



PERISCOPE
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Project Purchasing Education and Research with an Innovative Sustainability Scope

The PERISCOPE Consortium

Intellectual Output 1

White paper

Version: 1.0

Theoretical Innovation and Sustainability Purchasing and Supply Management (PSM) Competences Framework





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1. Executive summary

In the modern network economy, a typical industrial firm in Europe spends about 60 percent of its turnover on purchased components. More than half of the entire income of a firm is directly routed through to its suppliers. Hence, not only from the perspective of an individual firm but also from the perspective of European competitiveness the management of the buyer-supplier interface, i.e. professional purchasing and supply management (PSM), is crucial. World-class training and education of purchasers are essential to achieve this. In a previous Erasmus+ strategic partnership project competences characteristic for successful purchasers were empirically identified and a curriculum and a MOOC for teaching them were developed (www.project-perfect.eu). Since then, however, a new development has gained unprecedented momentum and this is the sustainability challenge facing the global economy. Developing sustainable and innovative solutions in supply chain management design is now obligatory for businesses and not merely an option.

Project PERISCOPE aims to prepare students in acquiring future PSM competences towards innovative and sustainability solutions. In a fast changing world, PSM employers need to keep pace with developments as they occur. Institutes for higher education must keep a step ahead of the employer needs of the future while facing this future themselves and preparing their students for the upcoming developments i.e. sustainable developments. Strong demand for directions on how to manage this change in general and how to educate and prepare the purchasing workforce in particular is clearly visible in both education and industry.

The objective of Project PERISCOPE project is to address this demand, by a) identifying those competences which are likely to prevail and those which are being newly added to the profile of a European purchaser and supply manager and b) develop a course-set to teach these competences. Moreover, trying to teach global mind-set, critical thinking and entrepreneurial competences with traditional means would be a missed opportunity. Hence, c) PERISCOPE is going to develop an open student-centred learning approach with educational materials.

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The challenge is that currently, very little knowledge is available on how purchasing managers together with their suppliers can develop sustainable and innovative solutions to face the sustainability challenges changes and requirements from an educational perspective. The following questions arise in this context:

- Which competences are managers likely to need for developing sustainable and innovative solutions together with their suppliers?
- How can students of the future be trained in an efficient, modern way (i.e. student-centred), i.e. already reflecting innovative and integrated methods?

A consortium has now been formed to achieve these aims, which brings together leading universities from across Europe, project management competence and practical exposure (e.g. associations and by industry partner workshops) with a very strong background and international network in PSM. The PERISCOPE consortium consists of five partners with complementary competences. The workload is spread over the five universities equally, with two colleagues working on the project in each university and thus with a total 10 researchers allocated to the project. about a total of some 1,200 working days will be dedicated to the project and this will represent a workload per person of 120 working days in 3 years, which is approximately 1 day per week on average. The workload is divided in a way that the project work can be performed within three years by a team of researchers.

The project aims to providing a framework for Innovation and Sustainability PSM competences. Building on that best practices world café sessions approach and Delphi Study will be done to the collection of future competence requirements for PSM managers towards innovative and sustainability solutions. Furthermore, an open module-based course for finding and applying innovative and sustainable solutions in PSM Education is developed based on the output of research. Finally, open-source learning materials are provided to prepare students for finding and applying innovative and sustainable solutions in PSM Education. These steps will be implemented by the participating universities and will simultaneously be disseminated through relevant associations and events through which they will be available to any higher education institution in Europe.

The Project PERISCOPE will support Europe and all of its many companies to focus on innovative and sustainable solutions at a crucial interface in PSM. Innovative and sustainable solutions are a great chance

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for the industrialised economies of Europe in a circular economy. In the long term, PERISCOPE will be applying an exceptionally powerful lever for providing the European economy with a competitive advantage through a focus on a circular economy. Via new learning and teaching methods for innovative and sustainable solutions in PSM the students will form the future workforce in PSM in the circular economy and will lead to a better use of resources.

This paper deals with the first Intellectual Output (IO1) of Project PERISCOPE. The aim of the IO1 is to provide a theoretical innovation and sustainability PSM framework from academic literature reviews and a collection of practice-oriented sources such as job advertisements and consultant reports. Developing topics such as sustainable sourcing, green supply chain management, green supplier involvement in product design innovation, ethical sourcing and responsible purchasing are the main concerns on the agenda of the PSM academics and professionals with special interest on how to prepare future PSM managers for sustainable and innovation issues.



2. Introduction to the white paper

Welcome to the Theoretical Innovation and Sustainability Purchasing and supply management (PSM) competences white paper. This white paper reports on the first Intellectual output (IO1) of Project PERISCOPE funded by Erasmus+ strategic partnerships. The aim of the IO1 is to provide a theoretical innovation and sustainability PSM framework from academic literature reviews and a collection of practice-oriented sources such as job advertisements and consultant reports.

The theoretical innovation and sustainability PSM framework focuses on the needed competences for innovation and sustainability regarding the field of purchasing and supply management. The term sustainable PSM is defined “as the consideration of environmental, social, ethical and economic issues in the management of the organization’s external resources in such a way that supply of all goods, services, capabilities and knowledge that are necessary for running, maintaining and managing the organization’s primary and support activities will provide value not only to the organization itself, but also to the whole of society and the economy (Miemczyk et al., 2012)”. This definition implies that sustainability is a fundamentally new way of thinking about PSM professionals’ knowledge and skills, requiring innovation in terms of practices and the development of new PSM models.

Sustainable development concerns are high on the agenda of governments, academics and business organisations around the world. For example, new Sustainable Development Goals (SDGs), based on the document “Transforming Our World: The 2030 Agenda for Global Action” of United Nations (United Nations, 2015), points out, the relevance of higher education in endeavours toward a better future (Márquez-Ramos & Mourelle, 2016). Taking the UN SDGs into account it will support the development of future-oriented competences on PSM with focus on sustainability and innovation. Developing topics such as sustainable sourcing, green supply chain management, supplier involvement in green or sustainable product design, ethical sourcing and responsible purchasing are the main concerns on the agenda of the PSM academics and professionals with special interest on how to prepare future PSM managers for sustainable and innovation issues.

Furthermore, the Covid19 pandemic has revealed the urgency to focus on sustainability and innovation PSM competences (Le Monde, 2020 <https://www.lemonde.fr/idees/article/2020/05/03/mettons-l-environnement-au-c-ur-de-la-reprise-economique>). European companies were required to manage

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unexpected challenges in PSM issues. Purchasing teams have been at the forefront to ensure business continuity dealing with under and over capacity issues, cash management while actioning plans to support fragile suppliers. In addition, continuity plans from purchasing were key to cope with supplier's uncertainty since suppliers had themselves to face their employee's sanitary security issues and their own supply scarcity.

Searching for a new equilibrium between historical know-how and new expectations, purchasing organisations will be key in accompanying the new normal. For some purchasing organisations this is about accelerating the already started initiatives in environmental and social transitions plus innovation while for some others it is time to define the right agenda. These include exploring new value levers with suppliers and their ecosystems beyond cost out, clear collaborative supplier relationships and developing the agility and resilience of supply chains without forgetting about the close to customer supplier's landscape consideration in a relocalization option.

This white paper is the first dedicated report on the PSM competences covering state-of-the art literature reviews and an analysis of current job adverts and consultant reports. Thus, this white paper serves as a foundation for discussing current purchasing competences, skills and knowledge requirements for innovation and sustainability in the new circular economy. Our findings are of particular value for the research community by providing the theoretical innovation and sustainability PSM framework. This framework could be used in practice as an orientation guide for the identification and composition of future and competence-oriented role profiles of employees and for designing qualification programs for industry.

A second white paper is planned as part of the intellectual output (IO2). This will consist of qualitative studies from conducting world café sessions, expert interviews and Delphi studies for examining not only current but also future PSM competences in enterprises.



3. Intellectual output 1: Theoretical Innovation and Sustainability Purchasing and Supply Management (PSM) Competences Framework

3.1. Aims

In order to meet the overall aims of Project PERISCOPE, it is firstly necessary to explore the competences concept through a review of how different sources have considered what competences in innovation and sustainability are needed in the field of purchasing and supply management. PERISCOPE pursues a scientific literature analysis, accompanied by other more practice-oriented sources, such as job advertisements and consultant report. The focus is based on competences (a construct of knowledge, skills and traits) needed in the field of purchasing and supply management in combination with an involvement of an innovative and sustainable focus as they face the challenges of the new circular economy. The outputs from this work feed into later IOs of the project.

3.2. Research questions

To support the over-arching exploratory aim, a number of research questions were developed as follows:

1. What are the competences that have been identified in the academic literature and practice-oriented sources as being necessary for innovation, sustainability and PSM practitioners?
2. What PSM specific and general competences does the PSM practitioner environment see as essential especially for innovative and sustainable development?
3. Identify what competences the PSM practitioners see as being required for dealing with future challenges regarding innovation and sustainability?



3.3. Structure of the white paper

The structure of the white paper is determined by research questions and has three parts. **First part** is provided in chapter 4 and focuses on an understanding of competence concepts in a more general sense and the importance of these for organisations. Furthermore, the identification of competences from the scientific literature in the contexts of innovation, sustainability and PSM is covered in chapter 4. The **Second part** of the white paper is devoted to the identification of the types of innovation, sustainability and PSM competences that will be required based on job description advertisements to describe the current environment. This is done in chapter 5. The **third part** (chapter 6) shows an overview of practise-oriented reports (consultant reports) to span the field of future challenges in PSM with a focus on innovation and sustainability.

In order to deal with the research questions and to provide some order to a complex discussion, the project team uses different sets of input data to produce the key output (Intellectual Output 1). The inputs are as follows:

	PART NUMBER	INPUT NAME	DESCRIPTION	WHITE PAPER CHAPTER
INPUTS	1	Innovation, sustainability and PSM competences from academic literature	A systematic review of PSM, sustainability and innovation related academic literature to identify what competences are needed for innovative and sustainable PSM professionals in their workplace	4
	2	Innovation, sustainability and PSM competences from job advertisements	A review of a selected number of PSM, sustainability managers and innovation managers job adverts that identify certain competences that are needed for applicants to the job role	5
	3	Innovation, sustainability and PSM competences from consultant reports (grey literature)	Using defined search terms, a list of publically available practitioner (i.e. from organisations) competences models was generated from a range of countries and also organisation type (e.g. public, private sector etc.)	6

Table 1: IO1 inputs

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This structure has been graphically represented as follows:

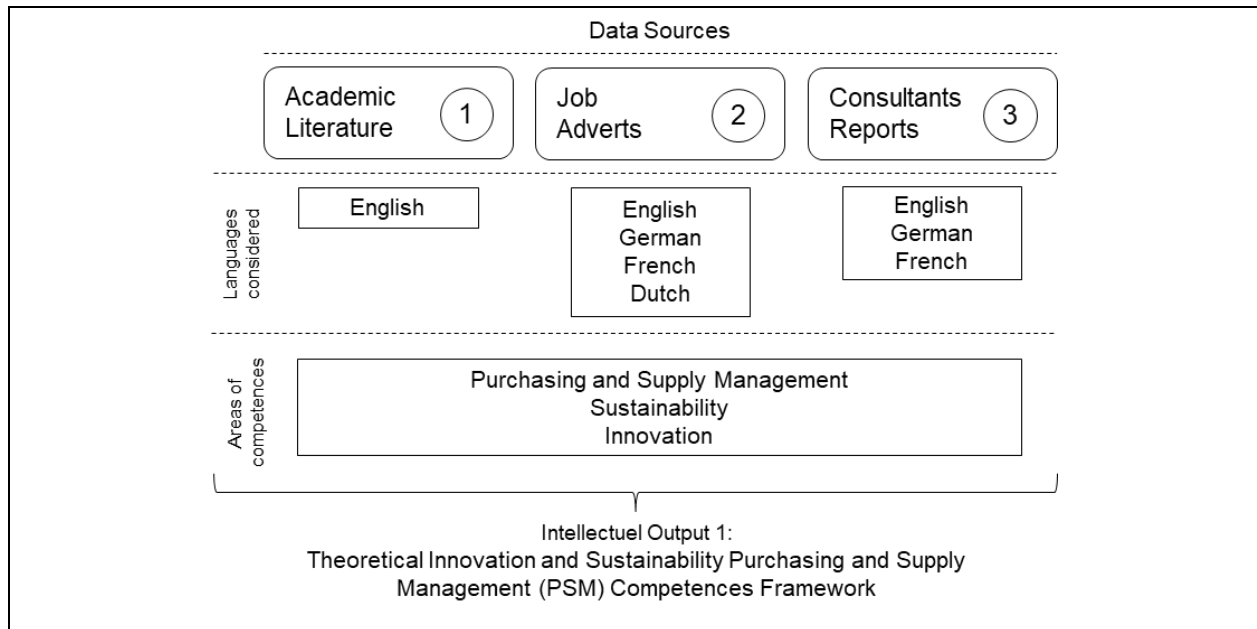


Figure 1: Structure of Intellectual Output 1 (own illustration).

The paper is structured to deal first with data sources of academic literature, job advertisements and consultant reports (grey literature), with each chapter covering a methodology, a presentation of the findings, followed by a brief discussion. This is followed by a summarizing chapter with a conclusion and then a brief discussion of how this work links to the other IOs on Project PERISCOPE.



4. Competences from the academic literature

The aim of this chapter is to review the current academic literature. The literature is thus analysed that discussed the competences which are necessary for PSM professionals, sustainable development and innovation in the PSM environment. A systematic and rigorous approach was adopted for identifying the key academic sources. The process undertaken was along established academic research lines and the academic literature search was made in www.scopus.com, www.ebsco.com and www.scholar.google.com using the following search terms and combinations:

We use conjunction “AND” to connect different segments and conjunction “OR” (Expressions in brackets) to connect keywords within the segments. Purchasing, procurement, buyer, sustainab* (sustainability, sustainable), innovation AND competenc* (e.g. competence, competency, competencies), skill, capabilit* (capabilities, capability). The key terms were searched in the title and abstract.

Academic articles in the period of 2010-2020 were analysed as a means for capturing a real-life phenomenon. The articles were then imported into an NVivo project for coding. The original naming of the competences was established and retained. Furthermore, list of general PSM sustainability and innovation competences were explored. A second researcher was involved to review the code book and categories for reducing within-study bias (Durach et al., 2017).

The next chapter first clarify the wording “competence” before the literature review is accomplished.

4.1 Competences, a construct of knowledge, skills and traits

Use of the term competence generally entails much debate. What precisely is a competence? What are key competences? Why do they differ depending on the contexts? Why are they so important? How can they be acquired? After the review of literature this is an attempt to clarify some of these questions stated above.

“Competences describe the specific attributes individuals need for action and self-organization in various complex contexts and situations. They include cognitive, affective, volitional and motivational elements; hence they are an interplay of knowledge, capacities and skills, motives and affective dispositions. Competencies cannot be taught, but have to be developed by the learners themselves”. Most importantly they are acquired during action, on the basis of experience and reflection (Unesco, 2017).



In the past few years the definition and selection of competences, which have a broader spectrum than skills, is achieving a relevant importance in all contexts. Choosing the right competences “contributes to improve assessments of how well prepared young people and adults are for life’s challenges” (Lambrechts, 2010).

Thus, many different definitions and interpretations for competences can be found in the literature depending on the different contexts or interests. They have been frequently misunderstood or interchanged by knowledge, skills, values, attitudes, etc. But a competence is much more than knowledge and skills. To go further, competence is defined by Lambrechts as:

“The ability to successfully meet complex demands in a particular context through the mobilization of psychological prerequisites (including both cognitive and non-cognitive aspects)”. On the other hand, the term key competence refers to those competences relevant and useful for everybody and in every context, “they do not replace domain-specific competences which are necessary for successful action in certain situations and contexts” (Lambrechts, 2010, p. 4).

In general terms, competences include content as well as process knowledge (know what and know-how), but furthermore they also include skills, values, attitudes, and motivation. Although the terms skills and competences are often used in the same context, a differentiation between these two exists. “Competences are broader in scope. They refer to the ability to use knowledge—understood broadly as encompassing information, understanding, skills, values, and attitudes— in specific contexts and to meet demands” (Mindt & Rieckmann, 2017). Following Rieckmann (Rieckmann, 2012, p. 129), competences are *“individual dispositions of self-organization which include cognitive, affective, volitional [...] and motivational elements”*. In addition to that he underlines that *“competencies [...] accommodate the topical knowledge required for successful problem solving in a particular context”*. Thus, competences promote self-organized action in different complex situations, dependent on the given setting and context.

To put it another way, competences can be used in many different contexts and combinations and the ranges of definitions correspond together and are connected, for example, aspects that are necessary in one area support competences in another. *“Skills such as critical thinking, problem solving, team-work, communication and negotiation skills, analytical skills, creativity and intercultural skills are all part of key competencies”* (Sady et al., 2019, p. 4). To sum up key competences represent overlapping competences *“that are necessary for all learners of all ages worldwide (developed at different age-appropriate levels)”*. They can be recognized as *“transversal, multifunctional and context-independent and do not replace*



specific competencies necessary for successful action in certain situations and contexts, but they encompass these and are more broadly focused” (Unesco, 2017, p. 10).

The words “competency” and “competence also have their different shades of meaning”. Competency is 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” (Boyatzis, 1982, pp. 20-21). Competency refers “to collections of knowledge, skills, abilities, and other characteristics (KSAOs) that are needed for effective performance in the jobs in question” (Campion et al., 2011, p. 226).

“The competences required of an occupation include both conceptual (cognitive, knowledge and understanding) and operational (functional, psycho-motoric and applied skill) competences. The competences more associated with individual effectiveness are also both conceptual (meta-competence, including learning to learn) and operational (social competence, including behaviours and attitudes)” (Delamare-Le Deist & Winterton, 2005, p. 39) Compare: Ancient Greek education was built upon three pillars: the learning of (cognitive) knowledge, (practical) skills and (character) virtues (Bitros & Karayiannis, 2011).

Summing up this chapter on the literature review it can be said that the definition of Delamare-Le Deist & Winterton of 2005 is used, in the framework of this research work, since this describes the term best.

4.2 Definitions on knowledge and skills

Knowledge

Knowledge is “the understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over the course of time. It is an individual’s interpretation of information based on personal experiences, skills, and competencies” (Bollinger & Smith, 2001, p. 9)

Hard skills and soft skills

soft skills are: “personality traits, goals, motivations, and preferences”. (Heckman & Kautz, 2012, p. 451)
“hard-skills or technical training (working with equipment and software) and soft-skills training (interpersonal or intrapersonal focus)”. (Laker & Powell, 2011, p. 113)

Explicit and tacit knowledge

Tacit knowledge (‘know-how’) can only be observed through its application and acquired through practice



(Kogut & Zander, 1992). Polanyi (Polanyi, 1966, p. 4) introduced the idea of **tacit knowledge** by stating: *“we can know more than we can tell”. “On the other hand, “tacit” knowledge has a personal quality, which makes it hard to formalize and communicate. Tacit knowledge is deeply rooted in action, commitment, and involvement in a specific context”* (Nonaka, 1994, p. 16). *“Tacit knowledge is less vulnerable but less accessible by legitimate organisational users, whilst explicit knowledge is more accessible but also more vulnerable to illegitimate exploitation”* (Jasimuddin et al., 2005, p. 109)

Explicit knowledge can be shared more easily between people (Grant, 1996) and is articulated in formal language, like manuals, mathematical expressions, copyright and patents (Smith, 2001). **Explicit knowledge** has *“the character of public goods* (Tamer Cavusgil et al., 2003, p. 7)”. **Tacit knowledge** can shift to explicit knowledge when it will be codified (Nonaka & Takeuchi, 1995).

