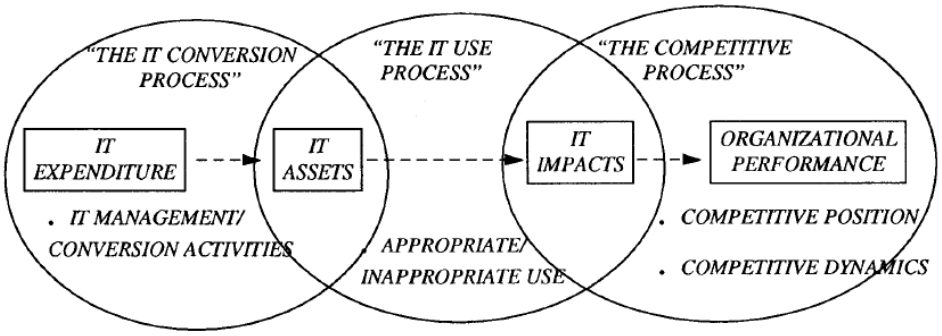

Figure 14. Process theory on IT business value [Soh and Markus, 2005, p. 37]

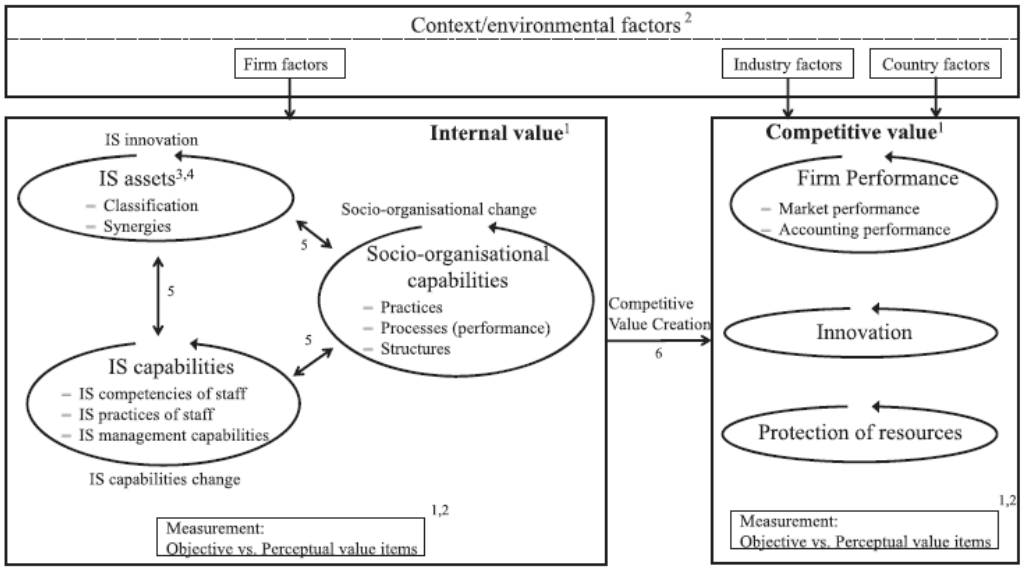

Figure 15. Research agenda suggested in [sample literature review, p. 151]

The development of a research agenda including research thrusts, research propositions, research paths and, most desirable, theories and methodologies for future research is a challenging and innovative task that can hardly – and should not - be standardized for the purpose of flexible and innovative pointers to relevant research. The readers can find more examples of how research agendas can be developed in the literature reviews of Joseph et al. [2007],, who propose a research agenda with a contextual model of turnover of IT professionals, Tyran and Shepherd [2001], who suggest a research framework for research on group support system technology to the classroom, Wade and Hulland [2004], who use the well-established resource-based view to develop IS research paths, and Belanger and Crossler [2011], who develop an information privacy concern multilevel framework and use this framework to make a chart for future research.

