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A Literature and Practice Perspective

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Journal article (Accepted manuscript*)

**Individual Competences for Sustainable Purchasing and Supply Management (SPSM):
A Literature and Practice Perspective**

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Structured Abstract:

Purpose – Implementing sustainability into global supply networks remains a challenge for companies. Purchasing and Supply Management (PSM) interacts closely with supply network actors, thus influencing how the firm's value creation is delivered. While previous sustainable PSM (SPSM) research has shed light on how to manage sustainability on an organizational level, the individual competences PSM professionals require are less understood.

Design/methodology/approach – We conducted a systematic literature review to determine the current research coverage of specific competences and knowledge required to implement sustainability. We complemented this with data from 46 interviews with practitioners. From coding the data with NVivo, a first comprehensive competence overview for SPSM was developed.

Findings – The literature review results, complemented with interview data, highlight that functional-oriented, cognition-oriented, social-oriented, and meta-oriented competences form part of a comprehensive SPSM competence model. We propose a framework that includes these, and integrates two behavioral moderators on the organizational level, i.e. situational enabling, as well as empowerment and obligation.

Research limitations/implications – While the proposed framework provides a basic first systematization of SPSM competences, further research is needed to extend it. There is ample opportunity to shed further light on both individual and organizational level factors that influence the application of SPSM competences, and therefore SPSM behavior.

Practical implications – The results have implications for higher education and professional training programs in companies. The framework provides an overview of competences needed for SPSM. The discussion highlights the need to apply education and training methods for different types of competences that are suitable for conveying implicit knowledge apart from explicit knowledge.

Originality/value – Adressing a current research gap in sustainability-related competences in PSM, the overall framework highlights SPSM competences of interest to both scholars and managers alike.

Keywords: Competences; Skills; Purchasing and Supply Management; Sustainability; Interviews; Systematic Literature Review

Introduction

We live in "a world in which 69 of the world's 100 largest economic entities are corporations rather than countries, [so that] responsible supply chains are a moral imperative" (The Economist Intelligence Unit, 2017, p. 10).

When considering which functions influence the implementation of environmental and social requirements in supply chains, the realm of purchasing and supply management (PSM) stands out because of its critical role in managing the external supply base of the firm. Companies have outsourced much of their value creation, so that up to 60-80% of the total costs of a modern firm are for sourcing goods and services from suppliers (Monczka *et al.*, 2016; Van Weele, 2010; Van Weele and Van Raaij, 2014).

With increasing resource scarcity challenges, stakeholder expectations, and growing legal regulations regarding environmental and social concerns, PSM has to not only manage traditional targets such as cost, time, quality, and flexibility, but is also faced with managing innovation and sustainability (Caniato *et al.*, 2012) within supply chains. While there is a rich history of research on the SCM competences (Hohenstein *et al.*, 2014) and PSM competences that are needed to meet the more traditional targets (e.g. Cavinato, 1987; Giunipero and Pearcy, 2000; Giunipero *et al.*, 2006), there has been much less research on the new competences needed to successfully manage these additional requirements.

This paper follows previous research, which defines sustainable purchasing and supply management (SPSM) as "the consideration of environmental, social, ethical and economic issues in the management of the organization's external resources in such a way that the supply of all goods, services, capabilities and knowledge that are necessary for running, maintaining and managing the organization's primary and support activities provide value not only to the organization but also to society and the economy" (Miemczyk *et al.*, 2012, p. 489). While this definition gives a broad overview of what needs to be done, individuals will ultimately have to

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perform such tasks. These individuals are the PSM professionals who may or may not act in accordance with sustainability criteria. Therefore, this research focuses on the individual level, i.e. PSM professionals, and seeks to answer the following research question: *Which individual competences and knowledge for PSM professionals are required for sustainable PSM?*

The paper is organized as follows: first, we describe the conceptual background for our research, positioning the topic of individual PSM professional competences within the organizational context they are embedded in; next are the methodology and results sections for the systematic literature review and for the practictioner interviews. After that, the overall findings are consolidated in a SPSM competence model. The paper closes with conclusions, as well as theoretical, educational, and managerial implications and suggestions for future research.

Conceptual background: PSM stakeholder scope and processes

To clarify our unit of analysis for our methodological approach (Durach *et al.*, 2017), we refer to the PSM discipline as defined above, with a focus on the upstream supply network. When positioning PSM in the broader supply chain management (SCM) context, we follow the so-called unionist perspective, viewing PSM as a sub-area within SCM (Spina *et al.*, 2013; Larson and Halldorsson, 2002).

To provide an overview of typical PSM processes and create a conceptual foundation in our research design, clarifying which exact tasks are required in order to achieve SPSM is necessary. The tasks can be grouped into two main areas: *source-to-contract* and *purchase-to-pay*. *Source-to-contract* describes the strategic sourcing process from demand analysis to contracting management, whereas *purchase-to-pay* includes all transactional tasks, covering ordering, claim management, and payment (e.g. Monczka *et al.*, 2016). In addition, there are some tasks that are overarching for the whole PSM function, which can be called *centers of competence* (e.g. Bals *et al.*, 2018; O'Marah, 2015).

In terms of *who* performs the processes, we use the term "PSM professionals," referring to individuals with different responsibilities within a PSM function. PSM professionals work in one or more steps of the source-to-contract, purchase-to-pay, or center of competence processes.

Individual competences and knowledge for SPSM

Definitions of "competence" and "knowledge", and their description and understanding in an academic context vary in different cultural settings (e.g. Delamare-Le Deist and Winterton, 2005, p. 28). For the term competence, we follow Boyatzis (1982, p. 21), who defines competence as "an underlying characteristic of an employee (i.e. a motive, trait, skill, aspect of one's self-image, social role, or a body of knowledge) which results in superior performance." Consistent with other research, competence here includes a comprehensive combination of individual knowledge, skills, and abilities (e.g. Mirabile, 1997).

