

Individual sustainability competences in Supply Chain Management

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Individual Sustainability Competences in Supply Chain Management

Wim Lambrechts^{1*}, Janjaap Semeijn¹, Cees J. Gelderman¹, Paul Ghijsen¹, Luc Van Liedekerke²

Abstract

Sustainability has become imperative for companies within global business settings. Within the context of supply chain management, the business case to integrate environmental and social aspects of sustainable development and foster sustainable supply chains has been developed extensively. In higher education settings, key competences for sustainable development have been defined, with a specific focus towards systems thinking, future thinking, normative perspectives, strategic competences and action approaches. Both discourses have evolved in separate settings (educational versus business context), resulting in a gap between educational interpretations on sustainability competences and business developments on (green) supply chain management. In this paper we explore the position of individual sustainability competences in the context of supply chain management. This contribution aims to clarify the relevance of such competences as systems thinking and future thinking in the context of supply chain management. It will first result in guidelines to translate sustainability competences specifically for supply chain management, applicable in both (higher) education and business. Such disciplinary translation has been recommended in the literature, and has led to comparable initiatives, e.g. in ecodesign and engineering education. Second, it provides further recommendations to develop the field of sustainable supply chain management, thereby surpassing the primary focus on the (financial) bottom line, and providing a holistic perspective inspired by (but not limited to) the triple bottom line.

Keywords

Competences, Corporate Social Responsibility, Skills, Sustainability, Supply Chain Management

List of abbreviations

CSR	Corporate Social Responsibility
GSCM	Green Supply Chain Management
HEIs	Higher Education Institutions
HESD	Higher Education for Sustainable Development

¹ Open University of the Netherlands, Faculty of Management, Science & Technology, Department of Marketing & Supply Chain Management, Valkenburgerweg 177, 6419 AT Heerlen, the Netherlands.

² University of Antwerp (UA), Antwerp Management School (AMS), BASF-Deloitte-Elia Chair on Sustainability.

*Corresponding author, e-mail: wim.lambrechts@ou.nl, tel.: 0031455762826. Wim Lambrechts has been holder of a Special PhD Fellowship (2015-2016) of the Research Foundation - Flanders (FWO).

SCM	Supply Chain Management
SD	Sustainable Development
SMER	Supply Management Ethical Responsibility
SSCM	Sustainable Supply Chain Management

1. Introduction

Higher education (HE) has a specific role to play in society: it prepares students for their future role as consumer, employee, politician, entrepreneur, etc. (Cortese, 2003). As a concept, Higher Education for Sustainable Development (HESD) emerged in the 1990's, under the influence of the many charters and declarations, specifically oriented towards fostering the integration of sustainable development (SD) in higher education (Lozano, Lukman, Lozano, Huisingsh, & Lambrechts, 2013; Wright, 2004). HESD is an emerging academic field, with growing contributions in international journals such as *Journal of Cleaner Production* and *International Journal of Sustainability in Higher Education* (Karatzoglou, 2013). The field can be described as an eclectic domain, covering a variety of subjects in different key roles of higher education institutions (HEIs). Lozano et al. (2013) describe seven dimensions of HESD: (1) institutional framework; (2) campus operations; (3) education; (4) research; (5) outreach and collaboration; (6) on-campus experiences; (7) assessment and reporting.

A multitude of cases, frameworks and models are reported in the literature, the majority of which deal with educational topics (Karatzoglou, 2013). Such contributions range from 'greening the curriculum' by introducing sustainability courses ('what needs to be learned?') (e.g. Brundiers & Wiek, 2013), over defining and integrating competences for SD (e.g. Rieckmann, 2012; Wiek, Withycombe, & Redman, 2011), to developing innovative pedagogical approaches ('how do we enable such a learning process?') (e.g. Steiner & Posch, 2006; Sterling, 2004). Competences for SD have been the focus of different studies, in which different sets of knowledge, skills, attitudes and values are presented. However developed in different settings, most of the reported competences for SD comprise the main structure and elements, as described by Wiek et al. (2011): systems-thinking competence, anticipatory competence, normative competence, strategic competence, interpersonal competence.

