

Conducting content-analysis based literature reviews in supply chain management

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Abstract

Purpose – Inconsistent research output makes critical literature reviews crucial tools for assessing and developing the knowledge base within a research field. Literature reviews in the field of supply chain management (SCM) are often considerably less stringently presented than other empirical research. Replicability of the research and traceability of the arguments and conclusions call for more transparent and systematic procedures. The purpose of this paper is to elaborate on the importance of literature reviews in SCM.

Design/methodology/approach – Literature reviews are defined as primarily qualitative synthesis. Content analysis is introduced and applied for reviewing 22 literature reviews of seven sub-fields of SCM, published in English-speaking peer-reviewed journals between 2000 and 2009. A descriptive evaluation of the literature body is followed by a content analysis on the basis of a specific pattern of analytic categories derived from a typical research process.

Findings – Each paper was assessed for the aim of research, the method of data gathering, the method of data analysis, and quality measures. While some papers provide information on all of these categories, many fail to provide all the information. This questions the quality of the literature review process and the findings presented in respective papers.

Research limitations/implications – While 22 literature reviews are taken into account in this paper as the basis of the empirical analysis, this allows for assessing the range of procedures applied in previous literature reviews and for pointing to their strengths and shortcomings.

Originality/value – The findings and subsequent methodological discussions aim at providing practical guidance for SCM researchers on how to use content analysis for conducting literature reviews.

Keywords Supply chain management, Literature review, Research process, Content analysis, Replicability, Research results, Research methods

Paper type Literature review

Introduction

Constantly increasing research output which provides large amounts of similar, deviant and contradictory findings make critical literature reviews crucial tools for excavating the “nuggets of knowledge that lie buried underneath” (Kirca and Yaprac, 2010, p. 306). In addition, literature reviews are the backbone of almost every academic piece of writing. Condensed overviews of relevant literature allow for grounding the authors’ research on the state of the art of existing research, thus highlighting the particular scholarly contribution to the research field. Hart (1998) argues that literature reviews help to narrow down the research topic as well as explaining and justifying research objectives, overall research design, and methodology used. Hence a review of related literature is not only found in the section explicitly called literature review, but also frequently in the introduction and the methodology section. Moreover, novel research findings are discussed against the background of the existing body of literature, thereby confirming, rejecting, contrasting,

and complementing previous research outcomes. In addition, literature reviews may be seen as a scholarly contribution in its own right, which map, consolidate and develop theory of a certain research area, thus facilitating subsequent research to build onto this ground. By providing in-depth account of research conducted in a certain field (Mentzer and Kahn, 1995), literature reviews represent valid tools for synthesising and refining scattered knowledge regarding all stages of the “normal research cycle” (Meredith, 1993, p. 4). This term was coined by Meredith (1993), who conceives theory-building as an on-going iterative running through the stages description, explanation and testing: descriptive models and frameworks may be transformed into explanatory models which are then empirically tested; cycle after cycle full-fledged theories are eventually developed.

More or less stringent guidelines for searching, organising and analysing literature feed whole books (e.g. Hart, 1998; Fink, 2005; Machi and McEvoy, 2009), while at least one chapter on literature reviews is obligatory for any textbook on methods for business students (e.g. Saunders *et al.*, 2009). Examining how literature reviews in the field of supply chain management (SCM) are presented in practice, it becomes obvious that the process of literature search, collection and

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analysis is often considerably less stringently described than an empirical research process would be outlined (e.g. Ho *et al.*, 2002; Tang, 2006; Gunasekaran and Kobu, 2007). This might be called the “good old fashioned way”, as scholars read various literature sources, relate them to each other, and try to make sense of them. The readers are confronted with the final outcome of an otherwise invisible and unexplained intellectual process. Replicability of the research and traceability of the arguments and conclusions call for more transparent and systematic procedures for conducting literature reviews. In this respect, content analysis offers one sound methodological frame for conducting rigorous, systematic and reproducible literature reviews.

The purpose of this paper is to underline the significance of literature reviews within the entire research process and the usefulness of content analysis as analytic tool. By means of applying content analysis, the paper reviews literature reviews of various inductively derived sub-fields of SCM. Criterion for inclusion into the sample of papers was that at least two reviews of the respective sub-fields have been published in relevant English-speaking peer-reviewed journals in the ten-year-period between 2000 and 2009. The findings of this content analysis and respective methodological discussions aim at providing some practical guidance for SCM researchers.

The paper is structured as follows: first, we reflect on the role of literature reviews within the research process and define literature reviews. While briefly outlining the wide variety of application fields and types of content analysis, we introduce content analysis according to Mayring (2000, 2008) as our method of choice for reviewing literature reviews covering the field of SCM. A descriptive evaluation of the body of literature is followed by a content analysis on basis of a specific pattern of analytic categories developed beforehand. When discussing the findings and outlining practical guidelines for content analysis, we encourage researchers to conduct literature reviews more rigorously.

