

On developing and evaluating of the literature review

Pertti Järvinen

Department of Computer Sciences

University of Tampere, Finland

pj@cs.uta.fi

Abstract. A researcher needs an effective literature review to uncover what is already known in the body of knowledge prior initiating any research study. In this paper we identify three possibilities: 1) There is no literature review, 2) the literature review exists but it is expired and 3) the recent literature review exists. We give some preliminary advice how to proceed in each of those three cases. A researcher can sometimes exploit the existing literature review. But as we demonstrate with some warning examples it is reasonable to evaluate that existing review, especially if the lens-directed approach was applied to. Hence the concept-centric approach can be recommended.

Introduction

Webster and Watson (2002, p. xiii) emphasize that “a review of prior, relevant literature is an essential feature of any academic project. An effective review creates a firm foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed. In the information systems (IS) field, we see few published review articles. As a result, the progress of our field is impeded.”

Webster and Watson (2002) see that there are two points in a scholar's life that lend themselves naturally to writing a literature review. "First, those who have completed or made substantial progress on a stream of research are well positioned to tell their colleagues what they have learned and where the field can most fruitfully direct its attention. Second, scholars who have completed a literature review prior to embarking on a project and have developed some theoretical models derived from this review are also potential authors (xiv)." We shall restrict our consideration to the latter.

Another restriction of our approach concerns the way to use the review. Webster and Watson concentrated on the publication of the review article as such, but we here prefer to consider the use of the review in a research project. As Webster and Watson above said such a review should be found or it should be accomplished prior the research project. There are then three possibilities: 1) There is no literature review, 2) the literature review exists but it is expired and 3) the recent literature review exists. In the first two cases we must perform the literature review ourselves; in case 1 totally and in case 2 partially, if we are lucky, or totally, if the structuring of the previous review is not satisfactory. In case 3 we do not need to accomplish the reviewing process but to use the new one, if we are lucky, but if the new review has an irrelevant structure, we must redo the reviewing process.

When the structure of the ready literature review is unsatisfactory? According to Webster and Watson the author-centric review fails to synthesize the literature. Many other reasons can be and we do not know all of them, but one reason could be the lenses used in classification of the articles in the reviewing process. By the lens we mean a classification with one or more dimensions. A certain dimension contains two or more classes to which the relevant articles will be assigned. Webster and Watson (2002) recommended the concept-centric approach and did not mention the lenses at all, but we shall analyse and evaluate some existing ones. For example, we show how Deetz's (1996) classification of four discourses is misunderstood and misused.

In this paper we have four types of contributions. First, consideration of those three possibilities gives differing advice. Second, paying attention to both the concept-centric and lens-directed approaches in those three cases deepens the consideration. Third, we shall demonstrate with some examples that evaluation of the review is also needed. Fourth, we shall tentatively consider how to exploit the literature reviews. We shall structure the rest of the paper accordingly.

Case 1: There is no literature review.

We here assume that the researcher has performed a tentative literature survey on the topic she is aiming to her research project, and this tentative survey shows that there is no literature review at all. She must herself perform the detailed literature review, and she has at least two possibilities: the concept-centric and lens-directed approaches. We below analyze and describe some aspects of both.

The concept-centric approach to the literature reviewing process

In this sub section we take the advice given by Webster and Watson (2002) as a starting point. It seems to be rather categorical and leave some details out. To this end we shall supplement it by some other instructions presented by Swanson and Ramiller (1993).

Webster and Watson 2002, p. xv) stressed that “s high-quality review is complete and focuses on concepts. A complete review covers relevant literature on the topic and it is not confined to one research methodology, one set of journals, or one geographic region.” A literature review is concept-centric. Webster and Watson recommend that you compile a concept matrix as you read each article as Table 1.

Article			Concepts		
	A	B	C	D	...
1		x	x		x
2	x	x			
...			x	x	

Table 1. The concept matrix

According to Webster and Watson (2002), “when your reading is complete, synthesize the literature by discussing each identified concept. Before commencing this step, take some time to develop a logical approach to grouping and presenting the key concepts you have uncovered. You might need to add a further dimension to the concept matrix to handle the unit of analysis, e.g. by dividing columns to three sub-columns according to organization, group and individual.” (xvii) They continue that “tables and figures can be an effective means of communicating major findings and insights. Nonetheless, tables cannot be merely lists of articles. They need to add value by categorizing articles based on a scheme that helps to define the topic area, such as types of variables

examined, level of analysis, gaps in the literature, or other important theoretical issues. ... A review succeeds when it helps other scholars to make sense of the accumulated knowledge on a topic. We believe that sense-making is enhanced when a review is logically structured around the topic's central ideas and makes good use of tables and figures to convey economically the key findings and relationships.” (p. xviii)

To our mind, the synthesizing process is not clearly described or the advice that Webster and Watson give are sketchy and therefore we like to follow the ideas presented by Swanson and Ramiller (1993) in their article describing an analysis of the manuscripts submitted to the journal *Information Systems Research (ISR)* during its start-up years, 1987 through 1992. They identified the primary research question for each of 397 submissions to *ISR*, and then categorized the research questions using an iterative classification procedure. Ambiguities in classification were exploited to identify relationships among the categories, and some overarching themes were exposed in order to reveal levels of structure in the journal’s submissions stream.