In the context of supply chain management (SCM), seemingly separate from the HESD discourse, the business case to integrate sustainability and foster sustainable supply chains has been developed, since sustainability becomes a growing demand within global business settings (Quarshie, Salmi, & Leuschner, 2016). Different definitions and interpretations are available for Sustainable Supply Chain Management (SSCM), ranging from a narrow focus towards environmental issues (also referred to as Green Supply Chain Management, GSCM), to a holistic interpretation of economic, environmental, social and ethical aspects in the supply chain (Ahi & Searcy, 2013). One of the working definitions of SSCM, which is adopted in the context of this paper as well, is: "The integration of sustainable development and supply chain management [in which] by merging these two concepts, environmental and social aspects along the supply chain have to be taken into account, thereby avoiding related problems, but also looking at more sustainable products and processes" (Seuring, 2008, 132). As a result of a systematic literature review, Seuring and Müller (2008) present a conceptual framework for SSCM, consisting of three elements: triggers for SSCM; supplier management for risks and performance; and SCM for sustainable products. They also point towards

the finding that SD is often reduced to environmental issues, and that a theoretical background is often missing for SSCM (Seuring & Müller, 2008). Another popular conceptualisation of SD is the triple bottom line (Elkington, 1997), in which sustainability is about finding a balance between economic, environmental and social performance. A triple bottom line framework for SCM was provided by Carter and Rogers (2008), who state “we are not suggesting that organizations blithely undertake social and environmental goals relating to the supply chain”, thereby referring to the extra costs that these goals would bring to an organization (Carter & Rogers, 2008, 369).

Such interpretations, in which SSCM is reduced to the supremacy of financial and economic dimensions over environmental and social dimensions, is criticized by Pagell and Shevchenko (2014), who state that “the question of how to create truly sustainable supply chains remains unanswered” (Pagell & Shevchenko, 2014, 44). A ‘truly SSCM’ might then be defined as follows: “To be truly sustainable a supply chain would at worst do no net harm to natural or social systems while still producing a profit over an extended period of time; a truly sustainable supply chain could, customers willing, continue to do business forever” (Pagell & Wu, 2009, 38).

Both discourses have evolved in separate settings (educational versus business context), resulting in a gap between educational interpretations on sustainability competences and business developments on SSCM. This paper explores the position of sustainability competences as developed in HESD literature in the context of SCM. The aim of the paper is to bridge the gap between educational discourses on sustainability competences and business discourses on (sustainable) SCM. It seeks to clarify the relevance of such competences as systems thinking and future thinking in the context of SCM. First, we provide guidelines to translate sustainability competences specifically for SCM, and applicable in both (higher) education and business. Such disciplinary translation has been recommended in the literature, and has led to comparable initiatives, e.g. in ecodesign, and engineering education (Mulder, Segalàs, & Ferrer-Balas, 2012; Verhulst & Van Doorselaer, 2015). Second, we give further recommendations to develop the field of SSCM, thereby surpassing the primary focus on the (financial) bottom line, and providing a holistic perspective inspired by (but not limited to) the triple bottom line.

2. Theoretical framework

This paper addresses two distinct fields of research: sustainability competences on the one hand, and (sustainable) SCM issues on the other. In order to set out the scope of the paper, this section presents the theoretical framework, with specific attention towards sustainability competences as described in the HESD literature (section 2.1), and (general) skills and competences as presented in SCM literature (section 2.2).

2.1. Sustainability competences

Competences and competence based (higher) education are the result of educational reforms under the influence of social constructivism (Van den Berg et al., 2006). Ideally, a competence comprises the knowledge, skills, attitudes and values a person needs to be successful in a certain situation. Key competences are relevant competences for any person in any context (Rychen & Salganik, 2003).

