An Analysis of Literature Reviews on IS Business Value: How Deficiencies in Methodology and Theory Use Resulted in Limited Effectiveness

Guido Schryen

Business Information Systems, RWTH Aachen University
52062 Aachen, Germany
schryen@winfor.rwth-aachen.de

Abstract. Enduring doubts about the value of IS investments reveal that IS researchers have not fully managed to identify and to explain the economic benefits of IS. This paper assumes that literature reviews, which represent a powerful instrument for the identification and synthesis of knowledge, have not tapped their full potential to address this issue due to deficiencies in methodology. The analysis of 18 literature reviews published in pertinent academic outlets during the past 20 years shows such deficiencies. Two of the most critical weaknesses identified are (1) the lack of theory use in most reviews and (2) a weak linkage of reviews, resulting in little progress in theory and framework development. The systematic identification of these weaknesses and the extraction of promising methodological examples from past literature are the main contributions of this work, which supports the composition of more effective literature reviews in future research.

Keywords: Literature review, Business value, Information systems, Methodology, Theory.

1 Introduction

Information systems (IS) started to be embedded in economic environments many decades ago and are even considered commodity inputs nowadays [1]. The reliance on IS has meanwhile occurred to an extent that, for some firms, such as Internet sellers, online banks, and telecommunication providers the failure of IS impedes or even renders business activities impossible. Beyond this firm-level impact, IS have also gained macroeconomic importance: according to the World Information Technology Services Alliance, the global marketplace for information and communication technology is likely to have topped $3.7 trillion in 2008 [2]. The economic relevance of IS has made research on "IS business value" highly attractive to researchers, who have shaped the academic discussion by publishing more than 1,000 research papers [3].

Some researchers provide sobering arguments on the economic relevance of IS. For example, [4;5] doubt the strategic power of IS and argue that IS are commodities and that any IS-based advantages will be soon eroded. Carr [1] sums up doubts by

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even entitling his paper "IT doesn't matter". Another discourse is rooted in empirical studies that do not find evidence that IS positively affected specific performance measures, such as productivity [8], stock market reactions [7], or "Return on Assets" [8]. Apparently, IS researchers have (at least not fully) managed to identify and to explain the economic relevance of IS so that business executives and researchers continue to question the value of IS investments, as Kohli and Grover [9] note in their recent review. However, answering this question is regarded fundamental to the contribution of the IS discipline [10].

This leads to the question of why IS researchers have not (yet) succeeded to demonstrate the economic value of IS. Possible explanations are that (1) the value of IS is actually limited and has been overrated by IS researchers [1;4;5], or (2) IS are economically valuable, but the specific types of value have not been identified or/and not clearly demonstrated [9]. Being an IS researcher, I believe in assumption (2) as I doubt that the wide use of IS in practice to support core business processes in many service and manufacturing industries is based on the error of practitioners, who would then have made suboptimal investment decisions. The consequence of believing in assumption (2) is to further assume that the main instruments for identifying and synthesizing (IS business value) knowledge, literature reviews, have not been used effectively. In this paper, the notion "literature review" refers to a paper that conducts the review of research papers as a task on its own; I do not investigate literature reviews that are conducted as a start of a research project. The particular appropriateness of literature reviews to preserve domain knowledge in general is stressed in an MISQ guest editorial [11].

Several authors published literature reviews on IS business value during the past 20 years in pertinent academic outlets. But what did go wrong? Haven't reviews managed to preserve findings, to build theories, and to prevent researchers from getting lost in the "jungle of literature", which is accompanied by a variety of methodologies, research objects, research models, and findings? Addressing these questions requires to analyze how literature reviews have synthesized findings in terms of methodologies and theories used and how they have contributed to building theories on IS business value. Coherent methodology and theories (or at least propositions) are regarded the essential "ingredients" of research manuscripts in general [12] and literature reviews in particular [11; 13-15]. The particular importance of theory building is stressed by Sutton and Staw [12, p. 380], who believe that *"[w]ithout constant pressure for theory building, the field would surely slide to its natural resting place in dust-bowl empiricism."* Sutton and Staw also highlight the importance of theory and methods.

In this paper, I conduct the aforementioned analysis by investigating 18 literature reviews on IS business value, which were published in pertinent academic outlets, such as MISQ, ISR, JMIS, EJIS, ICIS, CACM, JAIS, and ACM Computing Surveys, during the past 20 years. From a research methodological point of view, this paper is thus a meta review. Its main goals are to provide insights about how literature reviews on IS business value are performed within IS research, and to provide suggestions on how to overcome deficiencies in methodology.

The rest of this paper is structured as follows: Section 2 provides the background of the "ingredients" of my research, more specifically "IS and IS business value",

"theories", and "literature review methodology". In Section 3, the research methodology of this study is presented. Section 4 analyzes the literature reviews regarding their applied methodologies and theories. Section 5 discusses the findings and draws a picture of how literature reviews influenced their successors in terms of theory use and theory building. Finally, Section 6 concludes this article and highlights major findings.

