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A Hermeneutic Approach for Conducting Literature Reviews and Literature Searches

Sebastian K. Boell
The University of Sydney Business School, Australia, sebastian.boell@canberra.edu.au

Dubravka Cecez-Kecmanovic
Australian School of Business, University of New South Wales, Australia

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Sebastian K Boell

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Sebastian.Boell@Canberra.edu.au

Dubravka Cecez-Kecmanovic

Australian School of Business, University of New South Wales, Australia

Abstract:

The quality and success of scholarly work depends in large measure on the quality of the literature review process. This paper advances conceptual understanding of the literature review process and extends earlier guidelines on literature reviews. It proposes a hermeneutic framework that integrates the analysis and interpretation of literature and the search for literature. This hermeneutic framework describes the literature review process as fundamentally a process of developing understanding that is iterative in nature. Using the hermeneutic circle it describes the literature review process as being constituted by literature searching, classifying and mapping, critical assessment, and argument development. The hermeneutic approach emphasizes continuous engagement with and gradual development of a body of literature during which increased understanding and insights are developed. The paper contributes to better understanding of the literature review process and provides guidelines to assist researchers in conducting high quality reviews. Approaches for efficient searching are included in an Appendix.

Keywords: literature review; hermeneutics; research methods; conducting literature reviews; literature searches; interpreting literature; database searches;

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I. INTRODUCTION

The main purpose of academic activity is to engage in the creation of knowledge. This is achieved by developing new ways for understanding the world. While disciplines vary in the domain of knowledge they seek to create and the main means for creating it, questioning existing knowledge and proposing new understanding and explanation are common for all branches of scholarly activity. One important aspect of creating new knowledge is the awareness of existing knowledge and research undertaken by others. There are different means for becoming aware of existing knowledge and earlier research. For instance, one can learn about relevant research at conferences and meetings or in conversations with colleagues. However, arguably the most important means for becoming familiar with earlier research is through published writings by other scholars. Moreover, as the amount of published material steadily increases, finding literature efficiently through searches in large literature reference database such as *Scopus*, *Web of Science*, or *Google Scholar* is increasingly important. Identification of relevant literature, however, is only one aspect of conducting literature reviews. The body of relevant literature also needs to be understood and interpreted, and subjected to examination, questioning and critical assessment that unleashes imagination and advances scholarship. These two aspects of conducting literature reviews are therefore quintessential pursuits in the work of every scholar.

This paper is concerned with the literature review process and aims to contribute to a better conceptual understanding of how the search for literature and development of a literature review can be creatively intertwined and mutually enriching so as to advance scholarship. We describe the literature review process as a hermeneutic understanding process. We thus contribute a hermeneutic framework that advances conceptual understanding of the process of conducting literature reviews and offers practical guidance for researchers. The hermeneutic framework for conducting literature reviews is proposed and described in the paper to assist researchers in understanding and coping with often complex issues of literature review development. The framework also provides a clear account of the role of literature searches as part of the literature review process.

Generally, the term 'literature review' can refer to a published product such as literature reviews presented as parts of research reports (e.g. in papers or theses) or a stand-alone literature review publication. 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 [Green et al. 2006; Hart, 1998; Khoo et al. 2011]. Literature reviews typically provide: an overview, synthesis and a critical assessment of previous research; challenge or problematize existing approaches, theories and findings; and identify or construct novel research problems and promising research questions [Alvesson and Sandberg, 2011; LePine and Wilcox-King, 2010].

In addition to a final outcome, a 'literature review' can also refer to the process by which the literature review is developed. Used in this sense a literature review is the process during which scholars identify, analyze, assess, and synthesize earlier research. To conduct high quality literature reviews in Information Systems (IS) Webster and Watson [2002] propose a topic-centric approach for presenting earlier research, rather than a publication centric listing of results in earlier studies. The strengths of this approach are that it tends to be more critical, and that it foregrounds a researcher's perspective onto a domain [Khoo et al., 2011]. The use of qualitative research software is suggested to facilitate the creation of literature reviews that identify themes and contributions, and the way they are related, thus enabling a particular insight into existing knowledge [Bandara et al., 2011; Wolfswinkel et al., 2013]. In addition, Levy and Ellis [2006] describe different aspects of conducting literature reviews including for instance, the coverage of IS journals and conferences by different databases. Yet none of these papers discuss the role of literature searches in databases in more detail. This has left an open space for the proponents of 'Systematic Literature Reviews' to draw attention to and emphasize the role of literature searches [Okoli and Scharam 2010]. However, Systematic Literature Reviews are criticized for reducing literature reviews to formalistic literature searches thus stifling academic curiosity and threatening "quality and critique in scholarship and research" [MacLure, 2005:393]. Moreover, highly structured approaches downplay the importance of reading and dialogical interaction between the literature and the researcher; continuing interpretation and questioning; critical assessment and imagination; argument development and writing – all highly intellectual and creative activities, seeking originality rather than replicability [MacLure, 2005, Hart, 1998]. As Schwarz et al. [2007] note, "there is not a single, uniform approach to developing a framework or review article" (p.44).

Literature searches – we should make it clear – are highly important for identifying relevant literature and developing a review. While they are seen as an important component of a literature review process, literature searches are not well understood within this process. In particular, to date none of the publications on literature reviews in IS [Bandara et al., 2011; Levy and Ellis, 2006; Schwarz et al. 2007; Webster and Watson, 2002; Wolfswinkel et al., 2013] provides a clear account of the role of searches within the wider context of the literature review process. Moreover, there is a need to improve understanding of the literature review process and the role of literature searches within it.

While the literature review process is of crucial importance for any research endeavor, the nature of this process and how it should be conducted are still subject to debate. In the current literature specific aspects are typically either over or under-emphasized. As a result, the literature review process is often not well understood and novice researchers especially find it difficult and overwhelming [Boote and Beile, 2005; Combs et al., 2010; Kwan, 2008]. The key challenge in understanding the literature review process is to unpack the researcher's engagement with the literature – finding, reading and interpreting publications and making sense of a potentially large body of literature relevant for a targeted problem.

Interpretation and understanding are inherent in the literature review process. It is thus no surprise that the centrality of understanding in literature reviews was highlighted by several authors [Boote and Beile, 2005; Hart, 1998; Schwarz et al., 2007]. We therefore propose hermeneutic philosophy as a theoretical foundation and a methodological approach for studying literature reviews as inherently interpretive processes in which a reader engages in ever expending and deepening understanding of a relevant body of literature. Hermeneutics does not assume that correct or ultimate understanding can be achieved, but instead is interested in the process of developing understanding. Engagement with the literature and development of the literature review can, thus, be described as an ongoing hermeneutic process of developing understanding. Moreover, this reflects the general development of understanding in scholarly activity where earlier theories are continuously replaced by better theories or advanced paradigms [Kuhn, 1962] rather than ultimate or final theories.

More specifically the objectives of this paper are:

> i) to contribute to a better understanding of the literature review as a hermeneutic process. By articulating the hermeneutic approach the paper makes a contribution to a conceptual foundation of literature reviews that aims to advance understanding and assist in conducting literature reviews in practice;

> ii) to demonstrate the role and importance of literature searches within this process and propose various search techniques and strategies that can be employed for conducting literature searches more efficiently. This objective, therefore, addresses a void in earlier literature on literature reviews in IS that did not discuss different search techniques and search strategies in detail.

This paper is structured as follows. First, the paper provides a brief introduction into literature reviews followed by an overview of a hermeneutic framework for interpretation and understanding of literature consisting of a double hermeneutic loop. It then discusses in more detail the wider hermeneutic loop associated with the analysis and critical assessment of literature. This is followed by a section discussing the importance of literature searches and different aspects of the search process forming the inner hermeneutic loop.

II. LITERATURE REVIEWS

This review first provides a brief description of the approach used to engage with the literature on literature reviews. It then introduces different types of literature reviews, followed by a discussion of earlier work on the literature review process.

In order to gain a deeper understanding of the process of conducting literature reviews we drew from different resources. Firstly, we consulted general introductory works into literature reviews drawing mostly on introductory textbooks [Davies and Beaumont, 2007; Feak and Swales, 2009; Finn, 2005; Hart, 1998; Machi and McEvoy, 2012; Ridley, 2008]. These works enabled us to establish a general understanding of how different authors seek to guide novices in undertaking literature reviews, and to derive aspects which different authors have deemed important to high quality literature reviews. Secondly, we drew from publications engaging with literature reviews in the context of IS [Bandara, et al., 2011; Levy and Ellis, 2006; Okoli and Schabram, 2010; Schwarz et al., 2007; Webster and Watson, 2002; Wolfswinkel et al., 2013]. Thirdly, we searched for additional research publications in the multidisciplinary research databases *Scopus*, *Web of Science*, and *Google Scholar*. These searches aimed at identifying research on literature reviews with a particular focus on the Social Sciences. Searches were further backed by using citation tracking, and consulting colleagues for additional literature. These techniques are further discussed in Appendix A.

Reviewing earlier work is an important part of any research. Generally, literature reviews aim to summarize and synthesize earlier research in order to provide an overview on what has been done regarding a particular research problem [Green et al. 2006; Khoo et al. 2011]. "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, 2011:82].

Generally three broad categories of literature reviews can be distinguished. Firstly, literature reviews are an integrative part of any research thesis [Perry, 1998]. Several authors have thus emphasized that learning to conduct literature reviews is an important part of research training [Boote and Beile, 2005; Combs et al., 2010; Dong 1996; Finn, 2005; Kwan, 2008; Wolfswinkel et al., 2013]. For instance, Combs et al. [2010] highlight the importance of literature reviews in research student training, emphasizing the role of advisors as facilitators in this process.

Secondly, literature reviews can be an important type of publication in their own right [Bensman, 2007; Garfield, 1987; Green et al. 2006; Fernander-Rios and Buela-Casal, 2009; Watson, 2001]. Stand alone literature reviews make an important contribution to research by 'being more than the sum of its parts' [Schwarz et al., 2007]. Articles reviewing earlier research are important in the process of knowledge development [Boote and Beile, 2005; Watson, 2001; Yadav, 2010] as they are not mere summaries of earlier research publications but instead 'serve particular objectives' [Khoo et al., 2011]. While the aim is generally to provide a comprehensive summary of earlier research in a particular area, this type of article comes in different shapes and forms depending on how they build their contribution to research. Most common are *review articles*. Such articles provide a comprehensive overview of earlier research often seeking to identify gaps or problematize a particular aspect in a body of literature [Alvesson and Sandberg, 2011]. In addition to review articles *framework articles* aim at a more specific contribution [Schwarz et al., 2007]. They may either seek to develop and propose new theories, theoretical frameworks, or specific hypotheses as part of a conceptual framework [Rocco and Plakhotnik, 2009]. And finally the techniques of *meta-analysis* are pooling empirical findings from earlier publications in order to compile an overall picture on a phenomenon [King and He, 2005]. As they require comparable empirical data they often focus on quantitative data.

However, the most common form of literature review appears as a part of research publications. Virtually every research article includes a section that reviews earlier related research. As part of research articles, literature reviews synthesize earlier relevant publications in order to establish the foundation of the contribution made by an article. Ideally literature reviews provide for the choice of methodology, the research design, and the interpretation of results presented in the study [Khoo et al., 2011]. Thus literature reviews are central to the research process in general [e.g. Boote and Beile, 2005; Hart, 1998; Kwan, 2008]. Green et al. [2006] even highlight the fact that undertaking a literature review is actually an important research method in itself. The importance of literature reviews for research publications is further underlined by the observation that inadequate reviews increase the likelihood of manuscripts being rejected [Combs et al., 2010].