Sustainability competences (also referred to as Competences for sustainable development) describe the learning outcomes (in educational settings) or individual competences (in business settings) that enable a person to cope with the complexity and uncertainty of sustainability issues. In the HESD literature, these competences are oriented towards aspects of systems thinking, future thinking, normative thinking, strategic thinking and action competence (Rieckmann, 2012; Wiek et al., 2011). Table 1 provides an overview of different competences for SD.

Table 1. Competences for SD (Source: adapted from Rieckmann, 2011; translated and cited in Stough, Lambrechts, Ceulemans, & Rothe, 2013)

Competence	Description
<i>Systemic thinking and handling of complexity</i>	ability to identify and understand connections; think connectively; be able to deal with uncertainty
<i>Anticipatory thinking</i>	develop visions, apply precautionary principle, and predict flows of (re-)action; be able to deal with risks and changes
<i>Critical thinking</i>	ability to look at the world, challenge norms, practices, and opinions; reflect on one's own values and actions; give opinions to others; understand external perspectives.
<i>Acting fairly and ecologically</i>	know alternative actions; be able to orientate oneself in regards to justice, solidarity, and conservation values; reflect on possible outcomes of one's actions; take responsibility for one's actions
<i>Cooperation in (heterogeneous) groups</i>	ability to deal with conflicts; to learn from others; be able to show understanding/sympathy
<i>Participation</i>	ability to identify scopes of creativity and participation; be able to participate in the creation of initiatives
<i>Empathy and change of perspective</i>	ability to identify onesown external perspectives; to deal with onesown and external value orientation; to put oneself in someone else's position; be able to accept diversity
<i>Interdisciplinary work</i>	ability to deal with knowledge and methods of different disciplines and be able to work on complex problems in interdisciplinary contexts
<i>Communication and use of media</i>	ability to communicate in intercultural contexts; to deal with IT; to be able to pass criticism on media
<i>Planning and realising innovative projects</i>	develop ideas and strategies; plan and execute projects; show willingness to learn for innovation; ability to deal with, and reflect on possible risks
<i>Evaluation</i>	ability to elaborate evaluation standards and carry out independent evaluations with respect to conflicts of interest and goals, uncertain knowledge, and contradictions
<i>Ambiguity and frustration tolerance</i>	conflicts, competing goals and interests, contradictions, and setbacks

The definition and description of sustainability competences has led to an extended debate about the purpose and relevance to define such competences. The many examples of sustainability competences (e.g. Barth, Godemann, Rieckmann, & Stoltenberg, 2007; de Haan, 2006; Rieckmann, 2012; Roorda, 2010) have been criticized for being mere 'laundry lists', missing the holistic notion of the competence concept (Wiek et al., 2011). Other authors point towards the problematic notion of SD as a guiding principle for education. The uncertainty of SD does not allow for a fixed set of learning outcomes, and the normative approach might lead to indoctrination (e.g. Jickling & Wals, 2008). Nevertheless, within the current context of social constructivist inspired educational reform and competence based higher education, sustainability competences are a legitimate starting point to move towards HESD. The specific integration of sustainability competences in higher education programs has been reported in a number of articles (e.g. Lambrechts, Mulà, Ceulemans, Molderez, & Gaeremynck, 2013; Segalàs, Ferrer-Balas, Svanström, Lundqvist, & Mulder, 2009). Specifically in the context of business management study programs, analysis in two Belgian HEIs pointed out that competences for SD were only integrated fragmented (i.e. elements of systems thinking without providing 'the bigger picture') and implicitly (i.e. without explicit reference to sustainability) (Lambrechts et al., 2013).

2.2. Competences in Supply Chain Management

Within the context of SCM, and previously logistics literature as well, specific attention has been given towards competences for successful supply chain managers. We provide a selection of key references in this field, with a specific focus on possible aspects of sustainability. Specifically within the context of HE, Jordan and Bak (2016) provide an overview of supply chain skills. They define 23 skills based on a literature review, including rather general skills like communication, leadership, IT skills, etc. Business ethics is also included as a skill, framed within the concept of Corporate Social Responsibility (CSR). Overall, this study presents a valuation of general competences for SCM, but does not provide specific translations of these competences (e.g. which specific ethical issues might be at stake in SCM?).