2 Background

2.1 IS and IS Business Value

The academic field of IS is terminologically pervaded by the use of syntactically similar notions, such as "information system (IS)", "information technology (IT)" and "information and communication technology (ICT)". However, these notions often lack any precise definition and differentiation, and they are often also based on different understandings of various authors. Reviewing articles published in "Information Systems Research", [16] find that the "IT artifact" has not been theorized and is widely interpreted depending on the specific research context. Having reviewed more than 200 papers related to IS business value, I find that this problem still exists. The notional fuzziness and heterogeneous semantics in literature is not surprising, because the IS discipline does not yet provide a broadly-accepted or even standardized ontology. For example, there are only few glossaries available, which even differ in their definitions of "IS" or "IT". In this paper, I adopt the "holistic" view on IS, as described in the ATIS Telecom Glossary [17, option 3]: *"The entire infrastructure, organization, personnel, and components for the collection, processing, storage, transmission, display, dissemination, and disposition of information."* Consequently, I consider literature reviews on the technological, organizational and/or personnel facet of IS.

The literature on the economic value of IS is extensive and, unsurprisingly, reveals different understandings of what IS business value is or can be. Understandings (can) differ in terms of notion and scope and in terms of the level, object and time of evaluation.

Notion and scope: The abundance of economic articles on IS offers a variety of notions and semantics. For example, early works use the notions "value", "benefit", "outcome" or "worth" [18; 19], Melville et al. [20] investigate "organizational performance", and Kohli and Grover [21] refer to value as "economic impact". This variety in terminology does not only mirror notional inconsistencies, it also reflects different understandings (semantics) of how to operationalize the economic impact of IS. For example, a large subset of empirical studies apply econometric approaches by analyzing the relationship between IS investments and economic variables, such as productivity [5], "Return on Sales" [21], or Tobin's q [22]. This view is accompanied by the widely adopted classification into process performance and organizational/firm performance measures [20; 23; 24]. Other studies stress that, beyond financial and non-financial measures, intangible assets can be affected by IS investments, such as organizational capabilities [9] or the strategic position [25].

Level of evaluation: The literature suggests different levels for the examination of the economic impact of IS. A widely used classification distinguishes individual level, firm level, industry level and economy level [26-30]. In addition, research can also focus on consumer surplus [26; 28; 29].

Object of evaluation: Consistent with the holistic definition of IS adopted in this paper, I address the economic impact of investments in information technology (hardware, software, technological infrastructure), in organizational assets (e.g. creation of a CIO position), and in personnel (e.g. improvement of employees' IS skills).

Time of evaluation: As Kohli and Grover [9] stress, research on IS value can be of "ex ante" and "ex post" nature. While "ex ante" research is closely related to decision making, "ex post" research is dedicated to the control of past expenses.

2.2 Theories

Because theories are an important concept in literature research methodology (see next subsection), I briefly introduce the concept of theories here. The first and probably most important question is what theory is. Although the notion of "theory" is widely used in many academic disciplines, there is a *"[…] lack of consensus what exactly theory is […]"*, as [12, p. 371] remark. Based on the work of Dubin [31], Whetten [32] argues that a theory has four constituent elements: While factors (variables, constructs, concepts) and the relationship between them constitute the subject of a theory (what and how elements), the underlying dynamics that justify the selection of factors and the proposed causal relationships constitute the theoretical glue that welds the model together (why element). It should be noticed that [31; 32] do not distinguish between a "model" and a "theory"; Sutton and Staw [12] note in their introduction that *"[…] [t] here is a lack of agreement whether a model and a theory can be distinguished"*. Whetten [32] even uses the expression "theoretical model" to refer to the fourth element of a theory, the who, where and when conditions. They place limitations on the propositions generated from a theoretical model and need to be discovered through tests of the rudimentary theoretical statement. The inclusion of the why element is consistent with the view of Sutton and Staw [12], who require a theory to have logic included and who state (subsection "Lists of Variables or Constructs Are Not Theory") that *"[a] theory must also explain why variables or constructs come about or why they are connected"*.

According to Gregor [33], the consideration of explanations as a constituent element of theory is based on a specific perspective on theories. Other perspectives also allow for non-explaining theories. Gregor [33] suggests as components common to all theories "means of representation" (physical representation by words, logic, diagrams, tables etc.), "constructs" (phenomena of interest), "statements of relationship", and "scope" (degree of generality of the statements of relationships). She also proposes a taxonomy of theory types (analysis, explanation, prediction, explanation and prediction, design and action) in IS research. It should be noticed that, in contrast to [12; 31; 32], [33] does not require a theory to contain an explanatory component.

As this work is not about defining or building a theory, I will not discuss to what extent concepts proposed as theories – be they rooted in IS or in other

disciplines – match different understandings; for a list of theories that are widely used in IS research see [34].

Although the aforementioned works are milestones in theory literature, it remains the question of how to resolve different understandings in the context of this paper, IS theories that are used or developed in literature reviews. I find the approach of Sutton and Staw [12] useful, who argue in their introduction that *"[…] though there is conflict about what theory is and should be, there is more consensus about what theory is not."* More specifically, the authors explicitly refer to references, data, lists of variables or constructs, diagrams, propositions, and hypotheses as concepts that are not theory (albeit they may be useful tools to build or describe a theory). In this paper, I consider theories used or developed in literature reviews through the lens of [12], which consequently means that I regard an explanatory component a mandatory feature of any theory.