Irrespective of the type of literature review to be developed, the actual process of undertaking literature reviews is of interest. When presented as part of a research thesis or research article, literature reviews usually come before the methods section, the presentation of results, and their discussion. However, this form of presentation implies a particular linear understanding of the literature review process. That is, literature reviews come early in the research process leading to the formulation of research questions and the research design. However, only in rare cases does this picture reflect the actual nature of the way literature is engaged. For instance, grounded theory explicitly suggests not engaging with literature until later during the research process [Glaser and Strauss, 1967]. While this view is less strict in Strauss and Corbin [1990], there is an ongoing debate as to at what point literature should be engaged and to what extent in grounded theory [Dunne, 2011].

While not all research methodologies are as vigilant as grounded theory on the effect of ideas arising from the literature and potentially "contaminating" results grounded in data, there is plenty of evidence that reading earlier research informs research at all of its stages. A literature review is not something that comes 'before' the 'real' study [Dellinger, 2005]. Reading, conducting empirical research, and writing are not a linear but rather an iterative process. There is no clear answer to the question of when to stop reading and when to start writing [Goodfellow, 1998; Kwan, 2008]. For instance, additional reading can help in strengthening the discussion of results [Dong, 1996] or may help in interpreting unforeseen results [Onwuegbuzie et al., 2007].

All these aspects highlight the fact that engagement with the literature is not a routine task, but an intellectual development process. Thus, the need to engage with literature and to identify relevant publications may arise at various points during the research process. It is therefore no surprise that several authors have pointed out that conducting a literature review in itself is not a linear process [Boell and Cecez-Kecmanovic, 2010; Combs, 2010; Kwan, 2008; Wolfswinkel, 2013]. For instance, Combs [2010] stresses that conducting literature reviews is an interactive and iterative process that aims for saturation in understanding. The description of literature reviews as an understanding process is also made by several others [Boote and Beil, 2005; Hart, 1998; Schwarz et al., 2007]; and

further underlined by the observation that an important aspect of creating good literature reviews is re-writing: they need to be re-written several times in order to form better understanding and to better convey this understanding to readers [Heyman and Cronin, 2005; Machi and McEvoy, 2012]. Other authors also emphasize the importance of (ongoing) reading [Kwan, 2008; Ridley, 2008] and writing [Feak and Swales, 2009; Levy and Ellis, 2006; Venkatesh, 2011] as part of the literature review process. In addition, Kwan et al. [2012] note that there are differences in building arguments in literature reviews in different types of IS research. Learning how to write literature reviews according to these implicit rules is the result of a learning process involving reading and repeated attempts at writing by researchers. Moreover, further important aspects for developing high quality reviews are critical engagement [Finn, 2005; MISQ, 2006; Ridley, 2008] and argument development [Feak and Swales 2009; Kwan et al., 2012; Machi and McEvoy, 2012; Ridley, 2008].

The notion of literature reviews as fundamentally an understanding process is further underlined by the advice given in textbooks on literature reviews. These textbooks generally do not prescribe a particular method for conducting a review but instead emphasize that literature reviews are an intellectual process. Hart captured this aspect in what he describes as a 'research imagination':

> "It is something not easily acquired. A research imagination takes time to develop: something that is part of the research apprenticeship. [...] the research imagination is about: having a broad view on a topic; being open to ideas regardless of how or where they originated; scrutinizing ideas, methods and arguments regardless of who proposed them; playing with different ideas in order to see if links can be made; following ideas to see where they might lead; and it is about being scholarly in your work" [Hart, 1998:29-30].

In contrast to these observations highlighting the intellectual nature and originality of literature reviews, other approaches to literature reviews suggest the use of formal methodology [Okoli and Schabram, 2010] and step by step approaches [Bandara et al. 2011; Wolfswinkel et al. 2013]. Here the emphasis shifts from intellectual engagement with earlier research towards rigor, replicability, and objectivity of the review process [Boell and Cecez-Kecmanovic, 2011; Green et al. 2006; Okoli and Schabram, 2010]. Of particular importance in this regard are so called Systematic Literature Reviews, which originated in Medicine in the context of meta-analysis [Eysenck, 1995; Thompson, 1995] but which were later adopted outside Medicine, first in software engineering [Kitchenham, 2004] and later in IS [Okoli and Schabram, 2010].

Systematic Literature Reviews are of particular interest due to the emphasis they place on the literature search process. While some general guidelines for conducting literature reviews mention the importance of locating literature [Boote and Beil, 2005; Levy and Ellis, 2006; Wolfswinkel et al. 2013] none of them address the literature search process in detail. The reason for this may be that they consider aspects such as reading, critical assessment, and argument development, as more important. However, these aspects can only come into play after relevant literature is identified. In addition, over the last decade the need for locating literature through database searches has become more and more important. In this regard formal approaches to literature reviews do address an important need that arises from the complex nature of database searches and the frustration researchers are facing while, on the one hand, being inundated with the sheer number of documents available and, on the other hand, fearing to miss important literature. However, claims made by systematic reviews of being replicable and unbiased do not hold up in practice and their adoption is seen as a risk to scholarship [Boell and Cecez-Kecmanovic, 2011; Hammersley, 2001; Hjorland, 2011; MacLure, 2005; Murray et al., 2007; Sandelowski, 2008].

Based on this review of the literature we can conclude that:

1) conducting literature reviews is not only an important aspect in nearly every research publication but also that it plays an important part in knowledge development in the form of review articles, and that it is a central consideration in research training and the development of research theses;

2) there are different and often conflicting understandings of the nature of the literature review process and confusing instructions on how it should be conducted; and

3) locating and interpreting literature is an important aspect of the literature review process that is currently insufficiently addressed in the literature.

To advance understanding of the literature review process we develop in this paper a conceptual foundation based on hermeneutic philosophy. Drawing from hermeneutics the paper champions an approach for conducting literature reviews that acknowledges that developing literature reviews is fundamentally an intellectual pursuit, an understanding process that involves reading, critical engagement, argument development, and writing. Within such a conceptualization of the literature review process we provide a clear account of different methods and approaches

that can be adopted in order to locate literature that feeds this understanding process. A hermeneutic framework proposed here contributes to better understanding of the nature of the literature review process and also assists researchers in conducting literature reviews in practice.

III. A HERMENEUTIC FRAMEWORK FOR THE LITERATURE REVIEW PROCESS

Hermeneutics as a conceptual foundation for literature reviews

Research typically starts with a puzzle or a problem found in research or professional literature, through education, media, or experience in practice. A researcher then begins her/his exploration by first seeking more general introductory texts and review papers which are especially valuable. She/he reads, makes sense of and interprets these texts and finds out further relevant texts in order to identify and understand major ideas, findings, concepts and theories and establish connections among them. During this process the development of understanding progresses gradually while the researcher engages with and makes her/his own way through the literature. Initial ideas and preunderstandings are questioned, refined and extended in the light of what is being learned.

Given that interpretation and understanding are of central concern we adopt hermeneutics as an underlying philosophy and methodology for conducting literature reviews. As a theory of interpretation that deals with questions of meaning of texts, hermeneutics philosophy [Gadamer,1976; Ricoeur,1981] provides a rich theoretical foundation for understanding and describing the literature review process. In particular, by providing principles for developing understanding of texts hermeneutics affords a methodology to conduct literature reviews. Drawing from hermeneutic philosophy as both a theory of interpretation and a methodology we propose a hermeneutic framework for describing the literature review process.

While hermeneutics was initially concerned with the interpretation of biblical texts it has been extended first to the interpretation of any text or linguistic material and later to understanding in general [Ramberg and Gjesdal, 2009]. The initial aim of hermeneutics in the nineteenth century was to reconstruct the original meaning of a text, that is, the meaning intended by an author [Schleiermacher, 1838|1998]. Similarly Dilthey[1] [1985–2002] argued for a theory of interpretation that aims to imaginatively re-enact the original meanings and experiences of others. These views were challenged by twentieth century philosophers, in particular Heidegger [1927|2002] and Gadamer [1976]. Heidegger made an important ontological turn and proposed that "interpretation is not just a meaning; it is grounded in a whole set of background practices, a kind of *preunderstanding* that makes knowing possible" [Barrett et al., 2011:187; emphasis in the original]. Unlike Schleiermacher and Dilthey who assumed that interpretation and understanding are cognitive processes, inside the mind, aimed at reconstructing an original meaning, Heidegger radically changed the view of hermeneutics beyond a methodology for understanding such original meaning. For Heidegger understanding is not only a cognitive process but the practical mode of human existence, embedded in the tradition of being and universal to all human activity [1927|2002].

Hans Gadamer [1976], Heidegger's student, developed these ideas further and approached understanding as a practical achievement through a dialogue between the reader and the text, between readers and between texts. For Gadamer, understanding of a text is always a translation in a concrete socio-historical and cultural context. There is no correct or universal interpretation of a text outside of history, culture, or irrespective of a standpoint. In Gadamer's words, "the standpoint beyond any standpoint … is pure illusion" [1976:376]. Gadamer adds new conceptual apparatus to hermeneutics as explained by Barrett et al. [2011]:

> "Understanding … is a projection of the horizon of the reader that meets the horizon of the text. Gadamer introduces an important phrase that many cite as one of his core contributions to the field of hermeneutics: *understanding is the fusion of horizons*. The dialogical encounter between reader and text extends or contracts the reader's world" [p. 189; our emphasis].

Horizon here denotes "the range of vision that includes everything that can be seen from a particular vantage point" [Gadamer, 1975|2004:301]. A reader's horizon initially may be narrow, thus allowing very limited understanding. However, a reader's engagement with a text may challenge the initial horizon and potentially extend it as well as open up new horizons. In such an engagement the reader extends and projects her/his horizon towards the text, which itself participates with its own historical context and horizon. The fusion of horizons of the reader and the text is a particular dialogical encounter through which the reader learns concepts, theories and terminology that are of relevance in regard to the text which in turn open up the text for further interpretation and understanding.

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1   Wilhelm Dilthey's (1833 – 1911) Selected Works are being published by Princeton University Press (1985-2002).

This leads us to the notion of the hermeneutic circle first proposed by Schleiermacher [1838|1998] and later advanced by Heidegger and Gadamer. The hermeneutic route to understanding is always iterative: an understanding of a text (a part) draws from the reader's preunderstanding of a context (a whole); and vice versa, the understanding of a context (a whole) develops from understanding individual texts or text equivalents (parts). In other words, the researcher is involved in:

> "a continuous dialectical tacking between the most local of local detail and the most global of global structure in such a way as to bring both into view simultaneously . . . Hopping back and forth between the whole conceived through the parts which actualize it and the parts conceived through the whole which motivates them, we seek to turn them, by a sort of intellectual perpetual motion into explications of one another" [Geertz, 1979:239].

Through such a circle the understanding of both the text (part) and the context (whole) are continually revised and mutually co-produced. As more texts are engaged with, the dialogical encounter is extended and the fusion of horizons broadened to texts reaching to each other's as well as to the reader's horizon. The questions of preunderstanding, preconceptions, tradition and biases involved in all dialogical encounters among readers and texts have been widely debated [Gadamer, 1976; Heidegger, 1927|2002; Kearney, 1999]. While they cannot be avoided – being inherent to all understanding – they can be reflected upon and thereby rendered more open for the unknown, unexpected and strange. The key issue for a reader, Gadamer [1975|2004] warns us, "is to be aware of one's own bias, so that the text can present itself in all its otherness and thus assert its own truth against one's own fore-meanings" [p. 272]. The more the reader remains open to the meaning of the other person or text the more likely it is that the hermeneutic circle will lead to the enriching and broadening of horizons.