Swanson and Ramiller (1993, p. 302) describe their approach as follows: “The research questions and their grouping into categories represent the primary database in our study. ... In place of the research questions themselves, we attempt to give a rich accounting of their core concepts, broader pattern, and underlying themes. To characterize the individual categories we provide descriptions of each and list the key words, concepts, and associations that appear in their constituent research questions.”

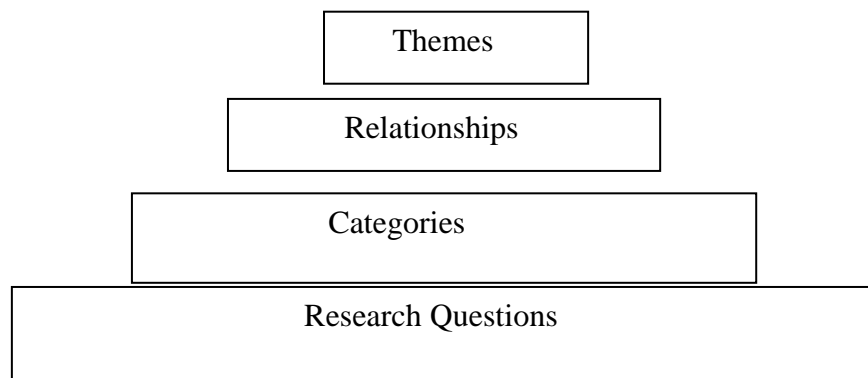


Figure 1. Characterizing the ISR submissions stream (Swanson and Ramiller 1993, p. 303)

They “also examine the relationships among the categories, as suggested by research questions that point toward other categories than those to which they have been assigned. And finally, we consider how clustering in the relationships suggests higher-order themes. The presentation therefore builds in a fashion suggested by Figure 1.”

To our mind, the Swanson and Ramiller’s procedure is more detailed, emphasizes the research problem, the class and relation concepts (Bunge 1967, p. 60), and gives advice how to find more abstract categories and themes.

The lens-directed approach to the literature reviewing process

In this sub section we shall discuss how we could find one or more suitable lenses by which we could structure our literature review. When the lens is a classification with one or more dimensions, and a certain dimension contains two or more classes to which the relevant articles will be assigned, we shall here describe and analyze classifications. The use of lenses requires that the researcher has some preliminary idea what she will study concerning the topic. This idea will guide her search of the classifying dimensions. Based on the analogical situation as in the beginning of the theory-testing study we recommend that the researcher organizes a competition between potential alternatives. This means that the researcher compares the potential alternatives and selects the classifying dimension or their combination which best serves her research idea.

In addition, there are the universal requirements for a good classification (Bunge 1967, p. 73; Järvinen 2004, p. 21): One of the rules of correct classification is that the characters or properties chosen for performing the grouping should stick to throughout the work (rule 1. the permanent principle of grouping). Two other rules of the correct classification are that the subsets of the same hierarchical rank should be exhaustive (rule 2.) and pairwise disjoint (rule 3.), i.e. should jointly cover the whole field and should have no members in common. The fourth rule is not a logical but a methodological one, namely, the various classifications of one and the same universe of discourse should be coincident (as regards the extensions) if they are to be natural rather than artificial groupings.

Case 2: The literature review exists but it is expired.

In case 2, the period of some last years is lacking from one or more old literature reviews (cf. Arnott and Pervan 2008). We must, however, check that old reviews

whether they are applicable or not. It depends on the boundaries on your work. According to Webster and Watson (2002) “boundaries include issues like level(s) of analysis, temporal and contextual limitations, the scope of your review, and your implicit values. For example, you should clearly state the unit of or units of analysis undertaken in the review; however, be wary of trying to go beyond a single unit unless you can provide a strong rationale for a multilevel perspective. Further, if your theory applies only to certain contexts (e.g., types of occupations, organizations, or countries) or to certain time periods, this should be identified for the reader. You also need support the scope of your review: state what literature and fields you will draw upon and why these define an appropriate boundary for the chosen topic and level of analysis. Finally, identify the values bounding your theory - that is, your implicit assumptions concerning whose interests are served (such as top management, IS professionals, users, or other stakeholders)”. (Webster and Watson 2002, p. xv)

If the old review is applicable to your purposes, you can supplement it by using the approaches presented in case 1 to find out and classify the studies published after the old review. If the old review is not applicable to, you must start from the beginning.