Competency or competence

Competency is 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”* (Boyatzis, 1982, pp. 20-21). **Competency** refers *“to collections of knowledge, skills, abilities, and other characteristics (KSAOs) that are needed for effective performance in the jobs in question”* (Campion et al., 2011, p. 226)

*“The **competences** required of an occupation include both conceptual (cognitive, knowledge and understanding) and operational (functional, psycho-motoric and applied skill) competences. The competences more associated with individual effectiveness are also both conceptual (meta-competence, including learning to learn) and operational (social competence, including behaviours and attitudes)”* (Delamare-Le Deist & Winterton, 2005, p. 39) Compare: Ancient Greek education was built upon three pillars: the learning of (cognitive) knowledge, (practical) skills and (character) virtues (Bitros & Karayiannis, 2011). Within the framework of this research work, the definition of Delamare-Le Deist & Winterton, (Delamare-Le Deist & Winterton, 2005) is used, since this describes the term best.

Capabilities

Capabilities are *“a set of differentiated skills, complementary assets, and routines that provide the basis for a firm’s competitive capacities and sustainable advantage in a particular business”* (Andreu & Ciborra, 1996). **Capabilities** can be found at the individual, firm, and network levels (Hess, 2007; Miller, 2015). First, at the individual level, **capabilities** include people’s experience and practice, skills and behaviours. Second, at the firm level, **capabilities** include strategic resources, technical equipment and organizational structure



(Chu, 2011; Miller, 2015). This also includes the firm's processes and managerial systems (Leonard-Barton, 1992). *"Capabilities depends largely on strategic or resource endowments"* (Chen, 1996, p. 105). Third, at the network level (i.e. firm's environment), **capabilities** reflect the richness of business environment, the maturity of external partners and the proficiency of new knowledge available outside the firm (Miller, 2015). At the network level, **capabilities** include also how suppliers are integrated, how information is disseminated to external partners and relationship-building capabilities (Quintens et al., 2006; Zou, 1994).

4.3 Sustainability competences

In the last few decades there has been considerable government policy and also academic, company and even public interest in fostering the path towards sustainability (Lynch, 2019). Furthermore, maintaining the environment along with using resources efficiently, delivering value to society in general and to the economy (long-term economic competitiveness) are the issues with which sustainability as a defined concept is dealing with (Behnam et al., 2018). Following Behnam et al. (Behnam et al., 2018) and referring to John Elkington's framework *"triple bottom line"* there are three different main approaches to sustainability:

1. people – social/cultural
2. planet – ecological/environmental
3. profit – economic.

In fact, companies are left with a complex challenge to tackle sustainability challenges such as *"resource depletion, loss of biodiversity or global warming"* (Klewitz, 2017, p. 476).

As a matter of fact, sustainability is treated dichotomously (sustainable/not sustainable) rather than a dynamic and unfolding process, which can be reached over time (Adams et al., 2016). Further sustainable development, which has the same fundamental meaning as sustainability and only distinguished from it in validity terms, is defined as the development that *"meets the needs of the present without compromising the ability of future generations to meet their own needs"* (World Commission on Environment and Development — (de Oliveira et al., 2018; WCED, 1987, p. 8). In addition to that sustainable development is an evolving process in which *"the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs"* (Mariadoss et al., 2011, p. 1306; WCED, 1987).

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Similarly, Sady et al. (Sady et al., 2019, p. 1) defined sustainable development as a concept built around realizing human development goals and at the same time sustaining the ability of ecosystems “*by providing natural resources and protecting wildlife and nature without diminishing the chances for future generations*”. The latest developments also show that the European Union strategy “*Europe 2020: A strategy for smart, sustainable and inclusive growth*” adapted in 2010 (European Union, 2010) shows the urgent importance of “*innovation, education, digital society, training, and lifelong learning in this context*”.

To sum up sustainable development requires a massive change in people’s consciousness and provides a framework for further decisions and actions. In line with this, a “*new culture of learning*” is needed, that should be focused on self-organization and competence (Sady et al., 2019, p. 2).

The focus on sustainability education is gaining more and more attention, since there is an urge to identify how future generations can be geared “*with the values, knowledge, skills and motivation to help achieve economic, social and ecological well-being*” (Biberhofer et al., 2019, p. 3). That is to say, the main target of sustainability education is to develop competences to be able to deal with (non-)sustainable development (Rieckmann, 2012; Wiek et al., 2011).

How can these competences be defined? Following Rieckmann (Rieckmann, 2012), competences cover not only cognitive aspects, but also affective, motivational and volitional elements. Key competences are defined as competences with a special importance for the development of social goals towards sustainability. Additionally, these competences “*require a high degree of individual reflexivity*” (Rieckmann, 2012, p. 129).

Further, competences related to sustainability involve the knowledge, values and attitudes to be able to tackle the multiple challenges of current societies (McPherson et al., 2016).

Competence domain	Allocated nodes	Total number of codings for the competence domain
Cognition-oriented competences	Ability to make decisions	120
	Critical thinking	
	<i>Systems thinking competence</i>	
	Supplier relationship management – holistic view	
	Resourcefulness – creative resource combinations	
Social-oriented competences	<i>Communication skills</i>	119
	<i>Cross-functional team working</i>	
	Organizationally and politically savvy – interaction	
	<i>Stakeholder management – communication</i>	
Functional-oriented competences	<i>Supplier Relationship management – communication</i>	444
	<i>Source-to-contract</i>	
	<i>Demand management – category strategy</i> <i>Demand management – tender analysis</i>	

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	Implementation – contract management	
	Implementation – reporting and measurement	
	Negotiation	
	Spend and demand analysis	
	Purchase-to-pay	
	Invoice, payment	
	Order confirmation, claim management	
	Ordering	
	Requisition and approval	
	Data and systems	
	<i>Supplier relationship management – application of tools</i>	
	Performance management	
	HR management and training	
	<i>Sustainability and compliance</i>	
	<i>Basic individual knowledge on PSM</i>	
	Stakeholder management – application of tools	
	<i>Basic sustainability knowledge</i>	
	Resourcefulness – application of tools	
Meta-oriented competences	<i>Commitment to change</i>	98
	<i>Self-reflection</i>	
	Organizationally and politically savvy – playful attitude	
	Supplier relationship management – cooperative attitude)	

Note: *Italics* = Most coded competences

Table 2: Competence domains, allocated nodes and their total number of codings (Schulze et al., 2019, p. 11).

These competences, in the sustainability context, frequently referred to as key competences, are defined as “*essential (competences) for sustainability that have not been the focus of traditional education*”. More precisely sustainability key competences are linked to a context which is highly characterized by complexity, uncertainty, rapid social change, individualization, diversity, and uniformity (Mindt & Rieckmann, 2017, p. 133). Key competences for sustainability must then be seen as competences that enable people to solve problems in a successful way “*with respect to real-world sustainability problems, challenges, and opportunities*” (Wiek et al., 2011, p. 204). To dive in deeper, five key competences for sustainability can be distinguished: systems thinking, anticipatory thinking, normative thinking, strategic thinking and interpersonal competences (Wiek et al., 2011). Recently, there has been added a sixth competence: integrated problem-solving competence. This sixth competence is specified as a “*meta-competence of meaningfully using and integrating the five key competences for solving sustainability problems and fostering sustainable development*” (Biberhofer et al., 2019, p. 4).

Furthermore, interview-based research ($n = 46$) of Schulze et al. (Schulze et al., 2019) emphasises that strategic rather than with transactional skills lead to success in CSR and in green PSM. The research of is derived from Project PERFECT, the predecessor of Project PERISCOPE and is the first study dedicated to the sustainable purchasing target. In table 2 the overview of competences that Schulze et al. (Schulze et al., 2019) found is displayed.



“The only hope for sustainability is to change forms of consumption. To do so, we must innovate.”
(World Business Council for Sustainable Development (WBCSD, 2002, p. 232)

4.4 Sustainability and Innovation competences

Sustainability challenges related to the environment, society and the slowdown in economic growth are impacting the dynamics and orientation of innovation. According to the last report by the OECD (OECD, 2015), technological development (as reflected in a large burst in patenting) has been observed in:

- climate change mitigation, e.g. related to lighting, electric power, electric and hybrid vehicles, energy generation, batteries, motors and engines;
- ageing, health and food security, e.g. from chemistry and biotechnology;
- information and communication management, including infrastructures for “big data” and virtual payments;
- new manufacturing processes, e.g. from chemistry, nanotechnology, composite materials, new materials, 3F printing and laser technology.

Aspects relating to the environment and society have become important issues for technology and innovation management, especially regulations and a deeper understanding of innovation impacts. Environmental aspects include the use of resources (materials, energy), recycled resources; emissions into the air, water, or ground; waste and hazardous waste; biodiversity; and ecological issues of the product over the life cycle (Baumgartner, 2014). Thus, product innovations focus on environmental concerns include not only the regulators but also consumers and industries. Blättel-Mink (Blättel-Mink, 1998) defines environmental innovation as the development and implementation of new products, new technologies, new production processes, new resources, new markets and new systems that integrate the economy and ecology, i.e. introduce ecological aspects in economic strategies. Environmental innovation are classified into products/services (e.g., eco buildings, electric cars, eco-holidays, and car sharing) and processes (e.g., re-planning energy and water use to minimize waste) (Demirel & Kesidou, 2019).

The development of environmental product innovations, also referred to as green products, have become an essential element in helping companies and economies move toward environmental sustainability (Dangelico, 2016). For the development of green products, a co-creation process with the

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participation of diverse stakeholders, by means of participation of suppliers and producers, and even advanced customers (e.g. NGOs and other stakeholders) may be required to obtain feasible results. It is argued that customers represent an important source of information on green product demand and of requirements about products' environmental performance, whereas suppliers may provide information about environmental technologies, new environmentally friendly materials, and solutions for the reducing the environmental impacts of production processes (Dangelico, 2016; Melander, 2017). However, achieving collaboration from relevant suppliers with green product development knowledge and capabilities require new PSM competences and green PSM internal practices. See table 3.

Society aspects from innovation include identifying unmet needs and developing solutions that create new markets while also addressing passionate concerns in society. Thus, social innovation is the development and delivery of new ideas (products, services, models, markets, processes) at different socio-structural levels that intentionally seek to improve human capabilities, social relations and the processes in which these solutions are carried out (Brazdauskas, 2015; Gran & Jacobi, 2016). The phenomenon of social innovation has in recent decades, received increased attention from academia, public and private institutions. The social innovation concept has been discussed in the literature under two facets. In the one, social innovation is related to the solution needs and problems (Taylor, 1970) that are largely related to territory (Gabor, 1970). The previous definition illustrates that social innovation mainly emphasizes society. Social innovation can thus be defined as a product that solves unmet or non-satisfied needs or processes (a new way of engaging actors to solve specific needs) (Nicholls & Murdock, 2012). In others words, social innovation implies new ideas with the potential to improve either the quality or quantity of life (Pol & Ville, 2009, p. 15) or improving social welfare (Borzaga & Bodini, 2014).

As with other facets of social innovation, the literature shows that social innovation can be interpreted as an interaction, collaboration and conflict which acquires new cognitive, relational and organizational skills. The European Commission (2013) proposes that "social innovation is defined as the development and implementation of new ideas (product, services and models) to meet social needs and create new social relationships or collaborations". Most studies demonstrated that social innovations involve social alliances that span the boundary between profit and non-profit organizations (Berger et al., 2004). Thus, the research team for the social innovations process discusses inclusion, capacitation and intense cooperation between heterogeneous actors involved in socially innovative projects. This may require new competences and skills to manage the collaboration between non-profit and profit organisations in social



innovation projects. Table 3 illustrates the key competences found in the literature review for innovation and sustainability.

Capabilities, competences and skills	Description	References
Anticipatory competency	Ability to think in long term horizons, to consider future generations` needs and to envision future scenarios by integrating uncertainty and risk.	(Biberhofer et al., 2019)
Collaborative competency	Ability to motivate, enable and sustain collaborative and participatory working relations, embracing diversity of multi-facetted teams and networks.	(Biberhofer et al., 2019)
Critical-thinking skills	Apply creative problem solving, question established ways of doing things, and be self-directed at investigating and proposing creative solutions to sustainability problems.	(Brazdauskas, 2015)
Interpersonal competency	Ability to deal with complex realities and transformation processes calls for more dialogue than usual business processes, which focus on the success of a single company. Four elements characterize this field: working in multi-stakeholder networks /sustaining them via a culture of cooperation; participative teamwork; integrative leadership and transdisciplinary communication skills.	(Biberhofer et al., 2019)
Life-cycle competency	It refers to going beyond the traditional focus on production and manufacturing processes and considers the environmental, social, and economic impacts of a product over its entire life cycle.	(Brazdauskas, 2015; Curry & Donnellan, 2012)
Manageability and Environmental policy capability	It is reflected in their environmental policy planning, adopting procedures that align its value chain with these policies. This commitment is evidenced in its management programs, goals and results.	(de Oliveira et al., 2018)
Normative competency	Ability to reflect, negotiate and apply sustainability values, grounded on deeper concepts of justice, equity and ethics.	(Biberhofer et al., 2019)
Strategic competency	Ability to collectively design and implement interventions, transitions, and transformative governance strategies toward sustainability. This capacity requires an intimate understanding of strategic concepts such as intentionality and systemic inertia.	(Wiek et al., 2011)
Systematic competency	Ability to analyze complex systems across different domains and scales and to cope with complexity by focusing on cyclic thinking. This implies that managers cannot explore or seek to understand a phenomenon like environmental sustainability as an independent process, but it has to be understood as a dynamic, interrelated complex system.	(Biberhofer et al., 2019; Brazdauskas, 2015)

Table 3: Competences for innovation and sustainability.



4.5 Competences to contribute to innovation

4.5.1 Defining Innovation

The Organization for Economic Cooperation and Development (OECD, 2015) which has provided indicators on various aspects of innovation since 1981, in the latest revision, describes innovation as “a wide range of activities in addition to R&D, such as organizational changes, training, testing, marketing and design”. The innovation field includes all users, suppliers, and consumers and it transcends borders between countries, sectors, and institutions; R&D is only one of these steps” (OECD, 2015, p. 11). By including different actors, the term innovation has also been defined as “an iterative and social process that comprises the technological development of an invention combined with the market introduction of it to end-users through adoption and diffusion” (Garcia & Calantone, 2002, p. 112).

Innovation is often represented as a process including several phases: searching, selecting and implementing the innovation (Tidd & Bessant, 2018). The last phase, implementing, includes further sub-activities such as acquiring, executing, launching and sustaining the innovation. Tidd and Bessant (Tidd & Bessant, 2018) state, “Innovation is more than simply coming up with good ideas; it is the process of growing them into practical use” (Tidd & Bessant, 2018). Considering sourcing innovation as a process allows us to distinguish the different phases of the innovation process instead of only considering the outcomes of the innovation (Crossan & Apaydin, 2010; Maital & Seshadri, 2012), or the invention.

This research builds on the definition of innovation provided by Narasimhan and Narayanan (Narasimhan & Narayanan, 2013) stating that innovation is “the process of making changes to products, processes and services that results in new value creation for the organization and its customers by leveraging knowledge efforts of the firm and (or) that of its supply network partners” (Narasimhan & Narayanan, 2013). This definition provides several interesting dimensions. First, it presents innovation as a process, which fits with seminal research in the field of innovation (Tidd & Bessant, 2018). Second, it recognizes that the supply network has a key role in the process, as a provider of innovations. Third, it is neutral regarding the innovation type (product, process or service) and the degree of the innovation (incremental, radical, discontinuous).



4.5.2 Purchasing's competences to contribute to innovation

The PSM literature suggests an extensive set of skills and competences for purchasing. Tassabehji and Moorhouse (Tassabehji & Moorhouse, 2008), proposed a multilevel framework and categorization of purchasing's skills into five sections: technical skills, interpersonal skills, internal enterprise skills (referring to interactions between a firm's own functions), external enterprise skills (referring to the richness of the supply chain network) and strategic business skills. In this framework, Tassabehji and Moorhouse (Tassabehji & Moorhouse, 2008) develop a taxonomy of purchasing's skills, including "new" skills which are necessary for preparing the buyer for the 21st century such as product knowledge, computer science proficiency, total quality management and government legislation. But, surprisingly, research on purchasing skills has not yet examined skills and competences related to innovation. A wide stream of literature reports on purchasing skills and capabilities, but does not investigate specific competences that purchasing have to contribute to innovation (Giunipero & Percy, 2000; Knight et al., 2014). Only recent studies, say, in the last decade, have begun to explore the core capabilities and competences that purchasing needs to contribute to innovation.

Traditionally, much attention has been paid to the role of the R&D function in capturing sources of innovation, while past studies perceived "purchasing's concern for innovativeness is a far cry from its former role" (Gadde & Håkansson, 1994, p. 34). The premium function of purchasing, however, is to source external capabilities (Handfield et al., 2015), so it is legitimate to consider that purchasing could play an important role in innovation exploration. The first competence thus reflects the capability of purchasing for exploring external opportunities (Legenvre & Gualandris, 2018). Searching for innovations within the supply network, purchasing professionals have specific individual skills such as a creative and innovation orientated mindset and curiosity-driven behaviour, which facilitate the sourcing of innovations (Hartmann et al., 2012; Kähkönen et al., 2017; Schiele et al., 2011). The innovation sourcing literature distinguishes the "search for completely new technologies and sources of knowledge and ideas outside existing supply relationships and supply chains" (Johnsen et al., 2012, p. 12) and "to look beyond immediate requirements and anticipate factors that could provide future competitive advantage" (Legenvre & Gualandris, 2018, p. 97). Purchasers also "need to explore external opportunities beyond first-tier suppliers in order to access or co-develop innovative solutions" (Legenvre & Gualandris, 2018, p. 97).



Competence for purchasers is also the ability to balance cost advantages with innovation advantages. This is the notion of “dual role” (Schiele, 2010). Purchasers should assess suppliers on their innovative capabilities rather than on the (low) cost levels (Johnsen et al., 2012). Purchasers thus “need to look beyond risks, cost, and product development to offer further competitive advantages” (Legenvre & Gualandris, 2018, p. 97). Purchasers should have a long-term perspective on the cost-innovation balance by pointing on purchasing’s dual role “to support the process of innovation while maintaining cost and integration responsibility over the entire product life cycle for the entire firm” (Schiele, 2010, p. 149).

Purchasers need to understand the wider ecosystem, to improve their business intelligence level, and “to engage effectively with outsiders and new players” (Legenvre & Gualandris, 2018, p. 97). “The purchasing function has clearly emerged as a pivotal interface and process owner of collaborative buyer–supplier relationships” (Luzzini et al., 2015, p. 115). Johnsen et al. (Johnsen et al., 2012, p. 13) suggests to “develop short-term supplier relationships, limited to the duration of innovation project” and to “manage these relationships as important but not (initially) strategic partnerships”.

Purchasing can take the lead in managing collaboration with existing key suppliers and securing their early involvement in the NPD process (Johnsen, 2009; Patrucco et al., 2017). The literature examined how informal buyer-supplier interactions and influences are a good means to enhance buying a firm’s innovation capabilities: some of these sources suggest that the ability to build formal and informal social interactions enables knowledge acquisition (Liu et al., 2017). Involving suppliers in innovation projects and exploring external opportunities (Legenvre & Gualandris, 2018) is part of a purchaser’s competences. Future PSM will “work on a more interdisciplinary level, developing more technical skills, and participating more actively in product development processes” (Von der Gracht et al., 2016, p. 46). A key factor is the early involvement of the PSM function in “the sourcing process, before any specific project has even been formally started” (Johnsen et al., 2012, p. 13). Organisation that are innovation focused, ought to concentrate on “strategic sourcing (i.e. actively scout and maintain the supply base)” but also need to “promote supplier collaboration (i.e. supplier development as well as involvement into the buying firm's processes)” (Luzzini et al., 2015, p. 115).