The literature review as part of the research process

The literature review forms one main step within the overall research process, which is usually situated quite at the outset of the research project. Just as one example, Saunders *et al.* (2009) propose a critical review of literature as second step within the sequence of steps in a research project. Similar approaches can be found in Tranfield *et al.* (2003), Fink (2005), and Adolphus (2009):

- formulate and clarify the research topic;
- critically review the literature;
- understand your philosophy and approach;
- formulate your research design;
- negotiate access and address ethical issues;
- plan you data collection and collect the data;
- analyse your data; and
- write your project report and prepare your presentation.

It should be noted, however, that reviewing literature is an important supporting tool for other stages of the research process as well. Anchoring one’s first ideas in the existing body of literature (while this usually does not imply a systematic review though) will most probably be of great help for formulating and clarifying the research topic in the first

place. Furthermore, unexpected insights from one’s own data analysis may induce the researcher to delve into literature at a later stage again in order to reconceptualise the findings.

Purposes and forms of literature reviews

Summing up the previous chapter, literature reviews constitute one specific stage within the research process while however not being limited to this stage. Selecting, reading and evaluating literature is an ongoing core activity of researchers that is usually carried out routinely and intuitively. Conceiving literature reviews as one explicit research stage offers the chance to deliberately take a more systematic approach. This claim for rigour matches the conception of Fink (2005) who defines a literature review as “a systematic, explicit, and reproducible design for identifying, evaluating, and interpreting the existing body of recorded documents” (Fink, 2005, p. 3). Similarly, Saunders *et al.* (2009) depict the process of reviewing literature as an iterative cycle of defining and refining parameters and keywords, searching for literature on the basis of these keywords, and evaluating and recording the body of literature. The aims of literature reviews are twofold: mapping, consolidating and evaluating the intellectual territory of a certain field, and identifying knowledge gaps to be filled in order to develop the existing body of knowledge further (Tranfield *et al.*, 2003).

Synthesising knowledge in the field of SCM research is done following roughly two approaches:

- 1 meta-analyses defined as “aggregated synthesis of pre-existing statistical findings” (Doyle, 2003, p. 324, also Cooper and Hedges, 1994; for examples see White, 1996; Orlitzky *et al.*, 2003; Song *et al.*, 2008); and
- 2 literature reviews defined as primarily qualitative synthesis of results (Fink, 2005).

Literature reviews forming this category may definitely go beyond the findings of single primary papers, generating novel interpretations inferring from the analysed literature sample as a whole. Conceived in this way, literature reviews resemble specific interpretative methods of synthesising knowledge such as meta-ethnography (see Noblit and Hare, 1988) and its more recent refinements, as for example meta-study, critical interpretive synthesis, and meta-synthesis (Thomas and Harden, 2007).

Within SCM, literature reviews have offered state-of-the-art syntheses of a variety of topics (e.g. Tang, 2006; Khan and Burnes, 2007; Rao and Goldsby, 2009, on supply chain risk management). While some authors clearly favour meta-analyses due to their stronger ability to validate their findings in comparison to literature reviews (e.g. Stanley *et al.*, 2008), others caution against erroneous conclusions from meta-analyses when these are conducted without the necessary care (Durlak and Lipsey, 1991; Rozas and Klein, 2010) and highlight their limited field of application being incapable of dealing with non-randomised studies or qualitative research (Petticrew, 2001). It seems to be reasonable to wrap up this controversy by stating that meta-analyses complement the traditional literature reviews (Kirca and Yaprak, 2010).

Since the constitutive work of Glass (1976), meta-analysis has its broadest application in medical science and psychology. In contrast to these disciplines, management and specifically SCM is a rather young field with a not yet fully consolidated research agenda. The heterogeneity of the

field diminishes substantially the applicability of meta-analysis as research method for synthesising knowledge (Tranfield *et al.*, 2003), which is reflected by an actually very limited number of meta-analyses in the field of SCM.

Especially since literature reviews may be considered the primary method of synthesising previous research on SCM, criticism regarding lacking replicability, transparency and thoroughness brought up by proponents of meta-analysis (Tranfield *et al.*, 2003) against literature reviews must be taken very seriously. It is striking, in fact, that the description of research methodology and procedure is altogether less rigorous than what would be expected from, e.g. either a survey (Forza, 2002) or case study (Dubois and Aurojo, 2007; Seuring, 2008), when considering recently published literature reviews in the field of SCM.

To address these challenges, content analysis represents an effective tool for analysing a sample of research documents in a systematic and rule-governed way. The next chapter outlines application fields and types of content analysis.

Procedures and applications of content analyses

Content analysis is a class of methods within empirical social science that can be applied both in a quantitative and a qualitative way. An early definition by Berelson (1952), one of the method's founders, emphasises the quantitative approach: "content analysis is a research technique for the objective, systematic and quantitative description of the manifest content of communication" (Berelson, 1952, p. 55). A more recent attempt to conceive the wide variety of methods and techniques that are captured under the label "content analysis" led to the broad definition that content analysis is "any methodological measurement applied to text (or other symbolic materials) for social science purposes" (Shapiro and Markoff, 1997, p. 14). Mayring (2008) detaches content analysis from any quantitative allusions by conceiving it as systematic, rule-governed, and theory-driven analysis of fixed communication.

