Running head: Case study research on sustainable supply chain management

Case study research on sustainable supply chain management – What evidence has been found?

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Abstract

This paper outlines findings of a content analysis assessing systematically all case studies in the field of SSCM, published from 1994 to 2007 in English-speaking peer-reviewed journals. The content analysis aims at structuring the field by applying categories deductively derived from a framework of sustainable supply chain management (SSCM). The study finds that the social dimension of sustainability has been neglected in research and practice so far, and that case study research has focused rather on win-win situations between the dimensions of sustainability than on trade-offs. Governing bodies, customers and stakeholders are identified as highly-relevant external triggers of SSCM. Intensive communication and cooperation across the entire supply chain proves true to be a paramount characteristic of SSCM. Notwithstanding, far-reaching supply chain integration is still rather limited, even in SSCM, and has to be extended if environmental and social goals are actively to be taken into account.

Keywords: Supply chain management, sustainability, case study research, content analysis, literature review, theory building

Introduction

In 2001, Mentzer et al. (2001) noticed that “SCM has become such a “hot topic” that it is difficult to pick up a periodical on manufacturing, distribution, marketing, customer management, or transportation without seeing an article about SCM or SCM-related topics” (Mentzer et al., 2001, p. 2). Yet, the intersection of supply chain management (SCM) and sustainability was a rather young field only a few years ago. This has developed rapidly since

then as can be seen by a series of special issues recently published or under development. While much of the academic development has first taken place rather on reverse logistics and closed loop SCM (see the early review by Fleischmann et al., 1997), the forward part of the supply chain has caught up. Within the last 15 years almost 200 papers on green and sustainable supply chain management (SSCM) have been published in peer-reviewed journals (exactly 191 peer-reviewed papers from 1994 to 2007) (Seuring & Müller, 2008). A first literature search for 2008 already yielded another more than 40 papers newly published or accepted for publication, which might only appear in 2009, of course.

Seuring and Müller (2008) found that the field of SSCM is dominated by case study research, as 70 of the 191 papers applied this research method (i.e. 37% of all papers); in contrast to traditional SCM and logistics publications, which are dominated by surveys and mathematical models (see e.g. Mentzer & Kahn, 1995 as well as Kotzab, 2005). Another evaluation (Seuring, 2008) has revealed that except for very few instances only case study based research projects have taken the effort to collect data from more than one company (i.e. supplier, manufacturer, distributor) of the supply chain. Almost half of the case studies under examination accessed two or more stages of the supply chain. Seuring and Müller (2008) explicitly call for follow-up research analyzing more deeply particular sub-bodies of publications. This is where the extant paper ties in by taking a closer look at what has been achieved so far regarding case study research on SSCM.

The aim of this paper is to systematically assess all case study publications in the field of SSCM, published in English-speaking peer-reviewed journals from 1994 to 2007. A framework

of SSCM (Seuring & Müller, 2008; Seuring & Müller, forthcoming) is used for deriving categories, which are applied in a content analysis to the chosen set of case studies.

The structure of the paper is as follows. After defining the basic terminology a brief overview about literature reviews addressing the field of SSCM is given. Some conceptual frameworks of SCM – both traditional and sustainable – are outlined. Categories are deductively derived from one selected framework of SSCM. The methodology of a literature review conducted as content analysis is outlined. Subsequently, the results of the analysis are presented. The paper concludes by integrating the findings into the broader context of the current SCM debate.

Basic terminology

For delineating SSCM as the major theme of this paper, core terms concerning this matter are defined below.

The most well-known definition of sustainability is that of the Brundtland Commission. It defines sustainable development as "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs'' (WCED, 1987, p. 8). Elkington (1997) suggests the integration of the economic, ecological and social aspect of sustainability in a "triple-bottom line" concept, emphasizing their intense interrelatedness. Dyllick and Hockerts (2002) conceive corporate sustainability as the business case (economic), the natural case (environmental), and the societal case (social). Thus six criteria for achieving corporate sustainability are derived: eco-efficiency, socio-efficiency, eco-effectiveness, socio-effectiveness, sufficiency and ecological equity.

Commonly used and well-adopted definitions of supply chain and SCM are shaped by Mentzer et al. (2001). They define the supply chain as "a set of three or more entities (organisations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer" (Mentzer et al., 2001, p. 4f.). SCM means „the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole" (Mentzer et al., 2001, p. 18).

