

Implementing sustainable purchasing and supply management (SPSM): A Delphi study on competences needed by purchasing and supply management (PSM) professionals

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ABSTRACT

This research is about a Delphi study that was conducted in the context of the development of a competence model for sustainable purchasing and supply management (SPSM). Based on the findings of a systematic literature review (SLR), it addresses the research gap in this area with the aim to foster the integration of sustainability in purchasing and supply management (PSM) in higher education and in professional training approaches for PSM professionals. The qualitative study was conducted with 16 Delphi experts in the field of PSM and sustainability, applying the critical incident technique (CIT). Together with the findings of the SLR, it led to a specific set of SPSM competences. The theoretical background is based on PSM research, educational sciences and organizational psychology.

1. Introduction

In 2015, the United Nations agreed upon the Sustainable Development Goals (SDG). When discussing the impact of business on the SDGs, the consideration of the upstream and downstream value chain was emphasised as an impact area: “The greatest social and environmental impact that your company has on the SDGs may be beyond the scope of the assets it owns or controls, with the greatest business opportunities being potentially further upstream or downstream in the value chain” (UNGC, GRI, WBSC, 2015, p. 12). At the same time, companies still rank sustainable supply network practices to foster human rights, fair labor practices, environmental progress and anti-corruption policies as the biggest challenge (UNGC, 2017). Looking at the responsibility to implement sustainable supply network practices in an organizational setting, the function PSM stands out due to its critical role in managing the external supply base of the firm, being traditionally rewarded for creating financial value (e.g. Monczka et al., 2016). Although it has been noted that sustainability should be embedded throughout PSM processes (Johnsen et al., 2014), the handling of social or environmental issues is still often considered as an additional task (Caniato et al., 2012; Pagell and Shevchenko, 2014).

In this regard, PSM research has already profoundly investigated the organizational capabilities for SPSM implementation (e.g. Giunipero

et al., 2012; Preuss, 2009; Carter, 2005; Marshall et al., 2015), but only very few studies included the individual perspective for SPSM implementation (e.g. Schulze et al., 2019; Schulze and Bals, 2017; Pagell and Wu, 2009).

Looking at theories from organizational psychology (e.g. Von Rosenstiel, 2011; Von Rosenstiel and Koch, 2003), the combination of organizational capabilities, i. e. norms and enablers, with individual motivations, abilities and skills impacts behavior. There are individual, professional and organizational factors that drive SPSM behavior, e.g. in terms of willingness to pay for sustainability (Goebel et al., 2018). Subsequently, behavior results in activities that either support or hinder organizational goals. Therefore, this paper focuses on the research question “Which individual competences of PSM professionals are required to implement SPSM?”. The aim of the research is to foster SPSM integration in the daily work of purchasing professionals, ultimately contributing to the implementation of sustainability in supply chains.

The implications of the findings of this research are manifold. Familiar denominations of competences are applied. Although these denominations might sound generic, they are each corroborated with exemplary quotes from academic literature and the Delphi experts for each competence in terms of its application in the specific SPSM context.

For responsible education, this offers inspiration for higher education institutions how to integrate sustainability into PSM curricula by

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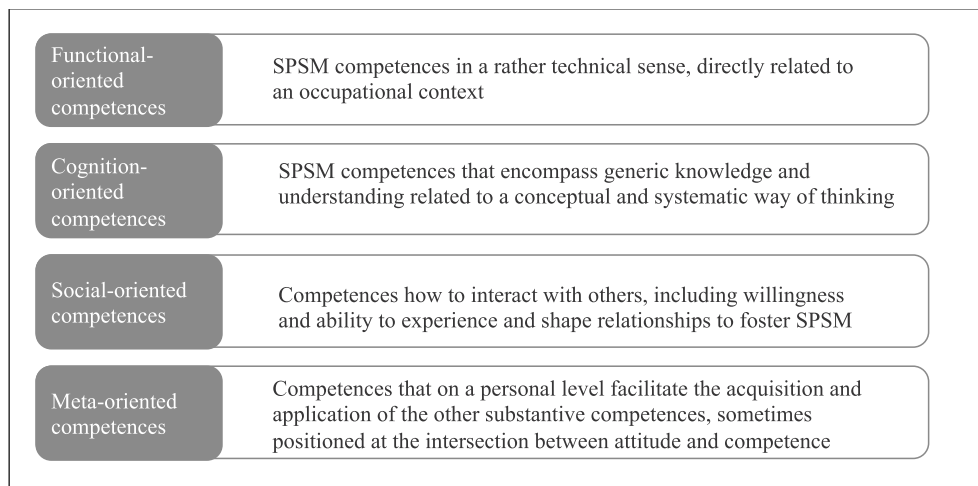


Fig. 1. Competence cluster definitions for SPSM competences (based on Delamare-Le Deist and Winterton, 2005, pp. 27–46).

focusing on the most important knowledge and competence areas. The research also aims to support companies and other organisations to develop competence profiles for SPSM. Competence profiles support the recruiting of future PSM professionals and the development of corporate trainings on SPSM. Finally, the SPSM competences that were gathered in this research can contribute to a future-oriented competence profile for purchasing professionals.

The remainder of the paper is organized as follows: the next section gives a short overview of the current state of literature with regards to PSM and SPMS competences, clarifying the research gap. Next, the conceptual framework of the study is described. Thereafter, the application of the Delphi method is outlined. The following section shows the results of the Delphi study. Finally, the consolidated results of a SLR and the Delphi study are provided. The paper closes with implications and an outlook on further research directions.

2. The sustainability gap in the field of PSM competence literature

While there is a rich history of research on supply chain competences (e.g. Flöthmann et al., 2018; Hohenstein et al., 2014) and PSM competences that are needed to manage in accordance with the more traditional targets like cost or delivery (e.g. Giunipero and Percy, 2000; Giunipero et al., 2006), much less is known about the individual competences needed to successfully manage sustainability aspects. Recent research on future skills in PSM moreover emphasizes that sustainability competences are a rather less researched area (Bals et al., 2019; Schulze et al., 2019; Schulze and Bals, 2017; Pagell and Wu, 2009). For example, Bals et al. (2019) evaluated how PSM competences have evolved over the last ten years according to the framework established by Tassabehji and Moorhouse (2008). Based on a literature review on PSM competences and based on interviews with practitioners, the authors identified three main new competence areas as being relevant for future research: competences related to digitisation (e.g. ‘eProcurement Technology’, ‘Automation’), innovation (e.g. ‘Innovative sourcing’) and sustainability. As Knight et al. (2019) note in their editorial to the 25th anniversary issue of JPSM, surprisingly no paper submitted to that issue was on sustainability and PSM, although they regard this as an essential area for further research. Considering these findings and statement, the focus on individual purchasing professionals as those implementing SPSM in practice, promises a valuable contribution.