The broad scope of content analysis can be translated into two levels of analysis: The first level analyses the manifest content of texts and documents by statistical methods. On a second level, latent content of the text and documents is excavated requiring interpretation of the underlying meaning of terms and arguments. It is a specific strength of content analysis that this method can combine qualitative approaches retaining rich meaning with powerful quantitative analyses (Duriau *et al.*, 2007), where it seems meaningful for the analyst (Mayring, 2000).

Referring to Mayring (2008) one may distil four main steps forming the process model of (qualitative) content analysis (cf. Kassirjian, 1977; Krippendorff, 1980; Mayring, 2000):

- 1 the material to be analysed is delimited and the unit of analysis is defined (material collection);
- 2 formal characteristics of the material are assessed, providing the background for subsequent content analysis (descriptive analysis);
- 3 structural dimensions and related analytic categories are selected, which are to be applied to the collected material (category selection); and
- 4 the material is analysed according to the (analytic) dimensions (material evaluation).

The segmentation into separate process steps is a crucial feature of qualitative content analysis allowing for traceability and inter-subjective verifiability, unlike most hermeneutic or other qualitative interpretive methods (Duriau *et al.*, 2007; Mayring, 2008).

Dimensions and related analytic categories which allow for classifying the reviewed material can be derived deductively or inductively. In a deductive approach they are assessed before the material is analysed, i.e. based on existing theory. When using an inductive approach, categories are derived from the material under examination itself, employing an iterative process of category building, testing and revising by constantly comparing categories and data (Eisenhardt, 1989; Mayring, 2000).

When evaluating the material, Mayring (2008) distinguishes between three qualitative techniques that ensure structured, theory-driven and rule-governed text comprehension and interpretation: summary, explication, and structuring. The technique of summarising content to a pre-defined abstraction level may be also used for inductive category building; thus it is possible to explicitly describe the step-wise process of material reduction and condensing, eventually leading to an inductively derived category system, which Krippendorff refers to as a matter of secret: "How categories are defined [...] is an art." (Krippendorff, 1980, p. 76). In contrast to the technique of summary, the technique of explication provides additional interpretation to single arguable text components through lexical-grammatical definition, narrow context analysis (referring exclusively to the text itself) and wide context analysis (including further information, for example, about the author or the specific conditions of text production). The technique of structuring embraces structuring for formal criteria (syntactic, thematic, semantic, dialogic), for aspects of contents, for types, and scales. Such structuring for scales adds to the categories the dimensions of valence (positive or negative evaluation) or intensity (evaluation on an ordinal, interval or ratio scale).

Qualitative content analysis according to Mayring (2000, 2008) has been taken up by various scholars and modified by some of them. For example, Gläser and Laudel (2009) take Mayring's method as a starting point for developing their own technique which allows for extracting complex information needed for distilling and assessing cause-and-effect mechanisms between variables/categories and which keeps the analysis scheme open for modifications and amendments during the whole process of data analysis.

It should be noted that the application field of content analysis is rather broad. The method of Gläser and Laudel (2009), for instance, was primarily meant as a tool for analysing expert interviews in social science. Therefore, qualitative content analysis can fulfil the role of a data analysis technique within SCM research in various ways, thus complementing a number of empirical data collection methods. Content analysis is suitable for analysing various qualitative and unstructured data such as those collected during unstructured or semi-structured interviews or web-based documentary research.

Further, content analysis may also be applied for analysing published material. Jauch *et al.* (1980), for example, have argued on the suitability of a structured content analysis of published case studies for organisational research. Likewise, Gold *et al.* (2010a, b) have content-analysed the entire body of case studies on sustainable SCM, published from 1994 to

2007 in English-speaking peer-reviewed journals. Its structured and rule-governed procedure makes (qualitative) content analysis also a powerful tool for generating highly valid and reliable findings from literature reviews in the field of SCM.

Reliability and validity issues of content analyses

Neuendorf (2002) underlines the overall goal of content analysis “to identify and record relatively objective (or at least intersubjective) characteristics of messages” (Neuendorf, 2002, p. 141). In this respect, it is obvious that findings of content analysis are rather contestable if based only on the multiple judgments of a single researcher (Brewerton and Millward, 2001). By involving several researchers into content analysis, validity and reliability of (literature) sampling and data analysis may be broadly enhanced (Duriau *et al.*, 2007). Specifically regarding text analysis, one may distinguish between the search for manifest or latent content. While the former can be easily assisted by software tools, the latter represents a substantial challenge since it relies on the interpretations, i.e. the mental schemes, of the researchers. The challenge consists in making “the judgments of coders intersubjective, that is, those judgments, while subjectively derived, are shared across coders” (Potter and Levine-Donnerstein, 1999, p. 266).

Literature discusses several measures for inter-coder reliability. When coding for nominal level variables, which represents the most common case in content analysis, Cohen’s kappa is commonly recommended for measuring *ex post* agreement between decoupled coders (Lombard *et al.*, 2002). For example, Dewey (1983) makes the point that despite its shortcomings, Cohen’s kappa should still be “the measure of choice” (Dewey, 1983, p. 487). If the coefficient indicates only moderate agreement ($k < 0.60$) or less (Landis and Koch, 1977), discrepancies of interpretations of constructs between different coders have to be aligned and data has to be re-coded.

