Purchasing category management: providing integration between purchasing and other business functions

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Abstract: Organising the purchasing and supply management (PSM) function has been changing due to the increasingly strategic role of the function requiring integration with other business functions and the entire supply chain. One solution is to organise PSM into categories - a common practice in today's manufacturing organisations. In this paper we explore how purchasing category management (PCM) affects cross-functional integration. We analysed purchasing category management practices through in-depth case-studies in four manufacturing firms in two types of industry. Our research contributes to the purchasing and supply management research in two ways. First, it addresses the role of purchasing category management in organising PSM in large manufacturing companies. Second, it elaborates on purchasing categories providing integration between purchasing and other business functions, suggesting how different mechanisms are needed for different contexts.

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1   Introduction

Structuring purchases to capture the potential synergies in the supply base is one of the main objectives in organising the purchasing and supply management (PSM) function (Faes et al., 2000; Rozemeijer, 2000; Rozemeijer et al., 2003; Smart and Dudas, 2007). Changes in companies' operating environment – in particular the need to manage an increasingly global supply base – have increased the importance of strategic purchasing integration (Foerstl et al., 2013; Narasimhan and Das, 2001; Trent and Monczka, 2003; Trautmann et al., 2009a). In consequence, the purchasing function has become more important, which also means higher expectations regarding its contribution to the performance of the organisation (Ellram et al., 2002; Hartley et al., 2014; Heilmann et al., 2011; Schneider and Wallenburg, 2013). The number of participants in the PSM process has increased in organisations and throughout the supply network, making purchasing management more complex (Johnson et al., 2014; Kaipia and Turkulainen, 2017; Ulkuniemi, 2012). In response to these increased requirements, the practice of organising purchasing according to categories has spread across companies (Trautmann et al., 2009b). This has created a need for new theoretical guidelines to understand the role of purchasing categories in organisations and to support the development of the PSM function along with its growing strategic importance (Ellram et al., 2002; Foerstl et al., 2013).

Placing a high priority on keeping the purchase price under control continues to be one of the most important objectives for the PSM function. The prices of certain materials are very sensitive to volume, making volume pooling an attractive choice in achieving cost savings due to economies of scale. This practice, forming groups of similar types of purchase commodities to gain volumes and negotiating power, has long been the norm, particularly in direct purchases. Typical examples are many commodity raw materials directly used in production (Davis et al., 1974). This practice has been called *commodity management* (Englyst et al., 2008; Schiele, 2007).

More recently, companies have begun systematically analysing all their purchasing costs and forming purchasing categories that cover all kinds of purchasing items, not only standardised commodities. O'Brien (2012) defines purchasing category management (PCM) as *segmentation of the purchasing spend of bought-in raw materials, components, goods and services*. We adopt the idea of segmentation and use the definition of purchasing categories as *a set of products and services purchased from the same supply market having similar product or service and spend characteristics* (cf., Cousins, 2005; Trautmann et al., 2009a; van Weele, 2010). *Similar product or service and spend characteristics* in this definition refer to a broader range of parameters than similarity of the products or services purchased, which in commodity management was core.

One view of purchasing category formation suggests that companies need to look beyond products and services to form higher level, strategic purchasing categories (Monczka and Markham, 2007). Purchasing category structure is not stable; new categories need to be developed when business models change or when significant technological advances are made. Higher-level purchasing category strategy objectives should focus on value creation, supply base reduction, global sourcing and ways to increase supplier integration on a long horizon.

Variation in companies' practices necessitates research exploring what drives category formation in different company contexts and how they are used in building synergies between the purchasing function and the other functions of business organisations. Some of the most recent research has proposed that more research is needed, for example, in the following areas (Hesping and Schiele, 2015):

- *Horizontal and vertical integration mechanisms*: Purchasing categories may lead to decentralised purchasing organisations. Horizontal and vertical integration mechanisms become increasingly important for to combine these decentralised efforts to accomplish the organisation's overall goals; it would be fruitful to explore the aspects that determine the degree of integration necessary within and across purchasing categories.

- *Formation of purchasing categories*: The literature lacks theoretically sound and empirically based classifications of purchasing categories. The much-used portfolio models (e.g., Bensaou, 1999; Kraljic, 1983) have been criticised for the difficulty in operationalising their dimensions, presenting only rough or minimally tested criteria through which to allocate products and services. It would be worthwhile to investigate how to structure spending and the supply base to support certain competitive priorities (Ateş, 2014).