To include the current stream of literature in the concept and strategy of this research, the authors thoroughly analyzed the existing academic literature on SPSM competences. Considering that there is no consistent definition and usage of the term ‘competence’ in academic research and literature (e.g. Delamare Le Deist and Winterton, 2005;

Krumm et al., 2012), it was decided for the analysis to rely on Krumm et al. (2012). They define a competence as “a set of abilities, skills and other attributes and characteristics that enable a person to manage complex situations effectively; this set can be developed through learning and experience” (Krumm et al., 2012, p. 3, translated by the authors). Complex situations are characterised as being situations that cannot be solved by standard types of solutions (Krumm et al., 2012).

For clustering the competences, the paper refers to the competence typology by Delamare-Le Deist and Winterton (2005), which features four types of competences: Cognitive, functional, social and meta competences. Similar to the focus on PSM professionals in this research, this competence typology has been previously applied in a study on sustainability competences required for CSR managers in organisations (Osagie et al., 2014). With a broader view outside the PSM focus, this literature provided valuable input for SPSM competences. Cognitive competences capture knowledge and understanding, skills are reflected in the functional competences and individual capabilities in the social competence cluster. Meta-competences are “concerned with facilitating the other substantive competences” (Delamare-Le Deist and Winterton, 2005, p. 39). For the meta-oriented competence cluster, the original definition was slightly adapted for this research to include personal attitudes and commitment. Fig. 1 shows the definitions for each competence cluster applied in this research.

Based on the definition and the clustering of competences as described above, a SLR was conducted, looking for answers to the guiding research question “Which SPSM competences are described in current research?” (Schulze et al., 2019). The SLR followed a structured process, including the definition and testing of search terms that were derived from the guiding research question, the literature search and selection, the coding and analysis followed by the reporting of the results (Tranfield et al., 2003; Durach et al., 2017). Search terms were derived from the keywords ‘sustainability’, ‘competences and knowledge’ and ‘purchasing and supply management’. The search was conducted in September 2016 and (to screen for the latest publications) again in February 2019, using the Web of Science and EBSCO databases. Initial test searches indicated that a relatively low number of articles matched with the research question. Therefore, it was decided to focus on English or German speaking academic journal publications, but not to limit searches in terms of publication date or journals, thereby widening the net as much as possible. A three step filtering process excluded papers with a non-relevant subject matter to the research question (e.g. consumer behavior), papers that covered other meanings of one or more of the keywords (e.g. ‘buy’ in terms of ‘consume’, ‘sustainable’ in terms of ‘enduring’) or articles that focused on organizational and not on the individual competences. The resulting papers were coded with the qualitative data analysis software NVivo

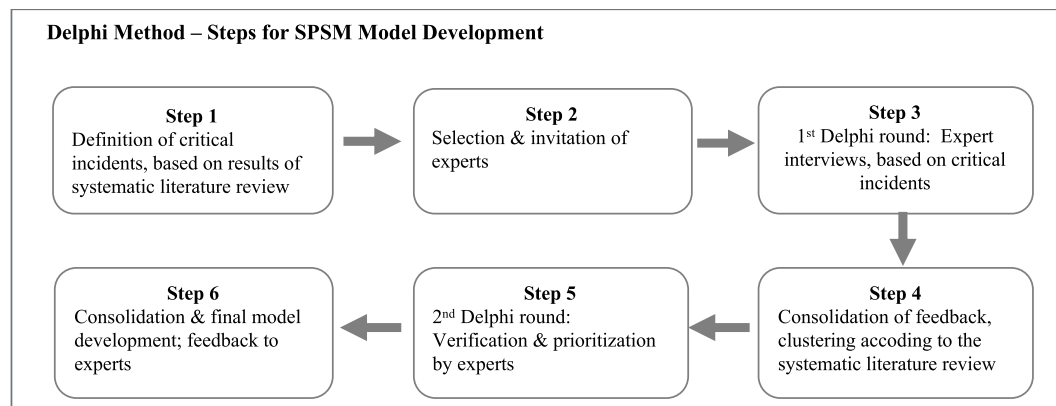


Fig. 2. Steps of the Delphi study for SPSM model development.

11. The coding scheme referred to the main tasks that need to be covered in a procurement process, including the strategic source-to-contract scope as well as the transactional purchase-to-pay tasks (for an illustration see Bals et al., 2019, Fig. 2). This approach was based on 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 this ex-ante coding tree, new nodes were defined during coding as additional competences, independent of functional process steps and tasks. It turned out that only very few studies so far were conducted on SPSM competences. Very often, those papers relate to only one dimension of the triple bottom line (e.g. Bowen et al., 2001; Steinfeld et al., 2017), refer either to a public or private purchasing context (Grandia, 2016; Eikelboom et al., 2018) or focus on the sustainability knowledge needed for specific industries or products (e.g. Börjeson et al., 2015; Huq et al., 2016; Putz et al., 2018). Other papers concerned ‘competences and knowledge’ and ‘sustainability’, but did not focus on ‘purchasing and supply management’ (Osagie et al., 2014; Wesselink et al., 2015; Maletic et al., 2014; Pullman and Collins, 2013). Summarizing the main findings, the SLR resulted in a first overview of competences required for SPSM, although, the number of 22 papers that matched with the search criteria was relatively low. In brief, all the identified competences relate to strategic PSM processes, none were identified in relation to transactional PSM process steps. The SLR evaluated a range of competences in all four domains according to the typology by Delamare-Le Deist and Winterton (2005). The analysis showed that functional-oriented competences are central, followed by social-oriented, cognition-oriented and meta-oriented competences. Details on the competences that resulted out of the SLR are provided in Table 2.

In summary, the analysis of current literature led to the motivation and aim of this research to contribute to a rather new research topic.

3. Methodology

To clarify the unit of analysis for the methodological approach, the paper refers to the PSM discipline as defined by Van Weele (2010), who describes PSM as “the discipline that is concerned with the management of external sources – goods, services, capabilities, and knowledge – that are necessary for running, maintaining and managing the primary and secondary support processes of a firm at the most favorable conditions” (Van Weele, 2010, p. 8). Miemczyk, Johnsen and Macquet (2012) applied van Weele’s definition to the sustainability context: “Sustainable purchasing is 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). To position PSM in the broader supply chain context, this paper follows the so-called unionist perspective, viewing PSM as a sub-area within Supply Chain Management (Larson and Halldorsson, 2002; Spina et al., 2013).