For the term knowledge, which is an integral element of the above definition of competence, the definition followed here is "the understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over the course of time. Knowledge is about an individual's interpretation of information based on personal experiences, skills, and competencies" (Bollinger and Smith, 2001, p. 9). In the context of this definition, we further differentiate between explicit ('know-what') and tacit ('know-how') knowledge (Grant, 1996; Nonaka and Takeuchi, 1995).

Compared to 'knowledge', we define "skills" as talents for managing particular tasks – for example, giving a presentation (Mirabile, 1997; Krumm *et al*., 2012) – whereas "abilities" are individual capabilities that are naturally predisposed, like intelligence (Mirabile, 1997), that are unlikely to be acquired through learning.

Although existing research provides a broad base of competences required for PSM professionals in certain contexts and roles (e.g. Cavinato, 1987; Giunipero and Pearcy, 2000;

Giunipero *et al.*, 2006), individual-level competences for implementing sustainability in PSM have not been explicitly discussed. The reason for this is that sustainability has only more recently gained importance and attention. Our study, therefore, intends to complement PSM competence research using this specific aspect of sustainability.

SPSM competences in the organizational context

Individual knowledge and competences do not become relevant to success until the system in which an individual is embedded can provide a framework for action (e.g. Argyris and Schön, 1978; Comelli and Von Rosenstiel, 2003; Von Rosenstiel, 2011; Von Rosenstiel and Koch, 2003). Therefore, the interdependency of organizational goals and objectives, and the application of individual competences and knowledge needs to be taken into consideration when conceptualizing sustainability knowledge and competences for PSM professionals.

From an organizational psychology perspective, individual competences and knowledge can be seen as "conditions of behavior" (Von Rosenstiel, 2011). This model draws from a history of psychological research approaches that deal with the determinants of individual behavior. Figure 1 shows the model adapted to the PSM context. The model highlights that competence and knowledge ("individual skills – abilities and skills") influence human behavior, but moreover, that this behavior is also influenced by individual motivation ("individual desire – motivation and values"), which also encompasses the organizational level contexts of "empowerment and obligation," as well as :situational enabling." Highlighting the importance of such organizational level factors, Goebel *et al*. (2018) suggest that obedience to authority influences the willingness of PSM professionals to pay extra for sustainability.

Please Insert Figure 1 about here

Based on Von Rosenstiel's model, our research focuses on the determinant 'individual skills' for behavior: competences and knowledge for sustainable PSM.

Methods

We conducted a systematic literature review, complemented by an exploratory empirical study, to answer the research question: *Which individual competences and knowledge are required for sustainable behavior on the part of PSM professionals?* Adopting a combined approach, similar to Osagie *et al.'s* (2014) research into individual competences for Corporate Social Responsibility (CSR) officers, we sought to identify the overlaps and differences of the current body of knowledge in the research and in the latest practitioner insights, an overview which is still lacking in the extant PSM literature. The systematic literature review provides research results on past to current requirements on PSM professionals' competences for SPSM. The empirical study allowed us to gain an up-to-date view on the latest competence requirements in practice. Given the relatively small basis of 22 papers that resultet from our systematic literature review, we intended to consolidate our foundation for the SPSM competence model through an empirical exploration of practitioner interviews. As such, both data sources were tied together in our coding approach and analysis. We performed the coding for the literature first, and used the resulting coding scheme to evaluate the empirical data.

Literature-based exploration: Systematic literature review

The motivation to conduct a systematic, rather than a traditional narrative literature review, was driven by a desire to gain a throrough and rigorous analysis of the field. As such, we followed the structured process defined by Tranfield et al. (2003) to ensure the replicability and transparency of the study: 1) literature search and selection 2) literature coding and analysis and 3) reporting the findings. Although we conducted this systematic review in September 2016, this process is also broadly consistent with the steps suggested by Durach et al. (2017) for conducting systematic literature reviews in supply chain management.

Literature search and selection

The overall keywords and search terms were derived from the guiding research question, which led to three major search terms: "sustainability," "competence and knowledge," and "purchasing and supply management." The three concepts that we investigated are frequently discussed in research and practice, and are also associated with a range of different synonyms used to examine the same, or very similar, concepts. We therefore identified relevant synonyms based on literature, common linguistic usage, and our experience as researchers. Furthermore, these concepts were discussed with a panel of experts to ensure the quality of the keywords. After the first set of keywords was identified, a test search run was conducted. This revealed a few search terms to be too generic (e.g. value chain, environmental, social), resulting in a very high number of unrelated hits. These keywords were subsequently removed from the final set as shown in Table 1.

Please Insert Table 1 about here

The first search was conducted using the Web of Science database. This specific database was selected because it is a well established source of data in business and management, and covers a broad range of academic disciplines (see e.g. Johnsen *et al.*, 2017; Osagie *et al.*, 2014). A second search was made to verify and complement the results, applying the exact same search criteria using the EBSCO databases on business and education research.

Various tests, with defined sets of keywords and search terms (Table 1), yielded a significant portion of results that covered other research areas, including consumer behavior, economic development, and medical sciences. Some of the search terms still were too generic. and used in the context of multiple research areas (e.g. 'capabil*'); therefore, we decided to conduct a block search to further narrow down the literature review (see e.g. Casimir and Tobi, 2011; Osagie *et al.*, 2014). In applying the block search strategy, we combined keywords with different search areas in the databases. The three main keywords derived out of the research

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question were searched in the search field option "title", combined with the other search terms in the search field option, which were "topic" / "subject term". In applying this approach, the portion of relevant findings was increased. Early searches indicated that a relatively low number of articles matched with the research question. As such, we decided not to limit searches in terms of publication date or journals, which widened the net as much as possible.