Purchasers need to develop skills for interaction with R&D (Mikkelsen & Johnsen, 2019), which could help to assess whether the innovation has a good technical value. If purchasers detect an innovation, they have to convince other departments internally like R&D that the opportunity is real, and find the relevant support to get it assimilated (Patrucco et al., 2017). This competence is also exemplified as the role of

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“purchasing engineering” unit (Luzzini & Ronchi, 2011), which has specific technical knowledge to interact with R&D. Interaction can also concern purchasing’s integration to marketing or business development functions (Gonzalez-Zapatero et al., 2017). This integration to marketing can facilitate a better understanding of customer needs and allow purchasing to gather unmet needs (Legenvre & Gualandris, 2018). In sum, to co-innovate with other firms purchasing teams need to communicate and to cooperate “closely with R&D, marketing, operations, and clients” (Legenvre & Gualandris, 2018, p. 97). This calls for new competences of the purchasing function to create new linkages with other functions (Narasimhan & Narayanan, 2013).

Another set of competences emerged from the literature, when it comes to considering the contribution purchasing makes to innovation management. In this context, purchasing innovation management needs to link innovation organisational skills to a context which is not only characterized by technological uncertainty but also uncertainty concerning the learning process at the organizational level. This can explain the competences for innovation identified in the academic literature review: project management, system thinking, problem-solving and unlearning. The latter has recently been added and defined as “unlearning is critical for deep changes involving throwing away or temporarily putting aside parts of individual and organizational patrimony or concepts learning from the past, to create space for new leaning” (Morales et al., 2018). In this sense, a learning process that is comprised of different unlearning-learning stages supports the innovation process (Akgün et al., 2007). In order to do this, companies need capabilities which help harness the differences between value frames and use them to reframe problems, combine competences in new ways and co-create innovative solutions (Watson et al., 2017).

Purchasing’s involvement in two opposite tasks such as innovation exploration and short-term cost reductions (i.e. benefiting from innovations or exploiting innovations) is investigated in the literature under the concept of purchasing ambidexterity (Gualandris et al., 2018). Purchasing ambidexterity is defined as “a balance dimension and a combined dimension between exploration and exploitation activities”. This balance is emphasized through the need to reconcile exploitative innovations and exploratory innovations through purchasing operations (Chanal & Mothe, 2005). Balancing exploratory and exploitative activities may be much easier said than done especially in the case of purchasing which traditionally has a strong focus on cost savings. Balancing exploratory and exploitative activities is therefore likely to cause tensions (Andriopoulos & Lewis, 2009). Despite the relevance of this topic,



however, the competence to solve these tensions remains under-studied in the purchasing literature (Blome et al., 2013; Kristal et al., 2010).

Last, competences related to digitalization and information systems are becoming critical for purchasing to contribute to innovation. With new solutions and technologies offered to purchasing professionals, procurement can tap extraordinary opportunities for performance improvement and innovation (Wyman, 2017). Innovation acquisition can occur faster through the use of web-based idea platforms, where suppliers upload and sell their innovative ideas online (Homfeldt et al., 2017). For example, big data and machine learning technologies can be combined and used as patent analysis tools to identify and select innovative suppliers and partners. Patent analysis tools not only help to scout for new innovative partners but also help to identify product categories with high importance for supplier-led innovations (Trautrimis et al., 2017). The use of artificial intelligence algorithms built in e-purchasing software can facilitate the design of new contracts with start-ups. The Internet of things (IoT) can support the development of a more capable and efficient PSM organisation (Hartmann et al., 2012). Purchasing has to develop these competences in order to take advantage of these news tools.

4.4. Innovation and sustainability purchasing competences

Given the importance of addressing a host of environmental and social issues, increasing research on sustainability concerns the purchasing and supply management (PSM) function such as sustainable sourcing and ethical sourcing. According to Miemczyk et al.'s (Miemczyk et al., 2012) literature review, sustainable PSM can be defined as “the consideration of environmental, social, ethical and economic issues in the management of the organisation’s external resources in such a way that supply of all goods, services, capabilities and knowledge that are necessary for running, maintaining and managing the organisation’s primary and support activities provide value not only to the organisation but also to society and the economy”.

This definition implies that PSM can provide value not only to the organisation by means of a supplier relationship (dyad perspective), but also to diverse stakeholders by a network perspective focus on the environmental aspects of material, waste and recycling and generic internal processes (Schulze et al., 2019). The relevance of integrating knowledge and competences to address environmental sustainability



challenges also clearly emerges in practice. For example, McDonald’s collaborated with HAVI Global Solutions, its primary packaging supplier, to minimize the environmental footprint of consumer packaging (Dangelico, 2016). From this it can be argued that sustainability is a fundamentally new way of thinking about the knowledge and skills of PSM professionals, requiring innovation in terms of practices and the development of new purchasing models (Bals et al., 2019; M. Pagell & Shevchenko, 2014; Schoenherr et al., 2012).

Some innovative models and practices have been found for sustainable PSM development, such as supplier involvement in eco-design, finding and forming new supplier relationships, acquiring supplier innovations e.g., green technologies, developing traceability technologies, creating circular supply chains through product recovery and recycling, and so on (Bals et al., 2019; Dangelico, 2016; Luzzini et al., 2015; Meehan & Bryde, 2011; Picaud-Bello et al., 2019; Wieland et al., 2016). However, little is known in the literature on what is the link between PSM professionals’ competences and skills requirements for sustainability and innovation. Table 4 illustrates the key competences, capabilities and knowledge found in the literature review for PSM innovation and sustainability.

PSM Capabilities, Competences and Skills	Definition	Reference
Capability for optimizing air resources	Capability for optimizing air resources consisted of managing the greenhouse gases (GHG), in a complete view of the life cycle to reduce CO2 emissions.	(de Oliveira et al., 2018)
Capability for optimizing Earth’s resources — soil and energy	This capability consisted of managing solid waste, such as developing an inventory that accounts for a large portion of the chain (except the supply of raw materials). The optimization can also be checked on the eco-efficiency actions, such as the reduction in energy relative consumption, considering the energy expenditure per unit of production.	(de Oliveira et al., 2018)
Capability for optimizing water resources	This capability among the optimization actions are included the methodology for calculating the water life cycle impacts. For instance, it is possible to emphasize projects such as the Calculation of the Water Footprint.	(de Oliveira et al., 2018)
Collaborative competency	Ability to motivate, enable and sustain collaborative and participatory working relations, embracing diversity of multi-facetted teams and networks	(Melander, 2017)
Green supplier involvement competency	Ability to involve a green supplier in the new product development process with its buyers as : (1) a knowledge source, where employees of new green product development gather new knowledge from green suppliers and apply such knowledge to generate new	(Cheng, 2020; Dangelico, 2016)



	green innovative ideas; (2) a co-creator, where green suppliers, together with firms' green product development employees, create new green products	
Green purchasing competency	Ability to lead a company to reduce its environmental impact by selecting suppliers able to provide more environmentally friendly materials and products	(Kalinowski et al., 2017)
Green supply chain management	It focuses on external relationships in procurement, production, distribution, reverse logistics and packaging, including innovation in these processes	(Sarkis, 2003)
Life-cycle competency	It refers to going beyond the traditional focus on production and manufacturing processes and considers the environmental, social, and economic impacts of a product over its entire life cycle.	(Melander, 2017)
Relationship environmental management capability	An externally oriented capability aimed at sustaining environmentally sound relationships with external stakeholders through various communication methods, highlighting the role of information exchange with external actors in the management of environmental.	(Lee & Klassen, 2008)
Supply chain environmental management capability	An externally oriented capability aimed at highlighting the relevance of collaborations with actors along the supply chain in environmental management.	(Dangelico, 2016)

Table 4: PSM competences for innovation and sustainability



5. Competences from job advertisements

To complement the academic review contained in chapter four, job advertisements from different countries were reviewed to show what competences employers feel their prospective employees should demonstrate in order for them to perform their jobs in their different positions. The focus of the analysis is on the needed competences for innovation and sustainability regarding the field of purchasing and supply management. Job advertisements for PSM, sustainability manager (SM) positions, innovation managers (IM) and a combination of sustainability purchasing (SP) and innovation purchasing (IP) were searched and analysed.

The job advertisement analysis was carried out in Austria, Germany, Switzerland, France, Netherlands, Belgium, Denmark, Sweden, Norway and Finland, whereas two regions were clustered: DACH (Austria, Germany and Switzerland) and the Nordic countries (Denmark, Sweden, Norway and Finland). A snapshot in time using available online platforms in each country are done. To ensure that a sector specific bias did not materialise a wide variety of industrial sectors are analysed. In addition, a variety of organisational levels were contained in the analyses to ensure that, for example, entry level positions were not just focused on and only competences that are mentioned three or more times are included.

The analysing of PSM job advertisements alone would not lead to a robust conclusion. Sustainability and innovation still do not receive meaningful mentions in PSM job advertisements especially in the DACH region. A fact that became apparent on the other hand is that many companies seem to fully outsource sustainability and innovation topics and often to so-called sustainability or innovation managers. Only in France do employers search for specific employees in the positions of an “innovation purchaser” or “sustainability purchaser”.

A new approach thus had to be chosen. In addition to recording required competences from PSM job postings, job advertisements related to specific sustainability and innovation roles were analysed. This would allow the highlighting of similarities or differences between required competences in PSM, sustainability, innovation jobs and a comparison to specific positions of an innovation purchaser or sustainability purchaser. In the following, the job advertisements analysis method was used. It is a well-established research method (Sodhi & Son, 2010) and it allows an unbiased overview (Askehave, 2010) of



competences required to be obtained while also quickly collecting data from a diverse set of companies, industries and management-levels.

5.1 Data collection



Figure 2: Competences from Job Advertisements (own illustration).

In total, in the timeframe between 25th of January and 15th of May 2020, required competences out of 338 job ads have been collected. 67 ads from the DACH region (30 for PSM, 17 for SM and 20 for IM jobs) and 37 ads from the Nordics (30 for PSM, 4 for SM and 3 for IM) have been searched and downloaded. 101 of these ads were found on LinkedIn (<https://www.linkedin.com>), while three additional came from the German job platform Stepstone (<https://www.stepstone.de>). The individual keywords used for the PSM job search were “PSM” OR “procurement” OR “purchaser” OR “purchasing” OR “buyer” OR “sourcing” OR “supply chain”. For the SM and IM job search, the terms “sustainable” OR “sustainability”, or respectively, “innovative” OR “innovation” were used individually or in combination with “manager”. Furthermore, the words “sustainable” OR “sustainability” OR “innovative” OR “innovation” have been used alongside “PSM” OR “procurement” OR “purchaser” OR “purchasing” OR “buyer” OR “sourcing” OR “supply chain” to find out if there exist open job positions that blend the tasks of PSM and SM or PSM and IM.

Geographically, the search for the DACH region was limited to the countries Germany, Austria and Switzerland. The search for the Nordics included Denmark, Norway, Sweden and Finland. Internship job ads have been excluded from the search results. All the ads were saved as PDF files and catalogued in a table. Next to the export date, the job portal, job name, company, industry and management level were noted down.

The required competences of PSM professionals in the BENE region, which includes Belgium and the Netherlands, have been adopted from PERFECT, a previous study. In that study, 100 job ads for each

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country had been downloaded and analysed. Original PDF export files for these job ads were not available and thus no metadata such as job name or company are available. Furthermore, no SM or IM job ads are available for this region.

In France neither PSM, SM or IM job ads were available. Instead, 26 job ads for so-called sustainability purchasing (SP) and 8 ads for so-called innovation purchasing (IP) job positions have been analysed. The differences between SM and SP and IM and IP will be discussed in the next chapters. No PDF exports of these ads or metadata besides job portal, job name and company are available. It should be clarified that 11 of these advertised SP and IP jobs are for open positions that are based outside of France. Nonetheless, these ads are all targeting French job seekers on French websites and are therefore included in the following analysis under the “France” region.

A list of all job ads from the DACH region, Nordics and France with all the available metadata can be found in the appendix.

Individual keywords used for the PSM job search were “PSM” OR “procurement” OR “purchaser” OR “purchasing” OR “buyer” OR “sourcing” OR “supply chain”. For the sustainability and innovation job search, the terms “sustainable” OR “sustainability” or respectively “innovative” OR “innovation” were used individually as well as in combination with the above mentioned PSM search terms or “manager”. Internship ads were eliminated from the search results. An overview of the analysed advertisements by industry, management level and country can be found in table 5.

Industry	DACH PSM	DACH SM	DACH IM	Nordics PSM	Nordics SM	Nordics IM	BENE PSM	France SP	France IP
n/a							200	2	7
Consultancy Services		3	1	2		1			
Consumer Goods / Retail	6	5	6	4	3			3	3
Energy	1		1	4		1			2
Financial Services / Banking	1	1	1						1
Industrial Machinery	4	2		3	1				2
Information Technology	4		2	8				1	1
Logistics	1	1	3					1	
Pharma / Healthcare / Biotech	2		1	7		1		1	3
Real Estate/Construction	5	2	2						
Automotive / Transportation	6	3	3	2					7
Management Level									
n/a		3		7		1	200	8	26
Entry-Level	6	2	1	4	1				

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Associate	10	9	13	12	2	1			
Mid-Senior Level	10	3	6	5					1
Director	2			2	1				
Executive	2								
Country (execution)									
Austria	3	2	4						
Germany	24	13	13						
Switzerland	3	2	3						
Denmark				3	1	1			
Finland				4	2				
Norway				4					
Sweden				19	1	2			
Belgium							100		1
Netherlands							100		
France								5	16
USA									6
UK								2	1
Poland									1
India								1	
	n=30	n=17	n=20	n=30	n=4	n=3	n=200	n=8	n=26

Table 5: Collected job advertisements by industry, management level and country

5.2 Job advertisement analysis and competences extraction

Following the collection of all the job ads for the DACH region and the Nordics, the next step consisted in reading through all of them and extracting the required competences that get mentioned directly or indirectly throughout the text.

Most job ads are worded very differently and there usually exist many synonyms for essentially the same competence. Therefore, to ensure consistency and the comparability of the required competences, a catalogue with pre-defined competences from which to choose from had to either be created or adopted. For this research, the decision reached was to use a catalogue developed by Bals et al. (Bals et al., 2019) and if deemed necessary add some additional competences. This catalogue (see table 6) consists of 69 competences that the authors regarded as very important for PSM jobs. It is based on the Tassabehji et al. (Tassabehji & Moorhouse, 2008) catalogue with the addition of competences that have only emerged in recent years and that have been identified through extensive interviews with 46 PSM professionals from 16 different companies.

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The competences fall into 4 categories: *Technical Skills* (19 competences), *Interpersonal Skills* (25 competences), *Internal/External Enterprise Skills* (17 competences) and *Strategic Business Skills* (8 competences). (Tassabehji & Moorhouse, 2008)

Technical Skills	Interpersonal Skills	Internal/External Enterprise Skills	Strategic Business Skills
Basic knowledge on PSM role & processes	Analytical skills	Change Management	Business Acumen
Computer Literacy	Conflict Resolution	Communication skills	Financial acumen
Contract Management	Creativity	Cross-functional abilities & knowledge	PSM Best Practice Intelligence Scouting
Cost savings	Decision making	Engineering	Risk management
eProcurement Technology	Effective questioning techniques	Finance	Strategic thinking
Intellectual Property	Integrity	Logistics	Critical thinking
KPI Reporting Design	Interpersonal Communication	Manufacturing/Production	Holistic Supply Chain Thinking
Languages	Knowledge sharing	Marketing	Sustainability
Negotiation	Leadership	Quality (QHSE)	
Process optimization	Learning agility	R&D	
Product knowledge	Prioritization	Supply Chain	
Project Management	Remote Virtual Working	Sales	
Quality assurance	Results focus driving for results	Cultural awareness	
Strategic sourcing	Structured way of working	Customer Focus	
Tools and Systems Implementation	Teamwork-working in teams	Networking	
Automation	Curiosity	Stakeholder Relationship Management	
Big Data Analytics	Deal with ambiguity	Supplier management	
Innovation sourcing	Humility		
Innovative sourcing approaches	Mobility		
	Openness, Open-minded		
	Passion		
	Resilience		
	Self-confidence		
	Self-reflection		
	Self-reliance		

Table 6: Catalogue of PSM competences elaborated by Bals et al. (Bals et al., 2019).

While this catalogue was specifically developed for clustering competences required for PSM jobs, most competences are undeniably required in non-PSM jobs as well. Therefore, this catalogue was also used to cluster competences extracted from the SM, IM, SP and IP job ads.

Throughout the analysis of all the job ads, some competences were found that are not mentioned in the Bals et al. (Bals et al., 2019) catalogue. Therefore, an additional small catalogue (table 7) was created with additional competences that were found in PSM jobs, and a larger number of competences that are frequently mentioned in SM or IM jobs.

Additional PSM competences	Additional SM competences	Additional IM competences
Policy compliance	Develop & drive sustainability strategy/programs	Develop & drive innovation strategy/programs
Total Cost of Ownership	Balance environmental, social and economic aspects (ESG)	Manage / Lead Innovation-Projects
Delegation	Identify sustainability risks	Idea & Knowledge Management
Lean (Six Sigma)	Policy compliance	Feasibility analysis
Business ethics	UN sustainable development goals	Prototyping
	Life cycle engineering/management/assessment	Innovation Marketing
	Sustainable & Innovative Energy Management	Identify (disruptive) business opportunities / technologies
	Green Value Chain Management	Foster innovation culture
	Carbon footprint reduction / assessment / carbon accounting	Product / Industry knowledge
	Sustainable Sourcing (e.g. Ecovadis)	Agile methods



Waste Management
Circular economy
Business ethics
Innovative Sustainability

Table 7: Additional competences to the catalogue of Bals et al. (Bals et al., 2019).

The competences collection workflow for the BENE region differed from that as explained above for the other two regions, because the required competences are those adopted from previous study PERFECT, where they had been extracted from the original job ads. While the competences for the French IP and SP jobs had been catalogued using the Bals et al. (Bals et al., 2019) catalogue, the competences from the 200 PSM job ads from the BENE region had originally been catalogued using a catalogue that differs significantly from that of Bals et al. (Bals et al., 2019), making a direct comparison with data from the DACH region or from the Nordics difficult. The competences from the original catalogue thus had to be aligned and combined with the Bals et al. (Bals et al., 2019) catalogue.

5.3 Results

The first part of this chapter focuses on the PSM, SM and IM related jobs ads from the DACH region. In the second part, the required competences for the various professions in the DACH region will be appropriately compared with the ones found in the Nordics, the BENE region and France. Suitable graphs with normalised data will be used to visualize the similarities and differences between professions and geographical regions in the various comparisons. The following table 8 gives a consolidated overview of all required competences for all regions and professions with the respective number of mentions.