In Case 1 we presented two approaches: the concept-centric and lens-directed approaches. If the old review was made by using the concept-centric approach, you can immediately start your review process. But if the lens-directed approach was applied to, you could check that the lens or lenses are the best possible ones. I mean that there is a little opportunity that after the old review the better lens were discovered, and hence it should now be used. This means that all the studies I the old review should be re-classified through this better lens.

Case 3: The recent literature review exists.

This case is quite similar as case 2. You must first compare your boundaries (level(s) of analysis, temporal and contextual limitations, the scope of your review, and your implicit values) with the boundaries in the recent review. If there is the fit, you can continue by further evaluating the recent review, e.g., its possible lenses. In case of no fit, you must start from beginning and follow the ideas presented in Case 1. – Case 3 finishes our presentation of three possibilities, and we now turn to evaluation of some lenses.

Evaluation of some lenses in the literature reviews

Our purpose in this section is to demonstrate that instead of peer-review approach all the literature reviews using one or more lenses are not correctly performed. We have for educational purposes selected many literature reviews to be read in our doctoral seminar. In the selected reviews we shall present the following deficiencies: The lens is not an exhaustive classification, the grouping principle in the lens is not permanent, the lens can be understood incorrectly and the paper can be classified wrongly.

The lens is not an exhaustive classification (rule 2)

Schultze and Leidner (2002) analysed the IS literature on knowledge management. They argued their lens as follows: “In order to frame the theoretical perspectives and assumptions that are available for knowledge management research, we adopt Deetz’s (1996) framework, which allows us to carve the theoretical landscape into four discourses: The normative, the interpretive, the critical and the dialogic.” (p. 214) The Deetz’s framework (in Appendix A) seems itself to be exhaustive when it covers both the theory-testing and theory-creating studies, but it, however, does not contain design research (March and Smith 1995, Hevner et al. 2004, Vaishnavi and Kuechler 2007, Gregor and Jones 2007)). Hence, the Deetz’s framework is not exhaustive, when all the knowledge management studies are considered. Because of this deficiency and the “number of difficulties in coding the articles” (p. 219) Schultze and Leidner mis-classified “such as the problem of database design and expert system design” (p. 222) to the normative discourse.

Sanford and Rose (2007) studied eParticipation that is an emerging research area which, like most emerging areas, lacks a clear literature base or research approach. Their study maps out some of the academic theories and disciplines that the new area addresses, using conventional literature study techniques. They also selected the Deetz’s framework by arguing: “In order to frame the theoretical perspectives and assumptions that are used in eParticipation research, we adopt Deetz’s (1996) taxonomy of discourses. Although developed in the context of organizational science, it provides a well-known and reasonably transferable account of different research styles suitable for use in most socially oriented literatures.” (p. 408) Also Sanford and Rose did not identify design research, although they had many expressions referring to design research, e.g. “to improve the efficiency ...” (p. 406), “tools for improving ...” (p. 409), to selectively

correct negative ...” (p. 410), “making eParticipation available ...” (p. 412), “how eParticipation should be.” (p. 413), “to map out dysfunctional institutional and societal structures and *replace them.*” (cursive added) (p. 415). Rose interestingly discussed with us about our post-analysis (Järvinen 2008, pp. 76-79) concerning their article.

In general, we can comment that the Deetz’s classification also classify many research approaches. The Deetz’s classification has the two variables or axes (Appendix A): 1) relations to dominant social discourse (consensus, dissensus), and 2) the origin of concepts and problems (local, a’priori/elite). The latter divides the traditional research approaches into two categories, the theory-creating (local) and theory-testing (a’priori/elite) ones. Edmondson and McManus (2007) recommend that for the mature topic with extensive literature, complete with constructs and previously tested measures etc. the theory-testing approach is the most suitable, but for the nascent topic with little or no prior work on the constructs and processes under investigation, the theory-creating approach is the most suitable. The topic of the literature review is seldom both nascent and mature at the same time moment. Hence, we cannot therefore recommend the Deetz’s framework to be used as a lens in the literature reviews.

The grouping principle in the lens is not permanent (rule 1)

Jasperson et al. (2002) used a metatriangulation approach to explore the relationships between power and information technology impacts, development or deployment, and management or use in a sample of 82 articles from 12 management and MIS journals published between 1980 and 1999. They explored the multiple paradigms underlying this research by applying two sets of lenses to examine the major findings from their sample. The technological imperative, organizational imperative, and emergent perspectives (Markus and Robey 1988) are used as one set of lenses to better understand researchers’ views regarding the causal structure between IT and organizational power. A second set of lenses, which includes the rational, pluralist, interpretive, and radical perspectives (Bradshaw-Camball and Murray 1991), is used to focus on researchers’ views of the role of power and different IT outcomes.