A different, less formalised approach towards ensuring inter-subjectivity of data analysis – not requiring constant decoupled coding but deliberately using the additional insight from discussing debatable issues instead – may be named “discursive alignment of interpretation”. When different judgments between researchers occur, they are individually assessed and resolved by gradually revealing and consensually redrawing the mind-maps having led to the discrepancy in the first place. This approach has been used by researchers in the field of SCM for analysing various kinds of qualitative data (e.g. Burgess *et al.*, 2006; Seuring and Müller, 2008; Gold *et al.*, 2010b; Pagell *et al.*, 2010) and is used in the extent paper as well. It particularly makes sense if search categories can be clearly characterised as “soft” criteria, i.e. they refer largely to latent content and deeper meaning embodied in the text (Duriau *et al.*, 2007).

Exceeding this narrow perspective of inter-coder reliability, Kolbe and Burnett (1991) highlight the outstanding importance of transparency to be ensured by detailed documentation of the method applied and the overall research process. They consider methodology reporting “critical for discerning the quality and usefulness of content-analysis studies as well as for allowing replication” (Kolbe and Burnett, 1991, p. 250).

Methodology of content analysis as applied

This paper conducts a systematic review of literature review papers in the field of SCM by means of content analysis. Kassarian (1977) stipulates that content analysis should follow a clear and purposeful process structure; accordingly, we follow the four-step process model derived from Mayring (2008) as introduced above.

Material collection

Our literature sample comprises English-speaking peer-reviewed literature review papers on SCM covering the ten-year-period from 2000 to 2009. Peer-reviewed journal articles represent a major mode of communication among researchers; therefore they are taken as unit of analysis. For compiling the paper sample, a literature search was carried out, based on the pair of keywords “literature review” and “supply chain management”, to be jointly found in title, keywords or abstract. The structured keyword search was conducted in major databases and library services: Emerald (www.emeraldinsight.com), Springer (www.springerlink.com), Wiley (www.wiley.com), and Scopus (www.scopus.com). Depending on whether a sufficient sample is reached at the title, abstract and keywords level, the selection of papers might either be narrowed or extended beyond this. Subsequently different processing steps might be needed for ensuring that identified papers really deal with the topics addressed. This has to be ensured by reading the papers and thereby reflection on their appropriateness for the topic studied. The papers contained in the sample provide alternative approaches for the identification of papers, as will be discussed subsequently (see Table I). While many of them take a similar route for identifying their material, one typical alternative is centring on a selected number of journals. This makes it easier to assess all related papers on a certain topic but might therefore miss relevant papers in other journals. As Table I indicates, the title, abstract and keywords (KWS) or selected journals (LRJ) are the two most common approaches. In either case, the major limitation arises that neither an all inclusive breadth of data collection nor unlimited depth in the analysis of the material is feasible. Hence, the researchers have to make an informed choice among these options and justify them against their research objective.

Within this piece of research, paper hits were inductively attributed to sub-fields of SCM according to their self-reported main focus and objective of the review: general SCM, SCM empirical research, postponement and build-to-order SCM, supply chain risk, supply chain performance, sustainable SCM, and supply chain integration. Criterion for inclusion into the paper sample was that at least two reviews of one sub-field have been published within the relevant time span. Altogether, we identified 22 papers, dispersed over 11 journals (see Table II).

Descriptive analysis

Information about the distribution of the articles across various journals is assessed and presented along with analytic findings in the subsequent chapter.

Category selection

Main analytic categories have been deductively derived from the research process model of Stuart *et al.* (2002): aim of research, method of data gathering, method of data analysis, and quality measures. According to the requirements of

Table I Data collection methods of papers under review

Reviewed papers	2. Method of data gathering	2.1 Number of papers	2.2 Period covered
Sub-field 1: general reviews SCM			
Croom <i>et al.</i> (2000)	KWS, IAC	NM	NM
Sachan and Datta (2005)	CSA, LRJ	442 papers	1999-2003
Burgess <i>et al.</i> (2006)	KWS, RRS	100 papers	NM
Sub-field 2: SCM empirical research			
Ho <i>et al.</i> (2002)	NFM	NM	NM
Spens and Kovács (2006)	CSA, LRJ	378 papers	1998-2002
Seuring (2008)	KWS	68 papers	1990-2005
Sub-field 3: postponement and build to order SCM			
Van Hoek (2001)	KWS, CRP, IAC	19 publications	1965-1998
Boone <i>et al.</i> (2007)	KWS	46 papers	1999-2006
Gunasekaran and Ngai (2005)	KWS	NM	NM
Gosling and Naim (2009)	KWS, CRP	91 papers	NM
Sub-field 4: supply chain risk			
Tang (2006)	NFM	NM	NM
Khan and Burnes (2007)	NFM	NM	NM
Rao and Goldsby (2009)	NFM	55 papers	NM
Sub-field 5: supply chain performance			
Shepherd and Günter (2006)	KWS	362 papers	1990-2005
Gunasekaran and Kobu (2007)	NFM	NM	1999-2004
Akyuz and Erkan (2010)	VIM	24 papers	NM
Sub-field 6: sustainable supply chain management			
Srivastava (2007)	KWS, CRP	227 publications	1990-2006 *
Carter and Rogers (2008)	KWS	NM	NM
Seuring and Müller (2008)	KWS	191 papers	1994-2007
Sub-field 7: supply chain integration			
Power (2005)	NFM	NM	NM
Fabbe-Costes and Jahre (2007)	KWS, LRJ	19 papers **	2000-2006
Van der Vaart and van Donk (2008)	KWS, LRJ	33 papers	2000-2006