The literature review process involves numerous activities of identifying and interpreting relevant texts for a particular research problem or a puzzle. To develop a literature review a researcher needs to find relevant texts, interpret them and develop a broad understanding of the literature before endeavoring to establish and critically assess the state of knowledge. Relevance in this context is dependent upon a researcher's understanding at a particular point in time. Initially some texts may be highly relevant as they convey new concepts, definitions and ideas to a researcher. However, at a later point similar literature may be less relevant as a researcher can learn less from it. At the same time, new literature that expands knowledge in a particular direction may become relevant. For example, a text introducing a new approach to a particular problem may point out to a highly relevant body of literature, previously overlooked. The literature review process can, therefore, be seen as a complex hermeneutic enterprise in which the researcher engages in a dialogue with individual texts and gradually extends this dialogue to include different texts talking to each other. In such a way the fusion of horizons may assist unfolding of a broader whole or a body of relevant literature which can open new horizons for understanding the research problem or puzzle. The new understanding of a body of literature in turn enables identification of new texts relevant to this understanding and a renewed dialogue with individual texts. We can thus see how the literature review develops iteratively through numerous hermeneutic circles.

Introduction into the hermeneutic framework for the literature review process

To better understand the nature of the literature review processes we propose a hermeneutic framework for the literature review which describes two major hermeneutic circles (Figure 1): the *search and acquisition circle* and the wider *analysis and interpretation circle* that are mutually intertwined. Literature reviews often start with initial ideas, questions or a description of a potential research problem from previous readings and experience; in a quest to learn more, the researcher enters the hermeneutic circle for literature searching, sorting, selecting sources, and acquiring papers of interest. This is followed by reading, the key activity that develops understanding. Through reading individual texts new literature sources of potential interest are identified, search strategies are refined and the hermeneutic searching circle continues. The searching and acquisition circle is part of the wider analysis and interpretation circle. Reading in particular is a key activity that links the searching and acquisition circle with the analysis and interpretation circle which evolves through reading, mapping and classification, critical assessment, argument development, research problem/questions (re)formulation and back to searching. The two circles are intimately intertwined not only through major hermeneutic links (full lines) but also through many other linkages among activities, some of which are presented as dashed lines in Figure 1. For a description of the hermeneutic framework in practice see Appendix B.

The two hermeneutic circles reflect Wittgenstein's [1953] distinction between puzzles or problems which require information and those that require clarification and insight [Hart, 1998]. By searching for literature we are seeking more information about a problem at hand and learn to identify more relevant sources of information. The hermeneutic process within the inner searching and acquisition circle helps us identify new relevant publications. By doing this we create an ever bigger set of publications that is initially overwhelming, foreign, and confusing. The more literature we acquire the more pressing it becomes to interpret, clarify and understand the diverse ideas,

approaches, findings and knowledge claims in individual texts. Through reading we develop better understanding of each text and embark on a route of clarification and insight into different texts and how they relate, that is, the wider analysis and interpretation circle. It is analytical reading, mapping and classification as well as critical assessment of the selected publications that address the problem of confusion and a lack of understanding of the emerging whole – the body of literature. Furthermore, developing clarification in this circle goes beyond sorting, comparing, and contrasting. It involves the creation of a distinct (ideally original) perspective on the literature that arises from the dialogical engagement and the fusion of horizons among researcher and numerous texts. A particular perspective on literature thus enables the researcher to grasp and critically asses the state of knowledge in the targeted domain and reveal important shortcomings or failures in dealing with the research problem. This also allows the development of new linkages among concepts and theories and new synthesis.

The Wittgensteinian view of the two hermeneutic circles – seeking information and clarification/insight – reminds us that they need to be harmoniously intertwined. Overemphasizing the searching for literature will lead to increasing confusion, while overemphasizing the literature analysis and interpretation at the expense of searching will lead to ignorance.
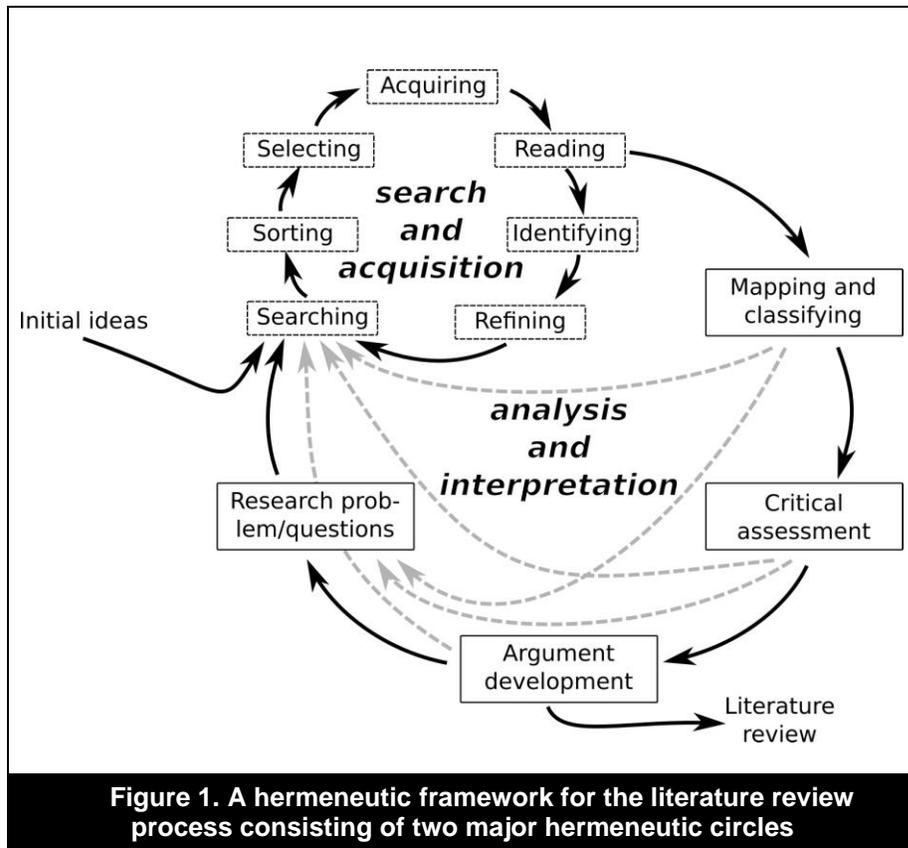

Figure 1. A hermeneutic framework for the literature review process consisting of two major hermeneutic circles

The process of developing understanding of the relevant literature through the hermeneutic circles seems never-ending. New sources and ways of interpreting and developing meanings that hang together somewhat differently can always emerge. This raises the question: how does literature review as a hermeneutic enterprise converge and eventually produce a well grounded, novel and interesting outcome? We answer this question by going deeper into the hermeneutic circles of the literature review process and by discussing the challenges in individual activities and potential strategies to cope with them within both circles.

IV. ANALYSIS AND INTERPRETATION – THE WIDER CIRCLE

The analysis and interpretation circle starts with more or less clear ideas about a research problem or a topic, and continues within the 'search and acquisition' circle, from which at some point the reading progresses to mapping and classifying, critical assessment, and argument development, often leading to the revised research problem and a new circle of literature searching, reading, mapping and classifying, and so on. Typically a literature review document is produced through several iterations through this circle. We describe here the analysis and interpretation circle first and then proceed with a description of the search and acquisition circle in the next section. An overview of the analysis and interpretation circle is provided in Table 1.

Table 1: Overview of the hermeneutic circle of analysis and interpretation	
Activity	Description
Reading	Through analytic reading the researcher develops an ability to identify key concepts, findings and theories and their interpretations and a capacity to infer assumptions and a methodological approach even when they are not explicitly stated. Through orientational reading a general understanding of the wider literature is achieved.
Mapping and Classifying	Mapping and classifying is a distinct activity in the analysis and interpretation hermeneutic circle which provides a systematic analysis and classification of relevant ideas, findings and contributions to knowledge within a body of literature.
Critical assessment	Critical assessment addresses the body of literature on the basis of a broader analysis of what is known, how knowledge is acquired, what types of knowledge are produced, how useful different types of knowledge are in understanding and explaining a problem of interest, and where the boundaries and weaknesses of existing knowledge are.
Argument development	The argument development builds from the mapping and classification, and also critical assessment, leading to the construction of a gap or problematization, which provide the motivation for further research. Through argumentation future directions of research and the rationale for specific research questions are developed.
Research Problem / Questions	Research questions can be formulated at a more general, abstract level and at a more specific, empirical level. A more general, abstract research question will logically follow from the gap in the literature or problematization of existing knowledge. An abstract, theoretical question is typically transformed into one or more specific questions that can be empirically explored.
Searching	Searching leads to the identification of additional literature for further reading. In section V searching it is more thoroughly described as a separate hermeneutic process in itself.

Reading

Reading as part of the literature review is *analytical reading*, which differs from leisurely reading [Hart, 1998]. Its purpose is to interpret and understand identified publications, first individually and then gradually in relation to one another. To engage in analytical reading, the researcher has to be immersed in a publication with the aim of achieving understanding. The researcher starts with some preunderstanding based on previous readings and experiences. While it can be limited and biased, preunderstanding enables the researcher to make sense of the publication, which in turn may challenge her/his preunderstanding. It is a dialogical encounter with the publication which enables the merging of horizons of reader and text that can lead to expansion of views and greater understanding. Gradually reading analytically produces an outcome – an understanding of the publication, its focus and aims, research questions addressed, approach and methodology adopted, concepts and theories used, type of evidence offered, and major knowledge claims and contributions made. It also reveals how an argument is developed and how claims to knowledge and contributions are justified [Kwan et al., 2012]. Such understanding however needs to be developed further for the researcher to be able to assess the publication, to compare and contrast its major findings in relation to others, and to classify its contribution within a broader context of relevant knowledge.

After reading a number of publications, researchers start building an understanding of how individual publications come together to form a body of relevant literature. Broader understanding of the literature in turn allows the researcher to re-interpret individual publications and their importance within a bigger 'whole'. The unfolding nature of the body of literature relevant for a particular research problem shows that the body of literature is by no means static. The more the reader delves into the publications the more she/he discovers additional publications and envisages the relevant body of literature. The body of literature is thus an unfolding whole that changes with every encounter with new relevant publications. For this it is necessary to understand not only the ideas in publications of interest but also their relationships and intellectual history.

Through analytic reading the researcher develops an ability to identify key concepts, findings and theories and their interpretations and a capacity to infer assumptions and a methodological approach even when they are not explicitly stated. The researcher also develops confidence in assessing knowledge claims and the strength of the argument and evidence provided.

Moreover, given that potentially relevant literature on any topic is typically huge, the reading needs to be carefully structured and organized. A useful reading strategy in case of a very large number of publications is first to glance through the identified texts in order to gain an overall impression of their content that can be described as *orientational reading*. This applies to research papers but is even more critical to reading larger texts such as books or theses. If the text is considered promising and relevant, one goes on to read the abstract/preface, introduction and conclusion. This may be sufficient for a researcher to gain an initial understanding of the publication and its

importance for the problem/topic addressed. And finally publications that are considered of central importance are read in-depth while taking extensive notes and making comments – a problem which is further discussed below. These notes form a basis for the development of the broader view of the relevant literature and for mapping and classifying the ideas and findings, and assessing the contributions of individual publications to the literature.

Mapping and Classifying

Analytical reading enables the researcher to acquire understanding of relevant publications and the body of relevant literature that not only expand her/his horizon but also provides a foundation to develop a novel perspective on the literature. To achieve this the researcher may adopt different ways of *mapping* and *classifying* different ideas and findings from the literature. Mapping and classifying is a distinct activity which aims to provide a systematic analysis of relevant ideas, findings and contributions to knowledge within the body of literature and present them in a way that enables the subsequent activity – a critical assessment of the state of knowledge related to the research problem.

Mapping and classifying is a significant intellectual endeavor as the body of literature is typically very large and not easily captured by maps or classification schemes and expressed in a comprehensive and succinct form suitable for subsequent assessment. As Hart [1998] explains, the purpose of mapping is to systematize the ideas and other important elements identified through analytical reading and present them in a succinct form:

"Mapping out the ideas is about setting out, on a paper, the geography of research and thinking that has been done on a topic. At one level, it is about identifying what has been done, when it was done, what methods were used and who did what. At another level, it is about identifying links between what has been done, to show the thinking that has influenced what has been produced. You can use these methods to elicit knowledge about the topic and then prepare diagrams and tables to represent that knowledge in terms of the relationships between ideas and arguments that you have found." [Hart, 1998: 144].