Articles were selected through a three step filtering process. First, the title, abstract and keywords of all 2,118 journal articles from the keyword search were screened, removing any papers that were obviously out of scope. For example, papers with subject matter that was not relevant to the research questions were excluded (e.g. consumer behavior, sustainable food supply, open source in information technology), as were papers concerning sustainability in the general sense of "enduring." Articles that focused on organizational, and not individual, competences for sustainable PSM were also removed, together with papers that covered other meanings of one or more of the keywords (e.g. "buy" in terms of "consume"). Consequently, only 102 articles resulted from this first step. The second filtering process involved reading the abstracts and conclusions of all 102 papers, reducing the list to 39 papers. Finally, in step three, the remaining 39 papers were read in full, selecting only those that focused specifically on individual competences for sustainability. The remaining 22 papers were divided into two groups: the first group included all papers that covered "competences/knowledge" and "sustainability" in the context of PSM (thus referring directly to the research question); the second group included papers on "competences/ knowledge" and "sustainability" in a broader context unrelated to PSM.

Coding approach and analysis

A coding scheme was developed based on the main steps of the procurement process. We chose the process as a first lens of analysis, with the core assumption that PSM professionals have to perform their tasks in ways that embed sustainability aspects or criteria in their daily

work. In addition to the *ex ante* coding tree, we defined new nodes during coding, as additional competences, independent of functional process steps and tasks, became evident. All coding was performed with the qualitative data analysis software NVivo 11.

After developing the *ex ante* coding tree, two papers were coded by two researchers to ensure the quality and inter-rater reliability of the coding by comparing, discussing, and clarifying individual differences (e.g. initially interpreting the scope of SRM differently). The results of their discussions were summarized and documented in a coding protocol, and the remaining coding ensued.

The coding protocol also served to ensure that coding was done based on the same definition of each process step, so key tasks and activities were described for each of the steps, based on the academic literature (Monczka *et al.*, 2016; van Weele, 2014; Johnsen *et al.*, 2014).

Results of the systematic literature review

The systematic literature review provided a relatively limited number of studies on individual sustainability competences and knowledge for PSM professionals. Generally, referring to the conceptual model of organizational and individual influences on behavior as adapted from Von Rosenstiel (2011, Figure 1), any studies (e.g. Giunipero *et al*., 2012; Preuss, 2009) deal with sustainable PSM at the organizational level. General knowledge and competences in the context of PSM and organizational performance were identified as another pertinent research focus, but only very few studies included sustainability as a specific topic in the scope of their PSM skill profiles. The findings of these studies are discussed in the following section.

Findings – Competences/ knowledge about sustainability in PSM. In total, the search resulted in 22 papers, of which 11 cover "competences/knowledge," "sustainability," and "PSM," and were published between 2001 and 2016. The following section provides an overview of the most frequently coded competences.

SRM – Application of Tools as an explicit knowledge area encompasses the competence to collect and understand sustainability data from suppliers (e.g. Börjeson *et al.*, 2015; Bowen *et al.*, 2001), the ability to identify and handle risk in the supply network (e.g. Klassen and Vereecke, 2012), as well as the skill to apply tools to monitor and evaluate suppliers and manage how they adhere to sustainability practices (e.g. Eriksson and Svensson, 2015; Klassen and Vereecke, 2012; Park, 2005).

Demand Management – Category Strategy refers to the ability to explore supply networks, the development of new market opportunities, and the integration of sustainability criteria in sourcing decisions (e.g. Eltantawy, 2016; Klassen and Vereecke, 2012; Swaim *et al.*, 2016). It includes situational awareness, coping with ambidexterity, and the ability to balance environmental goals with economic goals (e.g. Bowen *et al.*, 2011; Eltantawy, 2016; Klassen and Vereecke, 2012).

Sustainability, Compliance includes general expertise in sustainability, the knowledge to develop and implement sustainability policies, legislation, and procedures (e.g. Grandia, 2016; Klassen and Vereecke, 2012; Walker *et al.*, 2009). It also encompasses the competence to partner with organizations that engage in specific ethical practices (e.g. Lemke and Petersen, 2013).

Commitment to Change has a very tacit character. For example, Eltantawy (2016), Grandia (2016) and Walker *et al.* (2009) describe the competence and capacity to adapt to changing purchasing practices and organizational routines. Moreover, a positive commitment to sustainability, a leadership mindset, and willingness to implement sustainable procurement (e.g. Grandia *et al.*, 2015; Grandia, 2016; Swaim *et al.*, 2016; Walker *et al.*, 2009) were identified as parts of this competence type.

Findings – competences/knowledge about sustainability in general. The remaining 11 papers concerned "competences/knowledge" and "sustainability," published between 1999 and 2014, including:

Demand Management – Category Strategy clearly emphasizes two knowledge areas. The first is strategic thinking in terms of implementing sustainable business approaches (e.g. Dubey and Gunasekaran, 2015) and developing innovative business approaches and products (e.g. Maletic *et al.*, 2014), combined with the flexibility to find new solutions (e.g. Simola, 2007). The second is the ability to identify future business opportunities (e.g. Osagie *et al.*, 2014; Wesselink *et al.*, 2015).

For *Sustainability/Compliance,* Osagie *et al.* (2014) and Wesselink *et al.* (2015) emphasized the role of a sustainability/compliance competence center to drive sustainability implementation through managing programs and by facilitating, motivating, and coaching other departments. Developing and establishing sustainability measures is also seen as a key competence (e.g. Pullman and Collins, 2013).