We first evaluate the technology lenses (technological, organizational, and emergent) and then the power lenses (rational, pluralist, interpretive, and radical). The technology lenses are said to be causal structures proposed by Markus and Robey. We can say that two first technology lenses (technological and organizational) have well-defined causal structures, but the third one (emergent) is problematic. Jasperson et al. (2002) define that according to the

emergent lens, “the uses and consequences of information technology emerge unpredictably from complex social interactions” (Markus and Robey 1988, p. 588). The emergent perspective is typified by studies applying the structurational model of technology (Orlikowski 1992, Orlikowski and Robey 1991). The emergent perspective views the introduction of IT into an organizational setting as a catalyst, initiating a series of reciprocal causes and effects from which the use of the technology and the organizational outcomes arise (Orlikowski 1992, Pinsonneault and Kraemer 1993). To our mind, there are at least two reasons why the emergent lens is not the causal structure.

First, according to Gregor (2006, p. 617) “the concept of causality is extremely problematic but is of fundamental philosophical importance. The 18th century Scottish philosopher, David Hume, for example, pointed out that we are unable to see or prove that causal connections exist in the world, though we continue to think and act as if we have knowledge of them.” In addition to that, we cannot find which one of the four types of causality analysis (if any) defined by Gregor (regularity (or nomological), counterfactual, probabilistic, or manipulation or teleological causal analysis) is applied in the emergent lens.

Secondly, by the structurational model of technology Jaspersen et al. (2002) indirectly (via Orlikowski 1992) refer to Giddens’s structuration theory, but Jones and Karsten (2008, p. 131) clearly write that “a potentially significant implication of Giddens’s view of structure from an IS perspective is that it is ‘a virtual order of transformative relations ... that exists, as time-space presence, only in its instantiations in [reproduced social] practices and as a memory traces orienting the conduct of knowledgeable human agents’ (Giddens 1984, p. 17). This is the case, Giddens argues, even for apparently material allocative resources (such as land or information technology) which ‘might seem to have a real existence [but which] become resources only when incorporated within processes of structuration (Giddens 1984, p. 33). As he puts it, therefore, in one of his few direct statements on the topic, ‘technology does nothing, except as implicated in the actions of human beings’ (Giddens and Pierson 1998, p. 82).” Jones and Karsten (2008, p. 146) continue that “a number of aspects of the duality of technology would seem similarly at odds with Giddens’s account of structuration.”. Hence, the additions made by Jaspersen et al. into Markus and Robey’s emergent perspective are confusing. – To summarize, because of problems above with the emergent lens the classification of the technology lenses does not follow rule1, i.e., the grouping principle in the technology lenses is not permanent.

Jaspersen et al. (2002, p. 406) argue their power lenses as follows: “Because of the extensive descriptions and applications of the Burrell and Morgan framework (Table 2), the modified framework described by Bradshaw-Camball and Murray

(1991) is relatively well-defined. Some potential shortcomings of the Bradshaw-Camball and Murray framework are provided in the limitations section in this paper [Bradshaw-Camball and Murray (1991)], but we believe the benefits of its well-articulated theoretical base provide this study with the best possible set of paradigm lenses to apply to the murky concepts of power associated with IT research. Table 3 presents the definitions of the four power lenses (i.e., rational, pluralist, interpretive, and radical).”

	<i>Subjectivist</i>	<i>Objectivist</i>
<i>Radical change</i>	Radical humanist	Radical structuralist
<i>Regulation</i>	Interpretive	Functionalist

Table 2. The Burrell and Morgan (1979) framework

	<i>Subjectivist</i>	<i>Objectivist</i>
<i>Radical change</i>		Radical
<i>Regulation</i>	Interpretive	Rational and Pluralist

Table 3. The Bradshaw-Camball and Murray (1991) framework

Hence Bradshaw-Camball and Murray (1991) forgot the Burrell and Morgan’s radical humanist at all and put two classes (rational and pluralist) into the same cell and that is against rule 3. Jasperson et al. did not provide this shortcoming of the Bradshaw-Camball and Murray framework in their limitations section. Jasperson et al. (2002) did not find that Bradshaw-Camball and Murray differently applied the grouping principles originated by Burrell and Morgan to their framework.

The lens can be understood incorrectly

According to Deetz’s framework the interpretive discourse is called the quadrant with consensus and the emergent theory based on the local language. As Deetz (1996, p. 195) put it: “Concepts are developed *with* the organizational members being studied.” Hence, any a’ priori theory should not be used. However, Schultze and Leidner (2002, p. 225) found many studies with a’ priori theory they classified into the interpretive discourse, for example, Star and Ruhleder (1996) used Bateson’s learning theory, Virkkunen and Kuutti (2000) relied on activity theory, and Schultze and Boland (2000) applied Bourdieau’s theory of practice. But according to Richardson and Robinson (2007) work of Bourdieau belong to the critical discourse. To our mind, activity theory also belongs to the critical discourse. As Schultze and Leidner (2002) had difficulties in application with their lens (Deetz 1996) as also had Vessey et al. (2005) with their lens (Morrison

and George 1995) in classification of research approaches (see ((Järvinen 2005, pp. 227-228)).