The purpose of this research was to explore the purchasing categories and their role in integrating the purchasing function into the other functions of large industrial firms. To

achieve this objective we studied what drives companies to form purchasing categories and the use of organisational integration mechanisms in PCM.

The rest of the paper is structured as follows. In the next section, we develop a synthesis of the literature on organising the PSM function to provide a conceptual foundation for the empirical research. Then we explain the research methodology and analysis, including the data collection procedure. Sections 4 and 5 provide within-case analyses and cross-case analyses of the four research cases. Section 6 presents a discussion and implications of the study findings. In Section 7 we summarise the main research findings and present managerial implications.

2   Conceptual framework

How to organise PSM in companies revolves around the question of division of tasks, and the required integration between them. Most researchers distinguish between different types of purchasing organisations and how they differ in terms of coordinating the purchasing tasks. Centralisation and integration of purchasing has typically been considered to be a step towards a more professional purchasing function (Arnold, 1999; Faes et al., 2000; Giunipero and Monczka, 1997; Johnson and Leenders, 2004). The current trend in purchasing development is towards 'hybrid' organisation structures with a need for increased integration within the PSM function and between the PSM function and the company's other activities (Foerstl et al., 2013; Johnson et al., 2014; Quintens et al., 2006; Schneider and Wallenburg, 2013; Sillanpää et al., 2015; Trautmann et al., 2009b).

Hesping and Schiele (2015) criticise earlier research for failing to differentiate the scope of strategy development at different hierarchical levels of analysis. Following a structured literature review of the purchasing research literature between 1970 and 2012, they propose a five-level hierarchical framework fostering a multi-stage understanding of strategy development in purchasing. They argue that (1) firm strategy and (2) purchasing strategy, as one of a firm's functional strategies, can be extended by (3) purchasing category strategies for the multitude of supply markets, (4) sourcing levers as tactics applied to specify category strategies, and (5) directing supplier strategies toward each supplier within a sourcing category. In this paper we adopt the guidelines proposed by Hesping and Schiele (2015) that the formation of purchasing categories is guided by the strategies on the levels of the firm and the purchasing function. They state that purchasing categories cover several supply markets and use sourcing levers as 'tactical building blocks' of purchasing category strategy. Sourcing levers describes a typology of activities through which the goals in a purchasing category will be achieved (Schiele et al., 2011).

To respond to the mounting expectations for the PSM function, purchasing category formation and category strategies need to enhance company-wide integration. The primary sources of purchasing synergies are economies of scale, economies of process and economies of information (Faes et al., 2000; Rozemeijer, 2000; Trautmann et al., 2009b). To achieve purchasing synergies in organising PSM, an organisation designer must match the company's cross-functional integration requirements with the appropriate types and amounts of lateral relations, i.e., integration mechanisms.

We approach integration from the information-processing perspective, defined as sharing and processing information in organisations (Galbraith, 1973). In order to achieve

integration managers can adopt a variety of integration practices (Lawrence and Lorsch, 1967; Turkulainen et al., 2013). The information processing view makes a distinction between three modes of integration: impersonal integration mode, personal integration mode and group mode (Galbraith, 1973; Kaipia and Turkulainen, 2017; Van de Ven et al., 1976). Importantly, the information processing view argues that integration practices offer a different capacity to process information and simultaneously also impose different costs on organisations (Galbraith, 2002).

Five types of integration mechanisms can be identified, ranging from the least costly and easiest to form to the most complicated requiring a lot of management time and energy (Galbraith, 1973, 2002):

- voluntary processes and informal groups

- virtual integration through information systems

- formal groups

- integrator roles

- matrix organisational forms.

Purchasing managers need to implement various integration mechanisms simultaneously in order to develop the required amount of information-processing capacity in their organisations and to implement global purchasing efficiently. The characteristics of five factors in a purchasing category – purchase novelty, product complexity, purchase importance, demand volatility and supply market characteristics – have been used to explain the type of integration mechanism required in each case (Trautmann et al., 2009a). Different purchasing categories require different ways of integration, even within the same firm, because of the individual nature of purchasing categories. Companies need to maintain different information-processing capacities and organisational designs simultaneously to manage different purchasing categories efficiently.