Commitment to Change in the sense of personal awareness and commitment towards sustainability, as well as the willingness to bring assignments into action, was also emphasized in this set of papers (e.g. Buller and McEvoy, 1999; Osagie *et al.*, 2014; Wesselink *et al.*, 2015).

Finally, *Systems Thinking Competence* is defined as the ability to understand the impact of sustainability implementation on different systems and their interactions (e.g. Maletic *et al.*, 2014; Osagie *et al.*, 2014; Wesselink *et al.*, 2015), combined with an understanding and anticipation of upcoming sustainability challenges (Fadeeva and Mochizuki, 2010; Maletic *et al.*, 2014; Osagie *et al.*, 2014).

Empirical exploration: Interviews with PSM professionals

In addition to the systematic literature review, we empirically explored the sustainability competences and knowledge PSM professionals need from a practitioner point of view. Our

intention was to identify competences and knowledge as perceived in practice, and to compare them to the ones that resulted from the literature review. Both sources of data, therefore, were, in parallel, taken into account when developing of the SPSM competence model. The main stages of the empirical data collection were: 1) interview data collection; 2) coding and analysis; and 3) reporting the findings.

Interview data collection

As part of a wider research project on PSM competences, we conducted 41 interviews with PSM professionals, and 5 with supplier representatives, from 16 companies in Europe, who represent a broad range of industries. The interviews aimed to identify the competences and knowledge required to cope with current and future challenges in PSM functions.

A sampling strategy for the case companies was developed, with the goal of addressing a broad range of company characteristics as well as to include different sectors, business models (i.e. profit-focused versus social business), firm sizes, and a buyer versus supplier view.

Within each company, we interviewed PSM professionals, covering the various purchasing process steps and key account managers within selected suppliers. A semi-structured interview guide was used to conduct the interviews, which had been pre-tested and refined before launching the interviews. One section of the interview guide specifically covered sustainability-related questions. This section evaluated if the practitioners consider sustainability as a major future challenge and, if so, which areas they viewed as most important. The section also included a discussion on required competences and knowledge in this area. In addition to this section, in some of the interviews, sustainability was also discussed in other sections, with regard to either current or future competence requirements. Data collection took place between June and October 2016. The interviews were conducted in English by one or two researchers and lasted 60–90 minutes in total. Each interview was audio-recorded, transcribed, and reviewed by the interviewers.

Coding approach and analysis

The coding approach was similar to the coding in the systematic literature review. After finishing the coding of the academic literature, all 46 interview transcriptions were coded in NVivo 11. First, the specific questions on sustainability knowledge and competences were coded, then the entire interview transcript was coded to capture any further input regarding sustainability competences. A coding scheme with pre-defined nodes according to the purchasing process was adapted.

Although differences in results by case demographics (e.g. buyer versus supplier interviewees, the business model of the company) were checked, there was only one large difference detected: compared with PSM professionals, supplier representatives perceived *Communication Skills* to be relatively more important than *Demand Management – Category Strategy*. In the following section, we highlight the main findings from the interviews.

When asked about knowledge and competences for coping with future sustainability requirements, interviewees tended to emphasize *Basic Sustainability Knowledge* in the broader sense of awareness of the concept of sustainability and its key elements, including climate change and human rights issues. Interviewees also highlighted the requirement to understand sustainability with regard to the entire value chain, including the need for purchasing professionals who understand the relationship between sustainability risks in supply networks, product quality issues, and potential impacts on reputation and customer reactions. As described in a later section, this also relates to *Systems Thinking*.

Interviewees emphasized the need to comprehend regulatory frameworks and the standards of their own organization. The following quote from a food industry practitioner was typical of practitioner views:

> *"Everybody who works in [PSM] is trained in what we call 'responsible sourcing,' which is basically our code of conduct, which is our understanding of sustainability, risk of corruption, human rights and what has to do with our supply chain. […] And more recently we have been looking more into land usage, water usage and greenhouse gas emissions."*

Thus, practitioners focused on *Basic Sustainability Knowledge*, because this is a prerequisite for purchasing professionals to act in a sustainable or "responsible" manner.

Much more specific to PSM were statements regarding *Demand Management – Category Strategy*. The following competences in particular emerged from our analysis: supply chain mapping and sustainable supply network design, supplier evaluation with regard to sustainability in the supplier selection process, and strategic sustainability risk analysis. Risk analysis was also identified as part of *Supplier Relationship Management – Application of Tools,* in the context of ongoing sustainability monitoring of suppliers. Being able to conduct supply chain sustainability risk analyses was therefore seen as a critical competence.

Systems Thinking complements *Basic Sustainability Knowledge* and *Demand Management – Category Strategy* in terms of understanding the sustainability context. Here, PSM professionals emphasized the importance of competences related to a holistic understanding of supply networks, their interdependencies, knowledge about the impacts of sustainability issues on supply network actors, and a basic understanding of how businesses work. As expressed by interviewees in the food and electronics industries, respectively:

"I think it can help to get some basic understanding [of], for example, life cycle analysis and supply chain mapping for the whole understanding of the whole supply chain to begin with." (Interviewee, Food Industry). As a precondition, however, a detailed and in-depth understanding of the product was emphasized, highlighting that it is not only about having basic supply market knowledge, but, depending on the industry, even very detailed technical knowledge on the product, how it is being produced and from which components, as well as understanding the effects of components on product features. Based on these detailed insights, understanding both the upstream tiers (e.g. production of components, sub-components, raw materials extraction for them) and the downstream tiers (e.g. how and which product features are valued by business customers, private customers and end consumers) becomes much easier.