Mapping of ideas and knowledge claims from the literature often starts during the analytical reading when it can be done in any way that makes sense to a researcher. However when the mapping aims to present the geography of research as part of the literature review document it needs to be presented in a way that is intelligible to readers. Tabular, graphical, or pictorial presentations of maps are useful to describe, for instance: different streams of research, historical development of ideas, schools of thought or other major research classifications [Daley et al., 2010]. See also Table 2. The aim is to synthesize the relevant literature into a compact classification that describes major views/approaches, contributions, authors and sources, etc.

Table 2: Possible means for mapping and classifying research literature	
Means	Description
Research approach and methodology	Epistemological position on which a piece of research is based (e.g. positivist, interpretivist, critical, post-structuralist) and methodology adopted in a study
Unit of analysis	The major entity researched (e.g. an information system development, IT department, IT governance in an organization, social networking site)
Unit of observation	Parts of the world about which data are collected: humans, groups, information technology, information systems, organizations, etc.
Level of analysis	Individuals (micro level), teams and organizations (meso level), or nations or cultures (macro level)
Major concepts	Central theoretical concepts, constructs or variables investigated (e.g. technology adoption, IS value, IS development methodology, power, trust)
Theoretical lens	Central theories used by a particular publication (e.g. Technology Acceptance Model [TAM], structuration theory, Actor Network Theory [ANT])
Conceptual framework	Research study is classified according to an established or proposed conceptual framework
Discipline	Disciplinary lenses applied to explore a particular phenomenon or research problem (e.g. management, economic, legal, organizational, political)
Historical development	Genealogy of ideas and intellectual developments in a research domain; tracing the stages and influences in the development of ideas

For instance, Webster and Watson [2002] and Perry [1998] argue for concept-centric rather than author-centric classification of the literature, a structure that supports critical assessment and a reviewer's voice [Khoo et al., 2011]. To achieve this, articles can be classified according to concepts developed and to the unit of analysis (organization,

group, individual) using comparison tables or hierarchical ordering. A concept map is a schematic device that represents concepts and their relations (in a form of a propositional statement) [Novak, 2004]. Hart [1998:156-7] provides illustrative examples of literature mapping using semantic maps of research approaches and concept or mind maps [Perry, 1998]. Software tools can be helpful in this process; for instance, mind maps can be developed using software like *CompendiumNG*, enabling easy update and restructuring. Table 2 summarizes some means for mapping and classifying.

An alternative way for mapping and classification is to propose or adopt a conceptual framework to present the literature. An excellent example is provided in Schultze and Leidner [2002] where knowledge management literature is classified according to Deetz's [1996] framework that defines four discourses of organizational inquiry – normative, interpretive, dialogic, and critical. By adopting this particular framework Schultze and Leidner expose certain aspects of the knowledge management literature. For instance, based on Deetz's conceptual framework Schultze and Leidner reveal that knowledge management research is biased in favour of a consensus and especially normative discourse, while largely ignoring dissensus discourses.

It is important to note that the mapping and classification of literature is a creative process that builds on a deeper understanding of the body of literature achieved through analytical reading. This process may lead to new questions and identify new relevant publications to be included in the body of knowledge. Researchers are invited to use their imagination to develop a distinct, innovative and interesting way of mapping and classifying the literature (using e.g. concept mapping, classification scheme, frameworks, etc.). Eventually this will help in developing a review of the literature that is centered around the discussion of important concepts or ideas arising from the discourse expressed in the literature [Kwan et al., 2012] rather than the discussion of individual publications [Webster and Watson, 2002]. A particular mapping and classification serves to provide an overview of the literature and at the same time enable particular insights into the state of knowledge in the targeted domain. Ultimately such a mapping and classification allows the researcher to critically assess the body of literature, reveal weaknesses and under-researched problems and/or to problematize dominant knowledge claims [Alvesson and Sandberg, 2011; Green et al. 2006; Hart, 1998; Khoo et al. 2011].

Critical assessment

Systematic and comprehensive presentation of complex and varied literatures as maps and classifications provides a basis for critical assessment (see Figure 1). A critical assessment of the body of literature aims to analyze and evaluate the state of knowledge related to the problem/topic studied and identify major weaknesses [Finn, 2005; Ridley, 2008]. Maps and classifications help in analyzing connections and disconnections, explicit or hidden contradictions, and missing explanations, and thereby identify or construct white spots or gaps. While analytic reading implies critical reading of every publication, the activity of critical assessment addresses the body of literature and requires a broader analysis of what is known, how knowledge is acquired, what types of knowledge are produced, how useful different types of knowledge are in understanding and explaining a problem of interest, and where the boundaries of existing knowledge are. A critical assessment of the body of literature thus demonstrates that literature is incomplete, that certain aspects/phenomena are overlooked, that research results are inconclusive or contradictory, and that knowledge related to the targeted problem is in some ways inadequate [Alvesson and Snadberg, 2011]. Critical assessment, in other words, not only reveals but also, and more importantly, challenges the horizon of possible meanings and understanding of the problem and the established body of knowledge.

For instance in their review of knowledge management literature based on the Deetz's [1996] framework Schultze and Leidner [2002] show that the literature presents a one-sided view of knowledge in organizations: it only addresses knowledge management that has positive implications and fails to recognize its negative and unintended consequences. A particular way of seeing and mapping the body of literature (using a framework) enabled them to both highlight weaknesses in the dominant approaches (consensus focused and normative) and also convincingly demonstrate blind spots – the lack of research that addresses the contradictory and double-edged nature of knowledge.

Critical assessment of a body of literature can be more radical than identifying or constructing gaps or white spots. Alvesson and Sandberg [2011] propose "problematization of a literature domain" that challenges the "assumptions that underlie not only others' but also one's own theoretical position … [not] to totally undo one's own position; rather, it is to unpack it sufficiently so that some of one's ordinarily held assumptions can be scrutinized and reconsidered in the process of constructing novel research questions" [p. 252]. To attempt a more radical critique and problematize a literature domain a researcher has to engage in dialectic interrogation of assumptions and results in the literature and also of her/his own familiar position. This challenges researchers to adopt a reflective attitude toward the horizon of possible meanings established by the body of literature and question the hermeneutic

achievements thus far. The researcher, especially the junior researcher, needs to feel encouraged to think differently and to question the authority of established understanding.

Whatever type of critique is proposed, existing research and knowledge should be treated with due respect [Webster and Watson, 2002]. Whether adopting gap-spotting or problematization we are always drawing from and building upon the knowledge of others one way or another. This is of importance when arguing for one's own research based on the literature.

Argument development

Based on a critical assessment of different approaches, strands of research and knowledge produced thus far, a researcher develops an argument for a research gap or problematization of established knowledge. The arguments for the claim that existing knowledge is insufficient or problematic have to be compelling in order to warrant further research. The arguments are compelling if sufficient evidence is shown to demonstrate not only the gap or problematic assumptions but also why it is important to address the gap or to conduct research based on different assumptions. The logic of the argument from the mapping and classification, to critical assessment and the construction of a gap, to the motivation for further research has to be consistent, well articulated and convincingly documented [Feak and Swales, 2009; Levy and Ellis, 2006; Machi and McEvoy, 2012; Ridley, 2008].

Importantly, the way arguments are developed and laid out will to some extent depend on the research community addressed by a piece of research. Research is not only always written on the basis of a background provided by other research it draws *from*, but also with regard to a community it seeks to contribute *to*. Different communities have different standards for building their arguments and thus different structures will be convincing to different readers and reviewers. One aspect of a hermeneutic engagement with the literature is thus to become familiar with these standards. For instance, Kwan et al. [2012] show that there are differences in the way IS researchers build their arguments: they noted differences between the way literature reviews are constructed in design science research versus behavioral science research.

Argument development is crucial for the writing process when conducting literature reviews and is also the reason for the importance of continuous writing while conducting a literature review [Levy and Ellis, 2006]. Writing forces the development of a linear argumentation based on the literature analysis and assessment. Moreover, through argumentation, future directions of research and the rationale for specific research questions are developed.

Research Problem / Questions

The argument development ultimately constructs a gap or problematizes dominant knowledge in the literature that often requires the revision or reformulation of the initial research problem. Due to increasing understanding of the literature that emerges through several hermeneutic circles a researcher is likely to refine or sometimes even change the targeted research problem. The refined research problem may then trigger a new circle of searching and reading followed by updating the maps and classification of the literature and its critical assessment. A particular framing of a research problem reflects a researcher's critical assessment of the state of knowledge in the domain of literature and her/his assumptions about, and arguments for its relevance. Apart from constructing a gap or problematizing the existing literature a researcher also needs to argue why it is important (and for whom) to fill the gap or to develop new knowledge about the problem. This is highly important for establishing the necessity for further research.

A research problem is often transformed into one or more specific research questions that are worthy of examination and that a study (PhD or honors thesis or a research article) intends to answer. Research questions can be formulated at a more general, abstract level or at a more specific, empirical level or both. A more general, abstract research question will logically follow from the gap in the literature or problematization of existing knowledge. Such a research question is often theoretical and not necessarily suitable for empirical investigations, however, it is important as it indicates what theoretical contribution the research intends to make. A general or theoretical question needs to be developed further into one or more specific research questions that will be empirically tested.

A researcher goes through the hermeneutic circles of analysis and interpretation until a satisfactory outcome – a well argued literature review, including a research problem or questions is produced. As the above discussion demonstrates, the literature review is a hermeneutic achievement that has a dual purpose. It establishes, synthesizes and critically assesses a body of literature and also creates newness and proposes novel understanding that broadens the horizon of existing knowledge. The quality of a literature review thus depends on the quality of all activities in the hermeneutic circle of the analysis and interpretation as well as on the searching for literature, which we discuss next.

V. SEARCH AND ACQUISITION – THE INNER CIRCLE

Searching for literature – itself a hermeneutic circle – is part of a wider analysis and interpretation circle. Searching does not guarantee the compilation of high quality reviews, but without proper understanding of searches and identification of relevant literature the production of high quality reviews is impossible. It is, therefore, of general importance to understand how to conduct literature searches effectively. The literature searching and acquisition circle is an integral part of hermeneutic understanding of literature in which searching and reading inform each other (Figure 2). Importantly, searching for literature should be understood as going beyond the use of database searches alone. For instance, literature can also be identified through known literature such as using snowballing and citation tracking (see Appendix A), by asking colleagues or through serendipitous encounters when looking for other things [Greenhalgh and Peacock, 2005].
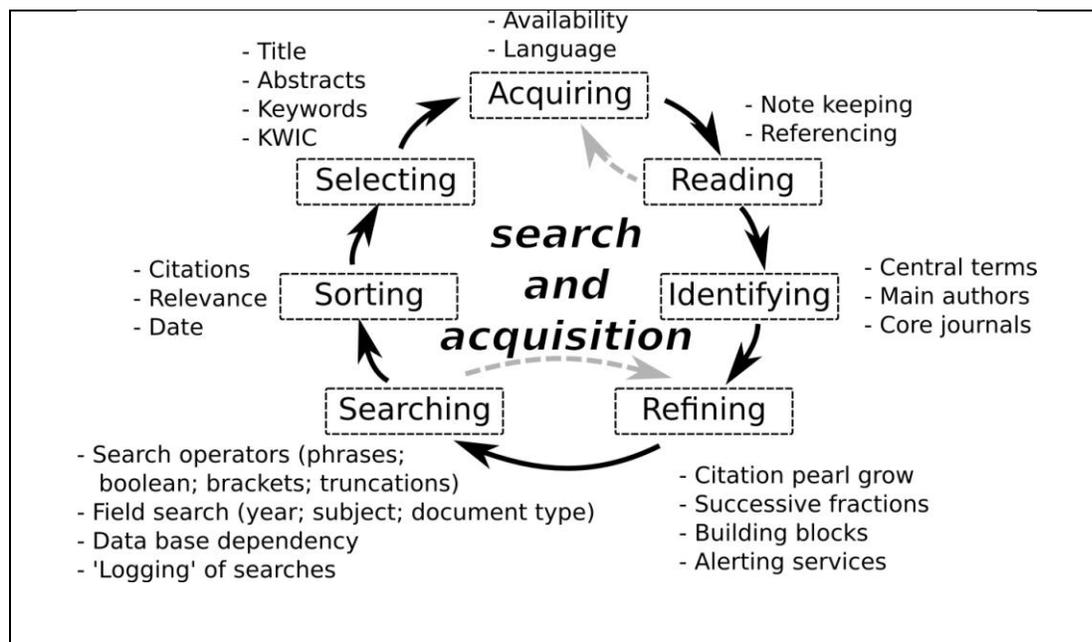
Figure 2. An overview of different tools and techniques associated with individual steps of the hermeneutic circle of literature searching and acquisition

Searching allows a researcher to move from the general to the particular by identifying publications relevant for a topic. In turn, reading publications will allow improvement of searches as one better understands what one is looking for, and also what one is not looking for. This process can be further broken down into different steps that usually follow each other in a circle as presented in Figure 2 and summarized in Table 3. We examine this circle briefly and introduce different tools and techniques that can be employed when searching for literature. In Appendix A the use of search techniques, tools and strategies is further exemplified.