3.1. Research philosophy and research strategy

The Delphi study was embedded in a cohesive research approach to develop a SPSM competence model. Following an interpretivist paradigm and a subjectivist view, the researchers decided for an inductive, exploratory approach. The aim was to gather facts to a rather new research topic. As outlined for example by Denzin and Lincoln (2011), the decision whether to apply quantitative or qualitative research depends on the philosophical assumptions of the research: “[...] Qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them” (Denzin and Lincoln, 2011, p. 3). Therefore, taking into consideration the aim, research philosophy and exploratory character of this work, the researchers decided on a qualitative approach for the Delphi study. To ensure a broad contribution to building facts, to verify the data and to contribute to the research quality of this research, the Delphi study was combined with a SLR. Initially, as outlined above, the current state of literature was reviewed (Schulze et al., 2019). The literature review first provided an overview of the existing knowledge in the field of SPSM competences. Second, it led to a preliminary framework for a SPSM competence model. For the papers that were identified, competences were carved out by a coding process, resulting in a first set of SPSM competences, allocated to the four competence clusters based on Delamare-Le Deist and Winterton (2005). This first set of competences built the framework for the conceptual design and the approach of the Delphi study. The researchers decided to combine the literature research with a Delphi study in a purely qualitative application. This approach was considered to be appropriate to find answers to the research question and to deliver the desired type of result, namely a newly built SPSM competence model. Also, the two methods were considered to be compatible in terms of their successive application, which led to an improved result for the research purpose.

After the literature was evaluated, the researchers conducted a Delphi study. The goal of the Delphi study was to get further input on SPSM competences from experts from academia and practice in addition to the findings from literature. The findings in literature were profound, but also limited. The feedback from experts was expected to enhance the relevance of the SPSM competences gathered in the SLR. When looking for a way how to combine the findings from literature and the Delphi methodology, the researchers selected the Critical Incident Technique (CIT). First, critical incidents for the Delphi study

Table 1
Demographics Delphi participants.

Delphi Expert	Practitioner or Academic	Job title/Area of Focus	Job title/Area of Focus	Sector	Job Experience	Educational background
Expert A	Practitioner	Senior manager, consultant sustainability and supply chain management	Senior manager, consultant sustainability and supply chain management	Consulting	10 years	Industrial engineering
Expert B	Practitioner	Procurement director	Procurement director	Chemicals	20 years	International Business Administration
Expert C	Practitioner	Sustainability expert, procurement manager	Sustainability expert, procurement manager	Public procurement	5 years	Environmental Management; Sustainability Development
Expert D	Practitioner	Supply chain manager	Supply chain manager	Public procurement	4 years	Geography
Expert E	Practitioner	Sustainability in supplier relations	Sustainability in supplier relations	Automotive	n/a	Political sciences; Environmental politics and sustainability
Expert F	Practitioner	Procurement & supply chain manager	Procurement & supply chain manager	Public procurement	3 years	European studies, philosophy, languages, int. Development
Expert G	Practitioner	Head of management systems and sustainability, procurement	Head of management systems and sustainability, procurement	Chemicals	7 years	Economics
Expert H	Practitioner	Group sustainability scouting and advocacy director	Group sustainability scouting and advocacy director	Interior & Design	n/a	n/a
Expert I	Practitioner	Purchasing advisor	Purchasing advisor	Interior & Design	5 years	Industrial engineering
Expert J	Practitioner	Head of sustainable development EMEA Region	Head of sustainable development EMEA Region	Interior & Design	6 years	Textile engineering
Expert K	Practitioner	Sustainability in purchasing	Sustainability in purchasing	Automotive & cons. Goods	> 10	n/a
Expert L	Practitioner	Sustainability in purchasing	Sustainability in purchasing	Automotive & cons. Goods	n/a	n/a
Expert M	Academic	Chair of corporate sustainable management	Chair of corporate sustainable management	Higher Education	16 years	Economics
Expert N	Academic	Chair of operations & supply	Chair of operations & supply	Higher Education	10 years	Occupational psychology; Business
Expert O	Academic	Professor for supply management and supply chain management	Professor for supply management and supply chain management	Higher Education	30 years	Business; Supply chain management
Expert P	Academic	Chair of supply chain management	Chair of supply chain management	Higher Education	10 years	n/a

n/a = not available.

could be derived from the most prominent competences and knowledge areas that were evaluated in literature. Second, the CIT provided the possibility to discuss competences in a way that made it convenient and inspiring for the participants. Grounded in organizational psychology, the CIT can be defined as a methodology to gather a set of descriptions of actions and behavior that are critical for success in certain situations (Flanagan, 1954; Brannick et al., 2012; Bartsch and Specht, 2009). In a rather condensed definition, the essential character of CIT is to collect critical situations and ask subject matter experts to describe how these situations are mastered in a successful manner. Additionally, subjects are to describe what kind of actions and behavior hinder a successful accomplishment. The critical incidents and the gathered descriptions are then analyzed and combined into clusters and dimensions (Flanagan, 1954; Butterfield et al., 2005). As defined earlier, ‘competences’ entail the element of dealing with complex situations. The critical incidents (CIs) that were applied in this research as part of the Delphi study on SPSM competences reflect such complex situations. No textbook or operating manual can provide solutions to successfully solve the CI situations, however, an appropriate set of competences helps individuals to cope with the incidents.

The researchers chose the Delphi study to be the appropriate next methodological step after having the literature-derived, preliminary framework for a SPSM competence model, following the definition of Linstone and Turoff (1975): “Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem” (Linstone and Turoff, 1975, p. 3). The development of a set of SPSM competences with only a limited base in current research is considered to be the ‘complex problem’ in this research.

3.2. Delphi method – application, sampling and data analysis approach

In its application in research, the Delphi method has undergone a development from its original scope to predict the future to a broader range of research questions (e.g. Häder, 2014; Linstone and Turoff, 2011; Linstone and Turoff, 1975). Häder (2014) provided a classification of different types of Delphi studies, including quantitative and qualitative approaches. The Delphi study performed in this research has an explorative character, it uses qualitative methods only, with a low degree of determination in terms of the operationalization of the research issue.

The Delphi study was executed following a structured process that included two Delphi rounds to gather input from experts, as described in Fig. 2.

First, the concept and interview guide was developed, incorporating the CIT. Considering that the Delphi study applied in this research was supposed to contribute to the development of a SPSM competence model, building on the findings of the literature review, the preparation of the questions to the experts was closely connected to the outcome of the latter. Also, the development of a competence model was supposed to be based on certain requirements in specific situations in the professional context. The application of the CIT allowed to combine both, the reference to the literature as well as the situational context. Being a qualitative research methodology, the CIT allows to gather a set of descriptions of actions and behavior that are critical for success. The methodology is considered to be useful to contribute to rather new areas, like the development of new job profiles, and can provide a basis for standardized quantitative research (e.g. Schuler and Kanning, 2014). The focus on critical situations allows to select actions and behavior that make a significant contribution to solve a specific issue or challenge. Flanagan (1954) described the method as “[...] a set of procedures for collecting direct observations of human behavior in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles” (Flanagan, 1954, p. 327).