Table 15. Research thrusts and research paths [sample literature review, p. 159]

Research gaps	*Research thrusts*	*Research paths*
Ambiguity and fuzziness of the 'IS business value' construct	How can we yield a comprehensive, consistent and precise understanding of the multifaceted construct 'IS business value'?	• Disaggregation and operationalisation of four types of IS business value (based on suggested value taxonomy). • Identification of value items with which the respective value can be measured. • Use of objective and perceptual measures. • Identification and development of methodologies that allow the measurement of value items.
	How can the assessment of (internal and competitive) business value account for the context of evaluation, and in particular the firm, industry and country environment and the preferences of evaluators?	• Identification of (value item specific) environmental factors and their impact on the ultimate economic meaning of value items. • Use of 'states' as conceptual constructs of economic conditions, which are instantiations of environmental factors. • Consideration of subjective preferences of stakeholders. • Identification of preference functions of stakeholder (utility theory).
Neglected disaggregation of IS investments	How can total IS investments be disaggregated conceptually and empirically such that the impact of different types of investments on the economic performance of a firm can be determined?	• Conceptual development of IS asset classification according to the objectives of the firm. • Suggestion of methodologies that account for potential ambiguities in classification. • Case studies in firms in order to trace and evaluate investments in particular IS assets.
	How can the disaggregation of total IS investments account for synergies and complementarities of IS assets?	• Identification of synergy opportunities of IS assets by means of business objectives, critical success factors and key performance indicators. • Distinction between 'super-additive IS value synergy' and 'sub-additive IS cost synergy'.
IS business value creation process as grey box	How, why and when do IS assets, IS capabilities and socio-organisational capabilities affect each other and jointly create internal value?	• Interdependencies between particular IS capabilities, competencies and practices; development of IS capabilities over time (change in IS capabilities). • Impact of socio-organisational change on changes in IS capabilities; consideration of three types of socio-organisational capabilities: customer management capability, process management capability and performance management capability. • Future work needs to resolve contradictory results in the literature regarding the relationship between IS innovation and socio-organisational change. • Relationship between IS innovation and change in IS capabilities needs to be investigated in order to understand how IS assets and innovation contribute to building and sustaining valuable, scarce and difficult-to-imitate resources.
	How, why and when do IS assets, IS capabilities and socio-organisational capabilities jointly create competitive value, thus performing a value creation process?	• Identification of complementarities of IS assets, IS capabilities and socio-organisational capabilities by means of business objectives, critical success factors and key performance indicators. • Protection of access to resources, decrease in dependence of own firm on other firms, and increase in dependence of other firms on own firm through inter-organisational IS (Resource Dependence Theory). • Competitive value of IS and capabilities manifests in performance differences along dimensions consistent with their strategic purpose (Resource-based view, IS governance). • IS use can have unanticipated consequences. The development of an integrated explanatory theory can draw on the multidisciplinary theoretical input of Markus & Robey (2004). • Erosion of competitive value over time depends on ability and speed with which IS assets and capabilities are imitated by competitors.

Table 16. Limitations of past research [Roberts et al., 2012, p. 640]

Limitation	Description	Guidelines
Conceptualization	A substantial number of IS articles conceptualize absorptive capacity as an asset. Conceptualizing absorptive capacity as an asset raises construct validity issues and fails to capture knowledge absorption processes. Possessing relevant prior knowledge is a necessary but insufficient condition for a firm to have an effective absorptive capacity capability. This also underestimates the role IT can play in knowledge absorption.	• Conceptualize absorptive capacity as a capability • Employ a holistic approach to the relationship between IT and absorptive capacity
Level of Analysis	IS scholars have investigated absorptive capacity at the individual level. Failure to take into account the differences between individual absorptive capacity and collective absorptive capacity undermines construct validity and inhibits theoretical development.	• Conceptualize and measure absorptive capacity as a collective construct • Build on appropriate learning research
Measurement	IS researchers often define absorptive capacity as a capability and yet measure it as an asset, thereby undermining construct validity. Adapting measures of organizational absorptive capacity at the individual level also complicates construct validity. Scholars eschew established measures of absorptive capacity, inhibiting the building of a cumulative research tradition. Finally, researchers often miss capturing the domain-specific nature of absorptive capacity.	• Conceptualize and measure absorptive capacity as a multidimensional capability • Develop metrics that capture each of absorptive capacity's dimensions • Measure absorptive capacity with respect to specific knowledge domains
IT Artifact	A substantial amount of IS research employs a nominal view of the IT artifact in relation to absorptive capacity. Conceptualization of IT is absent from these studies. Furthermore, absorptive capacity is often conceptualized as an asset or at a "macro" or abstract level, thereby making it difficult to provide relevant implications for managers.	• Describe the relationship between IT and absorptive capacity • Develop theoretical contexts with well-defined boundaries