Activity	Description
Table 3: Overview of the inner hermeneutic circle for conducting literature searches	
Searching	The aim of searching is to identify relevant publications. Within the hermeneutic framework retrieving small sets of highly relevant publications is preferable over huge sets of documents whose relevance cannot be sufficiently judged.
Sorting	After a search is undertaken different methods can be used for sorting results, such as relevance rankings, publication dates, or citations.
Selecting	After a search is conducted and results sorted individual publications are selected for acquisition and reading.
Acquiring	After publications are selected for reading, full texts have to be acquired which may not necessarily be a trivial matter.
Reading	Reading of acquired publications is initially orientational, leading to further selection of publications for analytic reading.
Identifying	Based on reading, researchers identify further search terms, additional publications (through citation tracking), authors, journals, conferences and other sources.
Refining	Search strategies can be used to refine searches in order to improve the precision of literature searches. In particular, 'citation pearl grow', 'successive fractions', or 'building blocks' can help in locating additional literature (see Appendix A for a detailed description).

The literature searching does not always take a full circle as different shortcuts are possible and often happen during this process. For instance, when reading one may directly identify additional literature that is then acquired; or searches may directly lead to the formulation of refined search strategies (indicated by dashed arrows in Figure 2). Starting from the bottom left in Figure 2 we introduce different tools and methods while going once through this hermeneutic circle.

Searching

Heidegger [1927|2002] noted that how one enters the hermeneutic circle affects one's understanding. In the context of literature reviews it is therefore important to consider how initial readings can facilitate understanding of a research area. Not all types of text are equally suitable for someone who is engaging with a new field of inquiry. Generally, primary and secondary research literature can be differentiated. While the former consists of original research publications, the later are publications that summarize and review original research publications.

Often it is advisable to approach research areas through secondary literature as it provides a wider overview on a research area. In contrast, approaching the literature through primary literature can be tough as it is not immediately clear how the findings of individual studies relate to a larger research area. While journal articles generally frame their findings they often need to be succinct when introducing earlier research. For instance, to those familiar with a research area one sentence containing the reference to a landmark publication can be sufficient without the need for repeating the whole argument presented in that original paper. For this reason someone entering a field is generally not able to grasp the complete depth of a literature review presented in original research papers.

In contrast, secondary publications, such as review articles or entries in subject specific encyclopedias, provide an overview of earlier research. Reviews have several benefits: they introduce a wide range of publications; they provide orientation into an area; they introduce specific terms and concepts; they relate different streams of research; and they usually point out shortcomings in earlier research, thus providing directions for future development. The practicalities of searching for secondary literature, most importantly review articles, are discussed in Appendix A.

Within the hermeneutic framework, retrieving small sets of highly relevant publications is preferable over huge sets of documents whose relevance cannot be sufficiently judged. The aim is to employ search techniques in a way that allow quick drilling down to a manageable set of highly relevant publications rather than aiming to find everything at once. Accordingly a good search strategy is one that results in high precision rather than high recall (c.f. Boell and Cecez-Kecmanovic [2010]). Searching is an integrative part of conducting a literature review, not something that stands at the beginning of the review process. Through engagement with the literature a researcher becomes more familiar with specialized terms, expressions, research approaches, names of important authors, journals and conferences. Based on this deeper understanding of an area the way searches are approached can be continuously improved, for instance, as one becomes aware of new search terms.

Searching involves different techniques and methods that can be used when looking for literature in databases. For instance the use of 'field search' can help in identifying recent literature review articles on a specific topic. Moreover, search operators such as 'AND', 'OR', 'NOT' or 'NEAR', the formulation of phrases, and the combination of these can be used to formulate powerful search strategies. Skillful engagement with these techniques enables one to conduct efficient and effective literature searches aiming to maximize the identification of relevant literature within a short time-frame. These techniques are illustrated with more detailed examples in Appendix A. Appendix A can therefore be used by itself as a guideline while conducting literature searches.

Sorting

After a search is undertaken different methods can be used for sorting results. One way is to use the ranking algorithm provided by a database which is designed to display 'more relevant' documents towards the top of the list while pushing 'less relevant' documents towards the bottom. Generally, relevance of documents depends on a combination of factors which may include: the appearance of search terms in titles, abstract, and keywords; the recency of publications; or the number of times a document is cited. An alternative approach is to rank results by date. For instance, users interested in latest developments might prefer recent publications over older ones. Moreover, there are retrieval systems that use citations in articles and co-citations of articles (articles that are often cited together) to visually map literature into clusters of related publications that then can be used for browsing relevant and related papers [Chen, 2012].

In addition, sorting can employ citations. This method makes use of the fact that academics cite the work of other academics in their publications. Using citations as ranking criteria allows a researcher identifying central publications that are used extensively by other academics. Three databases mainly associated with this search feature are *Web*

of Science, *Scopus*, and *Google Scholar*. Citations are a good means for identifying landmark papers that are often referred to by others. Usually such papers should be included in a review. For instance, if one is interested in researching the acceptance of technology one could start a literature review by searching for the terms 'acceptance' and 'technology' in *Scopus*. Even though this search retrieves more than 10,000 documents sorting them by number of citations will identify Davis [1989] as a landmark publication in this area. However, this example also illustrates the downside of citations. Older publications are generally more cited as they have had more time to be cited by others. As a consequence, citation counts are not useful when searching for latest developments and current research.

Selecting

After a search is undertaken and results are sorted, individual papers are selected for reading. This involves looking at the title of documents and also the context in which the search terms appear. Often abstracts are useful for a brief assessment of the relevance of publications. Abstracts contain a short description of the content of a document usually between 200 and 500 words in length, ideally describing the aim, scope, method, main findings, and relevance of an article. However, abstracts will not in all cases sufficiently convey the content of publications [Hartley and Betts, 2009]. In such instances citation tracking may help in capturing publications that were initially missed as they are identified by looking at references used in other research. (This technique is discussed in detail in Appendix A). Based on titles and abstracts papers may then be selected for acquisition. Following the hermeneutic framework it is acceptable to focus on a limited number of publications that appear to be highly relevant. After these papers are read, subsequent iterations of the searching circle will allow one to pick up additional publications that initially were not selected.

Acquiring

After publications are selected for reading full texts have to be acquired. In some cases this can be difficult, but if authors concentrate only on publications that are easy for them to obtain, important findings may be missed. Often, institutional libraries subscribe to the electronic form of journals. In this case articles can be conveniently accessed from the desk or from home. However, not all publications are available in electronic form. For example, books, conference proceedings or older journal issues may require a trip to the library in order to obtain a copy. Moreover, some literature might not be available at an institution's library at all. In such cases publications may need to be requested through inter library loan (ILL). In addition, conference contributions are usually more difficult to obtain than journal articles. Libraries typically do not hold copies of proceedings of all major international conferences. In addition, relevant publications might appear in proceedings of conferences held by national societies overseas and therefore only available abroad. Similarly important publications might be published in foreign languages. If one cannot read the language in which they are written one may miss relevant findings.

Limited access should not be an excuse for excluding publications believed to be of importance. However, following the hermeneutic framework focusing initially on accessible literature is acceptable. After reading the first set of relevant papers the importance of publications not yet obtained can be better judged. For example, if it turns out that several relevant papers cite a particular publication this publication may be important to the research at hand. Even though initially the publication could not be readily acquired, this indicates that additional effort to obtain a copy might be rewarding.

There are some strategies for coping with difficult access to literature. One strategy for obtaining copies is to contact authors directly. Academics are generally happy to be contacted by others interested in their research. If possible they will pass on copies of their publications. In addition, the open access movement made self-archiving of publications on homepages and in repositories more common, thus providing better access to publications appearing in subscription journals.

Reading and Identifying

The most important step for informing searches is reading. Reading will allow researchers to learn more about a topic area that will allow, for instance, the identification of central terms and concepts that then can be used in subsequent searches. The importance of reading and different approaches to reading were already introduced above, and will not be repeated here. However, there are also some further aspects of reading such as referencing, and note keeping.

Referencing software will help to keep track of identified and read literature. Moreover, it will assist in citing material correctly. This is especially helpful when using different types of literature. For example, articles, books, book chapters, conference proceedings, or websites are all cited differently. Referencing software is also helpful when facing different referencing styles, such as Harvard style or Chicago style. Popular referencing software and tools are *Endnote*, *Refworks*, *Zotero*, or *Mendeley*. *Refworks* is an online service with great connectivity to import citations from many different databases; *Zotero* is an add-on for the Firefox web browser; and *Mendeley* brings social

network features to citations allowing sharing references and comments on documents with others. Also, the *Association for Information Systems (AIS)* provides on its homepage a list of *Endnote* citation styles for different IS journals and conferences.

Note keeping is another important technique associated with the reading process [Levy and Ellis, 2006]. In reading several texts in the context of a particular research, it is important to keep track of specific ideas appearing in different texts. Keeping notes either in a text document or a notebook helps a systematic recording and analysis of ideas and findings and assists researcher's orientation. This will also allow the shift from particular papers to concepts when writing the literature review [Webster and Watson, 2002]. It is, however, not possible to advocate one general approach for note keeping that might suit everyone and every research problem. No matter which approach one chooses, it is generally advisable to write personal summaries of publications that have been read [Levy and Ellis, 2006], and to continually keep writing down ideas that appear while reading papers. This will force one to clearly express ideas and arguments and to better recall them during the mapping and classification as well as the writing process of the literature review.

In addition to identifying additional publications through citation tracking (see 'snowballing' in Appendix A) and further search terms, building on a body of relevant literature can also help to identify important authors, journals, and conferences. Authors are not equally productive and for every area of research some 'core authors' can be identified [Lotka, 1926]. Future searches can, for instance, aim to examine more closely the oeuvre of such authors. Investigating the distribution of publications on a particular topic over journals can also be used when searching for literature as it allows a researcher to identify 'core journals' for specific topics. Using field search (as discussed in Appendix A) one can then focus on core journals and important conferences only. Also, instigating an alerting service for the most relevant journals or authors may help to stay in touch with latest publications on a topic. Nevertheless, it is important to keep in mind that the entire body of relevant literature will always extend over a vast number of journals, books and conferences, many of which contain only few publications on a topic [Bradford 1934]. A thorough and reasonably complete literature review can therefore not be limited to a specific or prescribed set of journals.

Refining

Finally search strategies can be used to refine searches in order to improve the precision of literature searches. In particular: 'citation pearl grow', 'successive fractions', or 'building blocks' can help in locating additional literature. These strategies were developed to improve database searches and they are discussed in detail in Appendix A.