Based on the BLM framework (Business, Logistics and Management skills), Murphy and Poist (2006) compare knowledge and skill requirements for senior-level and entry-level logistics managers. Extracted from an extensive list of skills, they concluded that SCM and business ethics were among the five highest ranked business skills, for entry-level logisticians business ethics was even at the highest rank (Murphy & Poist, 2006). This finding is in line with a study by Gammelgaard and Larson (2001), who found that ethical awareness was rated as important by practitioners in the field of SCM, in contrast to the students, who rated this skill less important (Gammelgaard & Larson, 2001).

With the evolution of logistics towards SCM, the required skills and competences of logistics managers or supply chain managers have become more demanding and complex (Ellinger & Ellinger, 2013). Rather than developing long lists of rather general business skills, it might be worthwhile to specifically describe what is expected from supply chain managers in the 21st century. An example is provided by Cottrill (2010), who defines four essential skills: higher order problem solving; managing ambiguity; multi-level communicator; world citizen. Other authors also point towards elements of global orientation, effective leadership skills, change management skills, and cross-functional skills (Ellinger & Ellinger, 2013). Such conceptualizations of 21st century skills for supply chain managers are

in line with the growing complexity and the need to be able to successfully involve stakeholders in SCM initiatives (Knight, Pfeiffer, & Scott, 2015).

With the growing attention towards sustainability in SCM, skills and competences for supply chain managers will need to be framed within this new context. A connection with sustainability competences as described in the HESD literature might be an interesting way to reorient SCM skills and surpass the general focus on business ethics on the one hand, or a narrow focus on GSCM on the other. Furthermore, it provides an opportunity to tackle the issue of a narrow interpretation of the triple bottom line as presented by Carter and Rogers (2008).

Individual competences and skills might also be related to personality traits of a professional, in this case the supply chain manager. Recent research found that up to 20% in business populations displayed levels of psychopathy, which is comparable to rates in criminal samples (Brooks & Fritzon, 2016). This poses specific questions towards the readiness to adopt specific sustainability competences, especially related to emotional intelligence, interpersonal competence, normative competence and (business) ethics.

3. Method

Given the blurry discussion concerning competences in HESD, and the multiple definitions available for sustainability in SCM, a systematic review of the literature is recommended. A systematic review provides “a systematic, explicit, and reproducible design for identifying, evaluating, and interpreting the existing body of recorded documents” (Fink, 2005, 3). Systematic reviews have been applied in both HESD (e.g. Ceulemans, Molderez, & Van Liedekerke, 2015; Karatzoglou, 2013) and SCM settings (e.g. Quarshie et al., 2016; Seuring & Gold, 2012; Seuring & Müller, 2008). The systematic literature review presented in this paper follows five steps: (1) Defining scope and search criteria (presented in section 3.1.); (2) Article search (presented in section 3.2.); (3) Evaluation of results and selection of articles (presented in section 3.3.); (4) Content analysis (presented in section 4); (5) Findings (presented in section 5).³

3.1. Defining scope and search criteria

Based on the theoretical background as described in section 2, the scope and search criteria for this systematic review were defined. The scope is the interlinking of the field of competences for sustainable development (in HE settings) and SSCM. The broad research question is: “how do competences for SD relate to the field of sustainability in SCM?”. The diversity in definitions and in the use of synonyms for some terms, requires that alternative wording should be taken into account in the search criteria. Table 2 provides an overview of the different search criteria adopted for our systematic review.

³ It should be mentioned that, at the time of writing this paper, the systematic review is still an ongoing process, in an iterative and inductive approach. Results presented in this paper are thus preliminary and prone to substantial review.