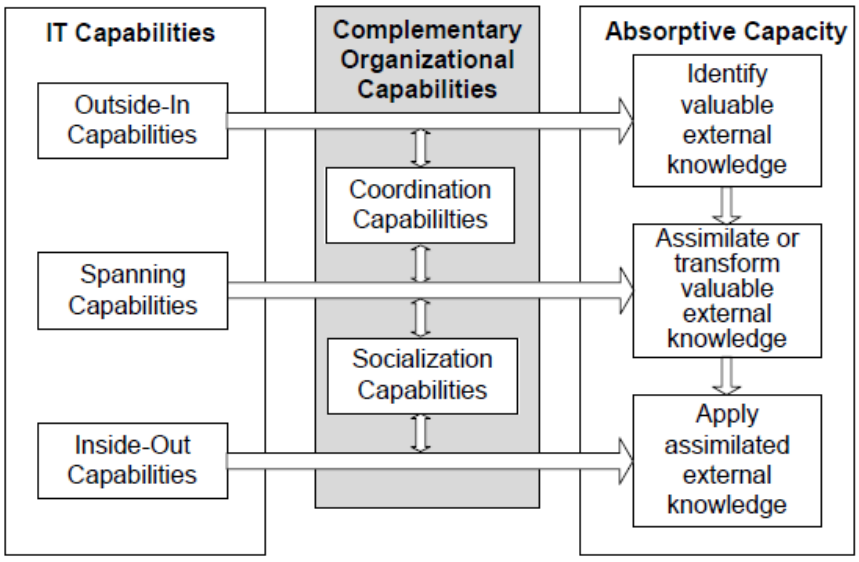

Figure 16. Research agenda suggested in [Roberts et al., 2012, p. 641]

Table 17. Research propositions [Roberts et al., 2012, pp. 642ff]	
Proposition 1	Synergies arising from complementarities between outside-in IT capabilities and knowledge-exchange coordination capabilities will have a positive effect on a firm's ability to identify and recognize the value of external knowledge.
Proposition 2	Synergies arising from complementarities between spanning IT capabilities and knowledge-exchange coordination capabilities will have a positive effect on a firm's ability to assimilate and transform external knowledge.
Proposition 3	Synergies arising from complementarities between spanning IT capabilities and knowledge-exchange socialization capabilities will have a positive effect on a firm's ability to assimilate and transform external knowledge.
Proposition 4	Synergies arising from complementarities between inside-out IT capabilities and knowledge-exchange socialization capabilities will have a positive effect on a firm's ability to apply external knowledge.

X. CONCLUSION PHASE

As in research articles of genres other than literature reviews, you should conclude your literature review. We recommend that you provide a summary of what your literature review has found, of what the implications for research and practice are, and what the limitations are. The summary should briefly synthesize each of the contributions of your literature review. In particular, it should state which concept(s) you adopted to review and interpret the literature and, potentially, to develop a research agenda. Of course, you should also summarize what you found in terms of literature findings, research gaps, extension of knowledge, and future research paths.

Implications of a literature review can refer to research and practice and should be presented [Webster and Watson, 2002, p. xxi]. Providing a research agenda means that you have already shown the essential implications for research. However, this does not necessarily mean that you do not have to say more on future research. For example, in the sample literature review, the author provides a separate section "Potential for further research", in which he briefly sketches future research areas that are not covered in the research agenda.

Finally, you state the limitations of your research. Please, notice that each literature review has limitations and that there is no "perfect" literature review. It does not reduce the quality of your review when you make the limitations explicit. In contrast, a good literature review does not only state what it has done but also what future literature reviews still need to do. The limitations can be rooted, for example, in the selection of publication outlets, the choice of search strings and key words, the use of a specific time period, the adoption of specific concepts, and the scope and boundaries of your review as you should have stated these during the framing phase.

XI. CONCLUDING REMARKS

We conclude our tutorial by proving a brief summary of what is included, suggesting some further recommendations and listing limitations of our tutorial.