The critical incidents for the Delphi study in this research were derived from the 12 most prominent competences (Table 2) that were

Table 2

Delphi Expert interviews compared to systematic literature review: Mapping of the resulting knowledge and competences to 4 competence clusters, including the 12 main competences (bold) and newly added (NEW) from Delphi Study; alphabetical order.

Competence Domain	Step 1: Allocated competences coded from literature (29 competences, incl. sub-categories) Bold: Top 12	Step 2: Allocated competences coded from Delphi Study Round 1 (41 competences incl. sub-categories) Bold: Top 10
Cognition-oriented competences	• Ability to make decisions • Critical thinking • Resourcefulness (creative resource combinations) • Supplier Relationship Management (holistic view) • Systems thinking competence	• Ability to make decisions • Conscientiousness (NEW) • Creativity (NEW) • Critical thinking • Resourcefulness (creative resource combinations) • Supplier Relationship Management (holistic view) • Systems thinking competence • Communication skills • Cross-functional team working • Interpersonal savvy • Stakeholder Management (communication) • Supplier Relationship Management (communication) • Thoughtfulness towards others (NEW) • Basic individual knowledge on PSM • Basic sustainability knowledge • Source-to-contract ◦ Demand Management – Category Strategy: - Purchasing specifications (NEW) - Supply market research (NEW) - Strategic positioning (NEW) ◦ Implementation - Contract Management ◦ Implementation - Reporting & Measurement • Intercultural knowledge (NEW) • Knowledge on product development (NEW) • Resourcefulness (Application of tools) • Supplier Relationship Management (application of tools) • Stakeholder Management (Application of tools) • Sustainability/ Compliance: ◦ Development of tools (NEW) ◦ Participation in peer initiatives (NEW) • Systematic way of working (NEW)
Social-oriented competences	• Communication skills • Cross-functional team working • Organizationally and politically savvy (Interaction) • Stakeholder Management (communication) • Supplier Relationship Management (communication)	
Functional-oriented competences	• Basic individual knowledge on PSM • Basic sustainability knowledge • Data & Systems • HR Management & Training • Performance Management • Resourcefulness (Application of tools) • Stakeholder Management (Application of tools) • Source-to-contract ◦ Demand Management – Category Strategy ◦ Demand Management – Tender Analysis ◦ Implementation – Contract Management ◦ Implementation – Reporting & Measurement • Negotiation • Supplier Relationship Management (application of tools) • Sustainability & Compliance	
Meta-oriented competences	• Commitment to change • Organizationally and politically savvy (playful attitude) • Self-reflection • Supplier Relationship Management (cooperative attitude)	• Commitment to change • Confidence (NEW) • Curiosity (NEW) • Integrity (NEW) • Organizationally savvy • Persistence (NEW) • Political savvy • Self-Awareness (NEW) • Self-reflection • Supplier Relationship Management (cooperative attitude)

evaluated in the SLR (Tranfield et al., 2003; Durach et al., 2017). The researchers assumed that these most prominent competence areas are a source for further investigation, and provide a common ground that experts can easily relate to when asked to describe successful or unsuccessful behavior. Nevertheless, to make sure that the pre-selected incidents did not restrict the input from the experts, they were provided with the opportunity to define own additional critical incidents, as well as to skip incidents that they could not relate to with their experience. 12 critical incidents were described, based on examples taken from academic papers, text books, business press and publicly available case studies. Four critical incidents were added by experts during the interviews.

As a second step in the Delphi approach, a sample of 16 experts was determined. Following Häder (2014), the principle to select the experts for a qualitative Delphi study is that each expert represents one specific perspective towards the research topic, and the individual professional expertise impacts the outcome of the study. The selection of experts for a Delphi panel is much different than for instance the selection of participants for a survey. Experts for a Delphi study are selected intentionally, and they do not reflect a random sample of any given population. The selection of adequate experts is a prerequisite for a successful explorative, qualitative Delphi study that aims to find answers to a complex and rather new research problem. Following Häder (2014, p. 106), the principle to select the experts for a qualitative Delphi study is

that each expert represents one specific perspective towards the research topic, and the individual professional expertise impacts the outcome of the study. The quality and uniqueness of experts is therefore the most important factor for a qualitative study, not the quantity of participants. Obviously, this is at the same time a limitation of this approach, as the possibility of generalization is limited. Nevertheless, coming back to the objective of the Delphi method in this research, knowledge generation within a circle of true experts to deal with a new and complex topic can still be achieved. The application of CIs for the expert interviews that were derived from the findings of the SLR also ensured that the findings gathered in the Delphi study consistently contributed to the process of knowledge generation. According to this principle, the researchers agreed that practitioners from companies and from public institutions as well as experts from academia should be included in the panel. The aim was to cover the main areas where SPSM is applied, discussed or investigated. Selection criteria were defined for each discipline and for the experts to be nominated. Experts allocated in companies were supposed to work in a firm that publicly committed to SPSM and that showed evidence of efforts to implement SPSM. For example, the publication of sustainability goals for PSM, the publication of code of conducts, reporting on projects to foster sustainability in PSM were used as sources for such evidence, together with publicly available feedback and recognition received from NGOs or other institutions on the company's SPSM activities. Also, the companies should belong to