Combining definitions of SCM and sustainability, Seuring and Müller (2008) define SSCM as "the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements" (Seuring & Müller, 2008, p. 2). As such, members in a sustainable supply chain have to fulfill environmental and social criteria but equally have to remain competitive by meeting customer demands and related economic criteria.

Literature Review

The literature on SSCM is still rather limited, and literature reviews are scant. In addition to one paper in conference proceedings focusing on remanufacturing and reverse logistics (Alfaro et al., 2003), Seuring and Müller (2008) found only seven papers that attempt to review part of the literature.

De Burgos and Lorente (2001) deal with environmental performance as an operation's objective; supply chain issues are only secondarily addressed. Baumann, Boons, and Bragd (2002) centre their review on green product development and take, hence, a similarly specialized perspective. Zisdisin and Siferd (2001) provide a limited review on environmental purchasing based on only 38 publications. Abukhader and Jönson (2004) examine the intersection of environmental issues with logistics. Kleindorfer, Singhal, and Van Wassenhove (2005) review papers integrating sustainability into operations management, while supply chain related issues are also covered. Seuring and Müller (2007) address the emergence and development of integrated chain management (Stoffstrommanagement) in Germany. For its rather broad review, Srivastava (2007) primarily takes a reverse logistics angle.

Seuring and Müller (2008) themselves provide a rather comprehensive overview of literature on SSCM, containing 191 papers published from 1994 to 2007. The case studies as one subset of this literature compilation are the empirical ground for the content analysis presented in the extant paper.

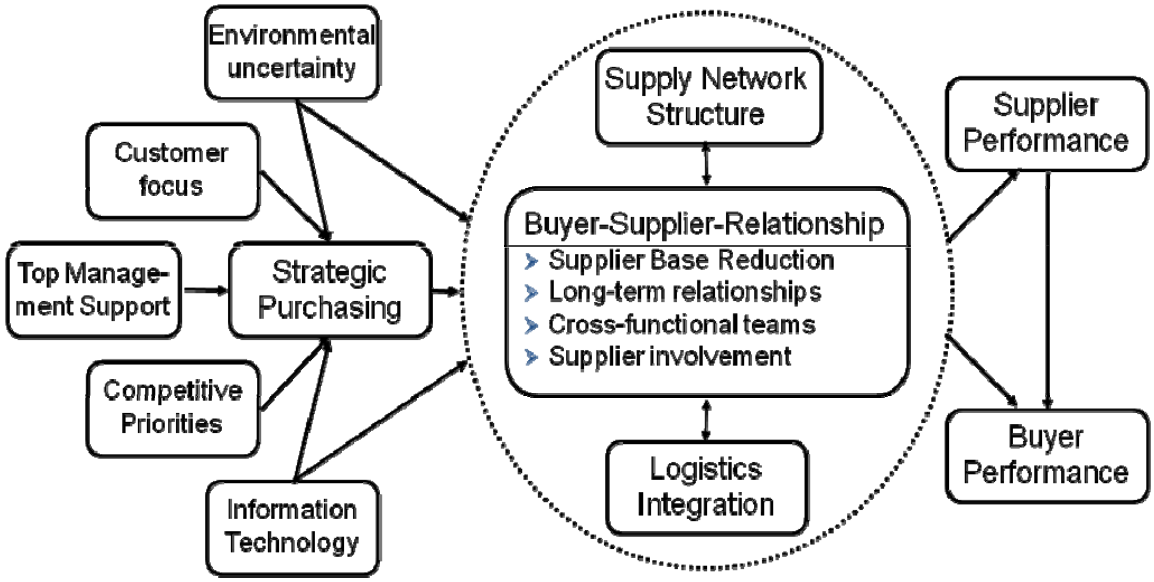
Category building from SCM theory

In this section, some conceptual frameworks of SCM – both traditional and sustainable – are presented. Finally, the framework of SSCM proposed by Seuring and Müller (2008) as well as Seuring and Müller (forthcoming) is used for deriving categories to be applied in the subsequent content analysis. Frameworks are distinguished from theories essentially in that effect that they represent pre-theories, not yet fulfilling all theory requirements, but substituting

for theories in many respects. Hence frameworks allow, for example, “a mapping of items (such as the existing literature or research studies) on to the framework” (Meredith, 1993, p. 7f.).