The use of integration mechanisms affords an important framework for understanding PCM. We build on the information processing principle and study purchasing categories from the perspective of the use of alternative integration mechanisms in manufacturing organisations in different business contexts.

3 Research method and data collection

An exploratory multiple-case research design was selected to explore the formation and use of purchasing categories in large manufacturing companies, following the guidelines given in Glaser and Strauss (1967), Eisenhardt (1989), McCutcheon and Meredith (1993), Miles and Huberman (1994), Meredith (1998), Stuart et al. (2002), and Yin (2009). Originally 11 companies in different industries were chosen for the initial data collection, in which a questionnaire was used to explore the role of purchasing categories in organising the PSM function. For the final analysis to study the formation and use of purchasing categories, and to compare the practices in different industry settings, four cases were selected from two different types of manufacturing industry.

Theoretical sampling criteria were used to select the final four cases. Two case companies from two industries formed the basis for comparison: the companies in the process industry represent an upstream position in the value chain, whereas the

companies in mechanical engineering are more downstream, providing their customers with customised solutions. Multiple cases provide more compelling evidence, robustness of the overall study, and the possibility to use replication logic in the analysis of the case data. Two companies were included from each of the two industries, predicting similar results (literal replication) in the same industry, but contrasting results for predictable reasons (theoretical replication) in different industries (Yin, 2009).

This research approach enables grounding the PCM practices in two industry contexts and in two companies in each of these (Glaser and Strauss, 1967). The unit of analysis is purchasing category structures in manufacturing companies, and particularly how integration mechanisms are used in integrating purchasing categories with the other business functions. We formulated our constructs *a priori* and collected both quantitative and qualitative data (Eisenhardt, 1989; McCutcheon and Meredith, 1993). We identified and described key patterns in organising purchasing categories in the selected research context in order to achieve a mapping and relationship building stage of theory development (Stuart et al., 2002).

The primary data collection methods were structured questionnaire, semi-structured interviews and collecting archival data. Background data on the context of purchasing category formation were collected using a questionnaire sent to the 11 companies initially selected. This served as a pre-study and the data collected was used to understand the contexts in which purchasing categories were formed in the original sample of 11 companies. In the interviews following the structured questionnaire data collection we interviewed a senior purchasing officer and one or two other senior purchasing experts (e.g., purchasing category managers) in the four selected case companies. All in all, ten interviews were conducted, the duration of which varied between 1.5 to 2.5 hours. In all the interviews there were two interviewers and the interviews were audio-recorded. The recordings were transcribed and written up as interview notes to be commented and approved by the interviewees to increase reliability.

The questionnaire included structured questions based on a selection of initial research constructs. This data aims at establishing a connection between the context in which the purchasing categories are used and the way they are formed. These constructs also describe the complexity of organising the PSM function in the case companies. The second data collection instrument comprised semi-structured interview questions. This instrument focused on the formation and management of purchasing categories. In addition, the case companies provided a broad set of archival data including purchasing function strategies, organisation structures, purchasing category hierarchies and definitions and purchasing category strategies and plans. These were used as a supplementary data source. The types of data collected for the research are summarised in Table 1.

The collected data were first analysed within individual cases. Detailed case descriptions were created and the practices for the formation and management of purchasing categories in single cases were analysed. Next, a cross-case analysis was conducted to identify similarities and differences between patterns and to capture potentially novel findings. Two types of comparisons were conducted; first, the two cases within one industry were compared, followed by cross-industry comparisons. To improve the validity of the study, triangulation by research method, researcher and data type was used (Miles and Huberman, 1994).

Table 1 Data collection and sources

Contextual characteristics	Data source
• The industry, the company and its customers	Structured questionnaire
• Rate of change in the company's industrial environment	Structured questionnaire
• Products and production principles	Structured questionnaire
• Structure of the supply base	Structured questionnaire, semi-structured interviews
• Characteristics of the PSM function and how it is organised	Structured questionnaire, semi-structured interviews
Formation and management of purchasing categories	
• Organising the PSM function in the company	Structured questionnaire, semi-structured interviews
• Underlying motivation and length of experience of using purchasing categories	Semi-structured interviews
• Stability of purchasing categories, i.e., how often purchasing categories are changed	Semi-structured interviews
• Purchasing category formation process and factors considered when forming purchasing categories	Semi-structured interviews
• Measurement and success of PSM in the company	Semi-structured interviews
Documentation as complementary data sources	Archival data, including purchasing function strategies, organisation structures, purchasing category hierarchies and definitions, purchasing category strategies and plans