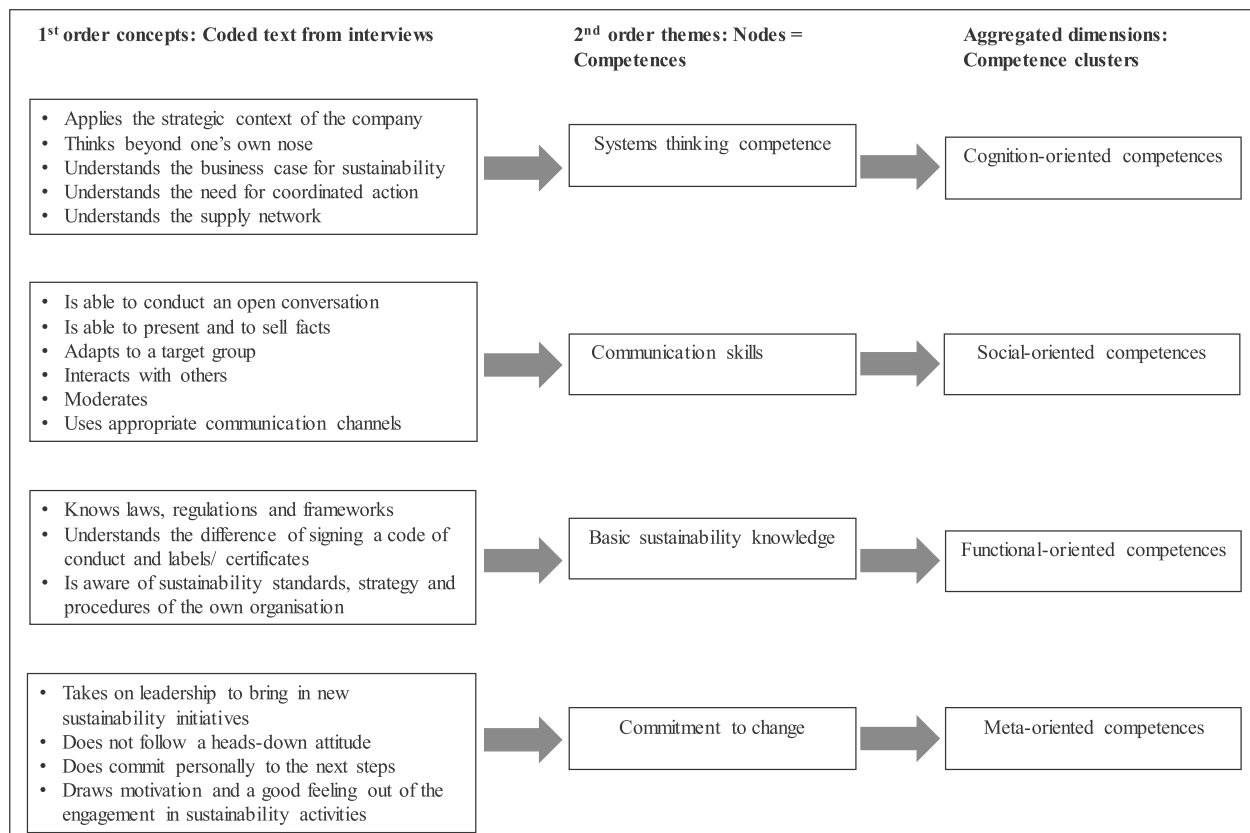


Fig. 3. Exemplary description of data aggregation, based on Gioia et al., 2013, p.21.

industries faced with a certain sustainability risk (e.g. chemicals, automotive). The experts should have subject knowledge in PSM and sustainability. As a result, for some institutions, two experts participated in the Delphi study, with one of them representing purchasing and the other more being in the sustainability area. The study also included procurement professionals from public institutions, as public procurement in some instances is on the forefront of SPSM, due to laws and regulations (e.g. see the modern slavery act in the UK). The selection criteria for the experts were the same as for the company representatives. For both groups, proof of expertise in PSM and sustainability was to be reflected by their role in the organization. Public or private practitioners had to have a role related to sustainable purchasing, being e.g. the sustainability officer in purchasing. Finally, academics doing research and/or education in the field of SPSM were included in the study. They were expected to hold a chair either in sustainability management or purchasing management with a dedicated focus on sustainability and ethical issues. Additionally, they were required to have research and publications in the field of sustainability in PSM and related competences. Table 1 shows the participant demographics.

Third, interviews with all 16 experts were conducted in the first Delphi round between January and April 2018. In the beginning of the interviews, the researchers explained the CIT approach to the participants, based on a test incident. Then, the researchers and the participants read the incident together, and the interviewees described successful and unsuccessful actions and behaviour for each of the 12 pre-defined critical incidents. The 12 critical incidents were permuted to avoid bias, for example with one critical incident being always the first or the last, or the influence of critical incidents in a certain order. All experts confirmed that the pre-defined 12 CIs described valid situations in the SPSM context. Four interviewees added an additional critical incident each that they considered typical and important in their job environment. For example, expert E added the following situation: “A

buyer receives an anonymous note that one of the company's suppliers is not paying minimum wage. When talking to the supplier about the accusation, the supplier feels very offended because there is a lot of price pressure. Also, the supplier has the suspicion that the note came from one of its competitors”.

Each interview took 2 h. All of the interviews were conducted as Skype meetings, only the pre-test was organized as a face-to-face meeting. The researchers documented the experts' input and provided it to them right after the meeting to allow for corrections or additions.

Fourth, after the first Delphi round, the researchers coded the documentations of the expert interviews. In the coding of the gathered input, we followed a structured approach, applying the qualitative content analysis and coding technique developed by Mayring (1993, 2015). Each statement regarding successful or unsuccessful actions and behavior in the context of one of the 12 CIs was allocated to a competence. The coding was done with the qualitative data analysis software NVivo 11, using the same ex-ante coding scheme as for the evaluation of the literature. To ensure reliability, the researchers coded the data based on a coding protocol also used for the evaluation of the academic literature. The coding protocol described each of the competence nodes, and included exemplary quotes. For example, the coding protocol for the competence around ‘Demand management – category strategy’ included ‘identify new, potential suppliers for changing business needs’. Therefore, statements from the interviewees like “Searches the markets to find legitimate potential suppliers” were coded to this competence/node. When the researchers identified new competences/nodes in coding the expert interviews, the coding protocol was adapted.

For newly found competences, new node descriptions were defined and documented. The authors discussed all new nodes with an additional researcher being a native English speaker, to ensure reliability and transparency. Sometimes, the discussion also led to changes in the wording or naming of the nodes, especially with the native English speaker. For example, first a new node ‘Thoughtfulness’ was proposed,

later separated into 'Thoughtful towards others' and 'Conscientiousness'. Also, the 'Steadfastness' resulted in 'Persistence' and 'Confidence'. Fig. 3 gives an example how the data was summarized, structured and assigned to one of the four competence clusters. In reference to Gioia et al., 2013, coded parts of the text are considered to be 1st order concepts, leading to nodes in the sense of 2nd order themes. Finally, these were aggregated to dimensions, in this case the four competences clusters, defined in Fig. 1.

In a fifth step, a second Delphi round was conducted with the same group of experts. The CIs were applied in the first Delphi round to gather input from the experts. The goal of the second round was to validate and prioritize the consolidated results of the first Delphi round. The CIs were not used during the second Delphi round, as a mere review of behavioral descriptions of the other experts for each CI would not have served the validation and prioritisation of competences. Also, this approach was supposed to give the experts the possibility to think beyond the CI situations. Instead, the experts were provided with an overview of the results and they were asked to give their feedback and preference in terms of which of the competences and knowledge areas should be part of a training in an academic as well as in a professional setting. The reference to curricula provided a context for the experts that made it more applicable to set priorities, rather than just rank competences generally. This part of the study was conducted based on a structured template, and the experts provided their feedback in a written format (see Fig. 4). In addition to the checkmarks, experts were also provided with the opportunity to give any other input regarding the competences or anything else they wanted to mention in a comments section. This allowed to collect feedback on the process, to add any additional competences that might not have appeared in the first Delphi round, and/or to critically discuss the gathered competences or their clustering in the four competence areas.