Chen and Paulraj (2004) developed their prominent research framework of SCM as a response to various calls for theory building in operations management, e.g. by Melnyk and Handfield (1998) or Meredith (1998). They consolidate and integrate relevant findings of various previous works into a research framework (see Figure 1), emphasizing the interdependence of relationships within a supply chain and hence the need of aiming for collaborative advantage (Chen & Paulraj, 2004).

Figure 1: A research framework of supply chain management

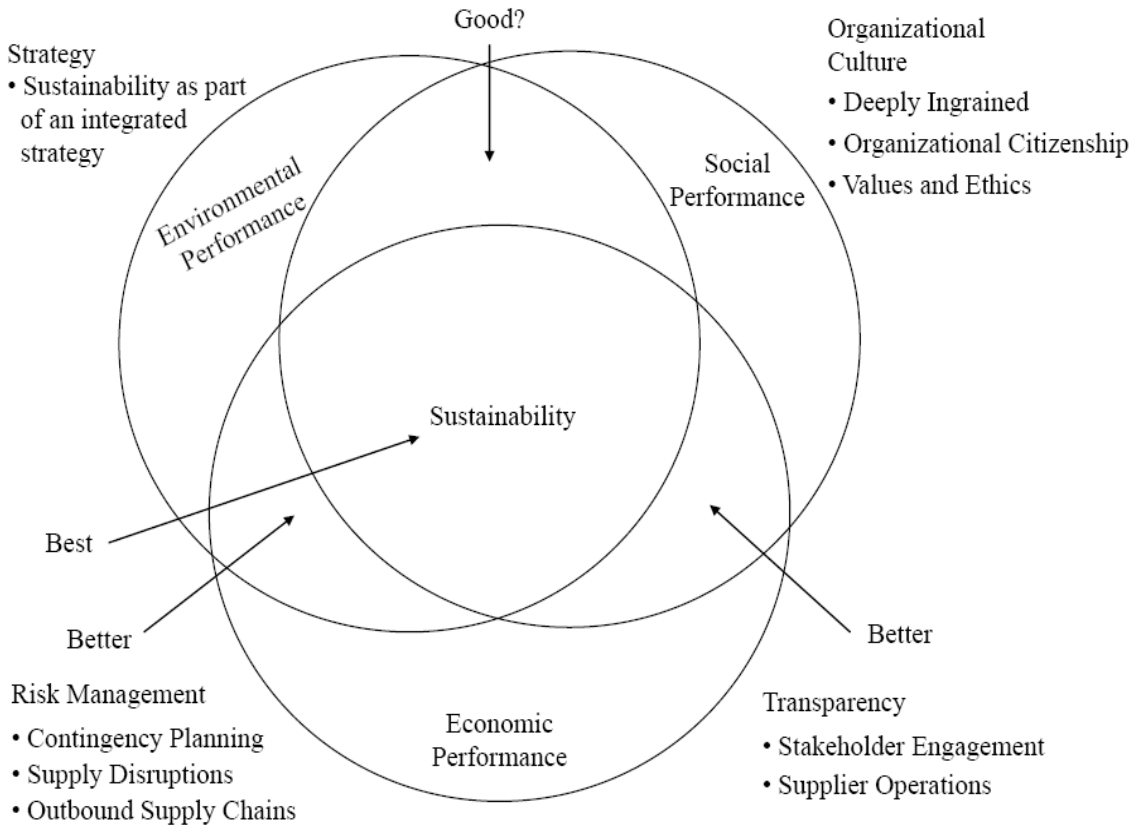


Source: Chen & Paulraj, 2004, p. 121

SSCM is still a rather young research field emerging as growing topic only recently (Seuring & Müller, forthcoming). Most recent attempts to structure the field of SSCM are two literature reviews provided by Carter and Rogers (2008) as well as Seuring and Müller (2008),

and a Delphi-study (Seuring & Müller, forthcoming). Carter and Rogers (2008) identify four facets supporting the performance on the triple bottom line (cf. Elkington, 1997) by means of a review of sustainability literature: risk management, transparency, strategy, and organizational culture (see Figure 2). On this basis, the authors define SSCM "as the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance of the individual company and its supply chains" (Carter & Rogers, 2008, p. 368).