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	DACH - PSM		DACH - SM		DACH - IM		Nordics - PSM		Nordics - SM		Nordics - IM		BENE - PSM		France - SP		France - IP	
Number of advertisements	30		17		20		30		4		3		200		8		26	
Technical Skills	Basic knowledge on PSM role & processes	28 93%	1 6%	0 0%	28 93%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	173 87%	7 88%	9 35%				
	Computer Literacy	23 77%	9 53%	3 15%	12 40%	0 0%	2 67%	71 36%	1 13%	6 23%								
	Contract Management	11 37%	1 6%	0 0%	8 27%	0 0%	0 0%	3 38%	14 54%									
	Cost savings	23 77%	0 0%	1 5%	14 47%	0 0%	1 33%	2 25%	7 27%									
	eProcurement Technology	3 10%	0 0%	0 0%	1 3%	0 0%	0 0%	3 38%	4 15%									
	Intellectual Property	0 0%	0 0%	1 5%	1 3%	0 0%	0 0%	0 0%	6 23%									
	KPI Reporting Design	6 20%	4 24%	1 5%	2 7%	0 0%	0 0%	1 13%	3 12%									
	Languages	20 67%	14 82%	16 80%	16 53%	1 25%	1 33%	152 76%	0 0%	8 31%								
	Negotiation	25 83%	0 0%	1 5%	23 77%	0 0%	0 0%	74 37%	3 38%	15 58%								
	Process optimization	18 60%	1 6%	0 0%	12 40%	0 0%	0 0%	13 7%	1 13%	2 8%								
	Product knowledge	0 0%	0 0%	0 0%	2 7%	1 25%	0 0%	0 0%	0 0%	11 42%								
	Project Management	18 60%	10 59%	18 90%	9 30%	1 25%	3 100%	51 26%	3 38%	14 54%								
	Quality assurance	12 40%	1 6%	0 0%	11 37%	0 0%	0 0%	0 0%	0 0%	2 8%								
	Strategic sourcing	21 70%	0 0%	0 0%	7 23%	0 0%	0 0%	3 38%	16 62%									
	Tools and Systems Implementation	11 37%	3 18%	0 0%	2 7%	0 0%	1 33%	2 25%	4 15%									
	Automation	2 7%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%								
	Big Data Analytics	1 3%	2 12%	0 0%	0 0%	0 0%	1 33%	1 13%	1 4%									
	Innovation sourcing	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	17 65%								
	Innovative sourcing approaches	3 10%	0 0%	0 0%	0 0%	0 0%	0 0%	14 7%	0 0%	12 46%								
	Interpersonal Skills	Analytical skills	19 63%	12 71%	11 55%	17 57%	2 50%	3 100%	97 49%	7 88%	12 46%							
Conflict Resolution		1 3%	0 0%	2 10%	1 3%	0 0%	0 0%	1 13%	1 4%									
Creativity		8 27%	7 41%	7 35%	4 13%	0 0%	1 33%	32 16%	2 25%	10 38%								
Decision making		12 40%	1 6%	3 15%	5 17%	0 0%	0 0%	26 13%	2 25%	5 19%								
Effective questioning techniques		7 23%	2 12%	6 30%	5 17%	0 0%	1 33%	0 0%	0 0%									
Integrity		3 10%	2 12%	0 0%	2 7%	0 0%	1 33%	23 12%	2 25%	1 4%								
Interpersonal Communication		18 60%	8 47%	5 25%	15 50%	4 100%	0 0%	78 39%	7 88%	12 46%								
Knowledge sharing		5 17%	5 29%	4 20%	4 13%	3 75%	0 0%	2 25%	7 27%									
Leadership		16 53%	6 35%	9 45%	12 40%	3 75%	2 67%	35 18%	5 63%	15 58%								
Learning agility		6 20%	3 18%	2 10%	4 13%	0 0%	1 33%	17 9%	0 0%	2 8%								
Prioritization		5 17%	2 12%	3 15%	3 10%	0 0%	1 33%	4 50%	7 27%									
Remote Virtual Working		1 3%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%								
Results focus driving for results		7 23%	9 53%	2 10%	10 33%	1 25%	0 0%	93 47%	1 13%	4 15%								
Structured way of working		13 43%	6 35%	4 20%	7 23%	1 25%	0 0%	60 30%	7 88%	4 15%								
Teamwork-working in teams		23 77%	12 71%	14 70%	19 63%	4 100%	3 100%	67 34%	7 88%	18 69%								
Curiosity		7 23%	4 24%	6 30%	2 7%	1 25%	0 0%	17 9%	2 25%	10 38%								
Deal with ambiguity		0 0%	0 0%	1 5%	0 0%	0 0%	0 0%	1 13%	3 12%									
Humility		1 3%	0 0%	0 0%	2 7%	0 0%	0 0%	1 13%	0 0%									
Mobility		3 10%	5 29%	6 30%	7 23%	0 0%	1 33%	23 12%	0 0%	4 15%								
Openness, Open-minded		8 27%	8 47%	4 20%	4 13%	0 0%	1 33%	17 9%	4 50%	5 19%								
Passion		7 23%	5 29%	8 40%	10 33%	1 25%	1 33%	44 22%	2 25%	1 4%								
Resilience		4 13%	1 6%	3 15%	6 20%	0 0%	0 0%	74 37%	0 0%	1 4%								
Self-confidence		6 20%	4 24%	4 20%	4 13%	0 0%	1 33%	13 7%	0 0%	0 0%								
Self-reflection		0 0%	0 0%	0 0%	1 3%	0 0%	0 0%	0 0%	0 0%	0 0%								
Self-reliance		10 33%	8 47%	5 25%	15 50%	1 25%	2 67%	74 37%	2 25%	7 27%								

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	DACH - PSM	DACH - SM	DACH - IM	Nordics - PSM	Nordics - SM	Nordics - IM	BENE - PSM	France - SP	France - IP
Number of advertisements	30	17	20	30	4	3	200	8	26
Internal/External Enterprise Skills									
Change Management	2 7%	2 12%	1 5%	4 13%	0 0%	0 0%	9 5%	1 13%	1 4%
Communication skills	21 70%	15 88%	15 75%	17 57%	3 75%	2 67%	106 53%	5 63%	9 35%
Cross-functional abilities & knowledge	15 50%	6 35%	7 35%	17 57%	0 0%	2 67%	80 40%	5 63%	8 31%
Engineering	8 27%	5 29%	13 65%	8 27%	1 25%	1 33%	61 31%	0 0%	9 35%
Finance	2 7%	0 0%	0 0%	1 3%	0 0%	0 0%		1 13%	0 0%
Logistics	5 17%	1 6%	1 5%	5 17%	0 0%	0 0%		0 0%	1 4%
Manufacturing/Production	8 27%	1 6%	0 0%	5 17%	0 0%	1 33%		0 0%	1 4%
Marketing	1 3%	0 0%	3 15%	1 3%	0 0%	1 33%		0 0%	1 4%
Quality (QHSE)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%		1 13%	2 8%
R&D	0 0%	0 0%	4 20%	3 10%	0 0%	0 0%		0 0%	9 35%
Supply Chain	14 47%	1 6%	0 0%	7 23%	0 0%	0 0%		1 13%	3 12%
Sales	1 3%	1 6%	1 5%	2 7%	0 0%	0 0%		0 0%	2 8%
Cultural awareness	2 7%	3 18%	3 15%	0 0%	0 0%	0 0%	7 4%	0 0%	2 8%
Customer Focus	3 10%	2 12%	1 5%	3 10%	0 0%	0 0%	53 27%	0 0%	3 12%
Networking	4 13%	6 35%	9 45%	3 10%	2 50%	2 67%	34 17%	3 38%	8 31%
Stakeholder Relationship Management	15 50%	9 53%	12 60%	16 53%	4 100%	2 67%	33 17%	6 75%	12 46%
Supplier management	21 70%	2 12%	0 0%	25 83%	0 0%	0 0%		6 75%	8 31%
Strategic Business Skills									
Business Acumen	17 57%	5 29%	4 20%	3 10%	0 0%	1 33%	69 35%	0 0%	7 27%
Financial acumen	3 10%	0 0%	0 0%	3 10%	0 0%	0 0%		0 0%	0 0%
PSM Best Practice Intelligence Scouting	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%		0 0%	1 4%
Risk management	6 20%	2 12%	0 0%	6 20%	0 0%	0 0%		3 38%	7 27%
Strategic thinking	3 10%	3 18%	3 15%	1 3%	0 0%	0 0%	19 10%	3 38%	4 15%
Critical thinking	2 7%	0 0%	0 0%	0 0%	0 0%	1 33%		5 63%	1 4%
Holistic Supply Chain Thinking	2 7%	0 0%	0 0%	0 0%	0 0%	0 0%	17 9%	2 25%	0 0%
Sustainability	1 3%	17 100%	1 5%	3 10%	0 0%	0 0%		8 100%	0 0%
Additional PSM comp.									
Policy compliance	2 7%			3 10%					
Total Cost of Ownership	1 3%			0 0%					
Delegation	1 3%			0 0%					
Lean (Six Sigma)	4 13%			1 3%					
Business ethics	1 3%			0 0%					
Additional SM competencies									
Develop & drive sustainability strategy/programs		15 88%			3 75%			7 88%	
Balance environmental, social and economic aspects (ESG)		2 12%			0 0%			0 0%	
Identify sustainability risks		2 12%			0 0%			7 88%	
Policy compliance		5 29%			2 50%			8 100%	
UN sustainable development goals		2 12%			0 0%			0 0%	
Life cycle engineering/management/assessment		7 41%			0 0%			1 13%	
Sustainable & Innovative Energy Management		3 18%			1 25%			2 25%	
Green Value Chain Management		1 6%			0 0%			0 0%	
Carbon footprint reduction / assessment / carbon accounting		10 59%			2 50%			2 25%	
Sustainable Sourcing (e.g. Ecovadis)		6 35%			0 0%			6 75%	
Waste Management		3 18%			1 25%			3 38%	
Circular economy		5 29%			1 25%			2 25%	
Business ethics		2 12%			0 0%			0 0%	
Innovative Sustainability		1 6%			0 0%			1 13%	
Additional IM competencies									
Develop & drive innovation strategy/programs			7 35%			3 100%			16 62%
Manage / Lead Innovation-Projects			15 75%			2 67%			0 0%
Idea & Knowledge Management			9 45%			0 0%			12 46%
Feasibility analysis			10 50%			0 0%			0 0%
Prototyping			5 25%			0 0%			0 0%
Innovation Marketing			1 5%			0 0%			4 15%
Identifying (disruptive) business opportunities / technologies			11 55%			0 0%			3 12%
Foster Innovation culture			2 10%			0 0%			7 27%
Product / Industry knowledge			6 30%			0 0%			0 0%
Agile methods			7 35%			0 0%			2 8%

Table 8: Consolidated overview of competences for all professions and regions



5.3.1 Competences for sustainability and innovation managers

As indicated in the previous chapter, competences that received various mentions in the job ads, but to which no competence counterpart in the Bals et al. (Bals et al., 2019) catalogue could be assigned, have been listed separately. This was especially necessary for the SM and IM job ads, while the only new PSM competences that received more than three mentions are lean (six sigma) principles with four mentions (13%).

In the context of sustainability, many companies are seeking to reduce their carbon emissions across all departments in the upcoming years and decade. In order to accomplish this, an assessment of the current in-house and also supplier carbon footprint is needed, hence carbon footprint assessment, commonly referred to as carbon accounting, is a must have competence for sustainability managers. Furthermore, life cycle engineering is becoming increasingly important, and this starts with sustainable sourcing practices for raw materials and ends with the recycling and reuse of the outdated products. Since ever stricter emission and waste management rules are being put into place across the globe, sustainability managers need to have a solid understanding of policy procedures and must make sure that the company-wide sustainability strategies comply with current and future legislations (see table 9).

Develop & drive company-wide sustainability strategies
Carbon footprint assessment / Carbon accounting
Sustainable Sourcing
Life cycle engineering / management / assessment
Policy compliance
Circular economy
Sustainable & Innovative Energy Management
Waste Management
Balance environmental, social and economic aspects (ESG)
Assess sustainability risks
UN sustainable development goals
Business ethics
Green Value Chain Management
Innovative Sustainability

Table 9: Additional sustainability job related competences in the DACH region.

Innovation managers are characterised by the ability to identify and analyse new potentially disrupting business opportunities and ideas as well as being able to plan and lead innovation projects and programs, whether these are company-wide, or limited to a small product engineering team. Additionally, they should have extensive product and industry knowledge plus a hands-on mentality, which are often essentials for working on new prototypes (see table 10).



Innovation-project lead / management
Identify (disruptive) business opportunities
Feasibility analysis
Idea & Knowledge Management
Develop & drive innovation strategies / programs
Agile methods
Product / industry knowledge
Prototyping
Fostering innovation culture
Innovation Marketing

Table 10: Additional innovation job related competences in the DACH region.

5.3.2 Competences for sustainability and innovation purchasers

In France, two new professional figures have emerged in recent times and these both appear to be in great demand. The first of these is referred to as innovation purchasing (IP), the second is referred to as sustainability purchasing (SP). However, these jobs cannot yet be found in other European regions.

The names suggest that these jobs are located at the intersection of PSM and IM or PSM and SM. In the following comparisons an analysis is made of whether this is in fact the case and if the required competences are closer to PSM or IM / SM job competences. The previously presented PSM, IM and SM competences required in the DACH region will be used as a comparison base.

It is worth noting that although the same catalogue (Bals et al., 2019) was used to categorize the French job ads. In the figures used in this part, the competences have been sorted by the number of mentions in the IP and SP jobs in descending order from top to bottom.

Technical Skills

The Bals et al. (Bals et al., 2019) model is focused on PSM skills, it is therefore to be expected that all competences in the technical skills category will receive more mentions in the French IP and SP jobs than in more general DACH IM and SP jobs.

If we take a look at figure 3, the frequent mentions of strategic sourcing, negotiation and contract management in IP jobs suggest that innovation purchasers are still very much involved in the classical buying process, which consists of working with suppliers on a regular basis. Contract management appears to be even more important in IP than in PSM jobs, while project management competences remain more

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important in IM jobs. However, two new competences appear in IP jobs, those are innovation sourcing and innovative sourcing approaches. Innovation sourcing can be understood as detecting innovations outside the company, such as within suppliers, and then potentially implementing them in the company. Innovative sourcing approaches is closer linked to the actual buying process and refers to how the buying process can be improved and innovated. For most other competences in this category (such as knowledge on PSM role & processes, cost savings, tools and systems implementation, KPI reporting), the number of mentions for IP jobs tend to be positioned between the number of mentions for PSM and IM jobs.

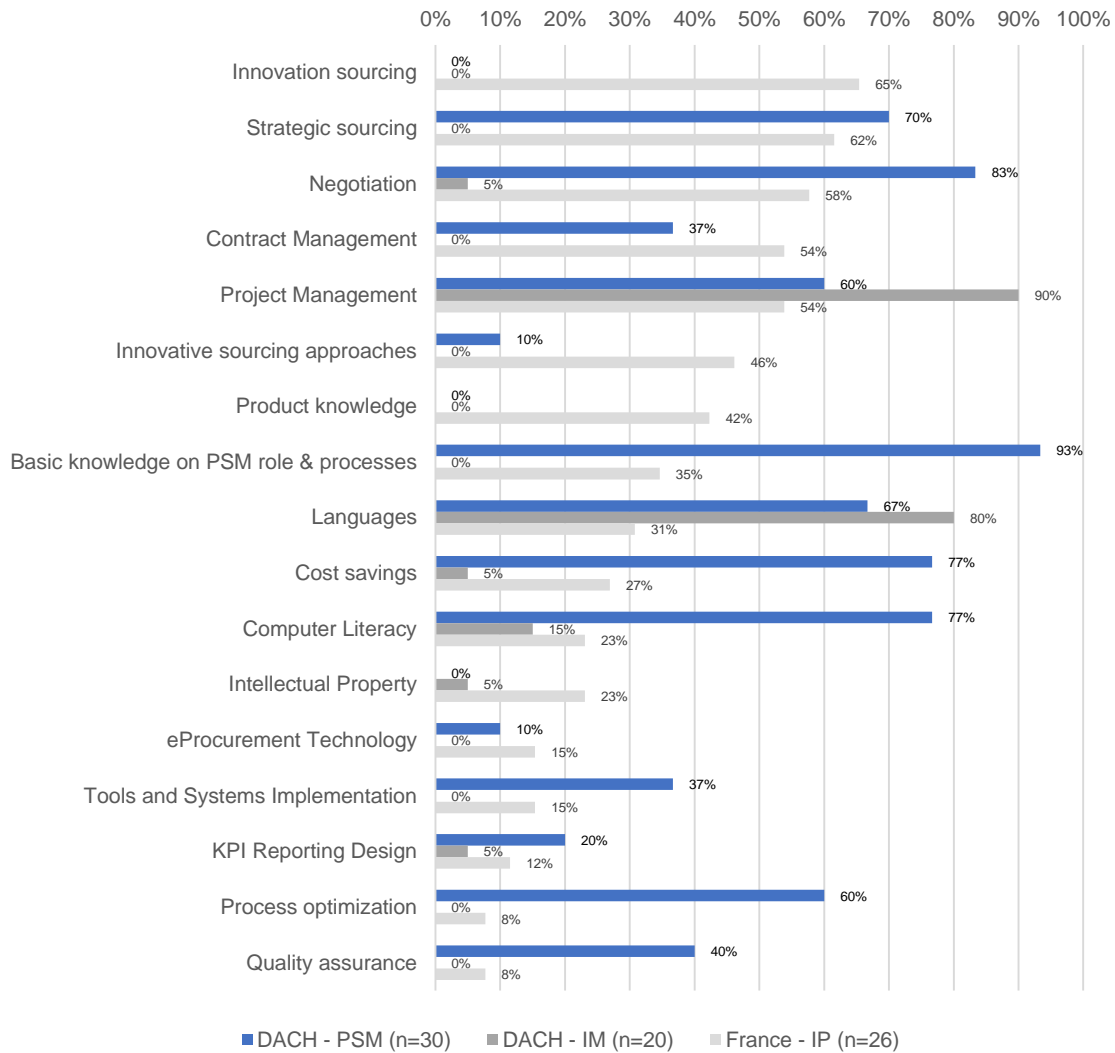


Figure 3: Comparison of required Technical Skills (DACH - PSM vs. DACH - IM vs. France - IP).

Figure 4 compares the requirement in terms of competences found in the technical skills category for DACH PSM and SM jobs and French SP jobs. Similar to what was observed in IP jobs, competences assigned to the technical skills category tend to be mentioned less in SP job ads than in PSM jobs ads, but more in SP job ads than in SM job ads.

The fact that there are no language requirements in SP jobs (or only limited language requirements in IP jobs) is almost certainly only due to cultural differences in France, while the small number of mentions made to computer literacy might be due to an influence of personal bias during data acquisition.

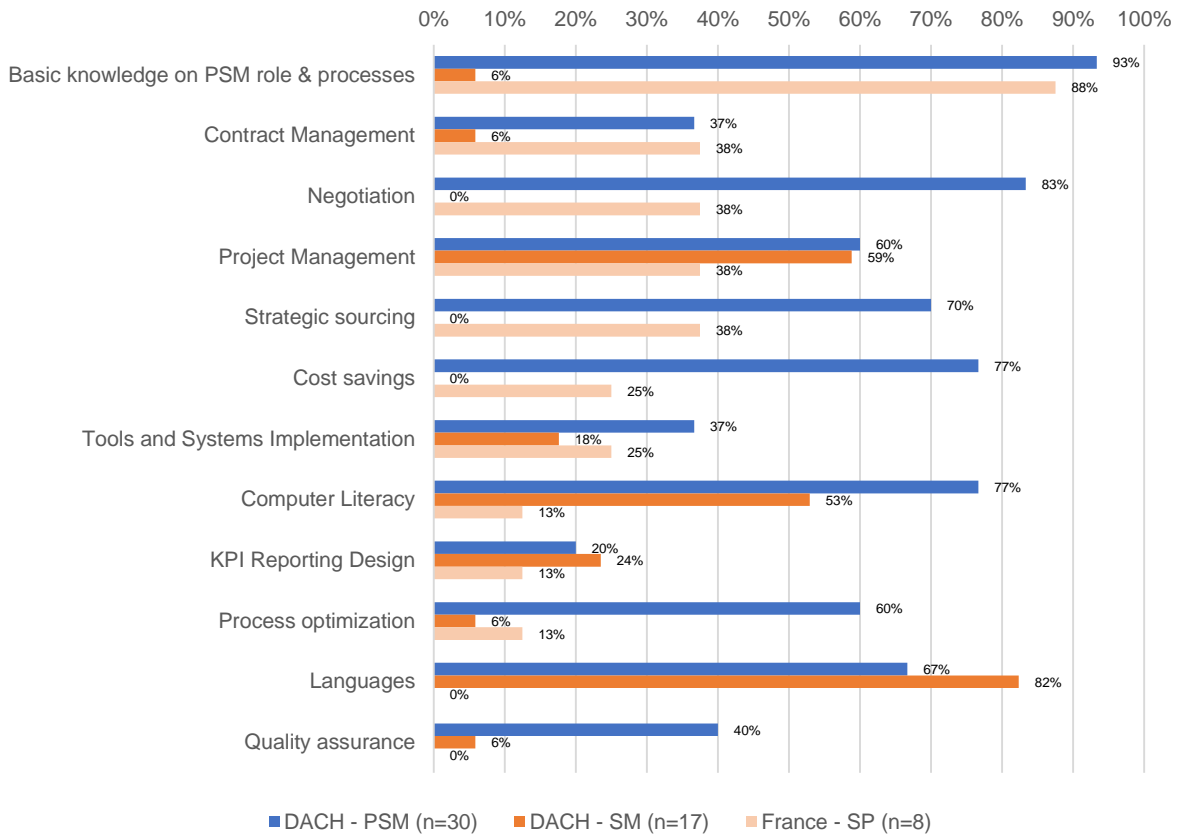


Figure 4: Comparison of required Technical Skills (DACH - PSM vs. DACH - SM vs. France - SP).