Notes: NM: not mentioned; NFM: no formal material collection; VIM: only vague information about material selection; KWS: keyword research in databases and library services; LRJ: research limited to certain journals; CRP: cross-referencing for further relevant publications; IAC: information request from academic colleagues; RRS: representative random sample; CSA: complete sample; *While going back to earlier papers by cross-referencing; **71 papers for descriptive analysis, 19 papers for in-depth analysis

literature reviews, the category data gathering is complemented by the categories number of publications gathered, and time period covered. Borrowing from the main process steps of content analysis as proposed by Mayring (2008), the category method of data analysis is complemented by type of data analysis, criteria for descriptive analysis, and main analytic categories/arguments for structuring the content. Table III gives an overview of all analytic categories and their definitions.

Material evaluation

The sample of literature review papers on SCM has been analysed according to these categories. The results are presented and discussed, aiming at providing some practical guidance for SCM researchers and instigating researchers to conduct literature reviews deliberately.

The theoretically-based categorisation scheme with predefined categories and clear definitions enhances reliability of the coding and – together with intense discussions within the research team – internal validity of

the findings. De-contextualisation and theory-led abstraction of the content analysis outcomes allow for claiming a certain degree of generalisation for the findings and hence external validity (Avenier, 2010). Furthermore, transparency and replicability of the research design are ensured by careful documentation of the entire research process. Finally, inter-subjectivity of data analysis largely dealing with latent content deserving interpretations (Duriau *et al.*, 2007) was pursued by “discursive alignment of interpretation” as described above.

Findings

Table II presents the distribution of papers across various source journals as well as their research aim and main topic, respectively.

Table III assesses the method of material collection, together with the issue whether the number of publications and time period covered are indicated. Table IV presents the method of data analysis (type of analysis, descriptive analysis

Table II Distribution over journals and main topics of papers under review

Reviewed papers	Journal	1. Aim/main topic
Sub-field 1: general reviews SCM		
Croom <i>et al.</i> (2000)	EJPSM	Classifying and critically analysing SCM literature through framework
Sachan and Datta (2005)	IJPDLM	Examining the state of logistics and SCM research from the standpoint of methodologies
Burgess <i>et al.</i> (2006)	IJOPM	Reviewing SCM research
Sub-field 2: SCM empirical research		
Ho <i>et al.</i> (2002)	IJPR	Identifying and discussing major weaknesses of extant SCM literature with respect to the conceptualisation, operationalisation, and modelling of SCM
Spens and Kovács (2006)	IJPDLM	Assessing the use of different research approaches in logistics research
Seuring (2008)	SCMIJ	Assessing the current practice of case based research in sustainable SCM and supply chain performance management
Sub-field 3: postponement and build to order SCM		
Van Hoek (2001)	JOM	Reviewing and conceptualising postponement literature
Boone <i>et al.</i> (2007)	IJPDLM	Assessing and documenting the progress of postponement research, identifying current gaps
Gunasekaran and Ngai (2005)	JOM	Reviewing and conceptualising build-to-order SCM
Gosling and Naim (2009)	IJPE	Engineer-to-order SCM
Sub-field 4: supply chain risk		
Tang (2006)	IJPE	Developing a unified framework for classifying supply chain risk management articles
Khan and Burnes (2007)	IJLM	Developing a research agenda for risk and SCM
Rao and Goldsby (2009)	IJLM	Developing a typology of risks in the supply chain
Sub-field 5: supply chain performance		
Shepherd and Günter (2006)	IJPPM	Taxonomy of performance measures followed by a critical evaluation of supply chain performance measurement systems
Gunasekaran and Kobu (2007)	IJPR	Determining the key performance measures and metrics in supply chain and logistics operations
Akyuz and Erkan (2010)	IJPR	Supply chain performance measurement revealing the basic research methodologies/ approaches followed, problem areas and requirements for the performance management
Sub-field 6: sustainable supply chain management		
Srivastava (2007)	IJMR	Classification of Green SCM primarily taking a "reverse logistics angle"
Carter and Rogers (2008)	IJPDLM	Introducing sustainability to the field of supply chain management and demonstrating the relationships among environmental, social, and economic supply chain performance
Seuring and Müller (2008)	JCLP	Outlining and conceptualising the research field of sustainable SCM
Sub-field 7: supply chain integration		
Power (2005)	SCMIJ	Integration and implementation of SCM practices from a strategic viewpoint
Fabbe-Costes and Jahre (2007)	IJPDLM	Relation between supply chain integration and performance
Van der Vaart and van Donk (2008)	IJPE	Analysis of survey-based research with respect to the relationship between supply chain integration and performance with regard to the constructs, measurements and items used