Figure 2: Sustainable supply chain management



Source: Carter & Rogers, 2008, p.369

According to Seuring and Müller (2008), (1) external pressure and incentives from governing agencies, customers and stakeholders as well as (2) supply chain intern barriers and supporting factors determine crucially if and how SSCM is implemented by the members of a supply chain. On this basis two main strategies are identified: (1) Supplier management for risks and performance and (2) SCM for sustainable products. Some additional insights are offered by a related Delphi-study, also conducted by Seuring and Müller (forthcoming), which found four major issues of SSCM: (1) Pressures and incentives for SSCM; (2) identifying and measuring how the three dimensions of sustainability impact SCM; (3) supplier management focusing on issues at the dyadic supplier–buyer interface; (4) SCM addressing more comprehensively the overall supply chain. These two studies are taken as the basis for deriving categories for our content analysis, which are presented in Table 1 below.

Table 1: Categories and their description

Category	**Acronym**	**Description**
1. Pressure		Summarizes pressures and incentives leading to the implementation of SSCM
1.1 Pressure from government	GOV	Regulatory activities from governing agencies
1.2 Pressure from customer	CUS	Comprises customer demands for sustainable products or processes and threats like boycotts
1.3 Pressure from stakeholder	STA	Demands and threats of NGOs and other interest groups
2. Risk avoidance/management	RIS	Points to the management of risks regarding all three dimensions of sustainability
2.1 Environmental risk	ENVR	Risks concerning the environment
2.2 Social risk	SOCR	Risks concerning human and societal issues
2.3 Economic risk	ECNR	Risks concerning the profitability
3. Performance		Addresses the performance in the three

		dimensions of sustainability
3.1 Win-win	WIN	Positive correlation between the performance in two or more dimensions
3.2 Trade-off	TRA	Negative correlation between the performance in two or more dimensions
3.3 Minimum criteria	MIN	Minimum criteria for each sustainability dimension
4. Supplier evaluation		Describes the management of suppliers focusing on issues at the dyadic supplier–buyer interface
4.1 Importance of supplier selection	SEL	Supplier selection according to their sustainability (economic, environmental, social) performance
4.2 Supplier self evaluation	EVA	Supplier self evaluation of their sustainability performance
4.3 Auditing and monitoring suppliers	MON	Practices aiming at auditing and monitoring suppliers concerning their sustainability performance
4.4 Implementation of environmental standards	ENVS	Implementation of environmental standards (either common or firm-specific)
4.5 Implementation of social standards	SOCS	Implementation of social standards (either common or firm-specific)
4.6 Supplier integration	INT	Supplier integration into the buyer's organizational, operational and cultural structure
5. Supply chain management		Comprises issues related to the management of the overall supply chain
5.1 Communication and coordination	COM	Means and intensity of communication and coordination between supply chain members
5.2 Total life-cycle approach	LCA	Concepts and thinking comprehending a product's total life-cycle
5.3 Cost and profit sharing	SHA	Sharing of costs and/or profits, thus building a supply chain identity
5.4 Joint innovation	INN	Cooperation between different supply chain members aiming at innovative products and processes
6. Third party involvement	TPI	Summarizes all third party involvement in auditing, certification and/or consulting
6.1 Third party involvement for auditing and certification	AUD	Involvement of third parties to implement certification schemes or standards
6.2 Third party involvement as	ENA	Involvement of third parties as consultants,

enabler/ consultant		advisors or facilitators

Source: Seuring & Müller, 2008; Seuring & Müller, forthcoming

Research Methodology – Literature Reviews as Content Analysis

"A literature review is a systematic, explicit, and reproducible design for identifying, evaluating, and interpreting the existing body of recorded documents" (Fink, 1998). The purpose of a literature review is to provide an in-depth account of research conducted in a certain field. It constitutes a first step in the theory development process (Mentzer & Kahn, 1995).

Regarding research methodology, two further issues need to be addressed. First, case study research needs to be briefly defined, as this research strategy was applied in the analyzed papers. Second, content analysis is described, as this is the method applied for the research presented in this paper.