Interpersonal Skills

A large number of interpersonal competences that are visualized in figure 5 appear to receive an approximately equal number of mentions in all three professions. Out of these, teamwork, leadership and analytical skills are deemed to be especially important. Creativity, curiosity, knowledge sharing, self-reliance and openness are required in ranges between 20% and 30% of all jobs.

The greatest discrepancies can be found in interpersonal communication, a competence that is much more requested in PSM and IP job ads than in IM job ads. On the other hand, mobility and passion are more important in IM jobs, while decision making and a structured working method receive the most mentions in PSM job ads.

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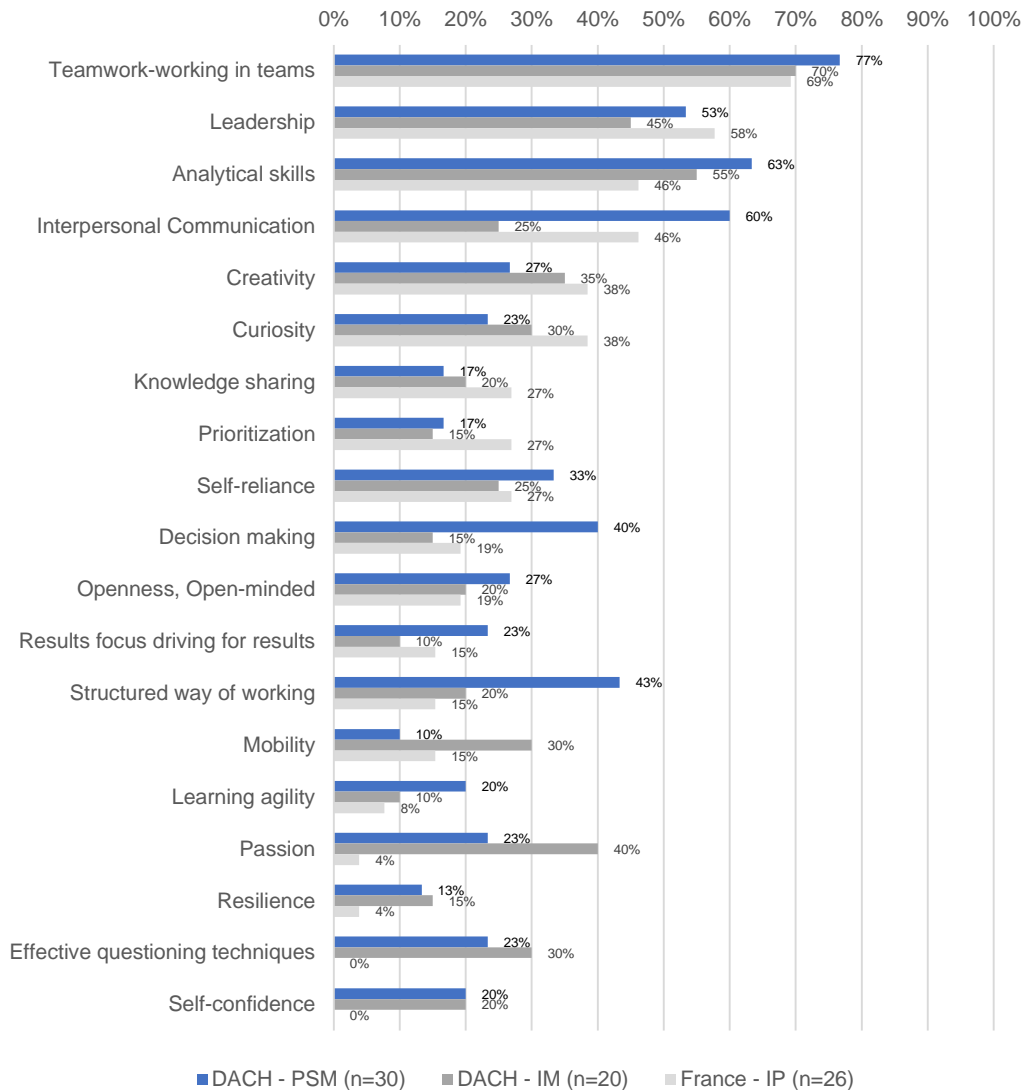


Figure 5: Comparison of required Interpersonal Skills (DACH - PSM vs. DACH - IM vs. France - IP).

In SP jobs, analytical skills, interpersonal communication, a structured working method and prioritization are very important and more often required than in PSM and SM jobs. Teamwork is highly relevant in all three professions, while leadership receives less mentions in SM job ads. Openness is relevant in both SM and SP jobs, while creativity, self-reliance, results focus and mobility are predominantly required in SM jobs. These comparisons can be seen in figure 6 on the next page.

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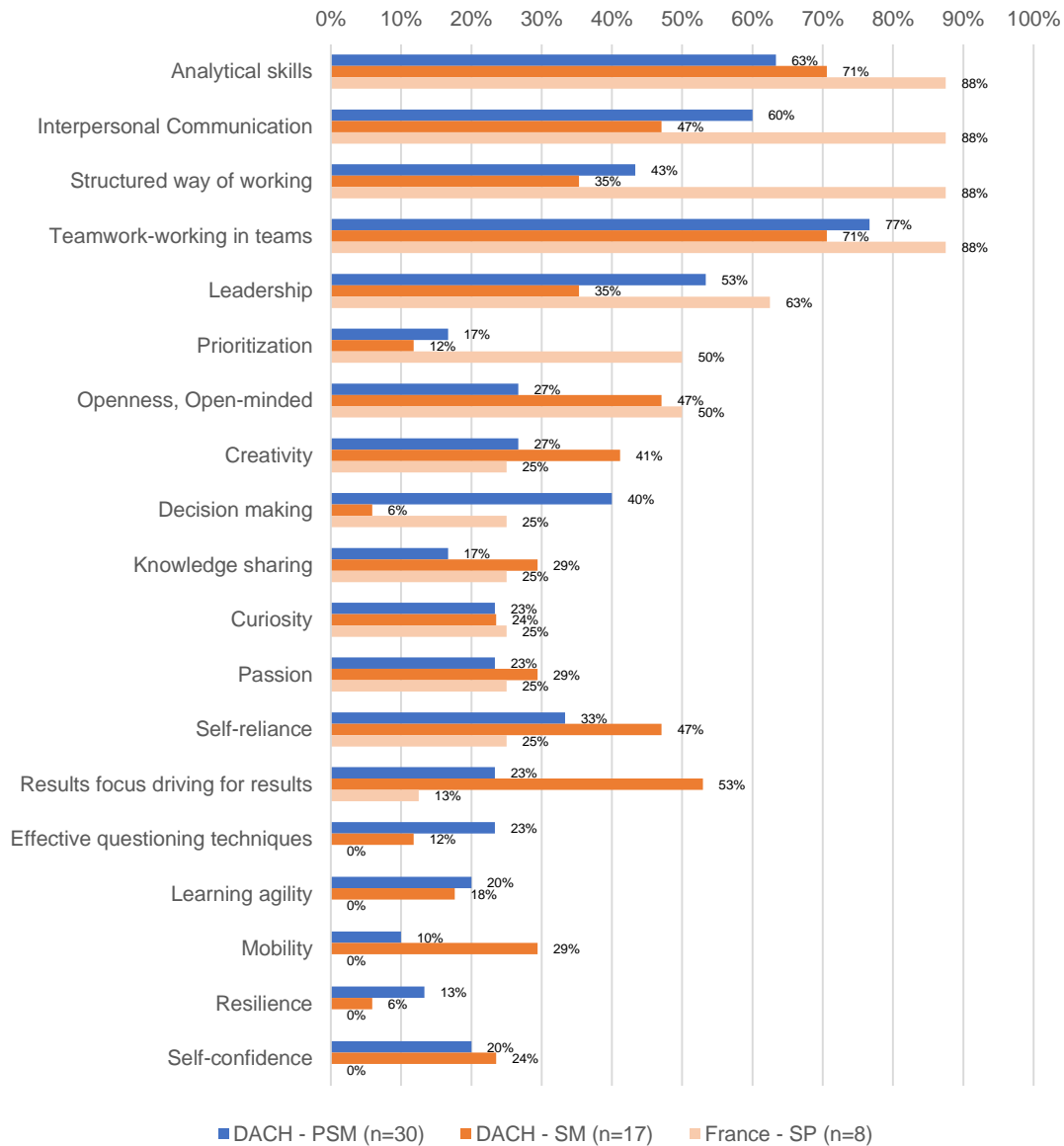


Figure 6: Comparison of required Interpersonal Skills (DACH - PSM vs. DACH - SM vs. France - SP).

Internal / External enterprise skills

Compared to IM job ads from the DACH region, some enterprise skills seem to receive less mentions in the French IP job ads, these are communication skills, engineering and networking. Stakeholder relationship management is a competence that is equally important in all three professions. Supplier management competences are required in 70% of PSM jobs and 31% of IP jobs. Innovation often comes from the supply chain. Establishing and maintaining successful relationships with suppliers is thus very

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important. Cross-functional abilities and knowledge are also quite commonly asked in all jobs (see figure 7).

The other enterprise skills are mainly relevant in PSM jobs or are not required in either profession.

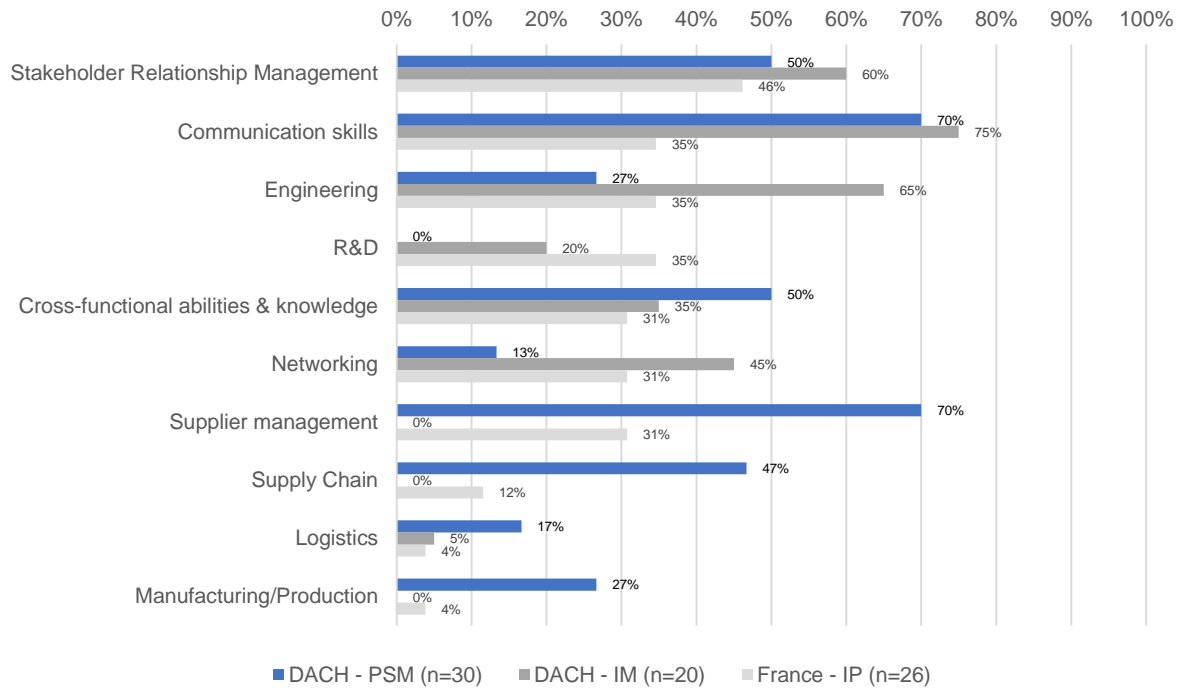


Figure 7: Comparison of required enterprise skills (DACH - PSM vs. DACH - IM vs. France - IP).

In SP jobs, stakeholder relationship management and supplier management competences are especially important and even more frequently required than in PSM jobs, which shows just how important the role of suppliers is considered to be in helping to meet the corporate goals set in terms of sustainability

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(see figure 8). Furthermore, communication skills, cross functional abilities and knowledge and networking competences also play an important role in SP jobs, while the other enterprise skills receive no mentions.

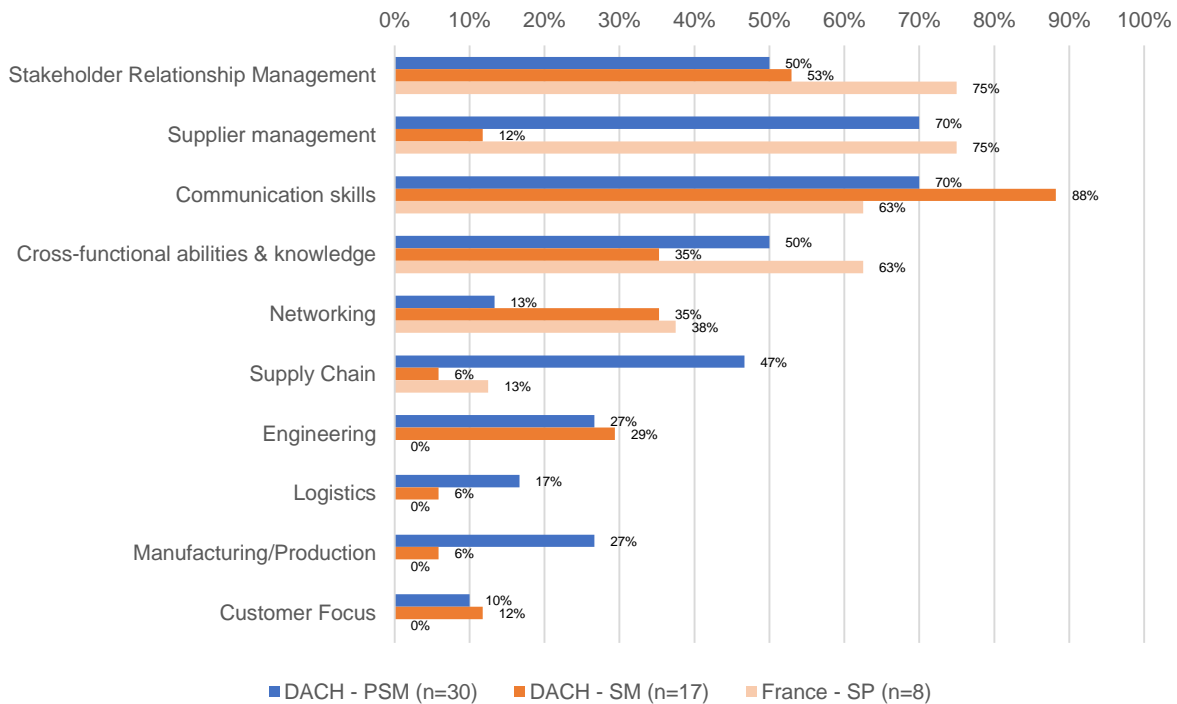


Figure 8: Comparison of required enterprise skills (DACH - PSM vs. DACH - SM vs. France - SP).

Strategic business skills

Strategic business skills are seldom mentioned in the various job ads. Business acumen is very important in DACH PSM jobs, but on the other hand less required in IM and IP jobs.

Risk management is required in 20% of PSM and 27% of IP jobs, but not at all in IM jobs, implying that fostering innovation from the supply chain and purchasing process is potentially subject to more risks than following innovation on the product- or business model front (see figure 9).

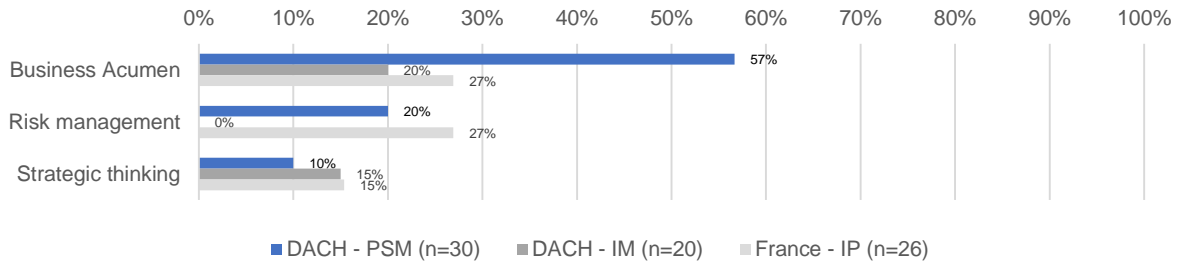


Figure 9: Comparison of required strategic business skills (DACH - PSM vs. DACH - IM vs. France - IP).

In French SP jobs, risk management and strategic thinking are more important competences than in DACH PSM and SM jobs. The fact that critical thinking is asked for in 63% of SP jobs and business acumen in no SP jobs is more likely to be due to different interpretations of the two competences between the persons that analyzed the ads from the DACH region and from France than to actual differences in competency requirements (see figure 10).

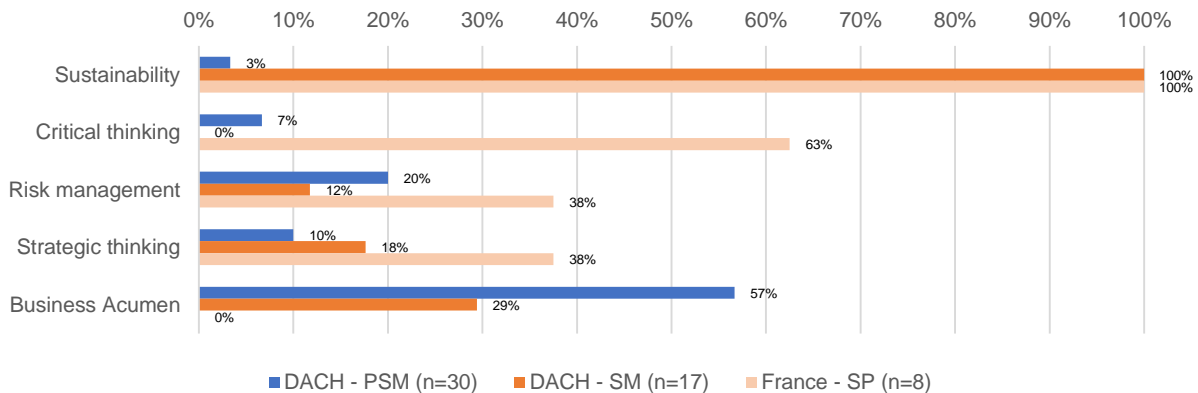


Figure 10: Comparison of required Strategic Business Skills (DACH - PSM vs. DACH - SM vs. France - SP).

Additional competences to the model of Bals et al., 2019

The catalogue of additional sustainability- and innovation-related competences that had to be created when analysing the DACH IM and SM job ads was also available during the analysis of the job ads from France. Putting these competences side by side for DACH IM / SM jobs and IP / SP jobs from France allows

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having a more conclusive understanding of the differences between the IM and IP professions as well as SM and SP professions.