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Overall, comparing the results of the systematic literature review with the results of the practitioner interviews, we found that practitioners most frequently focused on explicit knowledge areas. Nevertheless, practitioners did also emphasize more tacit knowledge areas, such as personal values and integrity as part of *Commitment to Change*, and interpersonal communication in the area of *Supplier Relationship Management – Communication*.

Combined Results: Toward a SPSM competence model

In order to arrive at a more aggregated result of the overall list of competences from both the systematic literature review and the interviews, we sought ways to further consolidate the results. Drawing inspiration from recent research on CSR officer competences (Osagie *et al.*, 2014), we concluded that a domain analysis according to Delamare-Le Deist and Winterton's (2005) competence typology could yield interesting results for PSM professionals as well. This holistic model combines four dimensions of competence that are necessary for performing professional tasks. Cognitive competences include general knowledge and understanding, social competences encompass individual behavior, and functional competences cover skills and knowledge in an occupational context. Meta competences are described as being "concerned with facilitating the acquisition of the other substantive competences" (Delamare- Le Deist and Winterton, 2005, p. 39). Table 2 shows our classification according to these competency areas. Nodes that reflected a common competence domain (i.e., cognition-oriented, function-oriented, social-oriented, or meta-oriented) were selected and grouped by two of the authors. After further discussion and alignment, the resulting clustering was implemented for further analysis in NVivo. The resulting allocation can be seen in Table 2.

Please Insert Table 2 about here

Our evaluation of the academic papers and practitioner interviews resulted in a clear prioritization of competence areas and assigned nodes (see Table 2). The evaluation also provided a clear picture in terms of PSM process steps that do not require specific sustainability

competences. We also found no evidence of sustainability competences related to neither the whole *Purchase-to-Pay Process*, nor for *Source-to-Contract Spend & Demand Analysis*. This suggests that academics and practitioners did not perceive these as important SPSM processes.

"Functional-oriented competences" were identified most frequently in both academic papers as well as in the interviews with PSM professionals. Our analysis of academic papers from both research areas and the analysis of the practitioner interview transcripts resulted in a high number of findings with regard to *Demand Management – Category Strategy* and *Supplier Relationship Management – Application of Tools.* The following quotes, taken from Eltantawy's *et al.*(2009) paper, and from an interviewee from the chemical industry, respectively, illustrate the latter:

> *"SM executives are expected to use these skills to coordinate and manage their interfaces to ensure that their organizations make ethical purchasing decisions and that their suppliers and customers are in turn managing their operations in an ethically responsible manner."* (Eltantawy *et al.*, 2009)

> *"you have to manage the supplier who is meeting requirements or not. How do you deal with them and how do you focus on those that are good? So managing suppliers in a very professional way is one of the other major areas, where I think it should be taken care of in the future."* (Interviewee, Chemical Industry)

The articles included frequent references to *Sustainability/Compliance* in terms of sustainability management competences required for specialized competence centers. Practitioners emphasized the importance of *Basic Sustainability Knowledge* for PSM professionals. Additionally, female practitioners emphasized that *Basic Individual Knowledge on PSM* is equally important for SPSM, and practitioners with cross-functional experience particularly highlighted required sustainability competences in *Demand Management – Tender Analysis*.

We found that the domain of "cognition-oriented competences" was coded most frequently from the interviews. Practitioner interviews in particular led to codings in the node *Systems Thinking Competence*, which was also supported by academic papers in the second

group (competences/knowledge about sustainability in general). No other nodes received higher numbers of codings.

The number of codings for "social-oriented competences" were comparable to the cognition-oriented domain, but there was a clear difference between academic papers and practitioner interviews. Most of the codings in this area came from academic papers in both groups; however, practitioners emphasized competences in the social-oriented domain less than the academic papers.

"Meta-oriented competences" were identified less frequently, though for practitioners, the domain was coded more often than the social-oriented domain, with a clear focus on *Commitment to Change*. We observed differences for some interviewee groups. Female interviewees, as well as practitioners with cross-functional experience, regarded social competences as more important than meta-oriented ones. Academic papers in the second group (competences/knowledge about sustainability in general) also revealed competences in the node *Self-reflection*.

Figure 2 proposes a framework that outlines the interrelation of individual SPSM competences, classified into four competence areas, with the sustainability performance of the focal firm depending on the organizational context. It depicts "SPSM competences" as a first-order composite construct, which is composed of four second-order constructs along the four dimensions discussed above. For further testing, the nodes shown in Table 2 could be used as items for each of the second order constructs.

Please Insert Figure 2 about here

In line with organizational context considerations (Comelli and von Rosenstiel,2003; von Rosenstiel,2011; von Rosenstiel and Koch,2003), we suggest including the two organizational-level constructs of "situational enabling," "empowerment & obligation," and on the individual-level construct "individual desire" as moderating factors between SPSM

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competences and the actual sustainability performance of the focal firm. This relates to Figure 1, where actual behavior is a result of both the individual level and the organizational level.

Conclusions: Implications, limitations and future research directions

This study set out with the research question *Which individual competences and knowledge for PSM professionals are required for sustainable PSM?* We focus on PSM, as it is a key function responsible for managing upstream supply chains. The conceptual background for our study is the classification of competences and the interrelation of individual competences within the organizational context. We rely on two data sources. First, we systematically reviewed the academic literature, and second we conducted PSM practictioner interviews to complement our literature review findings.