2.3 Review Methodology

"Literature review" is an established research methodology [35; 36] and important for IS research, as stressed by Webster and Watson [11, p. xiii f), who argue that the literature review *"[…] facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed. […][T]he literature review represents the foundation for research in IS. As such, review articles are critical to strengthening IS as a field of study."* The relevance of literature reviews has also been addressed by editors of renowned IS journals. For example, several years ago "MIS Quarterly" launched its "MISQ Review Department", a unit dedicated to the publication of literature reviews that was later renamed "MISQ Theory and Review Department". The "European Journal of Information System" and the "Journal of Management Information Systems" are further examples of renowned journals that explicitly include review papers and surveys in their scope of invited contributions. Apparently, literature reviews are deemed an important methodology in IS research to preserve domain knowledge.

The particular challenge to write good reviews is stressed in the description of the objectives of the MISQ Theory and Review Department (http://www.misq.org/misreview/MISQTRObjectives.html). We better understand what this means when we read the paper of Webster and Watson [11]. They provide a guide for writing a literature review that recommends using four key methodological components: (1) the systematic identification of relevant literature, (2) the structuring of the literature review by a coherent concept, (3) the development or the extension of a theory and (4) the evaluation of this theory (extension). I briefly discuss these steps, which are shown in Figure 1, by linking steps 2-4 to the understanding of theories as discussed above:

1. The authors recommend a structured approach that includes scanning table of contents, querying journal databases, and viewing selected conference proceedings. They further recommend to conduct a backward search (following references of identified papers) and a forward search (e.g. by using Web of Science) to find articles that cite relevant works. The requirement to conduct a

literature search that is systematic and comprehensive is also stressed by Zorn and Campbell [14, p. 174].

2. The authors recommend a structured approach that includes scanning table of contents, querying journal databases, and viewing selected conference proceedings. They further recommend to conduct a backward search (following references of identified papers) and a forward search (e.g. by using Web of Science) to find articles that cite relevant works. The requirement to conduct a literature search that is systematic and comprehensive is also stressed by Zorn and Campbell [14, p. 174].
3. The presentation of literature findings needs to be structured by using a coherent concept [11, p. xiv; 13, p. 233; 14, p. 175]. Webster and Watson [11] cite Bem [15, p. 172]: *"A coherent review emerges only from a coherent conceptual structuring of the topic itself. For most reviews, this requires a guiding theory, a set of competing models, or a point of view about the phenomenon under discussion."* As this part of a review is dedicated to preserve past literature findings, presumably those theories are particularly relevant that are classified in [33] as "analysis theory" or "explanation theory". According to the understanding of Webster and Watson [11] and Bem [15], the usage of a theory is not regarded mandatory.
4. Literature reviews should not only synthesize prior research, but also identify critical knowledge gaps and motivate researchers to close this breach. In order to making a chart for further research, Webster and Watson [11] propose to develop a theory or to extend a current theory. However, their understanding of "theory" includes models, propositions, and justifications, although they refer to Sutton and Staw [12] by saying that *"[m]odels and propositions capture relationships between variables, but do not, on their own, represent theory."* (p. xix). As mentioned in the previous subsection, I follow the understanding of [12] and distinguish between theories and propositions.
5. The evaluation of theories or propositions is described as "difficult and nebulous" by Webster and Watson [11]. In the light of the above discussion of theories, this phase can be aligned to working out what Dubin [31] considers as "who, where and when conditions" of a theory.

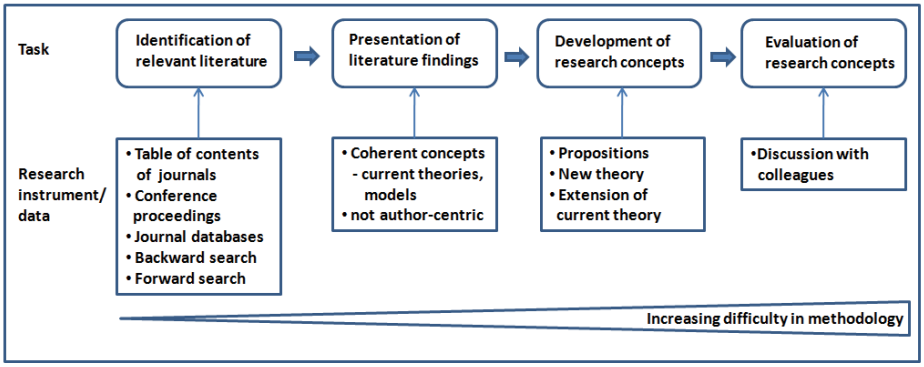

Fig. 1. Key tasks and research instruments in literature reviews, as suggested in [11]

3 Research Methodology

In order to achieve the goal of this paper, the identification of methodological and theory-related weaknesses of literature reviews, I first conducted a comprehensive literature search for reviews on IS business value. I used the research instruments for the identification of relevant literature, as described above. More specifically, I performed a title search in pertinent journal databases, namely Business Source Premier, MLA International Bibliography, EconLit, ScienceDirect, IEEE Xplore, The ACM Digital Library, and Web of Science. The logical search string was: ("IT" OR "information technology" OR "IS" OR "information systems") AND ("value" OR "investment" OR "productivity" OR "competitive" OR "performance" OR "measurement" OR "evaluation" OR "profit" OR "efficiency"). I did not limit my search to any specific time period. The last update of my search was conducted on 1 June 2008. In order to assure that no studies published in one of the most important IS journals are overlooked, I further scanned the table of contents of the following journals:

- MIS Quarterly, Communications of the ACM, Information Systems Research, Management Science, and Journal of Management Information Systems: These journals were classified as the five leading journals in the latest MIS journal ranking [37].
- European Journal of Information Systems, Information Systems Journal, and Journal of AIS: These journals are included in the more recent AIS list entitled "Senior Scholars' Basket of Journals" (http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=346).
- Academy of Management Review, ACM Transactions on Information Systems, American Economic Review: Reviewing many references provided in the literature, I found these journals appropriate candidates for containing valuable articles on IS business value. However, this selection mirrors the subjective opinion of the author. The time period under consideration was January 1995 until May 2008.