Table 2. search criteria identified in different research fields (Source: authors' own elaboration)

Regarding Competences for Sustainable Development	Regarding Sustainability	Regarding Supply Chain Management
Competence	Sustainable	Supply Chain Management / SCM
Competency	Sustainability	Supply Chains
Competences	Sustainable development / SD	Chain
Competencies	Ethics	Purchasing
Knowledge	Ethical	Purchase
Skills	Business Ethics	Procurement
Attitudes	Corporate Social Responsibility / CSR	Sourcing
Values	Environmental	Outsourcing
Capability	Green	Buyer
Capabilities	Ecological	Seller
	Social	Supplier
	Triple P	Trading
	Prosperity	Logistics

3.2. Article search

As preference is given towards journal articles published in journals with an impact factor, a first search was done in Web of Science™ (all databases, all years). Different field tags and Boolean operators were combined to identify literature relevant for our review. The results of these searches are presented in table 3. It can be observed that, when combining the three sets of search criteria, the number of results is too big to perform a content analysis. After scanning a sample of resulting articles, some search criteria were omitted, resulting in a smaller body of abstracts, yet still too large to perform a selection of relevant articles. After performing a second scanning of a sample of resulting articles, a new series of search criteria were deleted from the list, resulting in a new set of abstract. These steps of sampling abstracts and omitting search criteria was repeated in an iterative process until it resulted in a body of 111 articles.

Table 3. Search queries applied in Web of Science™ (Source: authors' own elaboration)

Search #	Search Query	Results (# of articles)
1.	TS=((competenc* OR knowledge OR skill* OR attitude* OR value* OR capabilit*) AND (sustainab* OR sustainable development OR SD OR ethic* OR business ethics OR corporate social responsibility OR CSR OR environment* OR green OR ecological OR social OR triple p OR prosperity) AND (supply chain management OR supply chain* OR chain* OR purchas* OR procurement OR sourcing OR outsourcing OR buyer OR seller OR supplier OR trading OR logistic*))	131.932
2.	TS=((competenc* OR knowledge OR skill* OR attitude* OR value* OR capabilit*) AND (sustainab* OR sustainable development OR SD OR ethic* OR business ethics OR corporate social responsibility OR CSR OR environment* OR green OR ecological OR social OR triple p OR prosperity) AND (supply chain management OR supply chain* OR chain*))	25.107
3.	TS=((competenc* OR skill* OR capabilit*) AND (sustainab* OR sustainable development OR SD OR ethic* OR business ethics OR corporate social responsibility OR CSR) AND (supply chain management OR supply chain*))	400
4.	TS=((competenc* OR skill*) AND (sustainab* OR sustainable development OR SD OR ethic* OR business ethics OR corporate social responsibility OR CSR) AND (supply chain management OR supply chain*))	111

In addition of this search in Web of Science TM, a search was done with a selection of search criteria and Boolean operators in Google Scholar, in order to also identify relevant publications in journals not featured in Web of Science TM. However, applying the fourth query as presented in table 2, resulted in 31.800 results. Therefore, search criteria were narrowed down to ("competencies for sustainable development" AND "supply chain management"). This resulted in an additional identification of 37 possible relevant articles for our study.

3.3. Evaluation of results and selection of articles

Based on the 111 articles identified in Web of Science TM and 37 articles in Google Scholar, a selection of relevant articles was made, based on reading the abstracts. It appeared that the majority of articles from Web of Science TM could not be selected for this study, because of several reasons:

- Subject of the articles is out of scope: articles were oriented towards very broad aspects of sustainability or CSR, without specific focus on competences and/or SCM.
- Different interpretation of search criteria: it appeared that the fuzzy discussion regarding competences is reflected in the search results. Competences within the context of (higher) education are interpreted as learning outcomes, while many articles in the resulting list dealt with core competencies of an enterprise instead of individual competences of (supply chain) managers.