According to Yin (2003, p. 13) "a case study is an empirical enquiry that (1) investigates a contemporary phenomenon within its real life context, especially when (2) the boundaries between phenomenon and context are not clearly evident". Linking this to the research stages of description, explanation and testing (Meredith, 1993), case studies might, for example, take up existing theories to gain a first insight into the phenomenon studied (Seuring, 2008).

Berelson (1952, p. 55) defines content analysis as a "research technique for the objective, systematic, and quantitative description of the manifest content of communication". Peer-reviewed journal articles represent a typical mode of communication among researchers, so they form a relevant unit of analysis. Since it is impractical to read everything, the researcher has to define narrowly what is included into the analysis.

Jauch, Osborn, and Martin (1980) have argued on the suitability of a structured content analysis of cases for organizational research. Case analysis can provide the researcher with in-depth data from multiple sources stemming from different time periods, allowing detailed insights beyond the single case. Content analysis of cases relies on the quality of the analysis schedule, which defines the assessment categories. Information unrelated to these categories is strictly eliminated from consideration.

Content analysis as a research method requires theoretical pre-considerations and follows a clear process, as this allows conclusions to be drawn on the analyzed material. A process model for content analysis (Mayring, 2003, p. 54; see also Neuendorf, 2002, p. 50f.) comprises the following four steps:

1. Material collection: The material to be collected is defined and delimitated. Furthermore, the unit of analysis (i.e. the single paper) is defined.
2. Descriptive analysis: Formal aspects of the materials are assessed, e.g. the number of publications per year. This forms the background for the theoretical analysis.
3. Category selection: Analytic categories are selected, which are to be applied in the literature review to structure the field.
4. Material evaluation: The material is analyzed and sorted according to the categories built. This should allow identification of relevant issues and interpretation of results.

This process was followed in the extant study. (1) English-speaking peer-reviewed papers have been selected according to their topic (SSCM) and the research method applied (case study). Thereby, the time period from 1994 to 2007 was taken into account. Our material collection mainly drew on the literature review conducted by Seuring and Müller (2008),

choosing from their literature body the subset of papers applying case study design as research method. (2) The assessment of formal aspects of the materials is left aside in the extant paper due to reduction reasons. (3) Preliminary categories for the analysis have been deductively derived from supply chain theory as described in the previous section. After a first round of coding, the categories have been modified and supplemented, thus applying elements of inductive category building. (4) The body of case study literature on SSCM is structured according to these categories. The results are further interpreted.

The limitations of the method are almost obvious: “Content analysis is reliant on the multiple judgments of a single analyst […] keen to find support for a particular view of the data” (Brewerton & Millward, 2001, p. 153). This risk can be reduced by involving two or more researchers when searching for and analyzing the data. This helps to ensure validity and reliability of the research. Neuendorf (2002) underlines the outstanding importance of reliability checks for content analysis, and Kolbe and Burnett (1991) state that “interjudge reliability is often perceived as the standard measure of research quality” (Kolbe & Burnett, 1991, p. 248).