4 Within-case analysis

4.1 Case Company 1: recently started purchasing category work in the process industry

Case Company 1 operates in the chemicals industry providing processed raw materials for industrial customers' multiple applications. They had carried out a systematic programme to cover the whole purchasing spend by purchasing categories less than two years prior to our data collection, primarily for cost reduction purposes. A few main raw materials had previously been treated as commodity groups. At the time of the interviews, there were 60 purchasing categories, managed by 35 purchasing category managers. In four-month cycles, five to eight new purchasing categories were formed.

The chief purchasing officer of Company 1 described their objectives in purchasing category formation as follows:

> "The main goal in our company for forming new purchasing categories has so far been pooling the corporation-wide purchase volumes and thereby gaining better purchase prices through higher volumes."

In its purchasing category formation, Company 1 aimed at centralising purchasing. Additionally, it wanted to raise the level of professional practices in their PSM function to benefit from synergies, cover 90 percent of the whole purchase spend systematically in order to gain economies of scale, and to manage key suppliers through a single purchasing category team.

Their main challenges mentioned in the interviews were to find competent people with purchasing expertise, knowledge of the total-cost-of-ownership (TCO) concept and a service-minded attitude. The category manager interviewed emphasised that it was essential to involve the correct capabilities in the management of the category:

> "It depends on the nature of the category what capabilities are emphasised when recruiting a category manager: if the category benefits from purchasing process development, it is important to have a category manager with such skills."

The main mechanisms that Company 1 used to coordinate the work within the purchasing categories were category managers and temporary teams with part-time members for purchasing category formation projects.

4.2   Case Company 2: emphasising reduction of TCO in process industry

Case Company 2 is a steel producer that has used purchasing categories for a long time for its main raw materials for production. These purchasing categories, however, had been called commodity groups. For some of the other materials purchased purchasing categories had only been in use for a couple of years. The number of purchasing categories on the highest hierarchy level was three, namely raw materials, additives and auxiliary materials for production and services. The second hierarchy level consisted of 20 purchasing categories. The purchasing spend was not entirely covered by purchasing categories.

The purchasing director (direct purchasing) of Company 2 elaborated their objectives in purchasing category formation as follows:

> "We have emphasised the need to seek savings in our total purchasing costs. We have carried out a comprehensive analysis to cover our whole purchasing spend. The main results have been identification of the savings potential, the purchasing items sourced from the same suppliers, the purchasing items used in several business units and the development of new solutions to achieve lower total cost of ownership."

In forming new purchasing categories important factors were savings potential through combining purchase volumes across the entire company and improvement of control over suppliers.

The term 'purchasing category' was reserved exclusively for categories under the responsibility of centralised corporate purchasing. The formation of new purchasing categories depended on the availability of the right PSM resources; in Company 2 this was considered an important constraint for effective PSM. For integration across the organisation Company 2 used purchasing category managers and temporary teams for purchasing category formation projects, but also permanent category teams with full-time members for the main purchasing categories established.

4.3 Case Company 3: business requirements guiding main purchasing category formation in the mechanical engineering industry

Case Company 3 operates in the mechanical engineering industry. Their key principle in PCM was the connection between purchasing categories and their business organisation structure. The regional sourcing director (Europe) reported:

> "Initially, forming purchasing categories was a tool to combine purchases and to become a globally organised company. Certain key materials for production have been organised in commodity groups for a long time. But systematic work to cover the purchasing spend by purchasing categories was started three years ago."

Company 3 aimed at maintaining a stable purchasing category structure; new categories were formed only if there was a particular reason to do so. The number of categories at the highest level of the category hierarchy was 20. The second hierarchy level consisted of close to 200 purchasing categories. In order to achieve the desired level of integration between the purchasing categories and the business organisation, Company 3 used a matrix organisation comprising main purchasing categories, business units, geographic regions and support functions (see Figure 1).