I also scanned the conference proceedings of the International Conference on Information Systems (1994-2008) using the AIS Electronic Library (AISeL).

I identified 18 literature reviews, which are listed in chronological order in Table 1. The model shown in Figure 1 is used to analyze these literature reviews in order to identify methodological and theory-related weaknesses. More specifically, the reviews are analyzed with regard to the identification of considered literature, the presentation of literature findings, the development of research concepts, and the evaluation of research concepts. Additionally, I apply a cross-review analysis in order to investigate the coherence of the literature review landscape in terms of whether literature reviews have considered each other and have jointly contributed to theory building in IS business value research.

4 Analysis

Table 2 (see Appendix) provides for each literature review a description of the considered literature and the identification procedure, the presentation of literature

findings, the development of research concepts and the evaluation of research concepts. The following subsections describe the results and refer to the studies by their abbreviations as given in Tables 1 and 2.

Table 1. Investigated literature reviews

Year	Authors	Publication outlet
1989	Kauffman and Weill (KW) [27]	International Conference on Information Systems
1992	DeLone and Mclean (DM) [38]	Information Systems Research
1993	Brynjolfsson (Br) [39]	Communications of the ACM
1995	Soh and Markus (SM) [40]	International Conference on Information Systems
1996	Brynjolfsson and Yang (BY) [28]	Advances in Computers
1998	Sircar et al. (Si) [41]	The Journal of Engineering Valuation and Cost Analysis
1999	Seddon et al. (Se) [42]	Communications of the AIS
2000	Bannister and Remenyi (BR) [3]	Journal of Information Technology
	Chan (Ch) [43]	Journal of Management Information Systems
	Devaraj and Kohli (DK) [29]	Journal of Management Information Systems
2002	Dehning and Richardson (DR) [24]	Journal of Information Systems
	Irani and Love (IL) [44]	European Journal of Information Systems
	Sylla and Wen (SW) [45]	International Journal of Technology Management
2003	Dedrick et al. (De) [46]	ACM Computing Surveys
2004	Melville et al. (Me) [20]	MIS Quarterly
2007	Chau et al. (Chau) [30]	European Journal of Information Systems
	Wan et al. (Wa) [47]	Americas Conference on Information Systems
2008	Kohli and Grover (KG) [9]	Journal of the AIS

4.1 Considered Literature

Seven reviews (KW, Si, BR, DK, IL, SW, KG) do not describe how they identify relevant literature, the others provide a description that includes the period and/or the academic journals and conference proceedings selected. Only one study (Me) describes the selection procedure in detail. One study (SM) differs from all others in that it considers five other works and describes them in much detail.

4.2 Presentation of Literature Findings

Most reviews (KW, DM, Br, BY, Si, Se, BR, Ch, DK, IL, SW, Chau, Wa) apply a taxonomy/classification to structure the presentation of literature findings. One review (SM) analyzes five other theoretical models in detail; another review (KG) unfolds

literature findings along research statements. Three reviews (DR, De, Me) propose and apply a research framework (I require a framework to contain at least what and how elements). One of these reviews (DR) lacks an explanatory component so that the framework is not regarded a theory in this paper. In contrast, the production system framework of (De) is explained and motivated, likewise the ”IT Business Value Model “of (Me). Thus, I regard both frameworks as theories in the sense of Sutton and Staw [12].

4.3 Development of Research Concepts

While five reviews (Br, Si, Se, IL, Chau) do not develop any research concepts, six reviews (KW, BY, Ch, DR, De, Wa) provide informal research recommendations, three reviews (DK, Me, KG) provide concrete research propositions (KG even provide a detailed research agenda in their work, which is both a review and an essay), one review (SW) develops a formal decision model, one review (BR) suggests a process model (without explanatory component), and two reviews (DM, SM) propose theories (IS success model/theory and process theory, respectively).

4.4 Evaluation of Research Concepts

Only one work (DK) performs an evaluation of the research concept (propositions) through empirical study in health care industry. However, this study is not a designed as “pure” literature review, although it contains a comprehensive review component.

4.5 Cross-Review Analysis

An overview of the relationships between the 18 literature reviews shows Figure 2, which distinguishes between three types of relationships: a methodological or theoretical impact is indicated by a bold arrow, a (weaker) consideration of a work and inclusion in the list of references is indicated by a dashed arrow, and a dotted arrow symbolizes an indirect consideration through the citation of the work of Seddon [48], who extends the model of DeLone and McLean [38].

The IS success model/theory developed by (DM) is used by (Chau) in order to define the IS value dimension of their taxonomy. Although (Se) also rely on the work of (DM), (Se) do not use the model/theory of (DM), they only follow the research methodology of (SM) to test the generality of their proposed matrix.