The paper can be classified wrongly

Schultze and Leidner (2002) took four exemplar articles (Bowker 1997, Elkjaer et al. 1991, Stenmark 2001), and Jarvenpaa and Staples 2000) one per quadrant, for the detailed analysis. We re-analyzed those four studies, and to our mind (Järvinen 2005, pp. 59-61), Schultze and Leidner (2002) succeeded to classify only one (Jarvenpaa and Staples 2000) of the four selected exemplars into the correct category of the Deetz's scheme. As we showed earlier Virkkunen and Kuutti (2000) was wrongly classified into the interpretive discourse, although it belongs to the critical discourse. Hence, it was surprise, that Richardson and Robinson (2007) who performed the literature review on critical studies did not included it into their data base (Järvinen 2008, p.93).

To summarize, it seems to be easier to find some deficiencies in the review papers where the lens-directed approach than in the papers where the concept-centric approach is applied to. We believe that the main motivation of the authors using the lens-directed approach has rather been to publish the literature review paper than to start a new empirical own study.

To the reader who expects that we should present the similar section as above about deficiencies of some concept-centric reviews, we must say that we have not found such ones. On the contrary, we can say that, for example, Ives et al. (1980) and Orlikovski and Iacono (2001) are two correctly developed, popular and influential concept-centric reviews.

On exploitation of the literature reviews

Yin (1989) proposes that library research and problem-finding should be combined. According to him, "beginning investigators may think that the purpose of a literature review is to determine the answers about what is known on a topic, but experienced investigators review previous research to develop sharper and more insightful questions about the topic". The citation contains two important reasons for the literature review to find out: 1) unexplored areas, and 2) a need for the denser differentiation. Edmondson and McManus (2007, p. 1155) supplement Yin by presenting that the literature review gives "an aid in identifying 3) relevant constructs and 4) areas of low agreement".

When the literature review is ready, it is rather easy to find areas of low agreement, i.e., areas where exist the conflicting results. The researcher must then have some theoretical idea how to solve the conflict, because research replication is not in favor. To find out unexplored areas was indirectly emphasized also by Colquitt and Zapata-Phelan (2007) analyzed the five-decade life span of the Academy of Management Journal (1958-2007). In this journal they also analyzed the texts “Information for Contributors” written by the editors. During the period 1999-2004 the cited editors wrote that “Manuscripts that offer an original theoretical and empirical contribution, but one that is small in scope, may be published as research notes ... Replications of previously published work and very incremental research rarely offer enough of a contribution to warrant publication.” (p. 1303).

We shall in this section tentatively provide how it is possible to exploit the literature reviews for other two alternatives: unexplored areas, and areas requiring denser differentiation. From the literature review to which the lens-directed approach was applied and the lenses are exhaustive, it is easy to find the unexplored area. It is an empty class, or an empty square, if there are two lenses. If the lens is not exhaustive, the researcher must extend the lens with absent classes and in that way to find out the unexplored area. The similar principle can be applied in the review to which the concept-centric approach was applied. The categories and themes then play the role of a lens. The researcher can then try to extend the category or the theme.

The last opportunity is to apply a denser differentiation. This can be done by dividing a certain class (e.g., person) into subclasses (e.g., male, female) or by adding a new lens. As an example of the latter we consider how Huy (2001) proposed four ideal types of planned change processes (Table 4), each with distinct temporal and non temporal assumptions, and each associated with altering a distinct organizational element. These types are commanding, engineering, teaching, and socialization.

	Emphasis of	change literature
Tangibility of content	<i>Episodic change</i>	<i>Continuous change</i>
<i>Tangible</i>	Formal structures (changed through commanding)	Work processes (changed through engineering)
<i>Intangible</i>	Beliefs (changed through teaching)	Social relationships (changed through socializing)

Table 4. Content of change and associated change intervention ideal types

The table above shows that two dimensions (emphasis of the change literature, tangibility of content) are exhaustive. Huy found many articles into each cell. We tested whether self-steering could be classified into some of the four cells but it was impossible.

Table 2 is now as a planar graph with two dimensions. To find the correct cell for self-steering we must take the third dimension, and it introduces the cubic structure. All the change intervention types in Table 2 are outer-steered. The other class of the third dimension could now be self-steered, and it can be described the upper level when the outer-steered were the lower level.

Discussion

We first described the three possibilities: 1) There is no literature review, 2) the literature review exists but it is expired and 3) the recent literature review exists. We also analyzed where in those three cases a new literature review was needed. For Case 1 Levy and Ellis (2006) recently proposed the processing advice they called “Blooms taxonomy”: Know the material, comprehend the material, apply, analyze, synthesize and evaluate. Our last two cases and their analyses seem to be novel.