This tutorial provides an introduction into the role of literature reviews in the IS discipline, including benefits of literature reviews for different groups of authors, and definitions and understandings of literature reviews. We suggest both methodological foundations and practical guidelines for conducting qualitative literature reviews in the IS discipline. We propose a methodological framework for conducting a literature review that consists of a framing process and phases of search and assessment, synthesis, interpretation, guidance, and conclusion. Thereby, our recommendations go beyond the question of how to search and synthesize the literature, they also cover the even more challenging tasks of framing a literature review, interpreting research findings and proposing research paths. Our tutorial includes many examples, including one example that is used to illustrate all phases in order to guide the reader through the overall process of doing a literature review.

While the previous sections mainly contain recommendations for conducting specific tasks in a literature review, we would like to add some further comments which should be generally considered when doing a literature review.

- As other authors, e.g., Webster and Watson [2002, p. xviii] and Zorn and Campbell [2006, p. 178] have already advised, the tone should be respectful of the studies reviewed and of the related authors. Please, keep in mind that it is easy to criticize previous work and to find limitations. If you do so, do not rate the perceived quality of work but describe these with facts.
- Use visualizations (usually tables, diagrams and figures, but other media data may be appropriate as well) in your literature reviews in order to synthesize and conceptualize your contributions [Webster and Watson, 2002, p. xvii; Wolfswinkel, Furtmueller and Wilderom, 2013, p. 8]. It allows readers and reviewers to more easily catch your ideas compared to first reading many pages of text. It also helps to meet the requirement stated by Baker [2000, p. 238]: *"It is your task to make the complex clear, not to confuse the reader with obscure and obtuse references in the mistaken belief that the more difficult it is to understand the more erudite it must be."*
- You will review different types of literature contributions, including empirical research, conceptual work, opinion pieces, and practitioners' experience. As a consequence, the basis and strength of conclusions and arguments differ. Although your literature synthesis should be concept-centric, it does and should not prevent you from stating how and to what extent specific references have contributed to domain knowledge.

Try to be as specific as possible in this regard and avoid making statements like “Smith said”, “Smith concluded or “According to Smith” [Zorn and Campbell, 2006, p. 175]. You should rather use formulations like “Based on the multiple case study conducted in companies X,Y, Z over the years 2000 to 2002, Smith analyzed the transcriptions of his interviews with the CIOs of X,Y,Z and found in all three cases that …”.

- In the presence of many literature databases, journals, conferences and other literature pools, writing a literature review methodologically and comprehensively usually requires not only a substantial amount of work and time but also the involvement of an experienced scholar. In his EJIS editorial, Rowe [2012, p. 470] even discourages single authorships: *“My editorial experience with literature reviews at Systèmes d’Information et Management and EJIS leads me to discourage single author submissions. The likelihood to meet the publication standards expectations greatly increases if at least two colleagues with experience on the problem (in the domain) are collaborating.”* This recommendation is consistent with the author of this tutorial, who compiled a literature review on IS business value [sample literature review], which is a field with hundreds if not thousands of articles published, in single authorship.
- Try to find an expert of the topic you write about and ask him/her for a friendly review. In addition, *“try it out on an intelligent layperson with no pretensions to expertise on the topic to see if it passes the acid test of being both understandable and interesting.”* [Baker, 2000, p. 238]

This tutorial has some limitations. First, the suggested phase-based framework is only partially based on the literature. It also reflects the experience and subjective attitude of the author how IS literature reviews should be written. Authors of other literature reviews may adopt different perspectives, and *“there is not a single, uniform approach to developing a […] review article.*” ([Schwarz et al., 2007] cited in [Boell and Cecez-Kecmanovic, 2014, p.44]). However, our analysis of many IS literature reviews and the literature review methodology show in most of the key regards a homogenous picture. Second, we analyzed literature reviews of selected IS journals only. We have not conducted a systematical search in proceedings of IS conferences and in table of contents of renowned journals of neighbor disciplines, such as management science and computer science. Third, the literature on review methodology we use is from the disciplines of IS and social sciences. It would be interesting to adopt methodologies used in other academic disciplines. Finally, our tutorial addresses only qualitative literature reviews. More precisely, scientometric and bibliometric studies as well as literature reviews that apply vote counting and meta-analysis are excluded from our considerations. We also do not cover literature reviews that apply “ad hoc” framing or incremental framing, we rather address literature reviews which use conceptual framing.

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