The review of (Br) is used by the same author (and a new co-author) to present a revised and extended version. The work of (Br) is also used by (Wa), who code input and output variables for each empirical study, as (Br) argues that the definition and measurement of input and output may explain different results of firm productivity. (Wa) also analyze studies with regard to deficiencies in measurement and methodology, as identified by (Br).

The process theory proposed by (SM) is only used in one review (Si), which classifies studies according to whether they are supported by variance theory or by process theory.

The taxonomy applied by (Se) to structure their review is used by (Chau) in order to define one dimension, which accounts for stakeholders, types of system, units of analysis, types of data, and research methods.

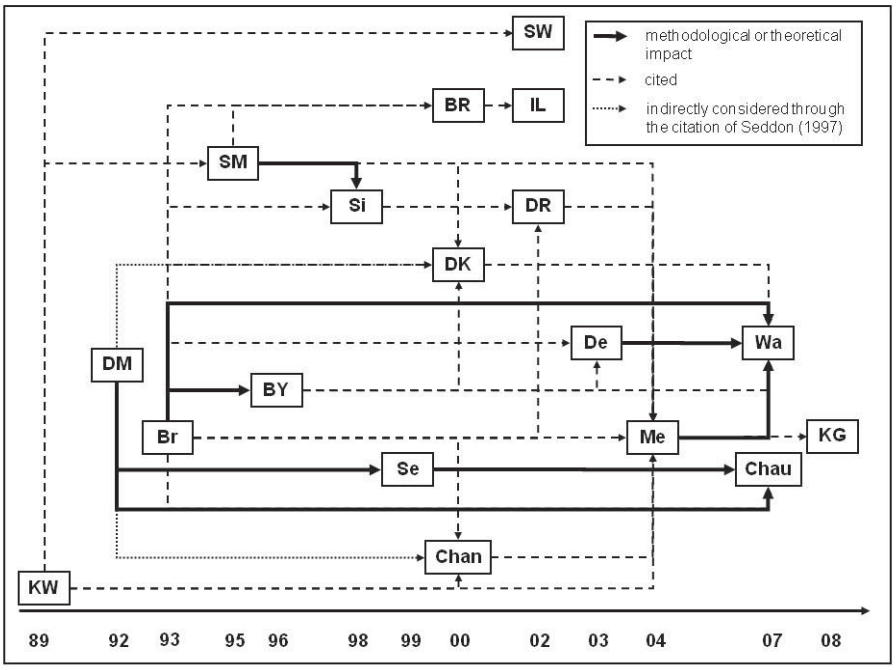

Fig. 2. Relationships between literature reviews

The theories of (De) and (Me) are used in only one review (Wa) to define their taxonomy.

5 Discussion

About one third of all reviews do not explicitly describe how the authors identified relevant literature and which criteria they used to select studies. This phenomenon is neither limited to specific outlets nor to specific time periods. Although this lack in description does not mean that the authors did not apply an appropriate procedure, but the reader is not informed about it. This limitation in transparency has at least two consequences: a) readers do not know whether the results of the review draw a representative picture of the literature, b) authors of future reviews have difficulties in identifying complementary literature search spaces, which still need to be explored. While consequence a) limits the informative value for the community and for those who doubt the economic value of IS, b) hampers progress in reviewing the literature. In cases where authors have already applied a systematic literature search, it is not laborious to describe the procedure, and they should do so. In other cases, authors should start to apply (and finally describe) their systematic literature search.

The presentation of literature findings is methodologically dominated by the application of a taxonomy/classification, which can regarded as research concept in the sense of Webster and Watson [11]. Only three reviews use a framework, with two of them also providing an explanatory component, and thus a theory. Overall, this

picture is not surprising, as it is more challenging to present and to use a theory in the presentation of literature findings than to use a taxonomy. However, this result is sobering at the same time, as the application of a theory bears the potential for its validation. What we need is more reviews that are theory-based. Excellent examples and guides for future literature reviewers are the reviews of (Me) and (De).

The development of research concepts, including the development of theories is probably even more challenging than applying an existing concept or theory to structure the presentation of literature findings. This difficulty is mirrored in the investigated reviews: Those reviews that provide concepts for further research mainly use informal research recommendations or research propositions. Only two works (DM, SM) spare no efforts to propose a new theory for IS business value (IS success theory and process theory, respectively). They are most valuable for making a chart for further research. However, the history of literature reviews shows how difficult it is to propose new theories. The examples of (DM) and (SM) provide good examples of how to accomplish this task.

The evaluation of research concepts and proposed theories is the most disregarded task. Only one review (DK) tests its propositions through an empirical study. However, although the work of (DK) provides a good literate review, it was primarily not designed to synthesize findings, but to test propositions in the health care industry. However, in the contemporaneous presence of excellent reviews and absence of the evaluation of research concepts in all reviews but one, the question rises of whether we require reviews to provide too much. Some of the investigated literature reviews provide examples of how laborious it is to sufficiently accomplish the other three tasks. In order to make literature reviews more manageable, I therefore argue to regard the evaluation task as an optional part of a review.