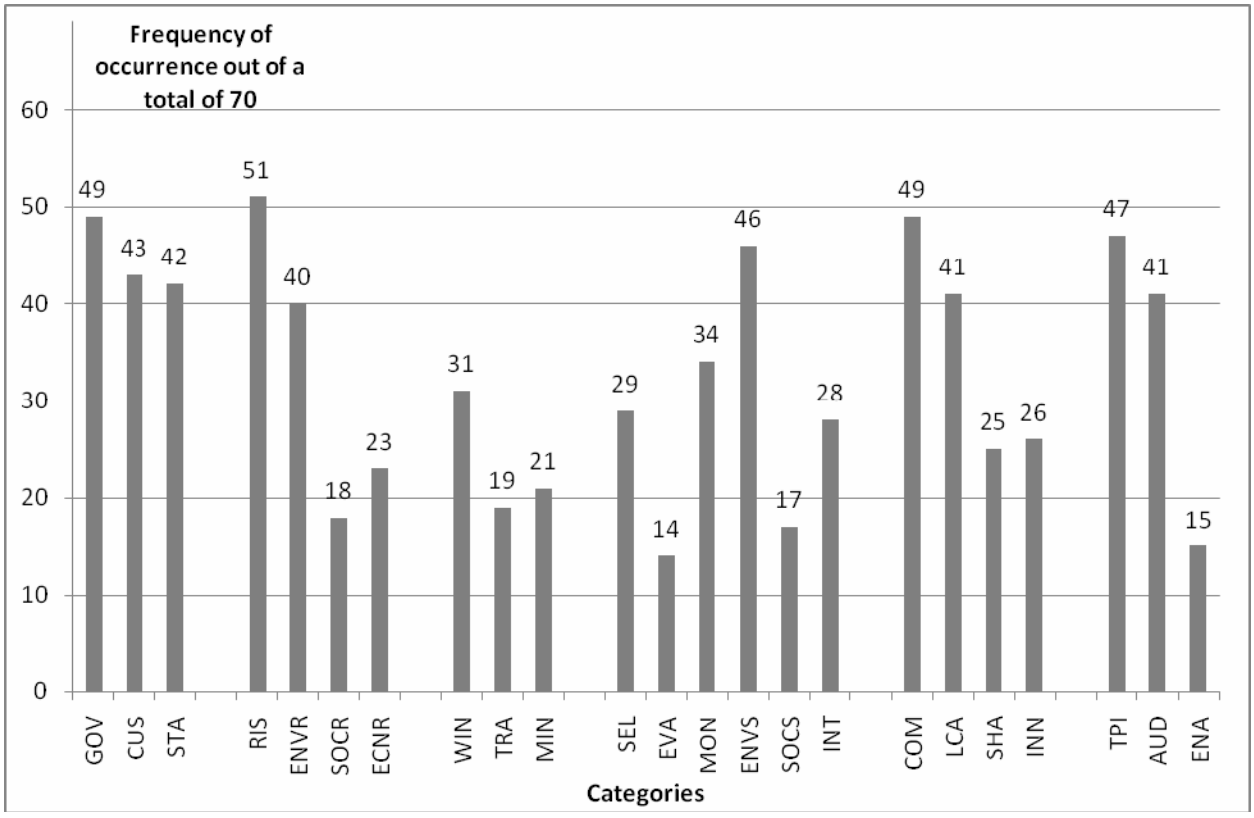
We selected Cohen’s kappa as index for measuring intercoder reliability, which is commonly used for nominal level variables. There are several recommendations for that index (e.g., Dewey, 1983). It represents a conservative measure tending to underestimate intercoder reliability (Lombard, Snyder-Duch, & Bracken, 2002). The reliability sample is a subset of the full sample, comprising eleven texts coded by two judges. Cohen’s kappa of .46 indicates a “moderate” (Landis & Koch, 1977) interrater agreement. This may be due to the fact that our categories can be characterized as “soft” criteria, i.e. they refer largely to latent content and deeper meaning embodied in the text (Duriau, Reger, & Pfarrer, 2007). The reliability check

induced us to align discrepancies of interpretations of categories between different coders. A revision of the coding of the entire sample will follow up. For the purpose of this paper, which presents preliminary findings of our content analysis, different judgments were individually assessed and resolved.

Results of the content analysis

The results of the content analysis of 70 case studies are displayed in Figure 3.

Figure 3: Frequency of category occurrence



Pressures from	TRA Trade-off	INT - Supplier integration
GOV Government	MIN Minimum criteria	**Supply chain management**
CUS Customers	**Supplier evaluation**	COM Communication and
STA Stakeholders	SEL Importance of supplier selection	coordination with suppliers
RIS Risk avoidance/management	EVA Supplier self evaluation	LCA Total life-cycle approach
ENVR Environmental risk	MON Auditing and monitoring suppliers	SHA Cost and profit sharing

SOCR Social risk	ENVS Implementation of environmental	INN Joint innovation
ECNR Economic risk	standards	**TPI Third party involvement**
Performance	SOCS Implementation of social	AUD for auditing & certification
WIN Win-win	standards	ENA as enabler

Source: Own Illustration

A majority of the analyzed literature discuss pressure from governing agencies (49), customers (43) and stakeholders (42) as important triggers for establishing corporate SSCM. Pressure by public authorities is addressed most often, while many papers treat all three pressures conjointly. Hall (2000), for example, mentions external pressures on firms by customers, regulations, environmental advocacy groups and neighbors.