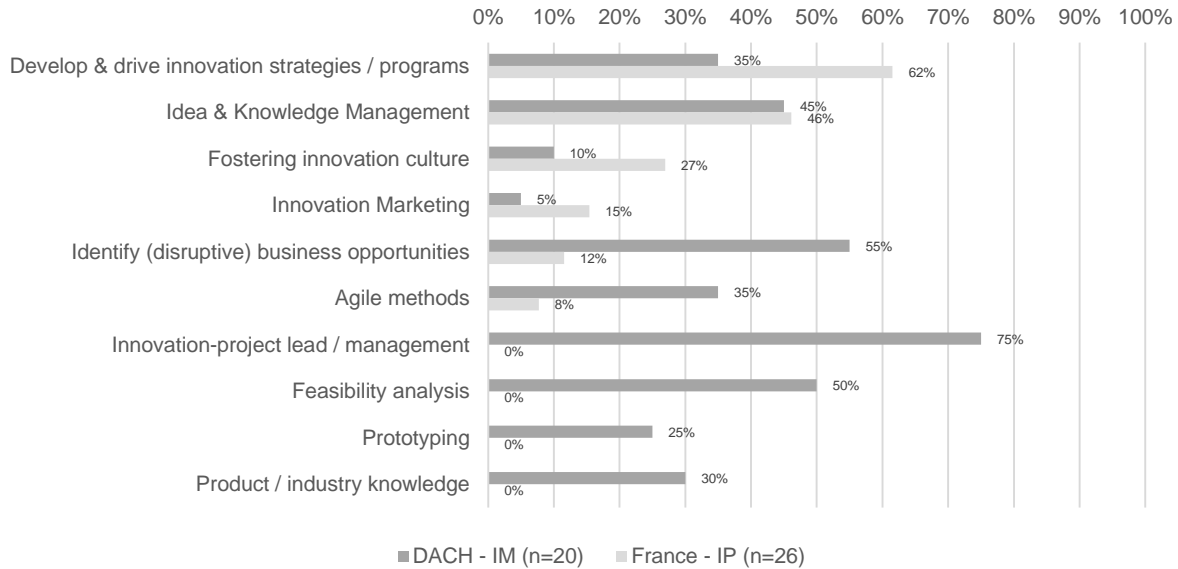


Figure 11: Comparison of additional IP and IM related competences (DACH - IM vs. France - IP).

Should these additional competences alone be considered, when looking at figures 11 above and 12 below, SP jobs appear to be more similar to SM jobs in terms of responsibilities than IP jobs are to IM jobs. In IP jobs the only competences of significance mentioned are developing and driving innovation strategies and programs, idea and knowledge management and fostering innovation culture. Once again topics related to risks are much more important in jobs that involve dealing with suppliers than in the general SM or IM professions as previously discussed in the strategic business skills sector. Policy compliance is another major competence requirement in SP jobs.

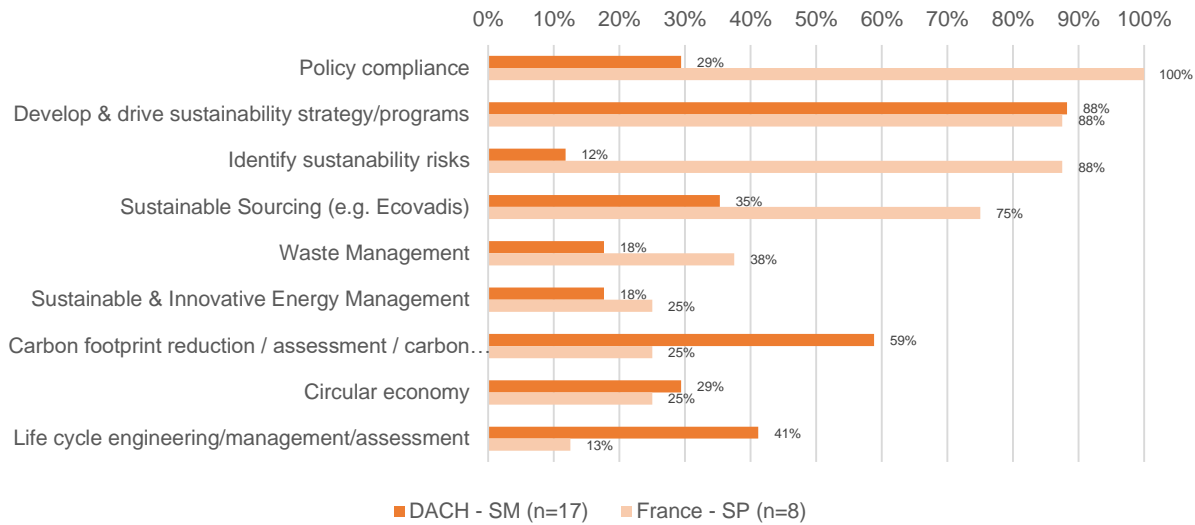


Figure 12: Comparison of additional SM and SP related competences (DACH - SM vs. France - SP).

5.4 Conclusion of the job advertisement analysis

The required job competences for PSM jobs, SM jobs and IM jobs in the DACH region were discussed in the previous chapter. IP and SP job competences demanded in France were compared with PSM, IM and SM job competences in the DACH region.

PSM job ads in the DACH region put a strong emphasis on competences in the technical skills category, while competences of this kind (cost savings, process optimization, project management, strategic sourcing, tools and systems implementation) are mentioned far less frequently in PSM job ads in the Nordics. This leads to the assumption that the PSM profession is given less strategic importance in the Northern parts of Europe, with the focus being placed instead on operational responsibilities (or the “classical” buying process).

This assumption is further strengthened when comparing competences from the interpersonal skills category (leadership, decision making, creativity, openness), which also receive fewer mentions in job ads from the Nordics, and when taking into account the fact that in the DACH region, business acumen is deemed significantly more important.

It has been explained previously that sustainability or innovation are not yet mentioned in the DACH region PSM job ads. However, sustainability and innovation topics within an organisation are handled by

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so-called sustainability or innovation managers, which would appear to be in great demand in the DACH region.

Sustainability or innovation do not play a significant role in PSM job ads from the Nordics either, and unlike the situation in the DACH region, very few SM or IM job ads have been found in the Nordics region. This could be explained either by the fact that sustainability or innovation are not generally considered to be important topics in the Nordics or most ads for such jobs are composed in local language and not in English. A different explanation could be, however, that sustainability and innovation in the Nordics are not new topics, but were already prioritized years ago and that all such tasks are now already covered by someone working in the company.

France is the one region where sustainability and innovation are already deemed to be very important in PSM. While with the available data is not possible to assess if sustainability or innovation are mentioned in actual PSM job ads, which could very likely be the case, French companies are going a step further by recruiting specific sustainability purchasing and innovation purchasing professionals.

These jobs appear to be positioned somewhere between PSM and SM jobs or PSM and IM jobs. Both SP and IP professionals are expected to be able to work and negotiate extensively with suppliers and outside partners to reach respective goals in the same way as PSM professionals, and as a consequence they are expected to have the same interpersonal and enterprise skills.

In terms of non-PSM competences, SP jobs and SM jobs seem to be closer related to each other than IP jobs are to IM jobs. While sustainability managers are first and foremost responsible for ensuring sustainability within the organisation and giving a broad strategic roadmap, sustainability purchasers are responsible for ensuring that all supply chain members and stakeholders are adhering to this roadmap.

Innovation managers are responsible for creating or identifying innovation within the organisation. The two main tasks of innovation purchasers on the other hand are to source innovation from outside the organisation and to find ways to innovate purchasing and supply chain processes.

In conclusion, even though all the analysed regions are located in relatively close proximity to each other geographically, substantial differences still exist between them in the required competences for PSM jobs as well as in the issues of how sustainability and innovation topics are treated within organisations.

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The results of the competences from job advertisements are taken into account in the summarizing chapter.



6. Innovation and sustainability PSM view from consultant reports to explore competences

This chapter reports the findings of a desk internet research targeting up-to-date consultant reports (e.g. studies and articles). The focus is on current and future economic or technological trends with regard to the interface between PSM, sustainability and innovation with a focus on competences

The research reported in this section examines “grey literature in the world wide web” as the data base in which future requirements for PSM competences with a focus on innovation and sustainability are outlined / published. German, English and French language search terms were defined as a means of narrowing the desk research and these were, of course, translated into the relevant target languages.

Search terms such as “trends in purchasing”, “purchasing requirements”, “purchaser of the future”, “sustainability purchasing”, “innovation purchasing” are used. The results of the initial search phase, which were published in German, English and French, were then translated into English by the researcher with the appropriate native language. The texts were then read and scanned one by one with a research focus on information about developments and trends in PSM, future sustainable and innovation requirements in PSM and required PSM skills/competences/characteristics/know-how. The results of this chapter support those in the summarizing chapter.

Table 11 displays the analysed consultant reports with the objective to summarise the important aspects and several identified keywords in English language according to the related studies.

	Study/Source	Keywords
	<i>Resources in German (9#)</i>	
1	(All about Sourcing, 2015) Source: https://allaboutsourcing.de/de/position-des-einkaufs-in-unternehmen/	Savings Technical industry Importance of purchasing Purchase costs/total costs Qualification, level of training Hierarchy and appreciation, recognition, position of the purchasing department Structures Software equipment Targets, success bonuses Reduction Number of suppliers Involvement in product development

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2	<p>Hövlér Holzmann Consulting GmbH: Sustainable Procurement: Nachhaltigkeit im Einkauf verankern und trotzdem Einsparungen realisieren (Holzmann & Grüne, 2016)</p> <p>Source: https://www.hoeveler-holzmann.com/ueber-uns/veroeffentlichungen/die-aktuellsten/sustainable-procurement-nachhaltigkeit-im-einkauf-verankern-und-trotzdem-einsparungen-realisieren</p>	<p>Shopping destination Requirements for purchasing Product groups and economy levers Dimensions of sustainability Purchasing functions Supplier selection, supplier evaluation Sustainability figures Eight main lever in sustainable purchasing Sustainability target</p>
3	<p>(WKO, 2018)</p> <p>Source: https://www.wko.at/service/umwelt-energie/nachhaltigkeit-unternehmen.html</p>	<p>Inexpensive products and services Responsibility for the consequences Expectations of companies in the area of sustainability Added value of sustainability Saving of resources, cost saving, competitiveness Software tool</p>
4	<p>t3n: 3 Gründe, warum nachhaltige Unternehmen erfolgreicher sind (Maslo, 2019)</p> <p>Source: https://t3n.de/news/3-gruende-erfolgreiche-setzen-1191810/</p>	<p>Change of perspective Innovation based on sustainability Further development Nature as a source of inspiration sustainable transformation of the products Dynamic demands of employees satisfaction, getting the best out of it, higher prices, investments, financing Transparency Future-proofsocial accountability</p>
5	<p>ATKearney: Procurement 2020+, 10 Megatrends die den Einkauf verändern werden (Scharlach et al., 2014)</p> <p>Source: https://docplayer.org/19495514-Procurement-2020-10-mega-trends-die-den-einkauf-veraendern-werden.html</p>	<p>Transparent Comparable Digitalization, Automation, Visualization Complexity Interpret Progressive approaches, possible potentials Cooperation, trust, intensive exchange Supplier Relationship Management (SRM) Reduce costs, promote innovation Risk</p>
6	<p>Efficio Consulting: Der Einkauf als Innovationstreiber (von der Decken, 2017)</p> <p>Source: https://www.efficioconsulting.de/insights/2017/04/26/der-einkauf-als-innovationstreiber/</p>	<p>Network Value chain Know-how of the partners Product Improvements Generation of ideas Innovation Scout Close communication Synergies Operating success Strategic decision-making Test Position in the organization Automate Defined procedures Evolution Cross-departmental</p>

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7	<p>Fraunhofer Institut: Innovationsmanagement durch den Einkauf (Ernst & Young, 2009)</p> <p>Source: https://www.ipt.fraunhofer.de/content/dam/ipt/de/documents/Studie_InnovationsmanagementEinkaufcm361-62167.pdf</p>	<p>Promoting innovation Innovative strength Cooperative development Early involvement of the purchasing department Support Satisfy Competitive Purchasing Strategy Orientation Target system Success measurement</p>
8	<p>SustainNet Consulting: Nachhaltige Beschaffung – ein Trend mit klarem Business Case (Goette, 2019)</p> <p>Source: https://sustainnet-consulting.com/nachhaltige-beschaffung-ein-trend-mit-klarem-business-case/</p>	<p>Strategic role Cross-functional Overall success Value Life cycle Advantages Value drivers Anchorage Cost reduction Risk minimization Direct costs Indirect costs</p>
9	<p>Mobility Work: Innovation - Die Zukunft vom Einkauf (Mouton, 2019)</p> <p>Source: https://www.mobility-work.com/de/blog/einkauf-innovation</p>	<p>Top performers Continuous improvement Product design Value chain Time to market Refining the procurement approach Exchange within the company</p>
	<i>Resources in English (#11)</i>	
10	<p>IMD: Why all businesses should embrace sustainability (Haaneaes, 2016)</p> <p>Source: https://www.imd.org/research-knowledge/articles/why-all-businesses-should-embrace-sustainability/</p>	<p>Sustainability strategy Long-term value Expectations on corporate responsibility Two critical gaps to be complaint Separate topics Competitive advantage Risks quantifying Investments in transparency Clarity Accuracy engagement</p>
11	<p>Supplychaindive: Sustainable sourcing is more cost-effective than you think (Weissmann, 2017)</p> <p>Source: https://www.supplychaindive.com/news/sustainability-green-supply-chain-procurement/513200/</p>	<p>Social responsibility Personal responsibility Cost pressure Simplify Green alternative, low cost alternative Supply chain operations Society Socially responsible procurement Policies on corporate social responsibility (CSR) Compete on sustainability strength Long term-approach Take control Align Power to select sources Shop with a social conscience</p>

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12	<p>Norma Group: Sustainability in Purchasing, 2019</p> <p>Source: https://www.normagroup.com/cr/en/purchasing/</p>	<ul style="list-style-type: none"> Supply relationship Reduce costs, achieve maximum value Laws and ethical principles Supplier code of conduct Preferred suppliers Status of suppliers, supplier scoring Evaluate, compare, control Product group strategy Exclude conflict materials Training of purchasers Transparent transfer of information
13	<p>Procurement Leaders: Innovation and procurement: Are you involved and do you deliver?, (Bartelse, 2017)</p> <p>Source: https://www.procurementleaders.com/blog/guest/innovation-and-procurement-are-you-involved-and-do-you-deliver-679498</p>	<ul style="list-style-type: none"> Pace of innovation Cost falling Production methods Pushing business management change Future market trends Talk to stakeholders Discuss process
14	<p>Jaggaer: Why the time is now for Sustainable Procurement, (Reilly, 2019)</p> <p>Source: https://www.jaggaer.com/sustainable-procurement-ecovadis/</p>	<ul style="list-style-type: none"> Regulatory landscape Consumer and investor pressure Responsible business practices Sustainability improvements and corporate Cost savings Risk management Requirements for suppliers Trust suppliers Transparent about procurement Accountability mounting Look beyond Stakeholder requirements Set clear goals Tools and methods Risk indicators
15	<p>Holding Redlich: Understanding the models for integrating sustainability into the procurement process, (Alden, 2018)</p> <p>Source: https://www.holdingredlich.com/blog/understanding-the-models-for-integrating-sustainability-into-the-procurement-process#edn13</p>	<ul style="list-style-type: none"> Environmental degradation Scarcity of resources Sustainable procurement Practices confusion Public sector Perspective regulating and participating life cycle benefits for organisation Society, economy environmental considerations, Holistically consider environmental Reducing pollution and energy consumption Upholding safe labour conditions Minimising operational deep change in ordinary maximise value smart management Complex challenges Price and non-price components
16	<p>UNESCO: Education for Sustainable Development, 2017 (UNESCO, 2017)</p> <p>Source: https://unesdoc.unesco.org/ark:/48223/pf0000247444</p>	<ul style="list-style-type: none"> SDGs Key competences Increasing complexity Problem solving progress Collaborate Complex changes Cross cutting competences Pursued together

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17	<p>Purchase Control: What is Sustainable Procurement, (DeVecchio, 2019)</p> <p>Source: https://www.purchasecontrol.com/uk/blog/sustainable-procurement/</p>	<ul style="list-style-type: none"> Risk reduction Local pollution Financial impact Noncompliance Cost reduction Invest Higher profits Reduce Future proofing Improve risk management Improve regulatory compliance Better cost control Competitive advantage
18	<p>BearingPoint: Procurement innovation vital to growth, 2013 (BearingPoint, 2013)</p> <p>Source: https://www.bearingpoint.com/en-gb/our-success/insights/procurement-innovation-vital-to-growth/</p>	<ul style="list-style-type: none"> Uncertainty Stagnate Increase in profits Supplier Management Risk control New priorities Savings Trained team Build Cross-functional Provision Obstacles Implement Supplier Quality Top down - bottom up
20	<p>Ernst & Young: Infinite possibilities Procurement in 2025, 2015 (Ernst & Young, 2015)</p> <p>Source: https://www.ey.com/Publication/vwLUAssets/EY-infinite-possibilities-procurement-in-2025/\$FILE/EY-infinite-possibilities-procurement-in-2025.pdf</p>	<ul style="list-style-type: none"> Innovation Outsourcing Administration Corporate functions Operational performance of procurement Global supply chain Develop capabilities Understanding models
22	<p>Procurement Leaders: Insight The future of skills, (Sawers, 2015)</p> <p>Source: https://www.procurementleaders.com/procurement-resource-library/whitepapers/the-future-of-skills1#.XwRxK-dCSU</p>	<ul style="list-style-type: none"> Strategic function Handle dichotomy Deal with the complexity Sensitivity Purchase locally Skillset and mind-set Communication skills Presentation skills Sell ideas to business Self-confidence Interact with suppliers Drive and change work Requisite skills Understanding the market
	<i>Resources in French (2#)</i>	



19	Decision-Achats: Acheteur vecteur des innovations (The buyer, a vector of innovation), (Wajnszok, 2011) Source: https://www.decision-achats.fr/Decision-Achats/Article/L-acheteur-un-vecteur-d-innovation-40689-1.htm	Industrial and commercial application Merge Place - own Innovation leader Functional Mapping Industrial protection strategy
21	L'opinion: Acheteur a la pointe de l innovation (Purchasing function: at the leading edge of innovation), (Raffay, 2019) Source: https://www.lopinion.fr/edition/economie/fonction-achats-a-pointe-l-innovation-188624	Start-up Attractive instruments Accept errors Specific objectives Joint venture

Table 11: Consultant reports regarding PSM with a focus on innovation and sustainability.

Based on an analysis of the varied sources (table 11) dealing with current and future economic or technological trends in the intersection of “PSM - sustainability – innovation”, in the following sections a description of trends is presented. First, an overview on the status quo of the sustainability topic in companies is provided. Second, the sustainability issue in PSM function in general as well as competences for persons carrying out a sustainable PSM function are addressed. The innovation requirement in sustainable PSM is then argued on this basis. Finally, competences in PSM for innovation were outlined and competences for sustainable & innovative PSM are analyzed.

6.1 Sustainability in companies

A company today is not only expected to offer qualitative products with a good price-performance ratio, but also methods and strategies for sustainable management. The goal of being sustainable forces companies to constantly develop in order to establish innovations, since it is expected that innovations will have a positive effect on the company and its performance through e. g. cost reduction or market expansion (WKO, 2018). Similarly, the integration of sustainable aspects into the management function of a company and thus, the supply chain is more important than ever (Maslo, 2019). Purchasing and supply management have a major impact on the performance of companies, since on average 43% of company turnover is comprised of purchasing costs. (All about Sourcing, 2015). In those companies where a strategic procurement model is implemented, the sustainability of their suppliers is a requirement and the purchasing department of the buying firm thus has the assertive force to select only suppliers demonstrating the social responsibility characteristics that dovetail with its own sustainable attitude. That is why an increasing number of suppliers have tried to adapt their business philosophy in the direction of



sustainability. This has e. g. changed the prices on the markets as well as the processes within the supply chain and with the result that the green alternative is increasingly becoming the cheaper option by taking environmental circumstances into account.