The analysis of the relationships between reviews shows that only five reviews (Se, BY, Si, Wa, Chau) use prior reviews as methodological or theoretic input. Only one of these reviews (Se) is used by another review: however, the reviews (Chau) and (Wa) were published only two years ago (2007) so that their reuse cannot be reliably assessed currently. I found six reviews that impact other reviews. Interestingly, four of them (DM, SM, De, Me) use or propose theories. In other words, each review based on a theory is reused by at least another one. Apparently, it is the theory-based reviews that determine large parts of the relationships between reviews. However, the overall linkage of reviews is weak in terms of quantity and quality (progress in theory development through chains of reviews). One might argue that this phenomenon mirrors diversity in research and is therefore valuable. On the other hand, we see almost no progress in theory development and advancement, which are valuable, if not essential, for the identification and presentation of the economic value of IS.

6 Summary and Conclusions

As it is argued in the literature that researchers have not fully managed to identify and to explain the economic relevance of IS, this paper assumes that literature reviews, which represent the most powerful instrument for the identification and synthesis of knowledge, have not been conducted effectively due to deficiencies in methodology.

The analysis presented in this paper investigates 18 literature reviews published in pertinent academic outlets during the past 20 years, is based on the methodological framework proposed by Webster and Watson [11], and shows the following weaknesses of past literature reviews on IS business value:

- About one third of all reviews do not explicitly describe how the authors identified relevant literature and which criteria they used to select studies. This limitation in transparency should be avoided in further literature reviews on IS business value by applying systematic literature search and by also describing it explicitly. The review of Melville et al. [20] provides an excellent example.
- The presentation of literature findings very rarely contains an explanatory component, which is regarded as a mandatory component of a theory [12; 31; 32]. Thus, I suggest drawing on theories in future literature reviews more thoroughly. A good overview of theories already applied in IS business value research is provided in [20], which presents approaches based on microeconomic theory, industrial organization theory, and resource-based view, amongst others. The application of a theory in a literature review on IS business value is very well demonstrated in [20;46].
- Only two reviews [38;40] propose a new theory for IS business value, which is certainly one of the most challenging tasks in a literature review, but which is also valuable, if not necessary, for making a chart for further research. While it is one option (and probably the most challenging one) to develop a new theory from scratch, others are the adoption of theories from disciplines other than the IS discipline, and the extension or modification of theories already used in the IS business value literature. The latter option includes the adoption of theories used in literature reviews on IS business value. However, my analysis shows that only five literature reviews used prior reviews as methodological or theoretic input. Thus, I also suggest drawing on (theories used in) existing literature reviews on IS business value.
- The evaluation of research concepts and proposed theories has been the most disregarded task in literature reviews on IS business value. However, in the contemporaneous presence of excellent reviews and the absence of the evaluation of research concepts in all reviews but one, the question rises of whether we require reviews to provide too much. Thus, I argue to regard the evaluation task as an optional part of a review in order to make literature reviews more manageable. A valuable methodological contribution of further research would be the suggestion and demonstration of guidelines for the evaluation of research concepts and theories, which is still "difficult and nebulous" [11].

It should be emphasized that the identified weaknesses in the analyzed reviews are not necessarily due to methodological decisions of the respective authors. An alternative explanation would be that in some cases authors needed to consider (well-founded) demands from journal reviewers and editors. However, respective information has not been available (to the author).

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References

1. Carr, N.G.: IT Doesn't Matter. Harvard Business Review 81(5), 41–49 (2003)
2. WITSA, Global ICT Spending Tops $3.5 Trillion: Industry Experiences Subdued Spending Growth (2008), http://www.witsa.org/press/Digital_Planet_Release_final.doc
3. Bannister, F., Remenyi, D.: Acts of faith: instinct, value and IT investment decisions. Journal of Information Technology 15(3), 231–241 (2000)
4. West, L.A., Courtney, J.F.: The Information Problems in Organizations – A Research Model for the Value of Information and Information Systems. Decision Sciences 24(2), 229–251 (1993)
5. Hitt, L.M., Brynjolfsson, E.: Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value. MIS Quarterly 20(2), 121–142 (1996)
6. Stiroh, K., Botsch, M.: Information Technology and Productivity Growth in the 2000s. German Economic Review 8(2), 255–280 (2007)
7. Im, K.S., Dow, K.E., Grover, V.: A Reexamination of IT Investment and the Market Value of the Firm – An Event Study Methodology. Information Systems Research 12(1), 103–117 (2001)
8. Dehning, B., Stratopoulos, T.: Dupont Analysis of an IT-Enabled Competitive Advantage. The International Journal of Accounting Information Systems 3(3), 165–176 (2002)
9. Kohli, R., Grover, V.: Business value of IT: An essay on expanding research directions to keep up with the times. Journal of the Association for Information Systems 9(1), 23–39 (2008)
10. Agarwal, R., Lucas, H.C.: The Information Systems Identity Crisis: Focusing on High-Visibility and High-Impact Research. MIS Quarterly 29(3), 381–398 (2005)
11. Webster, J., Watson, R.T.: Analyzing the past to prepare for the future: Writing a literature review. MIS Quarterly 26(2), xiii–xxiii (2002)
12. Sutton, R.I., Staw, B.M.: What Theory Is Not. Administrative Science Quarterly 40(3), 371–384 (1995)
13. Baker, M.J.: Writing a Literature Review. The Marketing Review 1, 219–247
14. Zorn, T., Campbell, N.: Improving the Writing of Literature Reviews Through a Literature Integration Exercise. Business Communication Quarterly 69(2), 172–183 (2006)
15. Bem, D.J.: Writing a Review for Psychological Bulletin. Psychological Bulletin 118(2), 172–177 (1995)
16. Orlikowski, W.J., Iacono, C.S.: Desperately Seeking the 'IT' in IT Research. A Call to Theorizing the IT Artifact. Information Systems Research 12(2), 121–134 (2001)
17. ATIS, ATIS Telecom Glossary 2007 (2007), http://www.atis.org/glossary/
18. Wiseman, D.: Information Economics: a practical approach to valuing information systems. Journal of Information Technology 7(3), 169–176 (1992)
19. Berghout, E., Renkema, T.: Evaluating information systems investment proposals: a comparative review of current methodologies. Information and Software Technology 37(1), 1–13 (1997)