The circular nature of search processes highlights that the development of understanding of a relevant literature is not a linear process. While one is traversing the hermeneutic circle of literature searching one continually improves understanding of what are the relevant publications and how different publications are related. For example, the reading of the same written work may lead to different understanding after further relevant publications are identified, acquired and read. This is reminiscent of Gadamer's [1976] claim that to understand means to understand differently [Bernstein, 1983].

Leaving the hermeneutic circle – Enough is enough

This leaves us with the question when a quest for literature should end? Following the hermeneutic framework it can be argued that any additional iteration of the literature searching circle will help to retrieve additional literature. Therefore, there is potentially no end to a literature search. Even though this is true, as the production of human knowledge is ongoing and consequently never ending, literature reviews have to end at some point. Usually research faces time constrains that do not exclude the literature review process. For this reason it is important that literature review is as comprehensive as possible in the time that is available. Following the hermeneutic framework can help researchers to identify the majority of central publications addressing a particular research problem or topic within several iterations or circles.

When time constraints are less prevalent the review process can be extended until a point of saturation is reached [Combs et al., 2010]. Criteria for saturation depend on the aim and type of the literature review. For a literature review as part of a research article this means that high confidence in the novelty and importance of a contribution can be established, and that a strong argument regarding the relevance of the research problem and the research questions can be crafted. In contrast, a review article will emphasize comprehensiveness in covering earlier research, especially landmark publications, mapping and classification and an assessment of the body of literature.

Literatures searches may be considered complete when they are reaching a point of saturation. While no formal criteria for saturation can be established, one indicator is diminishing novelty when reading additional literature and only marginal improvements in understanding the research problem. "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" [Levy and Ellis, 2006:192]. Another criterion for saturation can also be established by looking at cited publications. If most of the cited references of a new publication are already known a point of saturation may be reached. The hermeneutic framework, however, underlines the ongoing nature of literature reviews where additional reading will contribute to further understanding of a subject matter. Ultimately, the decision when a literature review has to stop will thus be governed by a researcher's pragmatic judgment of the exhaustiveness of the review for a particular purpose.

VI. CONCLUSION

This paper introduced a hermeneutic framework for the literature review process. It argues that the process of conducting literature reviews is fundamentally an understanding process that is best described as a hermeneutic enterprise. Hermeneutics provides an account of how understanding of a subject is formed, such as a body of literature relevant to a particular problem. According to hermeneutics understanding is not a linear process, but one that it is informed by earlier understanding. In other words, the way one comes to understand a specific literature is based upon earlier understanding of other literature. The hermeneutic framework therefore provides a theoretical foundation for the view of literature review "as an organic system that is constantly growing and changing " [Levy and Ellis 2006:208].

The hermeneutic framework for the literature review processes identifies two intertwined circles – the analysis and interpretation circle and the searching and acquisition circle, that are building on each other in a recursive manner. The role and relevance of literature searches are thus clearly described within a broader process of the literature review development. In such a way the hermeneutic framework provides an important alternative view on the role of searches which is conceptually different from protocol based, formal approaches [e.g. Okoli and Schabram, 2010]. This enables the introduction of search techniques and methods in a meaningful way.

Furthermore, the hermeneutic framework integrates different activities that are associated with the preparation of high quality reviews. Different authors have identified specific activities, such as the development of understanding [Boote and Beile, 2005; Combs et al., 2010; Hart 1998; Perry, 1998; Schwarz et al. 2007], critical engagement [Finn 2005; Management Information Systems Quarterly (MISQ), 2006; Ridley 2008] and argument development [Feak and Swales 2009; Kwan et al., 2012; Machi and McEvoy 2012; Ridley 2008] as central for developing high quality reviews. In addition, the literature review processes generally include specific phases that facilitate understanding: searching, reading, mapping and classifying, critical assessment, and argument development. Importantly, using the hermeneutic framework these phases do not follow each other in a simple linear fashion, but are part of an iterative process (hermeneutic circle) that successively leads to improved understanding.

One practical implication of the hermeneutic account introduced here is that understanding of a body of literature is an ongoing, potentially never ending, process. The concept of saturation is, therefore, important in order for setting criteria when the literature review is sufficiently comprehensive and insightful. Saturation implies that a literature review will not only depend on the literature, but also on the understanding of the researcher and the purpose of the review. The comprehensiveness and insightfulness of the literature review are in turn judged by the arguments and evidence provided. The deeper a researcher's understanding of the relevant literature, the more convincing the argument for comprehensiveness and insightfulness of the literature review.

Finally we would like to emphasize that there is no recipe for developing a high quality literature review. However, the hermeneutic framework for conducting literature reviews will help researchers appreciate the logic of scholarly stages in the literature review process, including its subtle intricacies and iterative nature. We hope that the conceptual understanding of the literature review process as a hermeneutic process and the proposed hermeneutic framework will free researchers from rigid guidelines and stimulate their creativity and imagination while at the same time guide them through the stages in a systematic and effective manner.

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   1. These links existed as of the date of publication but are not guaranteed to be working thereafter.

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3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.
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APPENDIX A: GUIDELINES FOR CONDUCTING LITERATURE SEARCHES AS PART OF THE HERMENEUTIC FRAMEWORK

The following section introduces different skills that can be associated with the search process. Mastering these skills will allow a more effective search for literature. The aim is to be able to quickly identify a number of highly relevant papers that will allow a researcher deeper insight into a topic. Additional searches can then be built upon a better understanding of what constitutes the relevant literature. Thus the search process itself can be understood as a hermeneutic process, where initial searches form the foundation for additional searches. There is no one or best way to search for literature, but searching is understood as an iterative process that builds on earlier understanding of the literature and that allows a researcher the identification of additional relevant literature over time. As better understanding of the literature is built, more effective searches can be conducted [Boell and Cecez-Kecmanovic, 2010].

Starting to look for literature

Web of Science and *Scopus* both classify review publications and thus allow a specific search for review articles (Figure A.1 and A.2). In addition, focusing on review articles has the benefit that only a fraction of all articles indexed by a database are searched. As a result, less restrictive search terms can be used for searching without the risk of becoming inundated by large sets of mostly irrelevant results.

Figure A.1. Searching for review articles in *Web of Science*

Another way to engage with a topic is to look up entries in subject specific encyclopedias. In contrast to general encyclopedias they will introduce a topic from a domain specific angle, relating it to other important subject specific

concepts. Moreover, entries are usually written by well known experts, which give them authority when cited. And finally, encyclopedia entries provide references to further relevant literature. As a shortcoming, subject specific encyclopedias have a limited market. That means they are produced in small numbers so not every library can afford them, and it usually takes years for new editions to appear. Therefore, encyclopedias may not reflect latest research. A regularly updated online encyclopedia, such as the *Stanford encyclopedia of philosophy* [Zalta, 2011] provides a means around this. In addition, the *Encyclopedia of information systems* [Bidgoli, 2002] may provide a starting point for IS researchers.

Additional publications to look out for at the onset of a literature review are edited books. Edited books aim to provide a wider perspective on the research topic they are dealing with. As a consequence they often provide a good overview of different research aspects regarding a particular topic. Moreover, they often contain an overview chapter that ties together the different aspects introduced in such a volume. A similar logic also applies to editorials of special issues of journals that often provide an wider overview on an area tying together all contributions to the special issue. Again, the 'document type' field in Web of Science or Scopus can be used to search for editorials containing specific terminology '(c.f. Figure A.1 and A.2).

Searching for literature

Using a hermeneutic approach, retrieving small sets of highly relevant publications is preferable to large sets of documents whose relevance cannot be sufficiently judged. Unfortunately, currently there is no database with the specific aim of indexing IS publications, so an important question is where to look for IS publications. A first point of reference can be the *AIS electronic library*[2]. However, it provides only limited coverage of IS journals. Moreover, Levy and Ellis [2006] provide an overview of the coverage of 50 different IS journals and 16 conferences by different databases. Their list suggests that *ProQuest's ABI/Inform*[3] or the *ACM digital library*[4] may be good places to start searching. However, neither of them provides comprehensive coverage of all journals and conferences. Therefore, the usefulness of these databases will depend on the topic at hand. Additionally, university libraries often provide a 'meta search' or 'cross search' that allows a researcher to find out the number of hits in different databases for a particular search term. Databases returning a high number of hits may be good candidates for searches on that particular topic. In addition, *Scopus*[5], *Web of Science*[6], and *Google Scholar*[7] provide good multidisciplinary coverage of academic journals with the additional benefit of allowing citation searches, further discussed below. Finally, the *OCLC's Worldcat*[8] is a premium resource when looking for books and edited volumes, providing an overview of holdings in libraries around the world.

Field Searches

One strategy that can help to limit the number of retrieved documents is the use of field search. Field search enables searching in specific 'fields' of records in a database, for example, the author or title field. However, when the number of retrieved results is overwhelming it is tempting to restrict searches to only document titles. This is not advisable as often relevant papers do not explicitly name the topic of their research in the title. Fortunately, there are other promising ways to employ field searches.

Usually not all documents contained in a database are of similar relevance to a particular inquiry. Limiting a search to groups of documents of potential relevance can help to increase the precision of searches. In addition, compared to using additional search terms, field search allows a researcher better judgement of what kinds of documents are omitted. Finally, if done properly, field searches can enable the searcher to move to new groups of documents in subsequent searches, avoiding the necessity of going through the same body of documents twice. Useful fields are often 'publication year', 'subject area', and 'document type'. They can be used, for example, to search for a review paper published within the last few years in disciplines likely to publish papers of relevance to IS (c.f. Figure A.2). Another example is to employ the document type field to search for special issues of journals when limiting a search to editorials.

In multidisciplinary databases the use of subject areas can be useful. The general advantage of focusing on particular subject areas is that they limit a search to particular sets of journals. Thus they can help in coping with different use of identical terminology across different fields of research. It is important to note that subject areas are not assigned at the level of individual publications, but at the journal level instead. Therefore, journals can have

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2   http://aisel.aisnet.org/
3   http://www.proquest.com/products/pt-product-ABI.shtml
4   http://dl.acm.org/
5   http://www.info.sciverse.com/scopus
6   http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science/
7   http://scholar.google.com.au/intl/en/scholar/about.html
8   http://www.worldcat.org/

several subject areas assigned to them. For instance, in *Scopus* the *Journal of Medical Systems* is assigned both to medicine and to computer science.

In *Scopus* as well as *Google Scholar's* advanced search, a search can be limited to particular subject collections (Figure A.2). In *Scopus* the 'advanced search' function allows a search for even more specific subject categories than the ones offered on the main search page. For instance, within the 'physical sciences' category the computer science subdivision is the one most likely to be of relevance when searching for IS publications. *Web of Science* through the *Web of Knowledge* interface also enables the use of subject areas, but only by means of refining after a search has been conducted. Here a successive fractions strategy (discussed below) may be applied.