Figure 1   Matrix organisational structure in company 3 (see online version for colours)
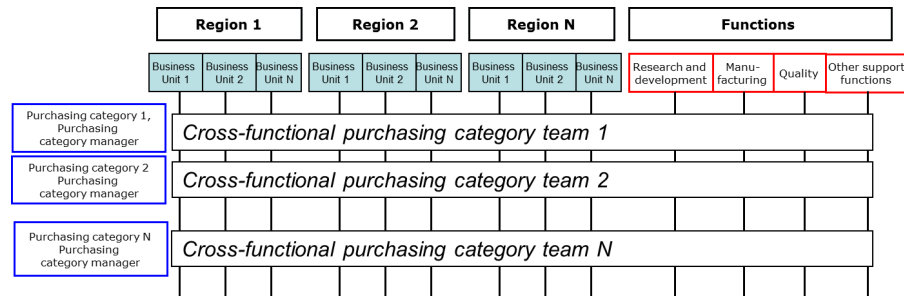
The regional sourcing director (Europe) of Company 3 explained the role of purchasing categories in their company as follows:

> "The purchasing category management concept is one of the central mechanisms in our company for functional and business integration. Purchasing category managers represent the cross-unit interests of all businesses for the relevant sourcing category. The purchasing category features set requirements for participants and for the cross-unit collaboration in the category."

Each of the purchasing categories had a purchasing category manager, but no other full-time personnel. The purchasing category manager's task was to balance strategic issues in the category with day-to-day purchasing. As resources, purchasing category managers used the business unit organisations and representatives from other functions. The resources might for example consist of purchasing resources responsible for the daily purchasing activities, and/or resources from the marketing function for the market requirements.

4.4   Case Company 4: using purchasing categories to harmonise purchasing across acquired companies in the mechanical engineering industry

Case Company 4 also operates in the mechanical engineering industry. The company had grown rapidly, tripling its sales volume during the past three years prior to our data collection, mainly through acquisitions. This growth had necessitated harmonising purchasing processes across the acquired companies and to consolidate the supply base. The purchasing development director of Company 4 stated:

> "The decentralised organisation model had reached its end. There was an urgent need to create a model that unifies the ways of working across the company."

Company 4 had used purchasing categories since the beginning of the 1990s, but covering only part of their purchasing spend. As part of the systematic PSM function development the company had formed six main purchasing categories under which over 200 subcategories were organised.

The purchasing development director explained how they had changed their organisation to reflect the need for improved integration across their company's business:

> "As part of the comprehensive change programme in our global PSM function we formed a matrix organisation with purchasing as a horizontal service function for the company's business units."

The situation in Company 4, i.e., giving the purchasing organisation an important role for facilitating integration in a matrix organisation, was similar to the situation in Company 3. Company 4's three-dimensional matrix consisted of purchasing category clusters, geographic regions and PSM support units, such as procurement development, supplier development, capacity management, procurement control, legal support and human resources development.

5   Cross-case analysis

In order to understand the relationship between the organising requirements and the formation of purchasing categories, we analysed the complexity of the case companies' business contexts and the issues they focus on in the purchasing categories. The complexity of the PSM task is described along with the company's growth, the complexity of their product-service structure, product-service customisation and the size and structure of the company's supply base (see Table 2).

Differences between the companies were found in the number of direct customers, product customisation, the number of suppliers and the type of the most important materials bought directly for production (direct materials). For the two companies in the process industry the most important direct materials were raw materials for production, whereas for the two mechanical engineering companies they were sub-assemblies, components and materials requiring engineering design.

The motivating factors common to all four case companies for their PCM were economies of scale, centralisation of the PSM function and improving skills and capabilities in their PSM practice. The PCM practices in the four companies are compared in Table 3.

Table 2 Comparison of the case companies' contextual characteristics

	Company 1	*Company 2*	*Company 3*	*Company 4*
Type of industry	Process industry	Process industry	Engineering and services	Engineering and services
Value chain position	Raw material producer	Raw material producer	Producer of complex customised products and solutions	Producer of complex customised products and solutions
Business volume, in Euros	Over 2 billion	About 7 billion	Over 7 billion	About 2 billion
Annual growth	4%	Over 10%	Over 10%	Over 10%
No. of direct customers	2,000 to 3,000	2,000 to 3,000	About 100,000 customers in the installed base	Tens of thousands
Product customisation	Most products are standard	90% are standard products	Products are customised to order specifications	Customised products, assembled to meet individual customers' needs
Most important materials for production	Commodity raw materials	Commodity raw materials	Sub-assemblies, components, materials requiring engineering design	Sub-assemblies, components, materials requiring engineering design
Total no. of suppliers	Over 15,000	About 4,000	Over 30,000	Over 30,000