The feedback in the written templates for the second Delphi round was documented in Excel, resulting in numbers of checkmarks per item. Qualitative feedback in the format of comments or field notes was captured in the same Excel files. Both, data resulting from the written templates as well as comments were manually evaluated and integrated in the research results. The number of checkmarks for each competence was counted, and the ones with the highest number of checkmarks were listed.

4. Results of expert interviews - Delphi round 1

The input of the panel of experts resulted in a list of competences that are required to successfully cope with the critical incidents. According to the coding process as described in the previous section, these competences are based on the individual descriptions of the interviewees in terms of successful and unsuccessful behavior in the critical incidents. The clustering to the four competence domains is based on the definition of Delamare-Le Deist and Winterton (2005), outlined in the conceptual background section of this paper. All competences that describe specific elements of the PSM process were added to the functional-oriented cluster, as they refer to PSM activities that need to be performed. Other competences in the functional-oriented group are, for example, 'Basic individual knowledge on PSM' and 'Basic sustainability knowledge'. Both include the term 'knowledge', in the sense of "information that a person has in specific content areas" (Spencer and Spencer, 1993, p. 10). The cognition-oriented SPSM competences encompass generic knowledge and understanding related to a conceptual and a systematic way of thinking, for example 'Systems thinking competence', 'Supplier relationship management (Holistic view)' or 'Conscientiousness'. Moving to the social-oriented domain, the authors added competences that enable the interaction with others to cope with sustainability issues, including the willingness and ability to experience and shape relationships to foster SPSM. Finally, meta-oriented competences complement the cognitive-oriented cluster on the personal level. Following Delamare-Le Deist and Winterton (2005), meta-oriented competences facilitate the acquisition and application of the other substantive competences, and are therefore

rather different to the other three competence clusters. Especially when applied in the SPSM context, meta-oriented competences are sometimes positioned at the intersection between attitude and competence. The twofold character of competences in this field is particularly relevant for 'Commitment to change'. Table 2 shows an overview of the competence domains and the competences that were gathered in the SLR and in the first round of the Delphi study.

For each of the competences, exemplary quotes, based on the input gathered in the SLR and the Delphi study, were provided, as some of the listed competences needed to be described in more detail in terms of what the mean in the SPSM context for the second Delphi round. Tables 3 and 4 show the quotes for the top 10 competences gathered in the first Delphi round.

Overall, the experts confirmed that the pre-defined critical incidents described valid situations in the SPSM context. All critical incidents resulted in a number of descriptions of successful and unsuccessful actions and behavior of PSM professionals. Four experts each added one new critical incident that they considered to be important. The evaluation of the descriptions led to new competences, or complemented the ones gathered in the systematic literature review. The results show that the interviewees described competences in all four competence clusters. Also when looking at the ten main competences in terms of number of codings, they are spread over all four competence clusters, with a slight dominance of the cognition-oriented and social-oriented cluster.

When looking at the main competences that reference to the PSM process (from the top 10 marked bold in Table 2), there is an unambiguous focus on *Supplier Relationship Management (SRM)*. It turned out already in the coding of the literature that SRM includes competences regarding all four clusters. Therefore, the researchers created appropriate sub-categories. The experts in the Delphi study especially referred to three of them. Table 3 outlines how the sub-categories were defined, providing exemplary quotes from the Delphi experts.

Hence, considering the input gained in the Delphi round 1, PSM professionals are required to apply a broad set of competences to interact with the supply network in the context of sustainability.

Delphi experts also mentioned competences that can be allocated to other steps of the PSM process, especially regarding the strategic purchasing activities. Interestingly, no competences were mentioned regarding the purchase-to-pay process. This indicates that SPSM hardly relates to the transactional purchasing tasks.

Versatile competences that were gathered out of the interviews with the Delphi participants were manifold. Table 4 shows the main competences (from the top 10 marked bold in Table 2) and their descriptions based on quotes. Of those, *Communication Skills* and *Systems Thinking Competences* were coded most often.

To provide evidence on the sources that led to the main competences and knowledge areas, the researchers evaluated in NVivo which of the critical incidents created the highest number of codings regarding the competences listed in Tables 4 and 5.

Two critical incidents stand out in terms of competences related to *Supplier Relationship Management*. The first, called "Suspected child labor at a supplier", was described as follows:

An annual supplier audit was conducted to ensure compliance to sustainability requirements of the company. The auditors came back with the impression that there might be children working at some of the production lines. However, they were not sure, as the age of the workers was hard to estimate. When faced with the situation during the audit, the supplier was not able to proof that the age of the workers was in line with the requirements of the company. Following up the audit report, the buyer contacts the supplier to discuss the issue.

The second, being titled "The supplier in a developing country", reads as:

In a regular Skype meeting to discuss current topics in the business relationship with a supplier in a developing country, the buyer introduces the sustainability standards and expectations to the supplier representatives. As a first reaction, the supplier representatives explain that

Cluster: Cognition-oriented competences			
Competence	Ability to make decisions	Critical thinking	Systems thinking competence
Exemplary actions & behaviour (from interviews)	- Balances reasons & appropriate measures - Copes with conflicting goals - Sees the balanced trade-off element	- Gathers information to get a better understanding of an issue - Asks for background information - Critically reviews processes and approaches	- Understands the business case for sustainability - Thinks beyond one's own nose - Applies the strategic context of the company - Understands the supply network - Understands circular economy models
Should this competence be integrated in			
- a curriculum for higher education?	Yes – is essential ☐	Yes – is essential ☐	Yes – is essential ☐
	Maybe – nice to have ☐	Maybe – nice to have ☐	Maybe – nice to have ☐
	No – not needed ☐	No – not needed ☐	No – not needed ☐
- a professional training?	Yes – is essential ☐	Yes – is essential ☐	Yes – is essential ☐
	Maybe – nice to have ☐	Maybe – nice to have ☐	Maybe – nice to have ☐
	No – not needed ☐	No – not needed ☐	No – not needed ☐

Fig. 4. Template Delphi round 2 – Example cognition-oriented competences.

Table 3

Main process-related competence Supplier Relationship Management and quotes from Delphi participants.

	Description based on quotes from Delphi participants	Competence cluster
Supplier Relationship Management - Communication	- Explains requirements and issues to the supplier - Shows the benefits of sustainability to the supplier - Convinces	<i>Social-oriented</i>
Supplier Relationship Management – Application of tools	- Explains the business risk to the supplier - Applies a code of conduct and monitoring tools - Conducts a risk assessment	<i>Functional-oriented</i>
Supplier Relationship Management – Cooperative attitude	- Draws consequences in case of non-compliance - Coaches the supplier in the implementation of sustainability standards - Shares experiences - Offers trainings to the supplier - Works together with the supplier	<i>Meta-oriented</i>

their priority is to develop economically, and that the purchasing organization should take into account this priority. They also explain that Western buying firms and suppliers in their country are in different development stages. Therefore, they express their concerns to be able to commit to the ambitious sustainability standards that the buyer presented.