20. Melville, N., Kraemer, K., Gurbaxani, V.: Review: Information technology and organizational performance: An integrative model of IT business value. MIS Quarterly 28(2), 283–322 (2004)
21. Bharadwaj, A.S.: A resource-based perspective on information technology capability and firm performance: An empirical investigation. MIS Quarterly 24(1), 169–196 (2000)
22. Brynjolfsson, E., Yang, S.: The intangible costs and benefits of computer investments: Evidence from the financial markets. In: Proceedings of the International Conference on Information Systems, Atlanta, Georgia (1999)
23. Barua, A., Kriebel, C.H., Mukhopadhyay, T.: Information technologies and business value – an analytical and empirical investigation. Information Systems Research 6(1), 3–23 (1995)
24. Dehning, B., Richardson, V.J.: Returns on Investments in Information Technology: A Research Synthesis. Journal of Information Systems 16(1), 7–30 (2002)
25. Irani, Z.: Information systems evaluation – navigating through the problem domain. Information & Management 40(1), 11–24 (2002)
26. Bakos, J.Y.: Dependent Variables for the Study of Firm and Industry-Level Impacts of Information Technology. In: Proceedings of the International Conference on Information Systems, Pittsburgh, Pennsylvania, USA (1987)
27. Kauffman, R.J., Weill, P.: An Evaluative Framework for Research on the Performance Effects of Information Technology Investment. In: Proceedings of the International Conference on Information Systems, Boston, Massachusetts, USA, pp. 377–388 (1989)
28. Brynjolfsson, E., Yang, S.: Information Technology and Productivity: A Review of the Literature. Advances in Computers 43, 179–215 (1996)
29. Devaraj, S., Kohli, R.: Information technology payoff in the health-care industry: A longitudinal study. Journal of Management Information Systems 16(4), 41–67 (2000)
30. Chau, P.Y.K., Kuan, K.K.Y., Liang, T.P.: Research on IT value: what we have done in Asia and Europe. European Journal of Information Systems 16(3), 196–201 (2007)
31. Dubin, R.: Theory development. Free Press, New York (1978)
32. Whetten, D.A.: What constitutes a theoretical contribution? Academy of Management Review 14(4), 490–495 (1989)
33. Gregor, S.: The Nature of Theory in Information Systems. MIS Quarterly 30(3), 611–642 (2006)
34. York University, Theories Used in IS Research Wiki (2009), http://www.fsc.yorku.ca/york/istheory/wiki/index.php/Main_Page
35. Salipante, P., Notz, W., Bigelow, J.: A Matrix Approach to Literature Reviews. In: Staw, B.M., Cummings, L.L. (eds.) Research in Organizational Behavior, pp. 321–348. JAI Press, Greenwich (1982)
36. Cooper, H.M.: Synthesizing research - a guide for literature reviews, 3rd edn. Sage Publications, Thousand Oaks (1998)
37. Rainer, K., Miller, M.: Examining differences across journal rankings. Communications of the ACM 48(2), 91–94 (2005)
38. DeLone, W.H., McLean, E.R.: Measuring e-commerce success: Applying the DeLone & McLean information systems success model. International Journal of Electronic Commerce 9(1), 31–47 (2004)
39. Brynjolfsson, E.: The productivity paradox of information technology. Communications of the ACM 36(12), 66–77 (1993)

40. Soh, C., Markus, M.L.: How IT Creates Business Value: A Process Theory Synthesis. In: Proceedings of the 16th International Conference on Information Systems, Amsterdam, The Netherlands (1995)
41. Sircar, S., Turnbow, J.L., Bordoloi, B.: The impact of information technology investments on firm performance: a review of the literature. The Journal of Engineering Valuation and Cost Analysis 1(3), 171–181 (1998)
42. Seddon, P.B., Patnayakuni, R., Bowtell, M.: Dimensions of information systems success. Communications of the AIS 2(3), 1–61 (1999)
43. Chan, Y.E.: IT value: The great divide between qualitative and quantitative and individual and organizational measures. Journal of Management Information Systems 16(4), 225–261 (2000)
44. Irani, Z., Love, P.E.D.: Developing a frame of reference for ex-ante IT/IS investment evaluation. European Journal of Information Systems 11(1), 74–82 (2002)
45. Sylla, C., Wen, H.J.: A conceptual framework for evaluation of information technology investments. International Journal of Technology Management 24(2-3), 236–261 (2002)
46. Dedrick, J., Gurbaxani, V., Kraemer, K.L.: Information technology and economic performance: A critical review of the empirical evidence. ACM Computing Surveys 35(1), 1–28 (2003)
47. Wan, Z., Fang, Y., Wade, M.: The Ten-Year Odyssey of the IS Productivity Paradoxon – A Citation Analysis (1996-2006). In: Proceedings of the Americas Conference on Information Systems, Keystone, CO, USA (2007)
48. Seddon, P.B.: A respecification and extension of the DeLone and McLean model of IS success. Information Systems Research 8(3), 240–253 (1997)
49. Mason, R.O.: Measuring Information Output: A Communication Systems Approach. Information & Management 1(5), 219–234 (1978)
50. Shannon, C.E., Weaver, W.: The Mathematical Theory of Communication. University of Illinois Press, Urbana (1949)