According to McKinsey, customers are willing to pay higher prices to sustainable companies, but on condition that they disclose their sustainability strategy and progress. It is not the higher revenues from price increases alone that are important for such a company, but also the possibility of attracting investments, which have been increasingly made in sustainable companies since 2004 (Maslo, 2019). The trend of showing ever more transparency with regard to sustainability not only affects the suppliers, but also the purchasing department of buying firms. As a result, the data quality of buyers is continuously improved by statistical programs, automation, visualization and digitalization. The use of such tools to process immense volumes of complex information will thus be decisive for the competitiveness of a company in the future (Weissmann, 2017). Consequently, companies currently have to close two gaps in order to be able to deal with sustainability. (i) The first gap is the “The knowing - doing gap”. A study by BCG/MIT shows that while 90% of managers consider sustainability to be important, only 60% of them implement a sustainable strategy themselves and only 25% have an integrated sustainable business model. (ii) "The compliance - competitive advantage gap" is the second. Unfortunately, many companies yet do not see the competitive advantage of sustainability. Only 24% already recognized this. Nevertheless, it is important to stick to the rules and separate these issues from each other (Haaneaes, 2016). With regard to buyer-supplier relationships the Supplier Relationship Management (SRM) in companies is also becoming increasingly important. It is now expected of supplying companies that they will permanently identify innovative problem-solving approaches while at the same time reducing costs through intensive, strategic cooperation between suppliers and expert buyers. This in turn requires a high degree of transparency (Scharlach et al., 2014).

Summarizing the trend of sustainability on a company level it would appear that companies must focus on sustainability issues now and in the future, otherwise they will no longer be accepted by society.

6.2 Sustainability in PSM

Sustainable PSM, or “green procurement”, means showing social, economic and ecological responsibility along the entire supply chain on the one hand, but on the other fulfilling the requirements of the organization in order to ensure its economic survival. In the course of this, "requirements,



specifications, and criteria that are compatible with protecting the environment and society" must be integrated into the PSM function of a company and should thus support the achievement of the company's objectives. The result of motivating PSM professionals in a sustainable way should be to bring benefits extending beyond the organizational boundaries. Taking more than merely organizational issue into account, the PSM has evolved from an operational to a strategic function (DelVecchio, 2019; Goette, 2019). A strategic oriented PSM department pays particular attention to three fundamental value drivers: (1) cost reduction, (2) risk reduction and (3) revenue growth. According to a study by the World Economic Forum and Accenture, a company is able reduce procurement costs up to 16% by integrating sustainability considerations. If a company demonstrates social and environmental responsibility, the risk of a decline of the brand value and the resulting costs from this are minimized. Sustainable suppliers will also reduce the risk of product recalls due to the use of harmful raw materials and reputation damage due to poor working conditions. The most difficult point for the implementation of sustainability issues is in marketing, which has increasing sales as its target (Goette, 2019). The most important purchasing factors in the decision making process for PSM were for a long time (a) price-performance ratio, (b) manufacturing costs and (c) quality, since each of these factors contributes directly to the success of a company. If sustainability is now to be integrated into the PSM process, the range and scope of the relevant decision making must be expanded (Vörösmarty et al., 2011). As a consequence, this requires a fundamental change in the way a company's procurement network operates (Mark Pagell et al., 2009).

6.3 Competences for Sustainable PSM

In order to overcome the hurdles as illustrated not only the PSM experts, but also all those employees in a company who are responsible for "sustainable action and development" need certain core competences. According to UNESCO, these can be divided into "Eight key competences for sustainability", which promote sustainable development in order to achieve the Sustainable Development Goals (SDGs) (UNESCO, 2017) and these are:

- system thinking competency
- anticipatory competency
- normative competency
- strategic competency
- collaboration competency



- critical thinking competency
- self-awareness competency
- integrated problem-solving competency.

In the following, these key competences are briefly explained and illustrated with practical examples from corporate reports.

System thinking competency is the ability to find and understand relationships, to analyze complex systems and to assign them to different domains. With this ability you should also be able to manage uncertainty (UNESCO, 2017). Management must establish a relationship between the corporate strategy and the sustainability strategy. This includes the expansion of the procurement task from a profit-oriented system to a value-maximized system, because it is essential to be aware of the fact that purchasing can pursue several objectives at once. Organizations must learn to deal with uncertainty, as many of them fear that they do not have the necessary implementation know-how (Alden, 2018; Haaneaes, 2016; Holzmann & Grüne, 2016; Reilly, 2019).

Anticipatory competency is the ability to identify and assess several future options and create a vision for the future. It is also about assessing the impact of one's actions and coping with risks (UNESCO, 2017) Procurement must decide what conditions are necessary for sustainability and implement them with the right approach. An action plan must be drawn up and it must be understood how its clearly defined goals can be achieved. Progress indicators should be used to record and understand, for example, the increase in sustainability of suppliers using suitable methods and tools, such as sustainability assessments. Suppliers need to be compared to find out who can offer the best price-performance ratio and also act in an environmentally and socially conscious manner to identify the opportunities and risks involved in supplier selection (Alden, 2018; Holzmann & Grüne, 2016; Reilly, 2019).

Normative competency is the ability to interpret and review the norms and values underlying one's behavior, and to negotiate conflicts of interest and compromise (UNESCO, 2017). The aim of sustainable procurement is to create value over the entire product life cycle while complying with all standards. However, this leads to contradictions between conventional purchasing objectives and the objectives of sustainability. Procurement experts need the normative competence to eliminate contradictions or find compromises that are acceptable to both sides and lead to an overall improvement in the company (Goette, 2019; Holzmann & Grüne, 2016).



Strategic competency is the ability to create and implement innovation and promote sustainability at both local and distant levels (UNESCO, 2017). The requirements and priorities of stakeholders need to be identified and aligned in order to then develop a plan of action. In this concept, the scope should be defined as well as which products are involved, and which organizational units are to be considered. In addition, savings levers must be found and defined in order to achieve early success in purchasing. Cooperation not only promotes the sustainability of one's own company, but also the sustainability of the stakeholders (Bartelse, 2017; Holzmann & Grüne, 2016; Reilly, 2019).

Collaboration competency is the capacity to learn from others and to show empathy. This means being aware of and respecting the concerns and actions of other people, building a relationship with them and acting sensitively. In addition, it is important to eliminate conflicts in a group and to promote cooperative problem solutions (UNESCO, 2017). Entrepreneurial evolution can only succeed in a team (von der Decken, 2017). This is the reason why top management must push sustainable development, because only when this is done will everyone involved be pursuing the same goal, meaning among other issues that the views and associated measures of the buyers can be understood by other departments. Communication within the company will be strengthened and, as a result, conflicts in groups can be avoided and solutions found to problems, as provided for by collaboration competency (Holzmann & Grüne, 2016; von der Decken, 2017).

Critical thinking competency is “the ability to question norms, practices and opinions, to reflect on own one’s values, perceptions and actions and to take a position in the sustainability discourse.” (UNESCO, 2017). The importance of the purchasing department should be constantly questioned in an organization. This is because initially management frequently fails to attach adequate importance to it at the beginning; a state of affairs that arises from not having adequate knowledge and working with outdated structures. The methods and treatises used must be constantly reconsidered in terms of sustainability and responsibility must be taken for them in order to review own values and actions (All about Sourcing, 2015; UNESCO, 2017).

Self-awareness competency is “the ability to reflect on one’s own role in the local community and (global) society, to continually evaluate and further motivate one’s actions, and to deal with one’s feelings and desires.” (UNESCO, 2017). Before the buyer moves on to supplier selection and makes decisions based on sustainability aspects, he must be aware that he always has economic power over his suppliers. For smaller suppliers in particular, the cancellation of a large contract can cost lives. Of course, the buyer bears



a great deal of responsibility for this, so the evaluation criteria must be constantly reviewed and renewed and if this is to be done sufficient resources must be available in the purchasing department. When management provides for these needs, this will lead on to new motivation (Holzmann & Grüne, 2016).

Integrated problem-solving competency is the competence to apply different problem-solving methods and to integrate the previously described competences in order to find workable and integrative solution paths to the problems of sustainability and to promote sustainable development (UNESCO, 2017). The various dimensions of sustainability must first be understood by purchasing experts if they are to be in any way capable in the first place of applying the known solution methods to the problems of sustainability development. The knowledge of key competences must be dealt with openly in such a way that they can be integrated most effectively into the path towards the goal of sustainability (Haaneaes, 2016; Holzmann & Grüne, 2016).

6.4 Sustainable PSM requires innovation competences

Remaining competitive, reducing costs and generating growth simultaneously has now become a major challenge for companies. The problem is compounded by customers who are now far more demanding, the ubiquitous call for sustainability and the volatility of the economy (BearingPoint, 2013). But the demand for sustainability also brings benefits, since sustainable development pushes innovation (Brazdauskas, 2015). So far, research and development (R&D) has taken on the task of finding innovative solutions to these challenges. Now, procurement must be included in this innovation process, as suppliers also play a significant role in growth and competitiveness (BearingPoint, 2013).

"The purchasing function not only facilitates exchanges within the company but is also a preferred intermediary between the players in the supply chain. As such, they are the driving force behind a new form of innovation." (Mouton, 2019) In this context it is therefore well known that a company is dependent on procurement in order to implement innovations. This is not always the case, however, in the creation of new ideas, which means that not all the available resources are used. In order to change this, procurement must be given a clear order by the management that innovation promotion must be firmly anchored in the procurement strategy. In a survey of procurement managers conducted by BearingPoint, 48% said that innovation is as important to their department as adding value, creating competitive advantage and entering new markets (BearingPoint, 2013). The consequence of the requirement is that



innovation procurement is constantly working to exploit new potential and is significantly involved in the progress of sustainability. As a result, the procurement department is given higher status within the organization and can thus achieve better results. This department must thus be supported by innovation management (von der Decken, 2017)

6.4.1 Sustainable Innovation

In general, there are two types of sustainable innovation: Incremental innovation, where small, continuous changes are made and radical innovation, where whole new systems or products are introduced. Large companies with established, functioning processes or products are more likely to make innovation changes on a smaller scale, as they want to maintain their existing strengths. Radical sustainable innovations also require a fundamental change in the entire corporate structure, require a lot of time and are often associated with high costs. They are therefore associated with many insecurities and risks, but differentiate a company within the market compared to others (Kennedy et al., 2017). There is also the option of what is known as “innovation scouts”. These are professional procurers with good relations to universities and the start-up scene, who concentrate solely on the search for new innovations (von der Decken, 2017). For example, a “joint venture” can be established between an organization and a start-up to find and promote promising concepts (Raffay, 2019). PSM is thus faced with the challenge of acting as an operative department and improving by advancing from a passive procurer role to that of active innovation promoters through specialized cooperation with suppliers and outsourcing. As a result, purchasers need to expand their skills in order to take up this position (Ernst & Young, 2015).

6.4.2 Developing Innovation and Sustainability Competences in PSM

In order to develop the required competences and generate “open innovation”, it is increasingly desirable for purchasing professionals to be:

- Business oriented: to better understand business expectations, competitor positioning, and what role open innovation plays within the organization.
- International: to better understand and work within global innovation networks.
- Influence and leadership: to sell and engage on open innovation visions both internally and externally with key partners.



- Impactful communicators: to collaborate efficiently with internal stakeholders and suppliers.

Some of the most advanced PSM functions have been working on expanding their resources skillset for over a decade by encouraging mixed career paths and making sure that their talent can have experiences outside of procurement; for instance, working in R&D for a few years before returning. Some CPOs have even set a 20% turnover objective per year to encourage profile diversity (Nouguès et al., 2017). One of the most important skills is the “market sensing capability”, as it lays the foundation for new innovations. A certain level of intuition is needed to predict future developments in the market in order to be able to respond in time. Identified gaps in the market can then, with the right approach, bring sustainable benefits (Demirel & Kesidou, 2019).

As a result of this increasing development of changes, structural breaks and complexity, the need arises for procurement and supply chain managers to acquire a new key competence: dynaxibility. This is the ability to competently manage dynamic and complex (dynaxic) developments - in other words, to manage our near and distant future. A well-informed purchasing professional also knows which suppliers can and should be involved in development processes. The purchaser is the gatekeeper to the suppliers, initiating early supplier involvement, therefore proficiency in cooperation and collaboration, in co-competition and co-creation are crucial. Implementing appropriate platforms to capture important, companies is also required (Von der Gracht et al., 2016).

6.4.3 Open question: What competences will ultimately be supported by new technologies and which ones should PSM professionals rely on today?

Some purchasing processes have already been automated to date, for example with “source to contract” solutions, and this is only the beginning. With the development of artificial intelligence (AI), and in particular robotic process automation (RPA), predictive analysis and automatic natural language processing (NLP), experts are now predicting the automation of specific skills shopping. New technologies could replace both, know-how and expertise (data collection and analysis, market research, the use of tools and technologies dedicated to purchasing, communication, leadership etc.) (Nouvelle, 2019).

Use of total cost of ownership analysis, life cycle analysis, and the use of third-party environmental certifications as a weighted screening methodology for selecting products and suppliers will become standard practices. The application of sustainability screens is more likely to take place at the supplier level than at the product level. So by 2025, the leading procurement organization leaders will be working with

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new social skillsets, global mind-sets, and analytic technologies. This shift will require multi-dimensional thinkers and profiles in procurement leadership (Ernst & Young, 2015).

Over the next ten years, the following skills will prove to be essential for a purchaser. The authors of Procurious HQ have separated these into automatable and non-automatable skills and described a variant of automation: The automation potential of “soft skills” or know-how within the Purchasing function and results are all the more surprising. While certain skills remain intrinsically linked to people, such as relationship building, influence, creativity and innovation, the respondents identified four main skills which could probably be digitized. about the issue here concerns communication, problem solving, leadership and negotiation. In the context of the leadership issue, Hugo Britt, Director of Content for Procurious, puts this into perspective: “It is quite worrying to note that leadership is considered to be capable of being automated. If personnel management is limited to monitoring progress and performance, then this role could very well be taken on by software. But true leaders bring a whole set of human skills, including the ability to motivate and inspire others, to lead by example and show real concern for the well-being of their team.” Relationships, teamwork/collaboration and influence are skills almost exclusively dedicated to stakeholders with the aim of creating lasting relationships, convincing them of the strategies adopted and working effectively. Creativity/innovation and flexibility/adaptability will allow them to respond to the challenges to come while becoming an agent of change (Procurious HQ, 2018).



7. Summarizing: Theoretical Innovation and Sustainability Purchasing and Supply Management (PSM) Competences Framework

The research purpose of this white paper was to explore a theoretical innovation and sustainability PSM framework focused on the needed competences for innovation and sustainability regarding the field of purchasing and supply management. The framework is shown in figure 13. The sources of the framework consist of academic literature reviews and a collection of practice-oriented sources such as job advertisements and consultant reports which are described in detail in previous chapters of this white paper. The theoretical framework provides readers with a set of findings that they will find useful and based on the structure of Innovation and sustainability PSM, the theoretical framework shows the associated competences for the individual focus areas. Detailed information of the individual competences is described in the previous chapters of this white paper. The output of the first research phase of Project PERISCOPE represents a basis for further intellectual outputs of the project.

This research highlights that there is little in the academic literature that specifically examines the competences needed for innovation and sustainability in the field of purchasing and supply management, although there are a number of examples of competence for each focus area (sustainability, innovation and PSM). Also practice-oriented sources (job advertisements and consultant reports) scarcely ever focus on innovation and sustainability in the field of purchasing and supply management context. France was found to be the only region where sustainability and innovation are already deemed to be very important in PSM. French companies are going a step further by recruiting specific sustainability purchasing and innovation purchasing professionals.

Against this background there is clearly a need to develop a higher education PSM course in sustainability and innovation purchasing and supply to focus future generations on a circular economy and provide them with a set of competences that will help them to manage future challenges in an innovation and sustainability PSM environment.

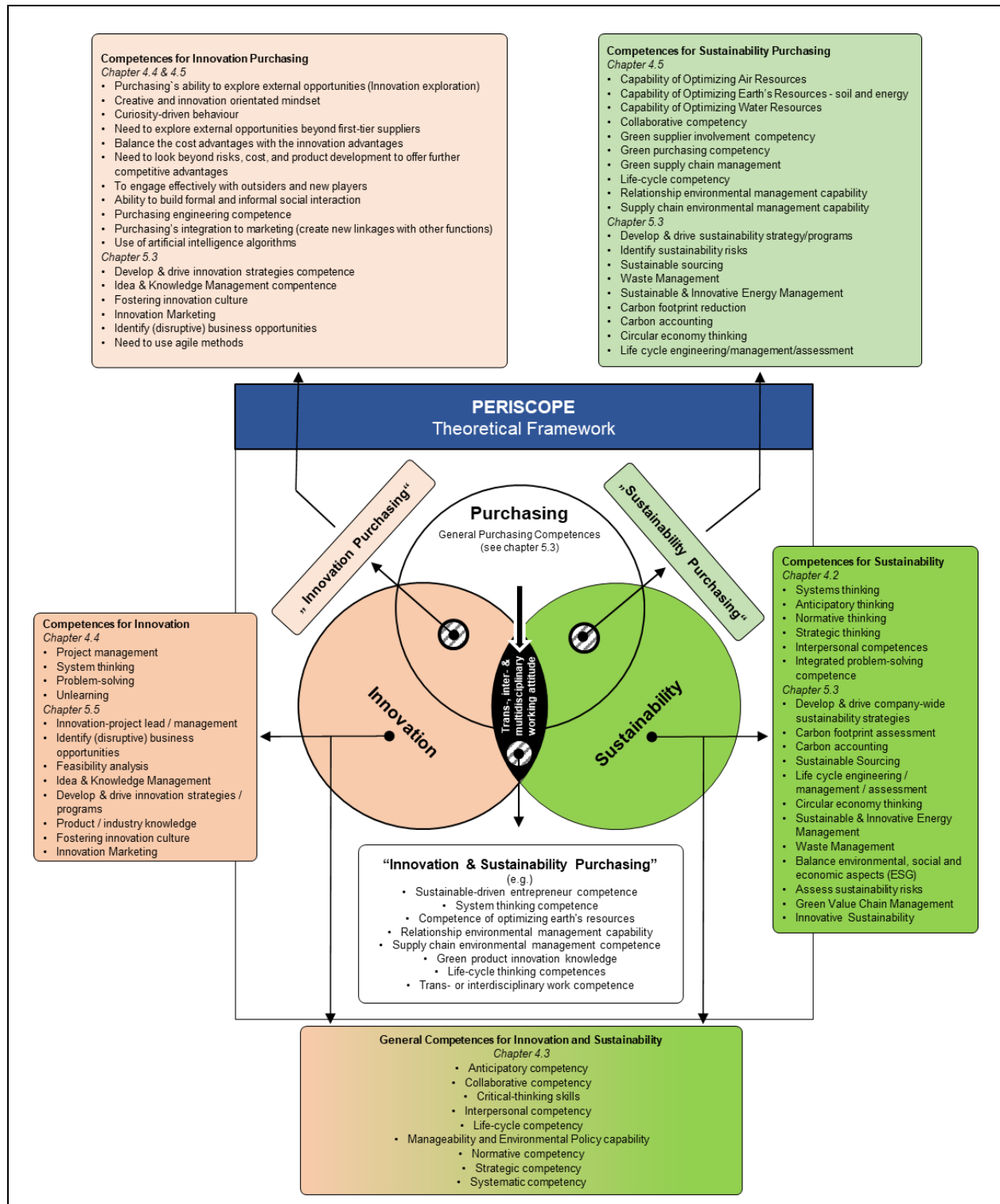


Figure 13: Theoretical Innovation and Sustainability Purchasing and Supply Management (PSM) Competences Framework.



8. Further work and link to intellectual output 3

This white paper is the first output and the first research phase of Project PERISCOPE and it is concerned with the *theoretical innovation and sustainability PSM competences framework*. The second phase of the project builds on the output of IO1 with an explorative study that is preparing the third phase in the research, the Delphi study. In order to facilitate the Delphi study a qualitative research based on world cafés expert discussion is organised on three themes:

1. What skills are needed for purchasing to contribute to sustainability?
2. What skills are needed for purchasing to contribute to innovation / co-development ?
3. What is preventing companies from being simultaneously sustainable and innovative?