While risk management (51) in general plays a strong role in our literature body, predominantly environmental risks (40) are addressed; economic (23) and social (18) risks are lower-ranking. Meyer and Hohmann (2000) is one of the rare articles pointing comprehensively to all three risks: environmental and social risks of conventional cotton farming and business risks of frontrunner companies due to limited flexibility in the niche market of organic cotton.

The interrelatedness of the corporate performance concerning all three dimensions of sustainability is only moderately discussed in the analyzed case studies. Win-win-situations (31) are considerably more often mentioned than trade-offs (19). 21 papers refer to minimum criteria for each sustainability dimension. One of the few articles addressing all performance categories is Walton, Handfield, and Melnyk (1998), suggesting, interestingly, both positive and negative correlations between environmental and economic corporate goals.

For managing the dyadic supplier-buyer interface it is far more common to implement environmental standards (46) than social (17) standards, which reflects the discrepancies concerning the occurrence of environmental and social risks. Supplier self evaluation (14) plays a considerably minor role in comparison to actively auditing and monitoring suppliers (34). The

importance of supplier selection (29) and supplier integration (28) are mentioned at an average level throughout the literature body. Papers taking a close look at the dyadic supplier-buyer interface and thus covering all six categories are, for instance, Yang and Sheu (2007) dealing with the challenge of practically implementing a greening of the supply chain, as well as Koplin, Seuring, and Mesterharm (2006) addressing the integration of social and environmental standards into SCM for the case of Volkswagen.

Regarding the management of the overall supply chain, our analysis yields an upscale importance of communication and coordination (49), followed by a total life-cycle approach (41). Cost and profit sharing (25) and joint innovation (26) occur at an under-average frequency level. Ras, Vermeulen, and Saalmink (2007) is one example of a case study pointing to communication and life-cycle assessment, while not mentioning the issues cost and profit sharing as well as joint innovation.

Third party involvement (47) is often discussed in the analyzed case studies, in particular in the context of implementing certification schemes or standards (41). Third parties involved as consultants, advisors or facilitators (15) are mentioned far less often. Graafland (2002), for instance, mentions SOCAM as audit organization of C&A, independent of C&A's commercial activities, as well as doctors consulted in the fight against child-labor.

Discussion

The alignment of supply chains to customers' demands is often highlighted in SCM literature (e.g., Korpela, Lehmusvaara, & Tuominen, 2001; Childerhouse, Aitken, & Towill, 2002). The SSCM framework used for our analysis assumes pressure from customers as one of

three pivotal external triggers for introducing SSCM, along with pressure from government and stakeholders. This is in line with previous research. Kleindorfer et al. (2005), for example, argue that “companies are most likely to improve their environmental performance when public pressure results in strong regulations” (Kleindorfer et al., 2005, p. 484). On the other hand, Roberts (2003) states that NGOs use increasingly “corporate reputational vulnerability” (Roberts, 2003, p. 160) in order to promote social and environmental change. Our analysis assesses frequent occurrence of all these three categories and thus backs the assumption of governing agencies, customers and stakeholders as external push factors.

While Seuring and Müller (forthcoming) assume that case study research might overemphasize companies acting as pro-active forerunners – at least partly induced by the fact that participating companies do not like negative reporting (Seuring, 2008) – our analysis shows that the importance of external triggers is acknowledged in the case studies. Even more noticeable is that government pressure is the most often mentioned of these triggers. This clearly shows that the outstanding role of regulations is not entirely left aside in the case studies, even though more space may be dedicated to proactive corporate activities.

Seuring and Müller (2008) postulate supplier management for risks and performance as one of two main strategies of SSCM. The relevance of preventing risks and securing performance finds evidence through our analysis, showing frequent occurrence of the category risk management. However, the neglect of the social dimension both in conceptual research (Dyllick & Hockerts, 2002) and in corporate practice (Beske, Koplin, & Seuring, 2008) becomes evident once again. Risk management as well as the implementation of standards clearly focuses on environmental aspects (e.g., Courville, 2003) according to our analysis. Social standards like

SA 8000 (Social Accountability 8000, cf. Graafland, 2002) or codes of conduct (Davies & Crane, 2003) still take a back seat.