From the existing review articles we identified two approaches: the concept-centric and lens-directed ones. At the same moment we found many deficiencies in the lens-directed review articles. Hence, we recommend the concept-centric approach. Our analysis also brought up the need of evaluation of review articles. This view seems to be underemphasized earlier. We speculate that one potential reason to use the lens-directed approach might to prepare a review article without any aim to continue any research study. The researcher does not then any particular research problem. To our mind, the lens-directed approach is easier than the concept-centric approach.

Our tentative trial to show how to exploit the literature reviews for finding unexplored or conflicting areas or a need for denser differentiation is preliminary and more research is still needed.

References

- Arnott D. and Pervan G. (2008). "Eight key issues for the decision support systems discipline", *Decision Support Systems*, vol. 44, no. 3, 657-672.
- Bowker G.C. (1997). "Lest we remember: Organizational forgetting and the production of knowledge", *Accounting, Management & Information Technology*, vol. 7, no. 3, 113-138.
- Brandshaw-Camball P. and Murray V.V. (1991). "Illusions and other games: A trifocal view of organizational politics", *Organization Science*, vol. 2, no. 4, 379-398.
- Buchanan D.A. (2003). "Getting the story straight: Illusions and delusions in the organizational change process", *Tamara Journal of Critical Postmodern Organization Science*, vol. 2, no. 4, 7-21.
- Bunge M. (1967). *Scientific Research I. The Search for system*. Springer-Verlag, Berlin.
- Colquitt J.A. and Zapata-Phelan C. P. (2007). "Trends in theory building and theory testing: A five-decade study of the Academy of Management Journal", *Academy of Management Journal*, vol. 50, no. 6, 1281-1303.
- Deetz S. (1996). "Describing differences in approaches to organization science: Rethinking Burrell and Morgan and their legacy", *Organization Science*, vol. 7, no. 2, 191-207.
- Edmondson A.C. and McManus S.E. (2007). "Methodological fit in management field research", *Academy of Management Review*, vol. 32, no. 4, 1155-1179.
- Elkjaer B., Flensburg P., Mouritsen J. and Willmott H. (1991). "The commodification of expertise: The case of systems development consulting", *Accounting, Management and Information Technology*, vol. 1, no. 2, 139-156.
- Giddens A. (1984). *The constitution of society*. Polity Press, Cambridge.
- Gregor S. and Jones D. (2007). "The anatomy of a design theory", *Journal of the Association for Information Systems*, vol. 8, no. 2, 312-335.
- Hevner A.R., March S.T., Park J. and Ram S. (2004). "Design science in information systems research", *MIS Quarterly*, vol. 28, no. 1, 75-105.
- Huy Q. N. (2001). "Time, temporal capability, and planned change", *Academy of Management Review*, vol. 26, no. 4, 601-623.
- Ives B., Hamilton S. and Davis G.B. (1980). "A framework for research in computer-based management information systems", *Management Science*, vol. 26, no. 9, 910-934.
- Jarvenpaa S.L. and Staples D.S. (2000). "The use of collaborative electronic media for information sharing: An exploratory study of determinant", *Journal of Strategic Information Systems*, vol. 9, no. 2-3, 129-154.
- Jasperson J., Butler B.S., Carte T.A., Croes H.J.P., Saunders C.S. and Zheng W. (2002). "Power and information technology research: A metatriangulation review", *MIS Quarterly*, vol. 26, no. 4, 397-459.
- Jones M. R. and Karsten H. (2008). "Giddens's Structuration Theory and information systems review", *MIS Quarterly*, vol. 32, no. 1, 127-157.
- Järvinen P. (2004). *On research methods*. Opinajan kirja, Tampere, Finland.
- Järvinen P. (Ed.) (2005). *IS Reviews 2005*. <http://www.cs.uta.fi/reports/sarjad.html> D-2005-7
- Järvinen P. (Ed.) (2008). *IS Reviews 2007*. <http://www.cs.uta.fi/reports/sarjad.html> D-2008-1
- Levy Y. and Ellis T.J. (2006). "Towards a framework of literature review process in support of information systems research", *Proceedings of the 2006 Informing Science and IT Education Joint Conference*, Salford, UK – June 25-28, 171-181.
- March S.T. and Smith G.F. (1995). "Design and natural science research on information technology", *Decision Support Systems*, vol. 15, no. 4, 251-266.
- Markus M.L. and Robey D. (1988). "Information technology and organizational change: Causal structure in theory and research", *Management Science*, vol. 34, no. 5, 583-598.
- Morrison J. and George J.F. (1995). "Exploring the software engineering component in MIS research", *Communications of the ACM*, vol. 38, no. 7, 80-91.