When asked about successful and not successful behaviour and actions to solve the situation, the experts of the Delphi study mentioned competences related to Supplier Relationship Management, amongst others.

For the main versatile competences, a different set of critical incidents inspired the Delphi participants, named “The stakeholder event”, “Purchasing is not involved” and “Purchasing contribution to a new sustainability strategy”. The latter reads as follows:

Due to a significant decrease in sales, combined with quality issues resulting in negative consumer feedback, bad media reports and severe loss of the companies’ credibility, the top management decided to implement sustainability as one key factor of a turnaround program. The top management issued a corporate commitment to reduce the

Table 4
Main versatile competences from Delphi round 1.

	Description based on quotes from Delphi participants	Competence cluster
Systems Thinking Competence	• Understands the business case for sustainability • Thinks beyond one's own nose • Applies the strategic context of the company • Understands the supply network • Understands circular economy models	<i>Cognition-oriented</i>
Critical Thinking	• Gathers information to get a better understanding of an issue • Asks for background information • Critically reviews processes and approaches	<i>Cognition-oriented</i>
Communication Skills	• Presents & sells facts • Conducts an open conversation • Interacts with others • Adapts to a target group • Uses appropriate communication channels • Moderates	<i>Social-oriented</i>
Cross-functional Teamworking	• Cooperates with others to find common solutions • Knows relevant internal departments to cooperate with	<i>Social-oriented</i>
Thoughtfulness towards others	• Shows understanding for the other position • Acts in a tactful manner • Is understanding • De-escalates • Is aware how to avoid conflicts	<i>Social-oriented</i>
Basic Sustainability Knowledge	• Knows sustainability strategies & procedures of the institution • Knows frameworks & law • Understands sustainability does not mean “doing good”, but preventing risk and following a business case	<i>Functional-oriented</i>
Commitment to Change	• Is passionate and beliefs in the benefit of sustainability • Does commit personally to the next steps • Takes on leadership to bring in new sustainability initiatives • Is willing to participate	<i>Meta-oriented</i>

environmental and social footprint and to support sustainable product development.

A buyer is invited to a meeting with representatives of corporate strategy, sales and marketing. It will be discussed how purchasing can contribute to the new sustainability strategy and commitment, taking into consideration the entire supplier network. Nevertheless, as the company is still in a difficult financial situation, the contribution of purchasing in terms of prices for products and raw material is expected.

To successfully cope with this situation, the Delphi participants especially mentioned *Systems Thinking Competence* as being an important asset for a purchasing professional. The actions and behaviour as exemplary listed in Table 4 need to be considered for instance in the context of this situation, namely “Understands the business case for sustainability”, “Thinks beyond one's own nose”, “Applies the strategic context of the company”, “Understands the supply network” and “Understands circular economy models”. The connection of critical

incidents and the gathered competences provides the unique SPSM context, also for the rather general competences.

4.1. Feedback from experts in Delphi round 2

Also in the second Delphi round the experts confirmed competences in all four competence clusters to be relevant for SPSM, with a slight dominance of the functional-oriented competence cluster in terms of the number of competences. This is in accordance with the results out of the SLR and Delphi round 1. Overall, a number of 24 competences was considered to be either essential or nice to have for the HE and the professional training context. Table 5 shows an overview of the competences that were considered either essential or nice to have for the two different educational contexts.

Overall, there is a dedicated focus on functional and cognition-oriented competences when looking at the essential list in Table 5 for both

Table 5
Delphi round 2 - Competences for Higher Education and professional training; competences most often mentioned by experts in bold (if more than one in bold, competences received an equal number of codings).

	Essential	Nice to have
Higher Education	• Systems thinking competence • Basic sustainability knowledge • Stakeholder Mgmt. (Communication) • Basic individual knowledge on PSM • Contract Mgmt.	• Persistence • Resourcefulness (Creative resource combination) • Conscientiousness • Thoughtfulness towards others • Confidence • Sustainability/ compliance (Development of tools)
Professional Training	• Basic individual knowledge on PSM • Stakeholder Mgmt. (Communication) • Systems thinking competence • Basic sustainability knowledge • Organisational savvy • SRM (Application of tools) • SRM (Communication) • SRM (Cooperative attitude) • SRM (Holistic view) • Contract Mgmt. • Measurement/Reporting	• Political savvy • Self-awareness • Curiosity • Conscientiousness • Thoughtfulness towards others • Interpersonal savvy • Stakeholder Mgmt. - Application of tools • Knowledge on product development • Resourcefulness - Application of tools

curricula, with 'Systems thinking competence' being the most prominent versatile competence, and SRM and 'Contract management' the most prominent competences related to the PSM process. A range of meta-oriented competences were listed by the experts as being nice to have for both curricula. In reference to the findings in Delphi round 1, the second Delphi round did not lead to any new competences, but confirmed the competence list as well as the priorities of the preceding steps. Therefore, it fulfilled the goal to validate the previous findings and helped to determine priorities.

Combination of SLR and Delphi study results.

Overall, regarding the four competence clusters as of [Delamare-Le Deist and Winterton \(2005\)](#), the SLR as well as both rounds in the Delphi study led to competences that populated each cluster. At the same time, the researchers did not code any competence that did not fit to one of the four clusters. Therefore, the four clusters were considered to be the appropriate framework for the SPSM competences. The data evaluation of the SLR and the two Delphi rounds led to a clear prioritisation of the functional-oriented domain. The consolidated results provide a clear indication that a range of functional-oriented competences form the basis for a SPSM competence model, because they were considered to be relevant both from literature and from the expert interviews. When thinking about appropriate learning methods, this kind of competences might be trained by established learning methods like presentations, readings and application in practice.

Interestingly, the meta-oriented domain was much more emphasised by the Delphi experts compared to what was found in literature. They contributed five new meta-oriented competences in the first Delphi round, and provided additional input to the existing ones. Also in the second Delphi round, meta-oriented competences were prioritised the second most often (right after the functional-oriented domain). This indicates that in a forward-looking manner, a SPSM competence model should include a range of meta-oriented competences. Experts delivered a broad range of descriptions of actions that help solving critical sustainability situations that are grounded in the meta-oriented cluster. Therefore, these competences seem to have a reasonable influence on the successful implementation of SPSM. SPSM training concepts will have to encompass appropriate training methods. The codings for the other two competence domains did not vary to a high degree, nevertheless contributed new competences and rich descriptions of successful behaviour also in those areas.