Case Companies 2, 3 and 4 had organised purchasing categories as hierarchies. Company 2 had three main purchasing categories on the first level and 20 on the second level of the purchasing category hierarchy. At the main category level the contents of the purchasing categories in Company 2 reflected the traditional division of purchasing items into direct (raw materials and production-related auxiliary materials) and indirect (services) sourcing. Company 3 had 20 and Company 4 seven main purchasing categories, further divided into about 200 subcategories. In contrast to the other companies, Company 1 had only one level of hierarchy in its purchasing categories. It was also consistently increasing the number of its categories. The immediate target was to save costs by pooling the acquisition of similar items. Company 1 had started to develop their PCM practice only recently.

The definitions of purchasing categories reflect the role and formation of purchasing categories in companies. Companies 1 and 2 emphasised the cost reduction target. For Company 3, the purchasing category definition emphasised the relationship between purchasing categories and the company's business unit structure. Company 4 was undergoing a process of change in which purchasing categories were being formed systematically to support their business areas based on equal volume of purchase spends in the main purchasing categories, similarities among the purchase items and capability requirements.

Table 3   Comparison of the case companies' purchasing category structures and main integration mechanisms in their purchasing categories

	Company 1	*Company 2*	*Company 3*	*Company 4*
Primary motivation for PCM	Pooling purchase volumes, cost reduction	Reduction of TCO	Cross-functional integration	Cross-functional integration
No. of purchasing categories on the highest level	60	3	20	7
No. of purchasing categories on the 2nd highest level	0	20	150-200	Over 200
History of purchasing category use	A few years, evolving	Commodity groups for long time, stable	Commodity groups for long time, functional integration for a few years, stable	Since 1990s, functional integration for a few years, evolving
Examples of main purchasing categories	Raw materials, energy, IT and related services, many others	Raw materials, production-related auxiliary materials, services	Machinery, mechanics, electrical equipment, R&D services, spare parts etc.	Steel, steel structures, mechanical components, electrics, parts subcontracting, service parts and services
Integration mechanisms used in the main purchasing categories	Temporary purchasing category teams (formal group), purchasing category managers (integrator role)	Temporary and permanent purchasing category teams (formal group), purchasing category managers (integrator role)	Permanent purchasing category teams (formal group), purchasing category managers (integrator role), matrix organisational structure	Permanent purchasing category teams (formal group), purchasing category managers (integrator role), matrix organisational structure

We moreover observed differences in the companies' motivations for forming purchasing categories. Both process industry companies reported that the primary motivation for forming a new purchasing category was potential cost savings. This contrasted with the two metal engineering companies, which reported finding synergy in purpose of use, product structure, position in the value chain and total purchasing category spend.

The two mechanical engineering companies used more comprehensive integration mechanisms in organising PCM than the two process industry companies (Table 4). In addition to using purchasing category teams and purchasing category managers for integration, Companies 3 and 4 used a matrix organisation comprising main purchasing categories, business units, geographic regions and support functions. One possible explanation is the value chain position: the companies offering their customers complex

solutions required more comprehensive integration mechanisms to create cross-functional integration in their business organisations.

The PCM concept was used as an organisational integration mechanism in all case companies. The purchasing category managers had the important task of integrating functions. The main responsibilities of the purchasing category managers were to create purchasing category strategies, to develop the purchasing categories, to communicate with stakeholders of the purchasing category targets and principles across the whole organisation and to disseminate purchasing category and market information. Furthermore, the role also included follow-up of implementation and achieving strategic objectives. A purchasing category manager usually managed a cross-functional team with part-time representatives from the relevant functions.

6   Discussion of the findings

The complexity of the PSM task is related to company growth, product-service structure, product-service customisation and the size and structure of the company's supply base. The position of the case companies in the value chain, whether raw material producers or producers of more complex customised products, seems to offer one explanation for the differences in forming purchasing categories and also for the use of mechanisms to provide integration between the PSM function and the rest of the organisation. To summarise the cross-case analysis, we classify three groups of PCM practice in firms, i.e., volume-pooling group, TCO group and integration group, see Table 4.