- Orlikowski W.J. (1992). "The duality of technology: Rethinking the concept of technology in organizations", *Organization Science*, vol. 3, no. 3, 398-427.
- Orlikowski W.J. and Baroudi J.J. (1991). "Studying information technology in organizations: Research approaches and assumptions", *Information Systems Research*, vol. 2, no. 1, 1-28.
- Orlikowski W.J. and Iacono C.S. (2001). "Research commentary: Desperately seeking the "IT" in IT research – A call to theorizing the IT artifact", *Information Systems Research*, vol. 12, no. 2, 121-134.
- Orlikowski W.J. and Robey D. (1991). "Information technology and the structuring of organizations", *Information Systems Research*, vol. 2, no. 2, 143-169.
- Pinsonneault A. and Kraemer K.L. (1993). "The impact of information technology on middle managers", *MIS Quarterly*, vol. 17, no. 3, 271-292.
- Richardson H. and Robinson B. (2007). "The mysterious case of the missing paradigm: A review of critical information systems research 1991-2001", *Information Systems Journal*, vol. 17, no. 3, 251-270.
- Sanford C. and Rose J. (2007). "Characterizing eParticipation", *International Journal of Information Management*, vol. 27, no. 6, 406-421.
- Schultze U. and Leidner D.E. (2002). "Studying knowledge management in information systems research: Discourses and theoretical assumptions", *MIS Quarterly*, vol. 26, no. 3, 213-242.
- Stenmark D. (2001). "Leveraging tacit organizational knowledge", *Journal of Management Information Systems*, vol. 17, no. 3, 9.24.
- Swanson E.B. and Ramiller N.C. (1993). "Information systems research thematics: Submissions to a new journal 1987-92", *Information Systems Research*, vol. 4, no. 4, 299-330.
- Vaishnavi, V. and Kuechler W. (2007). *Design Research in Information Systems*. August 4, 2007. URL: <http://www.isworld.org/Researchdesign/drisISworld.htm>
- Vessey I., Ramesh V. and Glass R.L. (2005). "A unified classification system for research in the computing disciplines", *Information and Software Technology*, vol. 47, no. 4, 245-255.
- Virkkunen J. and Kuutti K. (2000). "Understanding organizational learning by focusing on 'activity systems'", *Accounting, Management & Information Technology*, vol. 10, no. 4, 291-319.
- Webster J. and Watson R.T. (2002). "Analyzing the past to prepare for the future: Writing a literature review", *MIS Quarterly*, vol. 26, no. 2, xiii – xxiii.
- Yin R.K. (1989), *Case study research – Design and methods*. Sage, Newbury Park.

Appendix A: The Deetz's classification and its applications

Deetz (1996) proposed two dimensions for theory-testing and theory-creating studies (Järvinen 2004). "The first dimension focuses on the origin of concepts and problem statements as part of the constitutive process in research. Differences among research orientations can be shown by contrasting 'local/emergent' research conceptions with 'elite/ a priori' ones. - The key questions this dimension addresses are where and how do research concepts arise. In the two extremes, either concepts are developed in relation with organizational members and transformed in the research process or they are brought to the research by the researcher and held static through the research process (Figure2) – concepts can

be developed *with* or applied *to* the organizational members being studied.” (Deetz (1996, p. 195)

“The second dimension focuses on the relation of research practices to the dominant social discourses within organization studied, the research community, and/or wider community. The research orientations can be contrasted in the extent to which they work within a dominant set of structurings of knowledge, social relations, and identities (a reproductive practice), called here a ‘consensus’ discourse, and the extend to which they work to disrupt these structurings (a productive practice), called here ‘dissensus’ discourse.” (Deetz (1996, p. 195) Deetz sees these dimensions as analytic ideal types in Weber’s sense mapping out two distinct continua. – “The consensus pole draws attention to the way some research programs both seek order and treat order production as the dominant feature of natural and social systems. – The dissensus pole draws attention to research programs which consider struggle, conflict, and tensions to be the natural state.” (Deetz (1996, p. 197) The grid produced from these two dimensions still provides a spatially and visually convenient four-discursive space solution (Figure1).