This paper offers the first comprehensive overview of competences required for SPSM, and the main points are summarized in Table 2. All the identified competences relate to strategic PSM processes; none were identified in relation to transactional PSM processes. We evaluated a range of competences in four domains (cognition-oriented, social-oriented, functional-oriented, and meta-oriented competences). The analysis shows that functional-oriented competences are central. Social-oriented competences are also emphasized in academic papers, but practitioners emphasized competences in the cognition-oriented dimension. Moreover, our domain analysis suggested that sometimes one task, such as SRM, requires competences in all four domains.

Theoretical implications

By applying models from organizational psychology, our research intends to foster interdisciplinary debate on the skills and competences required for implementing sustainability into supply networks. We contribute a conceptual framework that combines insights from both a systematic literature review and interviews with practitioners on SPSM with competence dimensions (Delamare- Le Deist and Winterton, 2005) and conditions of behavior developed

in psychological research (e.g. Comelli and Von Rosenstiel, 2003; Von Rosenstiel, 2011; Von Rosenstiel and Koch, 2003).

Instead of positioning sustainability as an "add-on" activity, we followed the perspective of Johnsen *et al.* (2014), integrating sustainability into all PSM processes. This is consistent with Pagell and Shevchenko (2014), who see opportunities to "move the field from studying how to manage unsustainable supply chains in a more sustainable manner, to managing truly sustainable supply chains" (Pagell and Shevchenko, 2014, p. 45). Our research suggests that concrete tasks and competences are required to anchor sustainability in everyday PSM behavior.

Educational implications: Higher Education and professional training

Considering our focus on competences, we also see as important the need to reflect on what this means for education and professional training. Our results underline the necessity to think beyond function-oriented competences to include cognition-oriented, social-oriented, and meta-oriented competences. Suitable educational methods need to be considered, taking into consideration explicit as well as tacit knowledge areas within these competence clusters.

For teaching or training programs, we suggest to cover all competence domains for SPSM in PSM curricula, and to apply a range of training methods. For example, social-oriented competence development, such as *Cross-functional Team Working* or *Stakeholder Management – Communication*, might be facilitated through interactive or perhaps even simulation-based methods. Tacit knowledge may require problem-based learning or "serious gaming" (e.g. Hummel *et al.*, 2011), as well as individual mentoring (Nonaka and Takeuchi, 1995). Our findings suggest that some competence development requires combined training approaches to emphasize tasks in all four competence domains, addressing both tacit and explicit aspects. For example, SRM communication might require methods such as role playing, whereas SRM tools can be taught by explaining processes and providing software training.

Managerial implications

From a managerial perspective, this paper relates to the pertinent question of how PSM can foster sustainability throughout supply networks in practice. Recognizing the prominent role of PSM in influencing sustainability efforts of suppliers, the extant literature offers extensive potential practical activities to be performed on the organizational level, but actual implementation requires individual action. We suggest a strong focus on, and investment in, employee recruitment and training. The competences and knowledge identified in this research can serve as a starting point for drawing up competence profiles. We suggest that sustainability or compliance competence centers may play a central role as organizational hubs for professional training and development.

Moreover, the research model presented in Figure 2 underscores the point that organizations need to invest in both the individual level, i.e. select the right employees and train them, as well as the organizational level. The latter is essential, as transitioning from simply having SPSM competences to improving the firm's sustainability performance requires "situational enabling" and "empowerment & obligation."

Limitations

We acknowledge that our systematic literature review was a one-time screening of a pre-defined sample set in a selected database. Furthermore, the influence of the cultural and disciplinary background of the researchers on the information selection approach cannot be completely ruled out. Although we made considerable efforts to ensure that the review was all-inclusive, some relevant research studies might have been inadvertently omitted.

The main limitation of the empirical part of our study lies in the restricted number of interviewees and companies. The evaluation of sustainability competences and knowledge from a practitioner point of view was also embedded in a broader study of current and future PSM competences. Additionally, in the interviews, the timeframe for discussing sustainability

competences and the depth of the discussion was limited. Therefore, we suggest a broader empirical validation of the findings.

Future research directions

Currently, no comprehensive competence model exists to serve as a key element in academic education or corporate training programs. The papers on competences/ knowledge about sustainability in general (with a strong focus on Osagie *et al.*, 2014) provide a general CSR competence profile. Therefore, one future research direction would be to further develop the overall SPSM competence model. For future quantitative empirical research to validate the model, the nodes presented in Table 2 could serve to operationalize the items for each of the second-order constructs shown in Figure 2. As the framework becomes more elaborate, future research could then study competence profiles of certain job roles, as has been done in the field of logistics (e.g. for senior and entry level logistics managers, Murphy and Poist, 1991, 1998, 2006, 2007; Razzaque *et al.*, 2001).

In line with previously presented organizational context considerations, we suggest including two organizational level constructs – "situational enabling" and "empowerment & obligation," as well as the individual level construct "individual desire" (from Figure 1) – as moderating factors between SPSM competences and the sustainability performance of the focal firm. As this part of our conceptual framework refers to findings from organizational psychology, we suggest those could be further explored in a interdisciplinary setting with organizational psychology scholars.

Second, the emphasis on the social-oriented (via the systematic literature review) and meta-oriented domains (via interviewees) as second most important after the functional-oriented competences also warrants further research. Here it should also be kept in mind that sometimes one task, such as SRM, requires competences in all four domains. Research on these issues would benefit from a cross-disciplinary interface of operations management to

entrepreneurship, business ethics, organizational psychology and general management literature, helping to advance research on the microfoundations of CSR (Hafenbrädl and Waeger, 2016; Kourula and Delalieux, 2016; Christensen *et al.*, 2014; Aguinis and Glavas, 2012). For example, stakeholder management capabilities (in our research, in the social-oriented domain), and following and maintaining a mission-based approach (in our research in the meta-oriented domain), have been proposed as central capabilities for establishing triple bottom line (TBL) sustainable businesses (Tate and Bals, 2016).