Notes: Legend and journal count – *International Journal of Physical Distribution & Logistics Management (IJPDLM)*=5; *International Journal of Production Economics (IJPE)*=3; *International Journal of Production Research (IJPR)*=3; *The International Journal of Logistics Management (IJLM)*=2; *Journal of Operations Management (JOM)*=2; *Supply Chain Management – An International Journal (SCMIJ)*=2; *European Journal of Purchasing & Supply Management (EJPSM)*=1; *International Journal of Management Reviews (IJMR)*=1; *International Journal of Productivity and Performance Management (IJPPM)*=1; *International Journal of Operations & Production Management (IJOPM)*=1; *Journal of Cleaner Production (JCLP)*=1

and analytic structuring of contents), and quality measures as mentioned by the authors.

Evaluating and discussing the findings

Most important criteria of descriptive analysis of the examined literature sample regard the distribution of publications over the time period (3 papers) and over various source journals (5); whereas 15 review papers present no descriptive criteria. This often might be owed to limited word counts in refereed journal publications and the comprehensible focus of researchers on their main messages, but would still be seen as required core information.

While seven papers mention no formal material selection (6) or give merely vague information about material selection (1), 13 papers conducted keyword research in databases and library services, sometimes combined with subsequent cross-referencing for further relevant publications (3) and sometimes limited to a set of journals (2). Two reviews head for a complete sample of certain pre-defined journals within a certain time frame. One possible method of selecting most relevant journals that represent the state-of-the-art of research in a specific field is to use journal rankings (Spens and Kovács, 2006). A means of further reducing the body of literature in addition to keyword search as pre-selection tool is offered by Burgess *et al.* (2006) who used "a total of 100

Table III Analytic categories and their definitions

Categories	Definition
1. Aim of research	States the overall topic/objectives of the literature review
2. Method of data gathering	Reported tools/procedure for identifying, delimitating, and gathering the relevant literature sample
2.1 Number of publications	Number of publications contained in the literature sample
Period covered	Time period covered by the literature sample
3. Method of data analysis	Reported tools/procedure for analysing the literature sample
3.1 Type of data analysis	Qualitative and/or quantitative analysis
3.2 Descriptive analysis	Descriptive specification of the literature sample (e.g. journals, number of publications per year)
3.3 Analytic categories for analysing the contents	Main structuring (deductively or inductively derived) categories/arguments applied for analysing and/or synthesising the body of literature
4. Quality measures	Reported quality measures in terms of replicability, reliability, and validity

Table IV Data analysis methods and quality measures of papers under review

Reviewed papers	3. Method of data analysis	3.1 Type of data analysis	3.2 Descriptive analysis	3.3 Analytic categories	4. Quality measures
<i>Sub-field 1: general reviews SCM</i>					
Croom <i>et al.</i> (2000)	EAC	QAL, QAN	N	Y	NM
Sachan and Datta (2005)	IAC	QAL, QAN	DCA	Y	NM
Burgess <i>et al.</i> (2006)	ACA	QAL, QAN	DTP, DVJ	Y	DAI
<i>Sub-field 2: SCM empirical research</i>					
Ho <i>et al.</i> (2002)	IAC	QAL	N	Y	NM
Spens and Kovács (2006)	EAC	QAL, QAN	N	Y	OTR, VAL, IRC
Seuring (2008)	EAC	QAL, QAN	N	Y	VAL, DAI
<i>Sub-field 3: postponement and build to order SCM</i>					
Van Hoek (2001)	IAC	QAL	N	Y	NM
Boone <i>et al.</i> (2007)	IAC	QAL, QAN	N	Y	NM
Gunasekaran and Ngai (2005)	ACA	QAL	N	Y	NM
Gosling and Naim (2009)	ACA	QAL, QAN	DVJ	Y	NM
<i>Sub-field 4: supply chain risk</i>					
Tang (2006)	IAC	QAL	N	Y	NM
Khan and Burnes (2007)	IAC	QAL	N	Y	NM
Rao and Goldsby (2009)	IAC	QAL	N	Y	NM
<i>Sub-field 5: supply chain performance</i>					
Shepherd and Günter (2006)	IAC	QAL	N	Y	NM
Gunasekaran and Kobu (2007)	IAC	QAL	N	Y	NM
Akyuz and Erkan (2009)	IAC	QAL, QAN	DVJ	Y	NM
<i>Sub-field 6: sustainable supply chain management</i>					
Srivastava (2007)	ACA	QAL	N	Y	NM
Carter and Rogers (2008)	IAC	QAL	N	Y	VAL
Seuring and Müller (2008)	EAC	QAL, QAN	DTP, DVJ	Y	VAL, DAI
<i>Sub-field 7: supply chain integration</i>					
Power (2005)	IAC	QAL	N	Y	NM
Fabbe-Costes and Jahre (2007)	ACA	QAL, QAN	DTP	Y	DAI
Van der Vaart and van Donk (2008)	IAC	QAL	DVJ	Y	DAI

Notes: NM: not mentioned; Y: yes; N: no; IAC: inherent application of elements of content analysis while not describing the research procedure explicitly; ACA: application of content analysis while not denominating the method's name explicitly; EAC: explicit application of content analysis; QAL: qualitative analysis; QAN: quantitative analysis; DCA: distribution over countries of authors; DTP: distribution over the time period; DVJ: distribution over various journals; OTR: objectivity and transparency; VAL: validity; DAI: inter-rater agreement by discursive alignment of interpretations; IRC: inter-rater reliability measurements

randomly selected refereed journal articles". They justify this against the fact that a full review of all papers is neither feasible nor does it offer any further insights. Furthermore, it can be seen from the analysis that in most cases where the procedure of data gathering is not described, information about the number of papers reviewed and the time period covered is not given either.