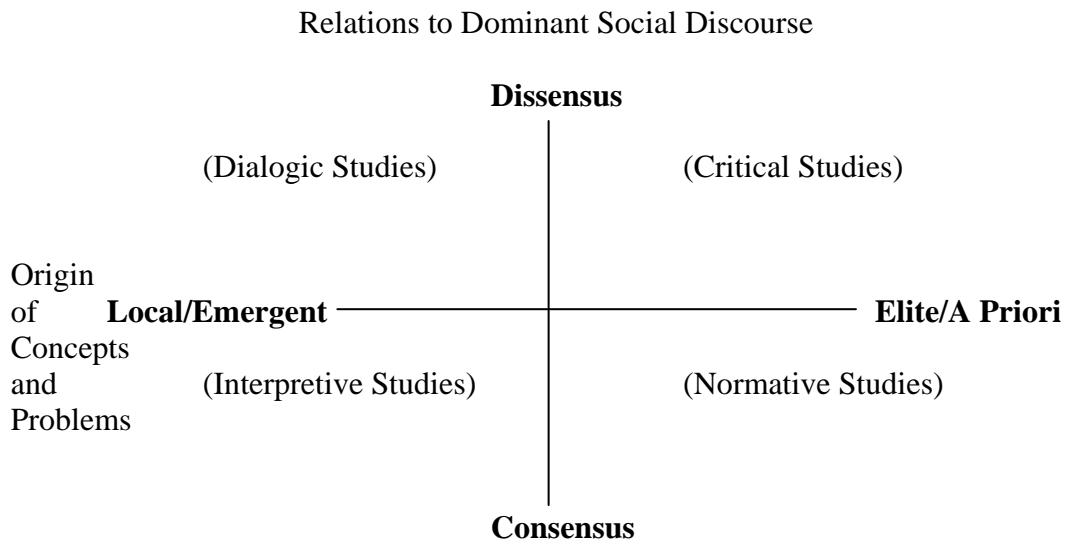


Figure 2. Contrasting dimensions from metatheory of representational practices (Deetz 1996)

The dialogic corner is new in Figure1 compared with Orlokowski and Baroudi (1991) who only had three “corners”. They examined many published articles and classified them into positivist, interpretive and critical ones. The two best examples we would like to classify to the dialogic corner are Davidson (2002) and Buchanan (2003). Davidson describes how eight power changes in the

requirements determination phase of the new information system project changed the tentative requirements. Hence, Davidson’s article nicely describes the “dialogic” nature of dissensus in the project. Buchanan (2003) gives another example of the dialogic corner, he pays attention to more than one stories describing the same phenomenon. The difference between the interpretive corner and the dialogic corner can show up with one story in the interpretive corner and many stories in the dialogic corner.

We have used Deetz’s classification in our taxonomy of research approaches (Figure 3). From Figure 3 we can find that Deetz’s classification (Figure 1) is utilized to classify research methods concerning empirical studies putting question: What is reality?, i.e. in the theory-testing and theory-creating approaches. The Deetz’s classification cannot be apply to “researches stressing utility of innovations”, i.e. to design research (design science) nor to mathematical approaches.

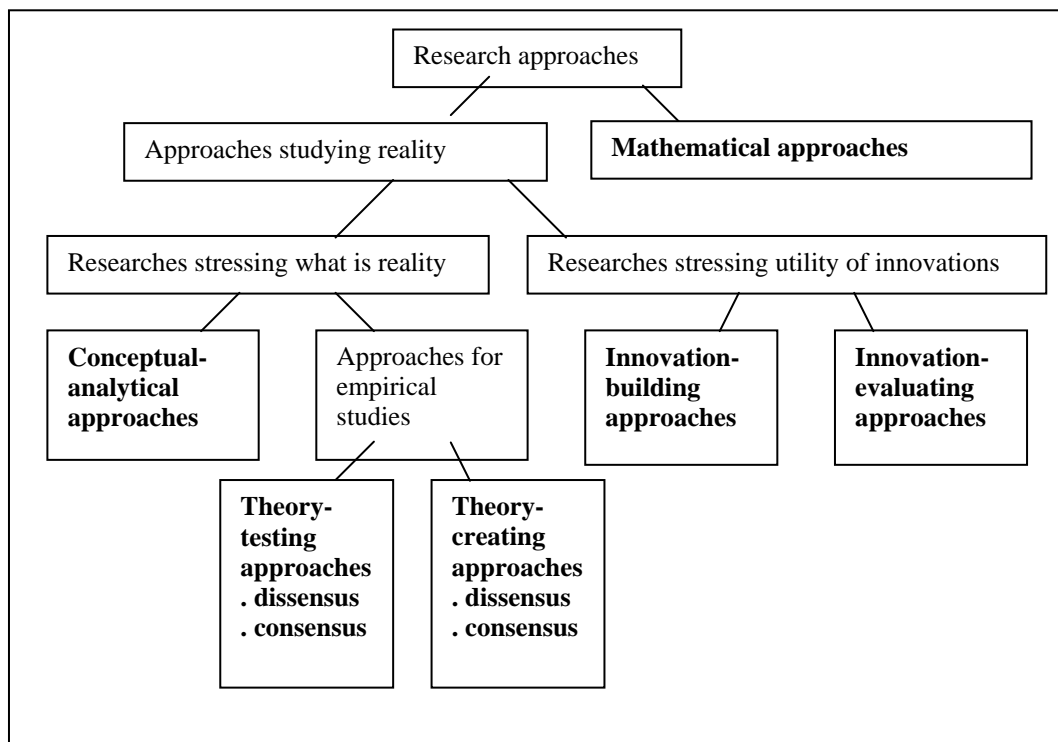


Figure 3. Järvinen & Järvinen's taxonomy of research methods (Järvinen 2004, p. 10)