Third, future research could sample for companies that follow the paradigm of an ecologically dominant logic (Montabon *et al.,* 2016; Markman and Krause, 2016). Markman and Krause (2016, p. 9) propose measuring a firm's sustainable practices based on two principles: "(1) They must enhance ecological health, follow ethical standards to advance social justice, and improve economic vitality; and (2) they must prioritize the environment first, society second, and economics third." Insights from Benefit Corporations ('B Corps'; Pullman *et al.*, 2018) or social businesses (e.g. Tate and Bals, 2016; Bals and Tate, 2018) could help further develop a more future-oriented definition of "sustainability performance" and related SPSM competences.

Fourth, how to train certain competences warrants future research. Previous research has already found that teaching explicit versus tacit knowledge requires different approaches (Giunipero *et al.*, 1999), and thus further insights into how exactly this could be done in the context of SPSM would be relevant to both higher education and professional training. Moreover, the role of sustainability/ compliance competence centers in improving SPSM competences could be further studied.

Fifth, the literature review results indicate that the motivational values for SPSM have not yet been broadly discussed, but a lot of research literature regarding consumer buying

behavior can be found (e.g. Di Donato and Jakubiak, 2016; Valsesia *et al.*, 2015). This body of

research could provide interesting insights that are relevant to the PSM context.

Overall, our findings indicate that there is scope for much further research on SPSM

competences, their development, and their implementation in an organizational context.

Note: A table with the 22 papers analyzed details the search term combinations and the number of search results, as well as the measures taken to assure research quality in terms of internal and external validity, reliability and confirmability. More information on sampling criteria and demographics are available upon request.

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FIGURES AND TABLES
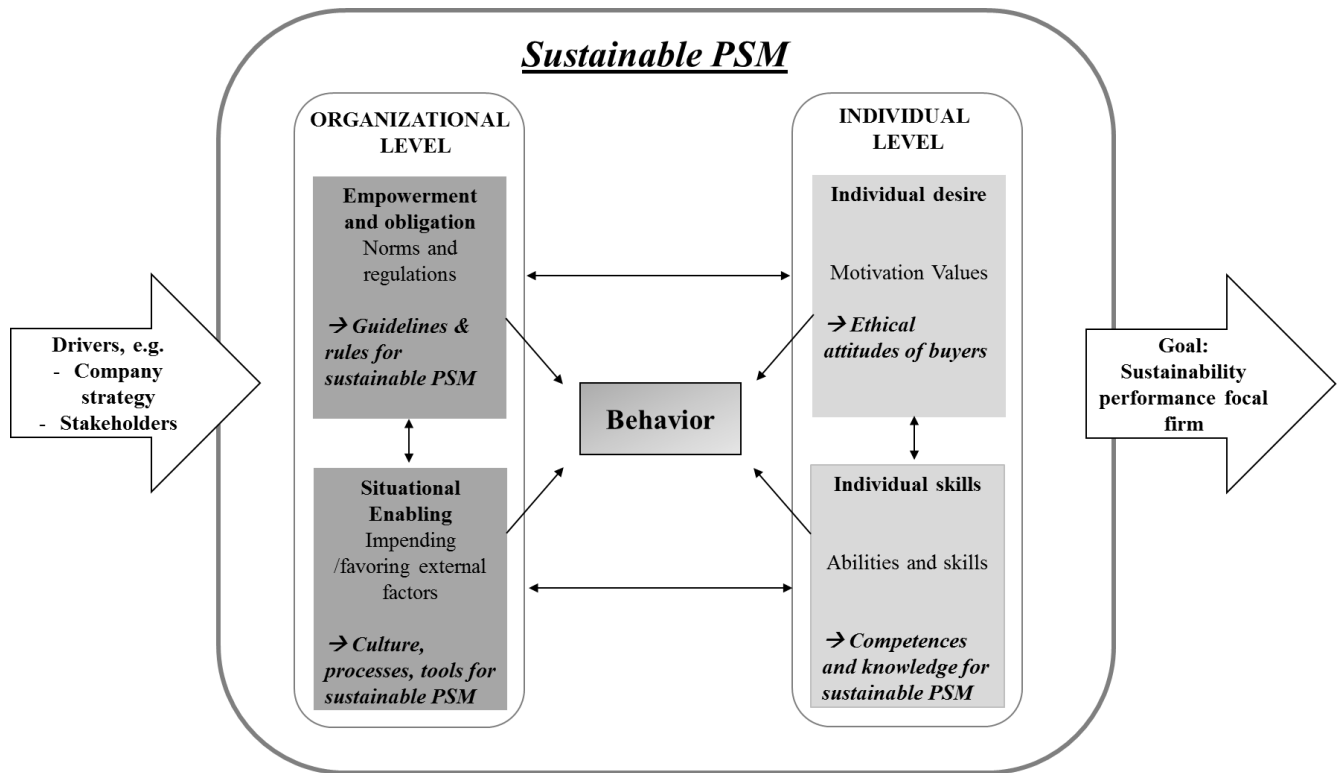
Figure 1: Organizational and individual level influences on behavior. Adapted from Von Rosenstiel (2010), p. 348; Von Rosenstiel and Koch (2003), p. 200
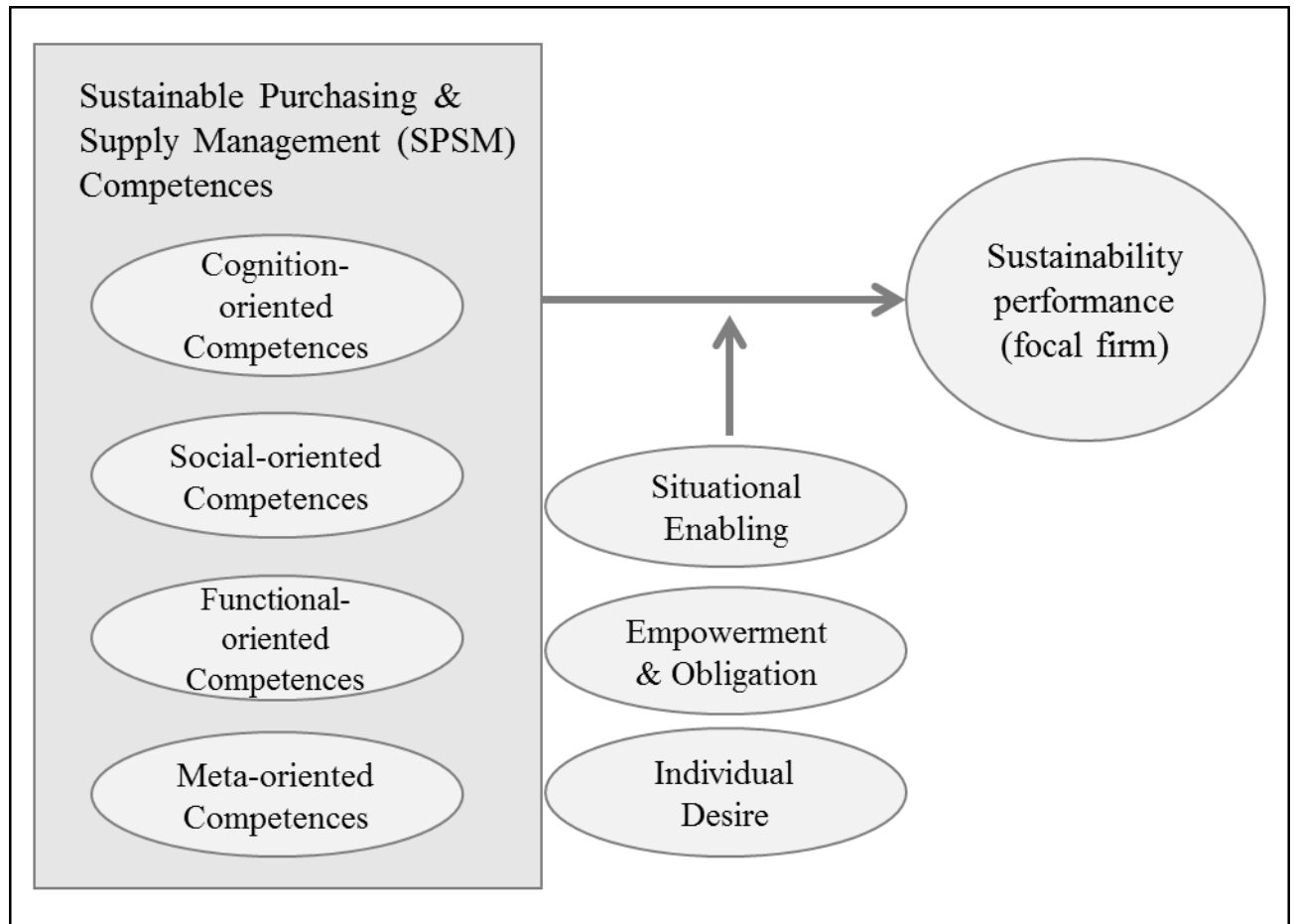
Figure 2: Toward a research model of SPSM competences