Complying with Seuring and Müller (2008), our analysis shows considerably more win-wins than trade-offs between the three dimensions of sustainability. Once more, this optimistic view may be partly owed to the propensity towards positive reporting within business research. When considering the aim of overall supply chain performance, the relation between environmental and economic performance was usually focused in literature (e.g., Green, Morten, & New, 1998; Yakoleva, 2007). In contrast, the social dimension has been rarely addressed (Seuring & Müller, 2008). Seuring and Müller (forthcoming) present a grading of how the sustainability dimensions are interrelated: win-win situations are reached most easily between social and environmental goals, less easily between environmental and economic goals, and the least easily between social and economic goals. A meta-analysis conducted by Orlitzky, Schmidt, and Rynes (2003), on the other hand, point to a positive correlation between corporate social and financial performance. Newton and Harte (1997) generally criticize much of the business literature for overemphasizing the “easy wins”. They conclude that further-reaching incorporation of environmental objectives into business needs stronger state regulation.

It is noteworthy that both Chen and Paulraj (2004) as one prominent example of a framework of traditional SCM and the framework of SSCM (Seuring & Müller, 2008; Seuring & Müller, forthcoming), which we applied for our content analysis, accord great importance to the dyadic buyer-supplier relationship. While Chen and Paulraj (2004) focuses on the key aspects supplier base reduction, long-term relationship, communication, cross-functional teams and supplier involvement, the SSCM framework centers this relationship on supplier evaluation

through self-evaluation, auditing and monitoring, or through the implementation of standards (e.g., ISO 14000, SA 8000, or firm-specific standards). This focus is reflected by additional categories for third party involvement for auditing, certification, and consulting.

In general, SSCM postulates a need for information flows and coordination among a wider range of companies along the supply chain than it is the case in traditional SCM (Pesonen, 2001). This may contribute to explain that the SSCM framework allocates communication rather within the broader context of managing the over-all supply chain, while Chen and Paulraj (2004) situate communication within the dyadic buyer-supplier relationship. Our analysis shows that communication and coordination is of paramount importance for SSCM. The frequent occurrence of this category affirms arguments of prior SCM research, which accord special attention to information flows and information exchange. Communication and coordination as a key ingredient of SCM has been widely incorporated into SCM and SSCM definitions (e.g. Mentzer et al., 2001; Seuring & Müller, 2008).

Furthermore, we found that still a great number of cases take on the total life-cycle approach. Companies often rely on this approach when implementing the second main SSCM strategy postulated by Seuring and Müller (2008): SCM for sustainable products (Lamming & Hampson, 1996; Pesonen, 2001; Michelsen, 2007). This strategy requires to ensuring product quality and operations performance. At the same time, however, it calls for deeper integration and partnership building, which allows, for example, joint product development and market launch. Hence, the complete supply chain from raw material extraction to the final customer needs to be integrated (Seuring, 2001; Kogg, 2003; Preuss 2005).

While communication and life-cycle approach are widespread in our literature body, cost and profit sharing as well as joint innovation are less often addressed. This confirms previous research pointing out that supply chain integration, in practice, is still rather limited (Fawcett & Magnan, 2002; Frohlich & Westbrook, 2001), even within SSCM. Seuring and Müller (2008) have assessed an increased need for cooperation among supply chain partners engaging in SSCM. Similarly, Spekman, Kamauff, and Myhr (1998) conclude that customer-focused integrated supply chains indispensably require high degrees of interdependence. Many companies, however, are deterred from deeper integration, because they estimate the risks of increased dependence higher than the possible benefits of collaboration.

Conclusion

This paper outlines findings of a content analysis assessing systematically all case studies in the field of SSCM, published from 1994 to 2007 in English-speaking peer-reviewed journals. A framework of SSCM served as basis for deductively deriving categories, used in the content analysis.

The insights of this analysis are summarized below:

(1) Pressures from governing bodies, customers and stakeholders are highly-relevant triggers of SSCM. (2) The social dimension of sustainability is neglected both in conceptual research and in corporate practice concerning corporate risk management as well as the implementation of standards. (3) Win-win situation between the dimensions of sustainability are more accentuated than trade-offs while the interrelations between the dimensions of sustainability need further research. (4) Intensive communication and coordination across the

entire supply chain is paramount for implementing SSCM. (5) Far-reaching supply chain integration is still rather limited, even in SSCM, and has to be extended if environmental and social goals are actively to be taken into account.

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