This resulted in only 5 articles specifically addressing the topic of our search, and an additional 21 articles to be further analyzed in order to clarify whether they should be included in the content analysis. After this further analysis 7 additional articles were retained. Of the Google Scholar search, a total number of 5 articles was retained for the content analysis phase of the systematic review. Table 4 provides an overview of the articles selected for content analysis.

Table 4. Selected articles for content analysis

Title	Journal	Type	Reference
<i>Web of Science</i> TM			
Commentary on Knowledge Creation and Dissemination in Operations and Supply-Chain Management	PRODUCTION AND OPERATIONS MANAGEMENT	Conceptual paper	(Starr, 2016)
Social management capabilities of multinational buying firms and their emerging market suppliers: An exploratory study of the clothing industry	JOURNAL OF OPERATIONS MANAGEMENT	Case study	(Huq, Chowdhury, & Klassen, 2016)
Fuzzy VIKOR approach for selection of big data analyst in procurement management	JOURNAL OF TRANSPORT AND SUPPLY CHAIN MANAGEMENT	Case Study	(Bag, 2016b)
How Transdisciplinarity Can Help to Improve Operations Research on Sustainable Supply Chains-A Transdisciplinary Modeling Framework	JOURNAL OF BUSINESS LOGISTICS	Conceptual paper	(Stindt, Sahamie, Nuss, & Tuma, 2016)

(Table 4. Continued)

Flexible procurement systems is key to supply chain sustainability	JOURNAL OF TRANSPORT AND SUPPLY CHAIN MANAGEMENT	Conceptual paper	(Bag, 2016a)
Matching supply with demand in supply chain management education	INTERNATIONAL JOURNAL OF LOGISTICS MANAGEMENT	Research paper	(Sinha, Milhiser, & He, 2016)
Using interpretive structure modeling to analyze the interactions between environmental sustainability boundary enablers	BENCHMARKING-AN INTERNATIONAL JOURNAL	Research paper	(Dev & Shankar, 2016)
The role of supply management resilience in attaining ambidexterity: a dynamic capabilities approach	JOURNAL OF BUSINESS & INDUSTRIAL MARKETING	Conceptual paper	(Eltantawy, 2016)
Environmental management: the role of supply chain capabilities in the auto sector	SUPPLY CHAIN MANAGEMENT-AN INTERNATIONAL JOURNAL	Research paper	(Liu, Srai, & Evans, 2016)
Reducing the carbon footprint within fast-moving consumer goods supply chains through collaboration: the manufacturers' perspective	JOURNAL OF SUPPLY CHAIN MANAGEMENT	Research paper	(Theißen, Spinler, & Otto, 2014)
Cotton and sustainability Impacting student learning through Sustainable Cotton Summit	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	Case study	(Ha-Brookshire & Norum, 2011)
Supply management ethical responsibility: reputation and performance impacts	SUPPLY CHAIN MANAGEMENT-AN INTERNATIONAL JOURNAL	Research paper	(Eltantawy, Fox, & Giunipero, 2009)
Google Scholar			
Higher education curriculum for sustainability: Course contents analyses of purchasing and supply management programme of polytechnics in Ghana	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	Case study	(Etse & Inglely, 2016)
Sustainability in higher education: a systematic review with focus on management education	JOURNAL OF CLEANER PRODUCTION	Research paper	(Figueiró & Raufflet, 2015)
An overview of management education for sustainability in Asia	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	Research paper	(Wu, Shen, & Kuo, 2015)
Dealing with the wicked problem of sustainability: The role of individual virtuous competence	BUSINESS AND PROFESSIONAL ETHICS	Conceptual paper	(Blok, Gremmen, & Wesselink, 2015)
Integrating sustainable development into operations management courses	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	Research paper	(Fredriksson & Persson, 2011)

4. Results

The selection of articles was analysed in an inductive approach, in which categories for analysis are derived from the articles under examination in an iterative process (Seuring & Gold, 2012). All of the selected articles have been published between 2009 and 2016, with the majority (ten articles) published (online) in 2016. The contributions are published in a variety of journals, with four articles in the *International Journal of Sustainability in Higher Education*, two in *Journal of Transport and Supply Chain Management* and two in *Supply Chain Management-An International Journal* (table 4).