Taking on the broad idea of Mayring (2008) who conceives data evaluation as text comprehension and interpretation by means of summary, explication, and structuring, it is little surprising that all reviews under examination have, at least inherently (13), applied elements of content analysis. All papers use deductively or inductively derived categories and arguments, respectively, for structuring and/or synthesising their bodies of literature. While five papers *de facto* apply content analysis without denominating the method's name and four papers explicitly base their reviews on the method of content analysis (referring to various proponents such as Kassarian, 1977; Krippendorff, 1980; Mayring, 2008; Guthrie *et al.*, 2004), the remaining major part does not describe the research procedure explicitly and does not segment it into separate traceable process steps allowing for better inter-subjective verifiability as promoted by, e.g. Mayring (2008) and Duriau *et al.* (2007). Carter and Rogers (2008) is just one example of a substantial review endeavour (having yielded an influential framework of sustainable SCM) that addresses the process steps leading to the conceptualisation only vaguely:

The conceptualisation as described above was an iterative process involving many hundreds of hours of reading, additional collection of literature, synthesis, and refinement of our framework via discussions with colleagues over a period of 17 months (Carter and Rogers, 2008, p. 362).

Regarding quality measures such as objectivity, validity and reliability, 15 papers miss them out altogether. Often only the procedure of review is described without discussing quality standards, e.g. "The paper begins by reviewing the general literature on risk and then proceeds to examine the literature on supply chain risk and its management" (Khan and Burnes, 2007, p. 198). One other paper highlights the outstanding importance of thorough literature reviews as "a precondition for doing substantive, thorough, and valid research" (Rao and Goldsby, 2009, p. 116), although treating reviews only as a means not an end. While it is true that literature reviews represent indispensable preparatory work for further, for example, empirical research, they should be regarded as full-fledged research methods themselves. Research methodology of literature reviews should be applied and described as rigorous as, e.g. those of surveys or case studies. Hence, a literature review is to prove its scope and limitations by transparent description of its procedure, thus being able to claim validity of the findings.

Altogether, four papers address validity issues and five papers ensure inter-rater agreement by "discursive alignment of interpretations" as described in more detail in the chapter "reliability and validity issues". Regarding quality measures, the endeavours of Spens and Kovács (2006) are exemplary as they address an extraordinarily broad scope of objectivity and transparency, validity, and reliability issues (cf. for more details Spens and Kovács, 2006, p. 380f.). It is interesting that Shepherd and Günter (2006), in contrast, reflect on usefulness and feasibility of applying an explicit and systematic review procedure and finally reject this option:

Although the systematic review methodology was initially considered, it was rejected as it argues that researcher bias in traditional narrative reviews can be overcome by adopting more "explicit and rigorous processes" (Tranfield *et al.*, 2003, p. 218). The problem with this positivist notion is it assumes it is possible to put aside one's theoretical commitments and step outside of rhetoric, a position robustly contested by post-modern researchers (e.g. Billig, 1996) (Shepherd and Günter, 2006, p. 244).

One may raise the objection to this argumentation that there is no need for researchers to put aside theory but it is, on the contrary, outstandingly important to make their *a priori* theoretical position transparent (Mir and Watson, 2000). This claim of transparency might not stop with the theoretical lens of researchers but might even be extended to the overall epistemological foundations of their research work (Avenier, 2010). Recent endeavours of shaping a constructivist view of organisational design science as "explicit, alternative model of science" (Avenier, 2010, p. 2) indeed propose "explicitness" and "ostinato rigore" (Avenier, 2010, p. 15f.) as two of three basic quality criteria of qualitative research (apart from ethics) that ensure the findings' epistemic legitimacy. Explicitness refers to evaluation principles such as thick description, reflexivity, audit, and trustworthiness (Schwartz-Shea, 2006). Ostinato rigore denominates the obstinate striving for becoming still more rigorous, for example by triangulation or negative case analysis (Avenier, 2010). Bearing these considerations in mind, it becomes clear that the postulation of "explicit and rigorous processes" by Tranfield *et al.* (2003, p. 218) are not confined to the positivist paradigm but are pivotal for ensuring epistemic legitimacy of knowledge under the constructivist paradigm as well.

Guidelines for conduction content analysis

The argumentations and findings presented beforehand are taken up for suggesting practical guidelines for SCM researchers conducting literature reviews as content analyses. Table V outlines the major milestones and their respective challenges on the way of carrying out such a content analysis. This is done against the underlying pattern of the four-step process model derived from Mayring (2008).