5. Conclusions: implications, limitations and future research

This research describes the results of a Delphi study that was conducted to find answers to the research question "Which individual competences of PSM professionals are required to implement SPSM?". The Delphi study was based on the findings of a SLR. The findings of the SLR indicated a research gap in the field of individual sustainability competences in PSM. The researchers grounded the approach in an interdisciplinary theoretical background, including PSM research, educational sciences and organizational psychology. It needs to be pointed out that this paper centers on the results of the Delphi study. Based on the final evaluation and findings, the SPSM competence model will be developed and potentially adapted in an academic and in a professional setting, applying action research methodology.

Summarizing the findings, the literature and results of the 1st Delphi round are consistent in terms of priorities and confirm the relevance of all four competence clusters 'cognition-oriented', 'social-oriented', 'functional-oriented' and 'meta-oriented', as defined by [Delmarche-Le Deist and Winterton \(2005\)](#). The Delphi experts complemented the SLR findings, as new competences were added to the set (e.g. thoughtfulness towards others, integrity, creativity), and comprehensive descriptions of the competences were gathered. In the second Delphi round, the experts prioritised some of the competences, and confirmed the set as a whole without adding new aspects.

The competence names that were chosen are rather general, relying

on familiar connotations. At the same time, the behavioral descriptions gathered with the critical incidents for each single competence provide dedicated direction how a competence contributes to actual SPSM implementation. Thus, the competence descriptions are specific guidance for embedding sustainability aspects throughout PSM processes.

5.1. Implications for research and education

Being one of the first studies on the nature of SPSM competences for purchasing professionals, this paper contributes to a field that previous research has paid little attention to. For research on SPSM in particular, the analysis of the relevance of competences offers a conceptual basis for bringing sustainability into overall PSM competence models. The focus on the individual level complements existing research on organizational capabilities for SPSM implementation.

From a research methodology point of view, the approach probably provides an interesting example of applying the critical incident technique in the setting of a systematic literature review and a Delphi study.

The competences and the exemplary descriptions, allocated in the four competence clusters, support the integration of SPSM learning goals and competences in curricula in higher education. For responsible education, the gathered competences and their exemplary descriptions provide direction in terms of learning goals and content.

5.2. Implications for managerial practice

For a professional context, organisations may take the model as a blueprint for the development of their specific SPSM competence model. They should position it in the strategic context of the firm, align it with strategic and operational goals, and finally allocate it to a set of HR processes and tools. In these regards, the SPSM competence model can serve to develop job roles, job descriptions, recruiting criteria, as well as competence assessment methods and trainings ([Campion et al., 2011](#); [Krumm et al., 2012](#)). The 12 critical incidents can be applied in an interactive format in SPSM trainings.

When thinking of the different steps of a PSM process (e.g. [Bals et al., 2019, Fig. 2](#)), organisations may want to consider which SPSM competences are relevant for each phase in the process. Resulting from the coding of literature and expert interviews in the present research, some process elements require more SPSM competence than others, as illustrated in [Table 3](#) for supplier relationship management.

Finally, the results of this research showed that the SPSM competences have a versatile character and therefore can be also relevant for a range of other PSM issues and topics. A purchasing professional who holds SPSM competences is probably at the same time well prepared for other tasks. This finding certainly contributes to research on current and future competence requirements in PSM, for example adding to the findings of the European research project PERFECT ([PERFECT, 2018](#)). The SPSM competences cover what professionals generally need to know to cover a modern role of PSM. Therefore, display and application of such competences might improve the recognition of SPSM in organisations, because it underlines what PSM as a functional area can contribute in future.

5.3. Limitations and future research suggestions

There are a number of limitations in this research, leading to future research opportunities. First, the empirical study, being qualitative in nature, is based on a restricted number of experts. As already mentioned when describing the methodology, the expert selection of the Delphi approach is a limitation with regards to generalization of the findings. Future research might therefore take the results of this research as the basis for a survey or other data collection approach that specifically samples for generalizability.

Second, the methodological approach to conduct the interviews with experts based on pre-defined critical incidents that reflected the main findings of the SLR might have influenced the outcome of the first Delphi

round. However, experts were able to add own incidents as needed during the first round (and only three were added) and the findings indicate that the discussions of the critical incidents resulted in a broader range of competences beyond the ones that they were initially intended to cover. Additionally, they helped to gather more in-depth descriptions of the individual competences. Nevertheless, the results might be further evaluated by other research methods, for example by conducting an extended Delphi study including more experts, or running case studies or action research projects in organisations. Case studies or action research might focus on gathering additional critical situations from practitioners that lead to observable behavior, or they might analyze the implementation of a SPSM competence model in an organization. Additionally, quantitative methods, for example a survey to ask purchasing professionals to confirm or prioritize the gathered set of SPSM competences, could help to verify the findings, as mentioned above with regards to generalization of the results. As other research has suggested that a moderating factor of needed sustainability competences is the overall sustainability maturity of the firm itself (Osagie et al., 2014), capturing this aspect in such future research could yield interesting results.

Further studies could also look at other data sources to gather SPSM competences like job advertisements for SPSM functions. Another interesting approach here could be the integration of a stakeholder point of view, asking suppliers or NGOs what they consider to be relevant SPSM competences. Especially in the HE context, the involvement of the future SPSM talents might lead to new findings and perspectives – asking them what they would be interested in learning about SPSM.

Also, more work can be done to further embed the research on SPSM competences in a theoretical framework. Potential candidates like the knowledge-based view of a firm (Grant, 1996; Nickerson and Zenger, 2004) or the resource orchestration theory (e.g. Hitt et al., 2011; Sirmon et al., 2011) need further investigation. In this context, the role of organizational strategies and structures and how PSM is embedded in an organization might be interesting perspectives (Miandar et al., 2019; Aguinis and Glavas, 2013).

For all of these suggestions, research might discuss SPSM competences looking from a vertical perspective in terms of different job roles, or in higher education with regard to different program levels. A horizontal perspective would look at SPSM competences and how they might differ between industries, markets, locations or customer expectations. A greater focus on future SPSM competences could shed light on the notion that SPSM competences contribute to a competence profile of the future purchasing professional. Also, companies that integrated social and environmental goals in their overall strategy, sometimes reflecting business models like social businesses (Bals and Tate, 2018; Tate and Bals, 2018) or businesses that follow a circular economy approach (Tate et al., 2019), might be interesting sources of future SPSM competences.

CRediT authorship contribution statement

Heike Schulze: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Validation, Writing - original draft, Writing - review & editing. **Lydia Bals:** Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Software, Validation, Writing - review & editing.

Declaration of competing interest

The authors have no conflict of interest.

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