Keywords	Search terms
Sustainability	Sustaina* OR responsib* OR ethic* OR green OR "corporate social responsib*" OR CSR OR "triple bottom line" OR TBL
Competence and knowledge	competenc*, knowledge, skill*, capabil*, abilit*, know-how, qualification, attitud*, behavio?r, belief*, attribute, "intellectual capital", maturity
Purchasing and supply management	Purchas* OR Sourcing OR Procurement OR "Supply Chain Management" OR Buy* OR "supply network"

Table 1: Keywords and search terms

Competence Domain	Allocated Nodes	Total # of codings for the competence domain
Cognition-oriented Competences	• Ability to Make Decisions • Critical Thinking • **Systems Thinking Competence** • Supplier Relationship Management - Holistic View • Resourcefulness - Creative Resource Combinations	120
Social-oriented Competences	• **Communication Skills** • **Cross-functional Team Working** • Organizationally and Politically Savvy - Interaction • **Stakeholder Management - Communication** • **Supplier Relationship Management - Communication**	119

Functional-oriented Competences	• Source-to-Contract
	  o **Demand Management – Category Strategy**
	  o **Demand Management – Tender Analysis**
	  o Implementation – Contract Management
	  o Implementation – Reporting & Measurement
	  o Negotiation
	  o Spend & Demand Analysis
	• Purchase-to-Pay
	  o Invoice, Payment
	  o Order Confirmation, Claim Management
	  o Ordering
	  o Requisition & Approval
	• Data & Systems
	• **Supplier Relationship Management - Application of Tools**
	• Performance Management
	• HR Management & Training
	• **Sustainability & Compliance**
	• **Basic Individual Knowledge on PSM**
	• Stakeholder Management - Application of Tools
	• **Basic Sustainability Knowledge**
	• Resourcefulness -Application of Tools
		444

Meta-oriented Competences	• **Commitment to Change** • **Self-Reflection** • Organizationally and Politically Savvy - Playful Attitude • Supplier Relationship Management - Cooperative Attitude)	98
	Legend: Bold = Most coded competences	

Table 2: Competence domains, allocated nodes and their total number of codings