Appendix

Table 2. Methodology of literature reviews

Review	Considered literature and identification procedure	Presentation of literature findings	Development of research concepts	Evaluation of research concepts
Kaufmann and Weill 1989 (KW)	13 empirical studies; selection driven by authors' preferences	Classification of studies according to methodology, focus, and caveats for measurement	Recommendations for research	--
DeLone and McLean 1992 (DM)	Conceptual contributions and 100 empirical studies; 01/81-01/88; 6 journals and one conference	Taxonomy with six dimensions of IS success (dependent variable): system quality, information quality, information use, user satisfaction, individual impact, and organizational impact; taxonomy influenced by communication theory [49; 50]	IS Success Model with categories of IS success, their relationships, and explanatory component (theory)	--
Brynjolfsson 1993 (Br)	Articles on productivity and IT; 30 leading journals in IS and economics	No research framework used; presentation of studies according to three categories: general studies, studies of IT in manufacturing, studies of IT in services; identification of deficiencies in measurement and methodology	--	--
Soh and Markus 1995 (SM)	Five theoretical process models	Each theoretical model is described in detail	Proposition of a process theory	--
Brynjolfsson and Yang 1996 (BY)	About 150 articles; selection based on studies considered in eight prior research studies, incl. Brynjolfsson 1993	No research framework used; presentation of studies according to five categories: general studies, economy-wide studies, industry-level studies, firm-level studies, studies on consumer surplus and economic growth; identification of deficiencies in measurement and methodology	Recommendations for further research	--
Sircar et al. 1998 (Si)	Productivity-related literature; selection of literature is not explained	Description of studies according to whether they are supported by variance theory or process theory	--	--
Seddon et al. 1999 (Se)	186 empirical papers that have been published in ISR, MISQ, or JMIS	Two-dimensional classification of IS effectiveness measures, with the type of system and the stakeholder being the dimensions	--	--
Bannister and Remenyi 2000 (BR)	Selection of literature is not explained	Taxonomy of techniques ("fundamental"; "composite" and "meta model" techniques) for classifying evaluation techniques	Proposition of a decision process model; no explanatory component	--
Chan 2000 (Ch)	Articles published in CACM, ISR, JMIS, or MISQ; 1993-1998	Classification of contributions according to research methodology, measures used, and levels of analysis	Recommendations for research and management	--

Table 2. (*continued*)

Review	Considered literature and identification procedure	Presentation of literature findings	Development of research concepts	Evaluation of research concepts
Devaraj and Kohli 2000 (DK)	Selected studies; selection of studies is not explained in detail	Classification of research papers according to their level of study (economy, industry, firm) and the variables and measures used	Research propositions	Test of propositions through empirical study in health care industry
Dehning and Richardson 2002 (DR)	Classification of 31 empirical studies; 1997-2001; studies in leading journals and conferences and listed in Sircar et al. (1998)	Research framework that includes information technology measures, process measures, firm performance measures and contextual factors	Recommendations for further research	--
Irani and Love 2002 (IL)	Analysis of 36 studies on investment appraisal techniques; selection of literature is not explained	Classification of investment appraisal techniques in six categories	--	--
Sylla and Wen 2002 (SW)	Selection of literature not explained	Classification of IT evaluation techniques into those addressing tangible benefits, intangible benefits, or risk	Proposition of a formal decision model	--
Dedrick et al. 2003 (De)	Analysis of more than 50 empirical studies on productivity, 1985-2002; leading academic journals	Production system framework and classification into country, industry and firm level are used to organize the presentation of literature findings	Recommendations for future research	--
Melville et al. 2004 (Me)	Analysis of more than 200 articles; selection procedure adopted from [11]	Development and application of a descriptive model of the value generating process; model based on the resource-based view, microeconomics and industrial organization; use of the model to develop research questions, which are finally used to unfold literature findings	Development of research proposition	--
Chau et al. 2007 (Chau)	Analysis of articles published either at PACIS (1993-2005) or at ECIS (2000-2005)	Taxonomy (level of value, stakeholder, type of system, unit of analysis, type of data, and research method) for classifying research papers	--	--
Wan et al. 2007 (Wa)	Analysis of 150 articles (1996-2006) influenced by productivity paradox (Brynjolfsson & Hitt 1996); selection procedure described in detail	Classification of empirical research by their results (i.e., positive, negative, no effect, or contingent), research methods, and the input and output variables used	Recommendations for future research	--
Kohli and Grover 2008 (KG)	Selection of literature not explained	Research findings are summarized along seven statements	Proposition of a detailed research agenda	--