Figure A.2. Searching for review articles in *Scopus* using a year range, search phrase, and only certain subject areas
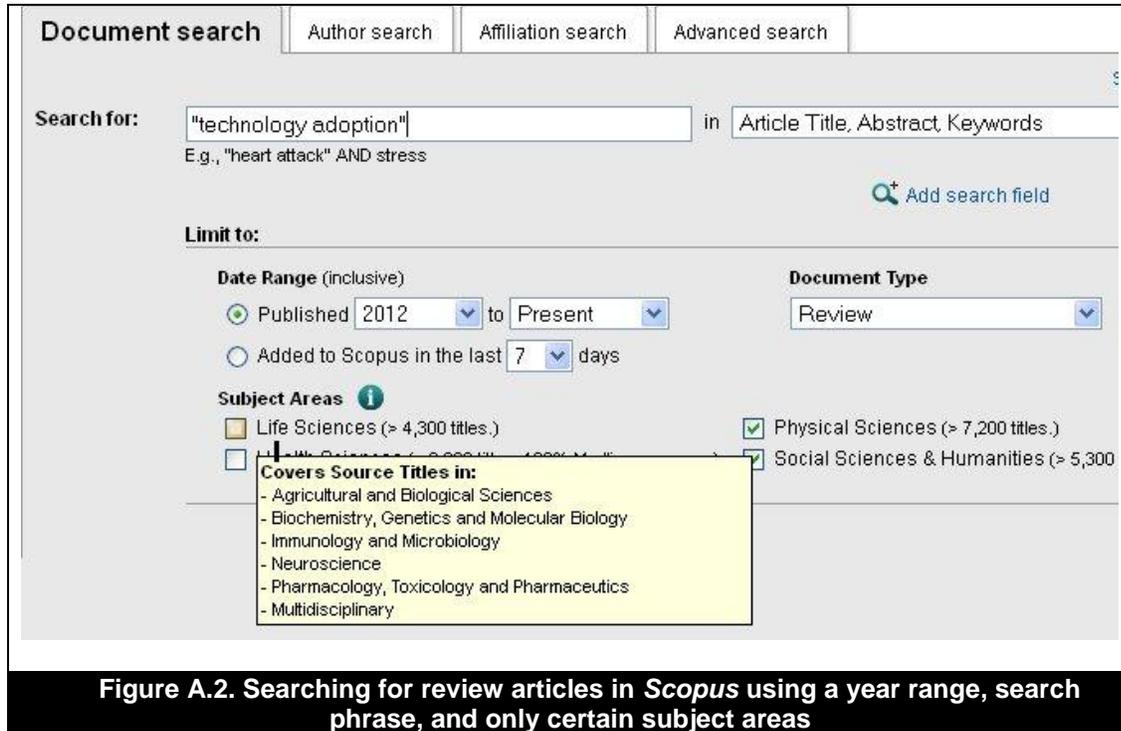
Search Operators

Using search operators is another way of achieving better precision when searching. Search operators are used to give retrieval systems additional instructions on what to do with search terms. For instance, phrases can be used to limit the number of retrieved documents by instructing a system that the search terms contained in a phrase appear in documents in exactly the same way as they do in the phrase. Often quotation marks are used to indicate the use of a phrase. For example, the phrase "technology acceptance model" will only retrieve documents where the terms 'technology', 'model' and 'acceptance' appear next to each other in the same order as in the phrase.

In contrast, truncations can be used to make search terms less restrictive. They are useful when a term can be spelled in different ways, for example, 'organisation' or 'organization'. But also when retrieval of singular and plural forms is desired, for example, 'system' or 'systems'. In many retrieval systems a question mark '?' is used to replace one character and '*' to replace more than one character. As truncation symbols can sometimes behave in unpredictable ways they are also called wild cards. If one is looking for filing systems one may use 'file*'. This will retrieve documents containing the words file, files or filing. However, it will also retrieve documents with the word 'filet', unlikely to be relevant in the context of filing systems.

Three further operators commonly used when searching are known as Boolean operators. These operators are 'AND', 'OR' and 'NOT'. Used in combination with brackets they allow construction of elaborate searches. Figure A.3 displays a visualization of the three operators using Venn diagrams.
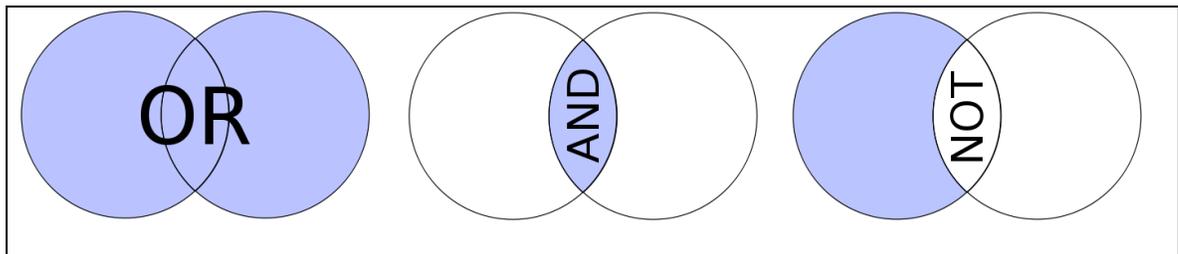
Figure A.3. Venn diagrams visualizing the Boolean operators OR, AND, and NOT

Combining terms using 'OR' indicates that either one of the used terms is sufficient for a document to be retrieved. One major use of 'OR' is to include synonyms in a search. For example, 'model OR theory OR framework' will retrieve documents that either use the term 'model', or the term 'theory', or the term 'framework' or any combination of these terms together. Therefore, 'OR' will usually increase the number of retrieved documents.

In contrast 'AND' is used to restrict a search to documents that fit different conditions at the same time. Its main use is to tie different terms together. These terms can stand for different concepts that should be present at the same time. For example, 'information AND system AND research' will retrieve only documents where all three terms appear together. The order of appearance is not important. Generally 'AND' will decrease the number of retrieved documents.

If it is desired to exclude documents containing a certain term the 'NOT' operator can be employed. For example, 'user NOT drugs' will retrieve all documents containing the term 'user' except those documents that also contain the term 'drugs'. The 'NOT' operator helps to eliminate irrelevant documents and thus reduce the number of retrieved documents. However, caution is necessary when using this operator. 'NOT' may exclude relevant documents that use a term in a way not anticipated by a researcher.

One last group of useful search operators are proximity operators. Proximity operators allow a combination of two search terms in a way that is less restrictive than phrases but more restrictive than 'AND'. They are called proximity operators because they indicate that terms have to appear relatively close to each other. Because two terms appear in the same document does not mean that they are related to each other. However, if they appear in proximity to each other the likelihood of them being related is much higher. Databases implement proximity operators differently. For example, some use 'NEAR', others W for 'within', and others 'ADJ' for 'adjacent', and some allow greater precision by specifying the maximum number of words between two terms. For example, the following string is used in *Scopus* to search for the terms 'document' and 'system' allowing one word to appear in the middle: '*document W/1 system*'.

Finally, brackets can enable the use of a combination of Boolean operators to construct elaborated searches. Using opening '(' and closing brackets ')' different Boolean operators and search terms can be tied together. For example, using brackets, the different examples from above can be combined into a search aiming to find articles discussing users of information systems in a theoretical context:

(information AND system AND research) AND (model OR theory OR framework) AND (user? NOT drugs)

Often the immediate construction of complex searches is, however, not advisable. In order to better see what different parts of a complex search contribute towards the final results, complex searches should be slowly built up. This strategy is known as 'building blocks' and will be discussed below.

Database dependency

The fact that databases are different has merits as well as disadvantages. On the one hand, some databases have distinct features not present in all retrieval systems. These features can be of additional help in identifying literature, such as the thesaurus *MESH* in *Medline*. On the other hand, there are no universal standards for database searches. This lack of standards makes it necessary to check the name of search fields or the usage of different search operators for each database prior to searching. If one does not check the usage of search operators, one may end up with unexpected results. Looking at the database description is particularly important when using search fields (especially in 'advanced' or 'expert' modes), because abbreviations used for fields can be different. For example, *Scopus* uses PUBYEAR for publication year while *Web of Science* uses PY.

Logging Searches

While conducting database searches, it is generally advisable to keep track of the searches undertaken. Ridley [2008], Schwarz et al. [2007], and Brocke et al. [2009] all note the general importance of logging searches when conducting literature reviews. Logging searches will help to keep track of used search terms, searched time spans, and covered databases. Such a list should be updated when additional searches are conducted. As is argued above, listing of search strategies does not improve the quality, rigor, or replicability of reviews. However, reviews should state explicitly: what literature they include; the boundaries of what related phenomena they do and do not cover; what time periods have been covered; and which databases have been searched. In short the boundaries of the review should be clearly stated. This will allow for a continuation and extension of the literature review at a later point without duplicating efforts already undertaken.

Snowballing and Citation analysis

Snowballing, also known as citation tracking is a method that can be used to identify further relevant literature after some relevant publications are identified. By paying attention to literature cited by others one can identify additional related literature. Greenhalgh and Peacock [2005] report that compared to other means for identifying literature citation tracking helped them to find the biggest share of relevant literature while taking less time per identified publication than any other method. However, citation tracking has one major disadvantage. It can only go back in time. Literature found using citation tracking could not be published later than the text referring to them. One way around this is to use citation analysis, for example, available in *Web of Science*, *Scopus*, or *Google Scholar*. Citation analysis allows the tracking of related literature forward in time by finding literature that cited a specific publication. However, literature can be cited for many possible reasons [Nicolaisen, 2007] and in contrast to snowballing citation analysis does not have the benefit of references being introduced within the context of a publication. For this reason it can be a tedious task to go through hundreds of publications citing a landmark paper. However, refining search results may help in this case. Citation tracking (snowballing) and citation analysis are both suggested when conducting literature reviews [Webster and Watson, 2002].

Refining searches

At the refining stage one can construct new searches based on a better understanding of a research problem. For instance, when reading one identifies additional terms for searching, or new ideas, or theories or methods that may be of interest. In addition, one can use search strategies for improving searches.

Citation pearl growing strategy

Citation pearl growing uses characteristics of relevant articles as a starting point for searching other relevant articles. In addition to using citation analysis, this method uses keywords assigned to documents. By looking at the keywords assigned to relevant documents one can try to find other documents indexed with the same keywords. Using keywords is especially promising when databases control the use of keywords via a thesaurus, but also in subject specific databases which may make use of more specific keywords. Furthermore, when getting stuck in one database one can extend the literature search to another database. Looking up a relevant publication in a new database can then be used to identify keywords used by this second database for a particular type of research. After finding additional literature in the second database one can revert to the first database using the same technique for identifying more relevant literature there.

Successive fractions

Using successive fractions one tries to start with a query designed to retrieve as many relevant documents as possible. For example, using a key term and its synonyms in an 'OR' search. This usually also retrieves a substantial number of irrelevant documents. Looking through the results one tries to identify groups of documents which do *not* belong into the set of documents one wants to retrieve. As one is going from large results sets to smaller ones the successive fractions approach is sometimes also called funnel search. The aim is to undertake additional searches that successively 'slice off' groups of irrelevant documents from the results. The goal is to come to a point where the result list reaches a satisfactory level of precision. One way of doing this is by excluding terms appearing in wrongly retrieved documents using the 'NOT' operator. However, the easiest way to use a successive fractions approach is to employ the 'refine search' functionality which is offered, for example, by *Scopus* and *Web of Science*. Refine search makes it possible to limit results to particular subject areas, journals, authors, years, etc.

Building blocks

The building blocks strategy works the other way round. It starts with a set of simple searches that are then combined to build up a complex search. The advantage of this method is that it allows an exclusion of search terms that retrieve unwanted documents during the search process. It is especially helpful when good search terms are not

known. Looking at the results for each term one can evaluate whether an additional search term helped to identify additional relevant documents. Unpromising search terms can then be omitted in order to achieve better precision.

Results from individual searches are then combined using the search history function. This function provides access to earlier searches where it is possible to combine (using OR) or subtract (using AND and NOT) results from different searches.

Finally, building blocks and successive fractions can be mixed for approaching desired documents. While building blocks can be used to slowly build up a search, successive fractions can be used to avoid a specific subset of documents when using terms with ambiguous meaning.

APPENDIX B: AN EXAMPLE THAT ILLUSTRATES THE HERMENEUTIC FRAMEWORK FOR CONDUCTING FRAMEWORK REVIEWS

The hermeneutic framework proposed in this article describes the nature of a literature review as a process of developing understanding that is emergent, unpredictable and creative, rather than straightforward, orderly and strictly prescribed. Thus, one important aspect of the hermeneutic framework is that understanding of literature develops gradually through several iterations of the hermeneutic circle, until a researcher reaches a stage of reasonable confidence that both coverage and depth of insight into the literature are sufficient. At that stage a researcher has developed a comprehensive mapping of the literature that enables critical assessment and identification of weaknesses or gaps. Understandably, there can be any number of iterations as the understanding process may unfold unpredictably into specific directions. Even in situations when a considerable insight into a literature is achieved, a researcher may stumble upon some leads to new and interesting sources, and after thorough reading reveal unexpected or contradictory findings. Similarly, a discovery of new literatures (from related disciplines) might shed a new light on a problem and question researcher's assumptions and a map of relevant knowledge developed thus far.