In the phase of material collection two main decisions to be taken are the definition and delimitation of the material and the definition of the unit of analysis. As Table I shows complete sampling is rather rare and only possible if the search scope is restricted to few journals and a narrow time period. The most common way of literature search is keyword search in databases and library services. This technique is recommendable particularly for covering a specific topic that might be addressed across several academic disciplines (and journals); it can be complemented by cross-referencing for further relevant publications and by requesting information from academic colleagues. According to Kassarian (1977) the unit of analysis might be, for example, the whole literature sample, the single document, or individual paragraphs. It is crucial though to keep the unit of analysis consistent throughout the entire study (Mayring, 2008). Furthermore, the content analyst should check the literature sample for possible bias from the same group of authors which could lead to an overrepresentation of certain subjects (cf. the findings of Beske *et al.* 2009 for survey research on SCM).

Regarding the phase of descriptive analysis, at least the distribution over the time period and over different journals (or other publication outlets) (see Table IV) is to be displayed,

Table V Milestones for conducting literature reviews as content analyses

Milestones	Critical considerations
Material collection	Defining and delimitating material Specifying the topic: suitable keywords for database search Scope of journals: selective or general Defining unit of analysis Consistent throughout the analysis Mind bias from similar papers by same group of authors
Descriptive analysis	Distribution over time period Distribution over publication outlets (particularly journals)
Pattern of analytic categories	Deductive versus inductive category building (corresponds to theoretically grounded versus explorative research approaches) Default two-steps approach: 1. Deductive category building, 2. Iterative cycles of inductive category refinement while coding
Material evaluation and research quality	Need of iterative coding cycles in case of inductive category refinements or deficient inter-rater reliability Transparency and objectivity (clear coding rules from the outset) Reliability (particularly inter-rater reliability): at least two coders, cross-coding for testing agreement or aligning mental schemes Validity (theoretical foundation, specific inductive refinements)

since this provides the reader with essential information about the literature sample.

When developing the pattern of analytic categories the main choice to be taken is between inductive and deductive category building, which corresponds with the decision of what overall research approach (theoretically grounded versus explorative) is envisaged. While a deductive approach requires opting *ex ante* for an adequate analytic framework to base the content analysis on, an inductive development of the analytic framework may resort to the technique of summarising the material under examination to a pre-defined abstraction level (Mayring, 2008); thus the material is stepwise reduced and condensed (Eisenhardt, 1989). Based on our own research experience of conducting literature reviews as content analysis (e.g. Seuring and Müller, 2008; Gold *et al.*, 2010b; Gold and Seuring, 2011), we suggest as default approach of developing the pattern of analytic categories a two-step-process: after the basic frame of categories and dimensions has been established on basis of existing theory, single categories are inductively refined during the coding process. This proceeding combines the strength of firm theoretical grounding with general openness towards unexpected findings.

When finally evaluating the material, coding cycles may have to be repeated if an inductive approach (as pointed out above) is applied (Saunders *et al.*, 2009) or if tests reveal that inter-coder reliability is insufficient (Lombard *et al.*, 2002). Most important reliability criteria of content analysis is inter-coder reliability, which Mayring (2008) mainly refers to as reproducibility of results. Inter-coder reliability may be ensured by involving at least two coders, hence coding the literature sample at least twice (Duriu *et al.* 2007); thereby, either inter-coder agreement should be measured or inter-rater agreement may be reached by discursive alignment of interpretations. Furthermore, clear definitions of categories and explicit coding rules from the outset (possibly to be adjusted during coding in the case of an inductive approach) supports ensuring transparency and objectivity of the research process (Jauch *et al.*, 1980; Mayring, 2000; Gläser

and Laudel, 2009). Validity may be enhanced by grounding the analytical pattern in sound existing theory (Mayring, 2008) and by inductively adjusting it, where necessary, to the specific research topic and literature sample. Here, criteria of explicitness and *ostinato rigore* as elaborated by Avenier (2010) should be taken as guidelines by the researcher.

Conclusions

This paper argues for content analysis as an effective tool for conducting literature reviews in a systematic and transparent way. Being part of the SCM community, we particularly target researchers in SCM and in related disciplines such as operations or logistics. This is in line with a brief outline of the method appearing in POMS Chronicle in 2009 (Davies, 2009), where the relevance of content analysis for operations’ management research was emphasised.

Our analysis found that literature reviews in SCM already inherently use this method while often not denominating its explicit name and neglecting the detailed description of data gathering, the rationale for the pattern of analytic categories, and quality criteria such as replicability, reliability, and validity. While the importance of the literature review within the research process is beyond question, it can be discussed how formalised such a review has to be conceived. Considering restricted time resources for searching and analysing the literature, a decision needs to be made on how formally and how comprehensively (qualitative or quantitative analysis, or both) the review has to be carried out – thereby balancing input and yield. When the challenge is to choose the reasonable from the feasible, approaching literature reviews with a clear research question and purpose in mind, respectively, is of great help. In any case, following a pre-defined process structure as proposed by content analysis guides the individual researcher or research team through the literature review process. We encourage researchers in the field of SCM to make the effort to deliberately head for transparency and rigour in their review endeavours.

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