Five articles are considered to be conceptual papers. These articles focus on aspects of flexible procurement systems and sustainable supply chain management (Bag, 2016a), the role of supply chain resilience in attaining ambidexterity (Eltantawy, 2016); transdisciplinary research in the context of SSCM (Stindt et al., 2016); sustainability competences from a virtues ethics perspective (Blok et al., 2015); achieving sustainability of ecosystem cycles (Starr, 2016, this is more of a discussion paper rather than conceptual).

Four articles present specific case studies. Bag (2016b) presents a case to analyse relevant skills specifically important for big data analysts in corporate settings. Huq et al. (2016) point towards the importance to implement social sustainability in complex global supply chains (e.g. clothing industry), with a focus on social management capabilities. Related to the same topic, another case study presents the educational perspective of sustainability issues in cotton supply chains (Ha-Brookshire & Norum, 2011). In a recent special issue of the *International Journal of Sustainability in Higher Education*, Etse & Ingley (2016) present a case study of the integration of sustainability in SCM education programs in Ghana.

The majority of articles present original research initiatives, with a specific focus on environmental sustainability initiatives in SCM (Dev & Shankar, 2016; Liu et al., 2016; Theißen et al., 2014); ethical responsibility in supply management (Eltantawy et al., 2009); a comparison of demand and supply in SCM-related knowledge areas (Sinha et al., 2016); and the integration of sustainability in management education (Figueiró & Raufflet, 2015; Fredriksson & Persson, 2011; Wu et al., 2015).

From our small sample of articles, it is clear that the implementation of environmental sustainability issues in SCM is receiving more attention than issues of social sustainability. However, different conceptual and research contributions also focus on ethical aspects, whether in the framework of SCM or rather general. Eltantawy et al. (2009) provide a definition of the concept of supply management ethical responsibility (SMER): “managing the optimal flow of high-quality, value-for-money materials, components or services from a suitable set of innovative suppliers in a fair, consistent, and reasonable manner that meets or exceeds societal norms, even though not legally required” (Eltantawy et al., 2009, 101). Furthermore, the interrelations between supply chain resilience and sustainability are developed in a conceptual contribution by Eltantawy (2016), in which resilience is interpreted as a dynamic capability with two dimensions (engineering and ecological engineering), and leading towards the firm’s ability to adapt and transform in a sustainability context (Eltantawy, 2016).

Specific references towards individual sustainability competences in the context of SCM are limited in the selected articles. Rather, they tend to refer to general “skills” important within the context of SCM. Such skills are described in general terms such as:

- “manufacturers lack the necessary skills for enhancing eco-efficiency and sustainability” (Theißen et al., 2014, 44);
- “corporate social responsibility” (Etse & Ingley, 2016, 275);
- “ethics as a concept” (Etse & Ingley, 2016, 276);
- “broad mix of technical, clear communication and managerial skills is essential for collaboration with green suppliers” (Bag, 2016a, 6);
- “sustainability/ethics/social responsibility” (Sinha et al., 2016, 854; Wu et al., 2015, 346).

It appears that the individual competences and skills mentioned in the SCM literature are ill defined, and handled too brief to contribute to the field. As seen in the HESD literature, sustainability as a competence comprises multiple dimensions, of which systems thinking, future thinking, normative competence, strategic thinking and interpersonal competence are core elements (e.g. Rieckmann, 2012; Wiek et al., 2011). Furthermore, specific individual competences related to CSR, and framed within a virtuous ethics perspective, contribute to the conceptualization of these competences (Blok et al., 2015). These are further discussed in section 5 of this paper.