To illustrate how the hermeneutic framework for conducting literature reviews is applied, in this appendix we briefly present the literature review conducted as part of our current research on 'literature reviews' that is reported in the this article and another that critically engages with the concept of Systematic Literature Reviews (SLR) [Boell and Cecez-Kecmanovic, 2011].

Starting the review – Initial move through the hermeneutic circle

The first iteration of the hermeneutic circle describes how the research problem emerged as the result of an initial engagement with the literature.

Initial statement of the "Research problem/questions"

Two main issues led to the research on literature reviews in IS and an initial formulation of the research problem. One was the intense theoretical work as part of a PhD by the first author [Boell, 2012] that was heavily dependent on reviewing earlier literature. As part of this engagement numerous practical problems of information retrieval and database searches had to be grappled with. The second issue that sparked the research interest emerged from several presentations of PhD research proposals, in which SLR was adopted as a 'superior method' for conducting literature reviews. When advised by senior academics on additional relevant and important research literature, students were at times puzzled as they had just presented various tables and figures stating that they reviewed a 'complete' set of publications retrieved from various databases and journals. Based on this experience we decided to further investigate the concept and origin of SLR and to engage with the issue of searching for literature more generally. Tentatively the research question at this point was the following:

- Where did SLR originate and what do they entail?

Initial "Searching", "Sorting" and "Selecting"

In order to examine the question we used database searches to track the phrase 'systematic literature review' and 'systematic review' over time. Based on this it became apparent that the phrase only started to be used in academic work in the 1990s (c.f. Boell and Cecez-Kecmanovic [2011]). Furthermore, a breakdown by discipline indicated that SLR are heavily used in medicine. Based on this increased understanding, a search for academic books was undertaken targeting the identified timeframe. Using the timeframe and discipline as filters we identified Chalmers and Altman [1995] as an early publication on the topic of SLR.

Initial "Acquiring" and "Reading"

In parallel with searching for early work on SLR we also obtained a reference to Kitchenham [2004] as a guideline on SLR used by students. Initial reading therefore focused on Chalmers and Altman [1995] and Kitchenham [2004]. Chalmers and Altman [1995] was a collection of presentations at a meeting by the *British Medical Journal* and the UK *Cochrane Centre* that advocated the concept of SLR in medicine. It thus traced the developments that led to the establishment of SLR, as well as discussing the rationale and approach for conducting SLR. Furthermore, reading Kitchenham [2004] showed that her guidelines were based on earlier guidelines in medicine.

Initial "Mapping and classifying"

Initial reading led to preliminary historical mapping of SLR, as a means for conducting literature reviews that originated from medicine. In medicine it was initially closely linked with the summation of research findings from earlier studies, in so-called meta analysis. Spreading from medicine SLR were subsequently adopted in health informatics and then by software engineers.

Initial "Critical assessment"

Reading both Kitchenham's [2004] guidelines and the contributions by different authors in Chalmers and Altman [1995] revealed a particular inconsistency among them. SLR in medicine aim to synthesize research results pertaining to a specific research question drawing from as comprehensive evidence as possible. While Kitchenham [2004] adopted this rationale, she overly emphasized the importance of database searches as central to the SLR process. However, reliance on literature searches limited to specific databases and journals was the shortcoming that led to the proposal of SLR in medicine in the first place. The critical assessment of Kitchenham [2004] in the light of Chalmers and Altman [1995] thus posed a contradiction in the literature that motivated our further investigation.

Subsequent circles of the hermeneutic literature review process

Based on an initial understanding of the problem domain the research progressed through the hermeneutic circle through further iterations as the contradiction in the literature described above led us to revisit the research problem.

Revised formulation of the "Research problem/questions"

The initial engagement with the literature made us aware of the importance of database searches for the literature review process. However, the contradiction in understanding of the roles of database searches in the two works reviewed so far was puzzling. Coincidentally, one of the researchers was at that time reading about Wittgenstein's [1953] philosophy of language, according to which words – and therefore search terms – have no inherent meaning. This led us to identify sources that apply Wittgenstein's [1953] philosophy of language to information retrieval. Blair [2006] in particular indicated the relevance of 'indeterminacy of language' for the use and design of retrieval systems. For instance, the use of a search term will only identify documents that explicitly refer to this term irrespective of the specific meaning (of the term) intended by a researcher. As a result a search will retrieve only a subset of relevant documents while also including irrelevant ones. This explains why Knipschild [1995] in Chalmers and Altman [1995] reported that database searches retrieved only 36% of relevant literature. Both of these aspects led to a reformulation of the research questions:

- What role do literature searches play in the process of conducting literature reviews?

- What are the properties that characterize the quality of literature reviews more generally?

Additional "searching", "sorting" and "acquiring" of literature

In order to address these questions, we decided to engage in a broader review of the guideline literature on conducting literature reviews. Firstly, a colleague alerted us to Schwarz et al. [2007] as a publication engaging with literature reviews in IS. And secondly, we engaged in a search for general guidelines on conducting literature reviews. The focus here was on handbooks as we were looking for works providing a substantial discussion of the process of conducting literature reviews. Using the university library's catalogue we could identify a number of relevant works that engaged in depth with the process of conducting literature reviews including Feak and Swales [2009]; Finn [2005]; Hart [1998]; Machi and McEvoy [2012]; and Ridley [2008].

Additional "reading" and "identifying"

Reading Schwarz et al. [2007] pointed us to Webster and Watson [2002] as a further discussion from IS on the process of conducting literature reviews. (This was an example of snowballing, as discussed in Appendix A). Subsequently, we obtained a copy of Webster and Watson [2002] and included it in our assessment of the literature.

Furthermore, we also engaged in reading the literature identified through our search in the library catalogue, as listed above.

Additional "mapping and classifying"

Assessing the literature obtained so far, we identified key aspects of literature reviews that were covered by these works. The aim here was to find out what features characterize the quality of literature reviews in general. In particular, this allowed us to identify a number of important issues related to the literature review process recurring across different sources: the development of understanding [Hart 1998; Schwarz et al. 2007]; critical engagement [Finn 2005; Ridley 2008]; argument development [Feak and Swales 2009; Machi and McEvoy 2012; Ridley 2008;, and the mapping and classifying of earlier work according to themes [Hart, 1998; Webster and Watson, 2002].

Interestingly, the general literature on conducting literature reviews did not address the role of database searches in detail.

Additional "critical assessment"

Assessment of the different literature review sources, in the light of our research questions, subsequently led us to two insights: firstly, there seems to be a lack of coverage of database searches in the literature on conducting literature reviews; and secondly, there are a number of key aspects that determine the quality of literature reviews. A quality literature review engages in a meaningful mapping and critical engagement with the literature, based on which it develops a thorough and convincing argument for a research problem and research questions.

"Argument development"

Based on the review of the literature undertaken so far we started to develop our argument which subsequently guided our research further:

- the process of reviewing literature is an important aspect of research, addressed in several guidelines;

- the literature review process involves several aspects that are related;

- searching for literature is an important aspect, that is currently not well covered by guidelines; and

- based on Blair's work [2006] the way in which database searches are approached by SLR appeared to be insufficient.

At this point our research thus led us to further investigate the process of conducting literature reviews, which eventually resulted in the development of the hermeneutic framework for conducting literature reviews, presented in this article.

More iterations through the hermeneutic circle

Obviously the process of engagement with the literature on literature reviews did not stop here, and we went through several further iterations through the hermeneutic circle while our research progressed. While our understanding on the subject matter built, the need to further investigate additional issues became apparent. For instance, we concentrated in subsequent iterations on identifying:

- **further guidelines on conducting literature reviews from IS**

  o this literature provided us with a more thorough picture on the current understanding of literature reviews, as they are proposed for IS teaching and research;

  o in particular this iteration underlined that the process of conducting literature reviews and the process of searching were not thoroughly addressed by these guidelines;

- **literature covering methods for conducting database searches**

  o this body of literature provided insights into tools, techniques, methods and strategies that can be used for efficient and effective searching;

- o in particular this iteration underlined the fact that various techniques for efficient and effective searching were at odds with the demands of SLR, as promoted by SLR guidelines outside of medicine;

- **literature on hermeneutics**

  - o this literature enabled us to learn how the understanding of hermeneutics has changed throughout time, and how it developed from an approach to interpreting texts, to a broader process of gaining understanding in general;

  - o in particular, during this iteration we applied hermeneutics to describe a literature review process as the hermeneutic circle, involving iterations between the understanding of a part (an individual piece of literature) and the understanding of a whole (a body of literature);

- **further literature on research on literature reviews**

  - o research undertaken on literature reviews enables us to relate our own research to a broader body of work done on literature reviews, as it identified different streams of research within the literature;

  - o this iteration underlined the fact that literature reviews are of high importance throughout all stages of research and that literature reviews are presented differently in different bodies of literature, thus emphasizing that reviewing the literature is not only summarizing earlier research, but also learning how to summarize them appropriately for a particular audience.

It is important to note that these iterations did not necessarily occur one after another, but at times were interwoven and informing each other. Overall our engagement with earlier research led us to a description of literature reviews, as an ongoing understanding process that can be described using the hermeneutic circle. As we indicated in this appendix, our research questions and argumentation gradually developed as part of this understanding process into the form presented in this article.

This brings us to a final comment regarding the conclusion of the literature review. As indicated above, literature reviews are an integrative part of research that informs all of its stages [Dellinger, 2005; Dong, 1996; Goodfellow, 1998; Kwan, 2008; Onwuegbuzie et al., 2007]. Similarly, our literature review developed and evolved until the final stages of the writing of our article. As we engaged deeper with the literature, our confidence in the value and novelty of our contribution grew. In the context of the current publication the review of earlier works, researching literature reviews, helped us in concluding our own literature review. Looking at recent publications on literature reviews we reached saturation as we could not find any indication that:

- earlier publications had dealt in depth with the importance of literature searches as part of a continuous understanding process, when reviewing the literature;

- any works had in detail underlined the iterative nature of the process of engaging with the literature;

- any writings had applied hermeneutics to the engagement with a wider body of literature (in contrast to the interpretation of individual texts).

Finally, as this example highlighted, searching and reviewing of literature relevant to a particular problem is something that evolves as part of an ongoing engagement with the literature. What is considered to be important and relevant is always subject to revision in the light of the knowledge that is obtained during this process, very much like the academic enterprise itself. As we showed, a body of literature of relevance to a particular research is not something that is pre-given but instead something that is evolving as the result of critical engagement with earlier research.

ABOUT THE AUTHORS

Sebastian K Boell. Sebastian has a PhD in Information Systems (IS) from the University of New South Wales (UNSW) in Australia and an MA in Information Science form Saarland University in Germany. His research encompasses conceptualizations of 'information' and 'information systems'. In particular, Sebastian is interested in advancing theoretical engagement with these concepts in IS research and practice. Sebastian has also worked on research in the areas of bibliometrics, scientometrics, and on telework and telecommuting.

Dubravka Cecez-Kecmanovic. is professor of Information Systems at the Australian School of Business, UNSW. Her research interests include theoretical and methodological developments in understanding information systems (IS) and organizing. She has published in *Information Systems Journal, European Journal of Information Systems, Information Technology and People, Journal of Information Technology, Information & Management, International Journal of Global Information Technology Management, Decision Support Systems, International Journal of Actor Network Theory and Technological Innovation*, and others. She is Senior Editor of Journal of AIS and Associate Editor of Information Systems Journal.