The aim of the world café research is twofold. Firstly it explores the working field regarding competences and organisational support in the field of sustainability and innovation purchasing and supply as a starting point for the Delphi study. Secondly, the aim is to attract knowledgeable participants for the Delphi study.

After the Delphi study has been carried out, learning objectives will be formulated for the higher education PSM course in sustainability and innovation purchasing and supply. The final stage is to design the course and will be tested on an audience of students.



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10. Appendix

List of job advertisements with available metadata

ID	Country	Job Title	Company	Industry	Man_Level	Exportdate	Portal
1.1	Germany	Advanced Procurement Specialist	DEMATIC	Information Technology	Associate	25.2.2020	LinkedIn
1.2	Germany	Sourcing Manager	N26	Financial Services / Banking	Associate	25.2.2020	LinkedIn
1.3	Switzerland	Procurement Lead Direct Procurement	Vifor Pharma	Pharma / Healthcare / Biotech	Director	25.2.2020	LinkedIn
1.4	Germany	Construction Procurement	WeWork	Construction / Real Estate	Entry-Level	13.3.2020	LinkedIn
1.5	Germany	Global Supply Manager, Capital Equipment	Tesla	Automotive / Transportation	Mid-Senior Level	13.3.2020	LinkedIn
1.6	Switzerland	Indirect Procurement Specialist	On	Consumer Goods / Retail	Entry-Level	13.3.2020	LinkedIn
1.7	Germany	Manager Sourcing & Procurement	The Walt Disney Company	Consumer Goods / Retail	Mid-Senior Level	13.3.2020	LinkedIn
1.8	Germany	Buyer Direct Materials	Bayer	Pharma / Healthcare / Biotech	Mid-Senior Level	13.3.2020	LinkedIn
1.9	Germany	Procurement Assistant	Huawei	Information Technology	Entry-Level	13.3.2020	LinkedIn
1.10	Germany	Sourcing Manager FDF	Novartis	Pharma / Healthcare / Biotech	Mid-Senior Level	13.3.2020	LinkedIn
1.11	Germany	Commodity Buyer	Bombardier	Automotive / Transportation	Associate	13.3.2020	LinkedIn
1.12	Austria	Project Buyer	Gebauer & Griller	Industrial Machinery	Associate	14.3.2020	LinkedIn
1.13	Germany	Senior Procurement Specialist	Fluence	Energy	Associate	13.3.2020	LinkedIn
1.14	Austria	Strategischer Einkäufer	Hilti	Construction / Real Estate	Mid-Senior Level	14.3.2020	LinkedIn
1.15	Germany	Procurement Specialist	Lilium	Automotive / Transportation	Mid-Senior Level	13.3.2020	LinkedIn
1.16	Germany	Operativer Einkäufer	Boeing Distribution Services	Automotive / Transportation	Entry-Level	13.3.2020	LinkedIn
1.17	Germany	Indirect Sourcing Leader	GE Healthcare	Pharma / Healthcare / Biotech	Associate	13.3.2020	LinkedIn
1.18	Germany	Regional Procurement Manager EU	Glovis Europe	Logistics	Mid-Senior Level	13.3.2020	LinkedIn
1.19	Germany	Manager Group Purchasing	RKW Group	Consumer Goods / Retail	Mid-Senior Level	13.3.2020	LinkedIn
1.20	Germany	Purchasing Manager	Schenk RoTec	Industrial Machinery	Associate	13.3.2020	LinkedIn
1.21	Germany	Purchase & Supply Chain Specialist	Native Instruments	Information Technology	Entry-Level	13.3.2020	LinkedIn
1.22	Germany	Einkaufsleiter EMEA	Hengstler	Information Technology	Associate	13.3.2020	LinkedIn
1.23	Austria	Strategic Purchasing Agent Projects	AVL	Automotive / Transportation	Associate	14.3.2020	LinkedIn
1.24	Germany	Strategic Procurement Manager	Beckman Coulter Diagnostics	Pharma / Healthcare / Biotech	Mid-Senior Level	13.3.2020	LinkedIn
1.25	Switzerland	Global Category Manager Software	ABB	Industrial Machinery	Mid-Senior Level	14.3.2020	LinkedIn
1.26	Germany	Vice President Purchasing	Berlin Brands Group	Consumer Goods / Retail	Executive	13.3.2020	LinkedIn
1.27	Germany	Bereichsleiter Einkauf Verpackung International	Lidl	Consumer Goods / Retail	Executive	13.3.2020	LinkedIn
1.28	Germany	Leider Supply Chain Management	Siemens	Industrial Machinery	Director	13.3.2020	LinkedIn
1.29	Germany	Purchasing Project Management Specialist	Nemak	Automotive / Transportation	Entry-Level	13.3.2020	LinkedIn
1.30	Germany	Purchasing Manager	Ingredion	Consumer Goods / Retail	Associate	13.3.2020	LinkedIn
2.1	Austria	Head of Group Sustainability	Erste Group	Financial Services / Banking	Mid-Senior Level	26.2.2020	LinkedIn
2.2	Germany	Sustainability Manager Digital Efficiency	Zalando	Consumer Goods / Retail	Mid-Senior Level	26.2.2020	LinkedIn
2.3	Switzerland	Sustainability Manager	Ancor	Consumer Goods / Retail	Mid-Senior Level	26.2.2020	LinkedIn
2.4	Germany	Program Manager Sustainability	DB Schenker	Logistics	Associate	26.2.2020	LinkedIn
2.5	Germany	Projektleiter Nachhaltigkeit	Porsche	Automotive / Transportation	Associate	15.3.2020	LinkedIn
2.6	Austria	Sustainability Manager	Ikea	Consumer Goods / Retail	Associate	15.3.2020	LinkedIn
2.7	Germany	Sustainable Supply Chain Manager	Ardagh	Consumer Goods / Retail	Associate	15.3.2020	LinkedIn
2.8	Germany	Senior Consultant Sustainability	Siemens Real Estate	Construction / Real Estate	Associate	15.3.2020	LinkedIn
2.9	Germany	Spezialist CO2 Management Supply Chain	Porsche	Automotive / Transportation	Entry-Level	15.3.2020	LinkedIn
2.10	Germany	Sustainability Manager	HIH Real Estate	Construction / Real Estate	Associate	15.3.2020	LinkedIn
2.11	Germany	Quality and Sustainability Specialist	Abis Plastic	Industrial Machinery	Entry-Level	15.3.2020	LinkedIn
2.12	Germany	Consultant Sustainability & Green Value Chain Op	Camelot	Consultancy Services	Associate	15.3.2020	LinkedIn
2.13	Switzerland	Sustainability Consultant	Quants International	Consultancy Services	Associate	15.3.2020	LinkedIn
2.14	Germany	Consultant - Product Sustainability	ERM	Consultancy Services	Associate	15.3.2020	LinkedIn
2.15	Germany	Spezialist Nachhaltigkeit Life-Cycle Assessment	Schaeffler	Automotive / Transportation	n/a	15.3.2020	StepStone.de
2.16	Germany	Specialist Sustainability	Vorwerk	Consumer Goods / Retail	n/a	15.3.2020	StepStone.de
2.17	Germany	Environmental & Sustainability Manager	Tesa	Industrial Machinery	n/a	15.3.2020	StepStone.de
3.1	Germany	Innovation Analyst	IPG Automotive	Automotive / Transportation	Entry-Level	26.2.2020	LinkedIn
3.2	Germany	European Innovation Brand Manager	Mars	Consumer Goods / Retail	Mid-Senior Level	26.2.2020	LinkedIn
3.3	Germany	Innovation Manager	Hermes	Logistics	Associate	26.2.2020	LinkedIn
3.4	Germany	Innovation Manager Disruptive Technologies	Peri	Construction / Real Estate	Associate	26.2.2020	LinkedIn
3.5	Germany	Innovationsmanager	Bayerische Hausbau	Construction / Real Estate	Mid-Senior Level	15.3.2020	LinkedIn
3.6	Germany	Innovation Manager	Juwi	Energy	Associate	15.3.2020	LinkedIn
3.7	Germany	Product Innovation Manager Ovens	Electrolux	Consumer Goods / Retail	Associate	15.3.2020	LinkedIn
3.8	Switzerland	Innovation Specialist	On	Consumer Goods / Retail	Associate	15.3.2020	LinkedIn
3.9	Austria	Innovation Manager	Gebrüder Weiss	Logistics	Associate	15.3.2020	LinkedIn
3.10	Austria	Innovation Manager	Raiffeisenlandesbank NO	Financial Services / Banking	Associate	15.3.2020	LinkedIn
3.11	Germany	Project Manager Innovation & New Business	GMG Color	Information Technology	Mid-Senior Level	15.3.2020	LinkedIn
3.12	Switzerland	Innovation Manager	Chimpy	Consumer Goods / Retail	Associate	15.3.2020	LinkedIn
3.13	Germany	Open Innovation Manager	Hyundai CRADLE	Automotive / Transportation	Mid-Senior Level	15.3.2020	LinkedIn
3.14	Austria	Innovation Manager	Österreichische Post	Logistics	Associate	15.3.2020	LinkedIn
3.15	Germany	Innovation Manager	PwC KDS	Consultancy Services	Associate	15.3.2020	LinkedIn
3.16	Germany	Innovation Manager	Ulmaco	Information Technology	Associate	15.3.2020	LinkedIn
3.17	Switzerland	Innovation Manager	Gerresheimer	Pharma / Healthcare / Biotech	Associate	15.3.2020	LinkedIn
3.18	Austria	Innovation Manager Aerosols	JTI	Consumer Goods / Retail	Mid-Senior Level	15.3.2020	LinkedIn
3.19	Germany	Digital Innovation Manager	Schaeffler	Automotive / Transportation	Associate	15.3.2020	LinkedIn
3.20	Germany	Senior Innovation Project Manager Global	Henkel	Consumer Goods / Retail	Mid-Senior Level	15.3.2020	LinkedIn

Purchasing Education and Research with an Innovative Sustainability Scope



Nordics - PSM	4.1	Sweden	Strategic Buyer	Siemens	Industrial Machinery	Associate	25.4.2020	LinkedIn
	4.2	Sweden	Sourcing Specialist	Cytiva	Pharma / Healthcare / Biotech	n/a	25.4.2020	LinkedIn
	4.3	Finland	Purchasing Specialist	Nokia	Information Technology	n/a	25.4.2020	LinkedIn
	4.4	Norway	Senior Buyer	Dovre	Consultancy Services	Associate	25.4.2020	LinkedIn
	4.5	Denmark	Senior Buyer	Man	Energy	Associate	25.4.2020	LinkedIn
	4.6	Norway	Supply Specialist	Teva Pharmaceuticals	Pharma / Healthcare / Biotech	Entry-Level	25.4.2020	LinkedIn
	4.7	Finland	Procurement Professional	Nordic Source	Consultancy Services	Director	25.4.2020	LinkedIn
	4.8	Sweden	Indirect Buyer Nordics	Danone	Consumer Goods/ Retail	n/a	25.4.2020	LinkedIn
	4.9	Denmark	Category Manager	HelloFresh	Consumer Goods/ Retail	Associate	25.4.2020	LinkedIn
	4.10	Denmark	Buyer / Purchaser	Biltema	Consumer Goods/ Retail	Entry-Level	25.4.2020	LinkedIn
	4.11	Sweden	Procurement and contracting manager	Worley	Energy	Associate	25.4.2020	LinkedIn
	4.12	Sweden	Senior Buyer	Volvo Cars	Automotive/ Transportation	Associate	25.4.2020	LinkedIn
	4.13	Sweden	Sourcing Manager	Ascom Holding	Pharma / Healthcare / Biotech	Associate	25.4.2020	LinkedIn
	4.14	Norway	Purchasing Project Co-Ordinator	Alore	Pharma / Healthcare / Biotech	Entry-Level	25.4.2020	LinkedIn
	4.15	Sweden	Strategic Sourcing Manager	Ericsson	Information Technology	n/a	25.4.2020	LinkedIn
	4.16	Sweden	Senior Strategic Buyer	Exeger	Energy	Mid-Senior Level	25.4.2020	LinkedIn
	4.17	Sweden	Tactical Buyer	CSC UKI	Information Technology	Associate	25.4.2020	LinkedIn
	4.18	Sweden	Category Manager	Oriola Corporation	Pharma / Healthcare / Biotech	Mid-Senior Level	25.4.2020	LinkedIn
	4.19	Norway	Senior Buyer	ABB	Industrial Machinery	Mid-Senior Level	25.4.2020	LinkedIn
	4.20	Finland	Buyer	Sumitomo SHI FW	Energy	Associate	25.4.2020	LinkedIn
4.21	Finland	Technical Buyer	Rocsole	Information Technology	Associate	25.4.2020	LinkedIn	
4.22	Sweden	Planner - Buyer	Johnson & Johnson	Pharma / Healthcare / Biotech	n/a	25.4.2020	LinkedIn	
4.23	Sweden	Strategic buyer	Scientia Omicron	Information Technology	Associate	25.4.2020	LinkedIn	
4.24	Sweden	Sourcing Specialist	Ikea	Consumer Goods/ Retail	Entry-Level	25.4.2020	LinkedIn	
4.25	Sweden	Global Commodity Manager	Bombardier	Automotive/ Transportation	Mid-Senior Level	25.4.2020	LinkedIn	
4.26	Sweden	Technology Sourcing Manager - Tech Procurer	Spotify	Information Technology	n/a	25.4.2020	LinkedIn	
4.27	Sweden	Customer Project Sourcing Specialist	Kone	Industrial Machinery	Associate	25.4.2020	LinkedIn	
4.28	Sweden	Sourcing Manager	Zound Industries	Information Technology	Mid-Senior Level	25.4.2020	LinkedIn	
4.29	Sweden	Sourcing manager	Telia	Information Technology	n/a	25.4.2020	LinkedIn	
4.30	Sweden	Head of Procurement	BioGaia	Pharma / Healthcare / Biotech	Director	25.4.2020	LinkedIn	
Nordics - SM	5.1	Denmark	Sustainability Manager	FLSmidth	Industrial Machinery	Associate	10.4.2020	LinkedIn
	5.2	Finland	Sustainability Program Manager, Climate and	Paullig Group	Consumer Goods/ Retail	Entry-Level	10.4.2020	LinkedIn
	5.3	Finland	Sustainability Lead	Spinova Oy	Consumer Goods/ Retail	Director	10.4.2020	LinkedIn
	5.4	Sweden	Sustainability Leader	Ikea	Consumer Goods/ Retail	Associate	12.4.2020	LinkedIn
Nor - IM	6.1	Sweden	Innovation Manager	EIT Manufacturing	Consultancy Services	Mid-Senior Level	10.4.2020	LinkedIn
	6.2	Sweden	Global Brand Innovation Manager	Essity Hygiene and Health	Pharma / Healthcare / Biotech	Associate	10.4.2020	LinkedIn
	6.3	Denmark	Project Leader for innovation and business tr	Ørsted	Energy	n/a	25.4.2020	LinkedIn
France - SP	7.1	France	Chargé de projets séco conception et achat s	Chanel	Consumer Goods/ Retail	n/a	Feb 20	LinkedIn
	7.2	France	Référent Conformité Achats	FDJ	n/a	n/a	Mrz 20	Golden Bees
	7.3	India	Responsible Procurement Manager-CSR/Sust	Maersk	Logistics	n/a	2017	Maersk.com
	7.4	UK	Global Procurement CSR Manager	Pearson	Consumer Goods/ Retail	n/a	Feb 20	reed.co.uk
	7.5	France	Analyste d'ue diligence fournisseurs	Servier	Pharma / Healthcare / Biotech	n/a	Feb 20	Cadremploi
	7.6	France	Procurement and Compliance Manager	Blablacar	Information Technology	n/a	Feb 20	Glassdoor
	7.7	France	Acheteur industriel - secteur du déchet/recycl	Ecosystem	n/a	n/a	Feb 20	APEC
	7.8	UK	Procurement Manager (CRS)	CocaCola	Consumer Goods/ Retail	n/a	Mrz 20	LinkedIn
France - IP	8.1	France	Acheteur Recherche Innovation Equipementie	n/a	n/a	n/a	n/a	n/a
	8.2	France	Acheteur Innovation	Rennes	n/a	n/a	n/a	n/a
	8.3	France	Acheteur Projets A Raymond	A Raymond	Automotive/ Transportation	n/a	n/a	n/a
	8.4	France	Acheteur Innovation	Albert	n/a	n/a	n/a	n/a
	8.5	France	Alternant Recherche et Innovation ENGIE	ENGIE	Energy	n/a	n/a	n/a
	8.6	France	Acheteur Direct Projet set Commodites	Biomerieux	Pharma / Healthcare / Biotech	n/a	n/a	n/a
	8.7	France	Innovation program buyer	Faurecia	Automotive/ Transportation	n/a	2018	direct
	8.8	France	Acheteur Recherche et Innovation	n/a	n/a	n/a	Feb 20	Manpower
	8.9	France	Acheteur public en Innovation	UGAP	n/a	n/a	2018	Emploipublic.fr
	8.10	France	Chargé de projet Sourcing & Open Innovation	AXA	Financial Services/ Banking	n/a	2020	direct
	8.11	USA	Sr. Procurement Manager - IP Innovation	RB	Consumer Goods/ Retail	n/a	Feb 20	Indeed.com
	8.12	USA	Sr. Advanced Innovation and R&D Sourcing Mar	Becton, Dickinson and Company	Pharma / Healthcare / Biotech	n/a	Feb 20	Indeed.com
	8.13	USA	Sourcing Manager - Coman - Innovation	Mars	Consumer Goods/ Retail	n/a	Jan 20	Indeed.com
	8.14	UK	Advanced Sourcing & Innovation Manager	Johnson & Johnson	Pharma / Healthcare / Biotech	n/a	2019	n/a
	8.15	USA	Supply Innovation Manager	BP	Energy	n/a	Feb 20	n/a
	8.16	France	Acheteur innovation	NTN-SNR	Industrial Machinery	n/a	Feb 20	Monster
	8.17	France	Acheteur innovation	EasyMile	Automotive/ Transportation	n/a	2019	LinkedIn
	8.18	France	Global Innovation Purchasing Manager	Faurecia	Automotive/ Transportation	n/a	2018	direct
8.19	Poland	Procurement Innovation Manager Raw Materie	Mondelēz International	Consumer Goods/ Retail	n/a	2018	LinkedIn	
8.20	Belgium	Acheteur Projets Innovation Aeronautica	Aeronautica	n/a	n/a	2020	direct	
8.21	France	Acheteur innovation Bouygues Global Mobility	Bouygues	Information Technology	n/a	2017	direct	
8.22	France	Acheteur Innovation	n/a	n/a	n/a	2019	n/a	
8.23	France	Acheteur Innovation	Daher	Industrial Machinery	n/a	2020	LinkedIn	
8.24	France	Acheteur Innovation	Naval Group	Automotive/ Transportation	n/a	2020	LinkedIn	
8.25	USA	Buyer - In-Car IT & Innovation	Volkswagen	Automotive/ Transportation	n/a	2020	LinkedIn	
8.26	USA	Purchasing Innovation Buyer	Faurecia	Automotive/ Transportation	n/a	2020	n/a	



Glossary

Audencia	Ecole Supérieure de Commerce <i>Audencia</i> Nantes - French school of management
BCG	Boston Consulting Group
CBS	Copenhagen Business School – Danish school of management
Delphi study	Systematic, interactive forecasting method based upon a panel of experts
ESSCA	École supérieure des sciences commerciales d'Angers - French school of management
IO	Intellect Output in Project PERISCOPE
MIT	Massachusetts Institute of Technology
MOOC	Massive open online course
NVivo	Qualitative data analysis software
PERFECT	Project on Purchasing Education and Research for European Competence Transfer
PERISCOPE	Project on Purchasing Education and Research with an Innovative Sustainable Scope
PSM	purchasing and supply management
SDGs	Sustainable Development Goals
SRM	Supplier Relationship Management
TU Graz	Graz University of Technology – Austrian university
UTwente	University of Twente – Dutch university
World café	the world café discussion method – form of participatory workshop dialog