5. Discussion

Within our sample of articles, sustainability issues addressed are mainly oriented towards embedding environmental and social sustainability within the context of SCM. Applying a systems thinking or future thinking approach in such a setting is only partially mentioned. Concerning systems thinking, an important aspect is the involvement of different societal stakeholders in SCM initiatives (Knight et al., 2015). Ethical and normative perspectives are presented in some articles, and provide ways to reorient SCM issues in a sustainability context. The question remains how sustainability competences can be translated within the SCM context. Earlier research concerning supply chain skills analyzed perceptions of graduate students of general skills for supply chain managers (Rahman & Qing, 2014). However, in relation to sustainability, this study only included environmental related skills such as ‘reverse supply chain’ and ‘knowledge of environmental issues in supply chain’ (Rahman & Qing, 2014, 283), thereby neglecting issues of ethical perspectives and social sustainability.

Referring to research in management education in two Belgian HEIs, competences related to systems thinking, future thinking and normative thinking were nearly absent within the study programs’ competence schemes (Lambrechts et al., 2013). Lans et al. (2014) address the connection of sustainability and entrepreneurship, and conclude that in entrepreneurship education, normative competence is often not seen as a characteristic aspect (Lans, Blok, & Wesselink, 2014). This is in contrast with research in the business context by Osagie et al. (2016), presenting individual competences for CSR, in which personal value-driven competences are included, comprising (i) ethical normative competences; (ii) balancing personal ethical values and business objectives; (iii) realizing self-regulated CSR-related behaviors and active involvement. Such value-driven competences were specifically highlighted by interviewed CSR professionals in a business environment (Osagie, Wesselink, Blok, Lans, & Mulder, 2016). Blok et al. (2015) frame normative competence and action competence within a virtue ethics perspective. Normative competence and action competence are moral competences, as they provide norms, values and beliefs, define what is right and wrong, and enable an individual to take the right decisions in a sustainability context.

The concept of normative competence and action competence from a virtue ethics perspective might provide guiding principles to reorient individual competences for SCM. However, given the complexity and uncertainty of sustainability, new questions emerge: do we know what is the right thing to do in a sustainability context? Which normative perspectives do we need to pursue? What kind of action do we need to take? It is clear that these questions require a broad understanding of sustainability and its multiple dimensions (economic, social, environmental, cultural, ethical, etc.). Reducing SSCM to only take into account the economic dimension (as proposed by e.g. Carter & Rogers, 2008), or narrowing down the concept to GSCM is insufficient to effectively define and conceptualize sustainability competences in a SCM context.

6. Conclusion

Individual competences for SD have been defined and conceptualized in different settings. Ideally, a competence incorporates knowledge, skills, attitudes and values (Rychen & Salganik, 2003). In higher education however, the integration of competences suffers many conceptual problems, and is characterized by the introduction of innovative approaches in conservative educational structures (Lambrechts & Van Petegem, 2016). Certainly within the context of sustainability and SSCM, a holistic approach is necessary in order to avoid reducing interpretations focusing on the supremacy of the economic dimension, or narrow conceptualizations of GSCM.

Within the selected articles in our analysis, specific reference has been made to ethical aspects of SSCM. Unfortunately, these were only broadly mentioned, without defining what it means for a supply chain manager to act ethically. Further research is needed on the ethical dilemmas a supply chain manager might face in the growing complexity and uncertainty of sustainability issues. These findings are in line with earlier results in which SCM and business ethics articles were compared in relation to SSCM (Quarshie et al., 2016). Specific attention towards soft skills, such as interpersonal competence as described in HESD literature (Wiek et al., 2011), as well as adding the perspective of virtuous competence, comprising elements of normative and action competence (Blok et al., 2015), might help to conceptualize the ethical perspective in SSCM.

The study also has some limitations to take into account. Our study is ongoing, it is still in progress and the systematic literature review will be continued, adding additional iterative cycles with other (combinations of) search criteria and in other databases as well. The application of new (combinations of) search criteria will enable us to include relevant literature on e.g. sustainability skills in logistics.

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