Table 4   Grouping of companies according to their PCM practices

	Volume-pooling group	*TCO group*	*Integration group; cross-functional integration of purchasing and other business functions*
Drivers of PCM	Direct cost savings through pooling of purchasing (Cases 1&2)	TCO (Case 2)	Business requirements and product/service structure (Cases 3 & 4)
Purchasing category coverage	Continuous formation of new purchasing categories (Cases 1&2)	Improvement of control over suppliers in purchasing categories (Case 2)	Purchasing categories cover the whole purchasing spend (Cases 3 & 4)
Purchasing category hierarchies	No purchasing category hierarchy (Case 1)	Purchasing category hierarchies formed (Case 2)	Purchasing category hierarchies supporting long-term business requirements (Cases 3 & 4)
Integration mechanisms	Purchasing category managers and temporary teams with part- time members in purchasing category formation projects (Cases 1 & 2)	Purchasing category managers and permanent purchasing category teams with full-time members (Case 2)	Matrix organisation, PCM concept as a central mechanism for cross-functional collaboration (Cases 3 & 4)

In the volume-pooling group of PCM, the main motivation for category formation is cost savings through pooling of purchasing. The need for more advanced integration between organisational functions is low at this early development stage of the PCM practice. In the second group of PCM, the main driver is to improve the TCO. Purchasing category hierarchies are formed for better utilisation of skills and resources in purchasing, and control over suppliers in the main purchasing categories is improved.

The third group is called the integration group, in which the aim is to integrate the PSM function to support the multidimensionality of an international business organisation. Business requirements and product-service structures drive PCM (cf. Monczka and Markham, 2007). The emphasis in reaching the synergy potential is on economies of information and process (Hartmann et al., 2008). Two of our case companies, Companies 3 and 4 were in this group, using matrix organisations, cross-functional purchasing category teams and strong purchasing category manager positions to enhance integration.

The observations suggest that companies seek a fit between the task of the purchasing function and organising their purchasing to best accomplish the task, consistent with Foerstl et al. (2013); Johnson et al. (2014); Luzzini et al. (2012); and Trautmann et al. (2009b). The task of organisational design is to match a company's cross-functional integration requirements with the right type of integration mechanisms. The PCM approach of a company reflects the complexity of the PSM task, which is further reflected in forming strategies of the different levels of the firm and the purchasing function (Hesping and Schiele, 2015). As the complexity of the task increases, the PCM needs to develop towards more comprehensive business integration.

In light of the literature on purchasing strategy we observe that different techniques for development are necessary for different stages of maturity and on different levels of organisation, which can be explained by the organisations' absorptive capacity (Schiele, 2007). A purchasing organisation with a higher absorptive capacity learns more from their organisational environment than those with a lower absorptive capacity. In our study the motivation and outcome of PCM were found to evolve such that in mature PCM the purpose is to serve business units' needs instead of targeting primarily the traditional role of the purchasing function to aim at cost savings.

In PSM organisations with more complex tasks, the purchasing category managers, cross-functional teams and matrix organisational structures serve as integrators between the internal customers of the purchasing function in the organisation. The formation of purchasing categories is guided by company-level strategies and the purchasing function (Hesping and Schiele, 2015). Purchasing categories cover several supply markets and use specific means for the category context in implementing the purchasing category strategy.

The goal in forming purchasing categories and category hierarchies is to create manageable entities, which differ between industry contexts. These 'entities' were found to have a multi-level hierarchical structure with different degrees of complexity depending on their level in the hierarchy. Strategies for the highest level purchasing categories include goal setting, supplier management and development actions that are aligned with the business strategies. For companies with the greatest need for integration across functions, the purchasing category strategy offers a formalised way to communicate the purchasing category plan to stakeholders in order to ensure a shared understanding of the targets and the means to achieve them. The hierarchical nature of purchasing categories is an important contribution to enhance the earlier understanding of

the need to differentiate the structure of purchasing organisations to fit their respective contexts.

7 Conclusions and managerial implications

We analysed PCM practices in order to understand how PCM can provide integration between purchasing and other business functions and how different mechanisms are needed for different contexts. Four companies were studied in two industry contexts, i.e., the mechanical engineering and the process industry. As a theoretical contribution, we found that the motivation for the companies' use of purchasing categories varied from pooling purchasing power to gain economies of scale, to supporting business functions and to realising cross-functional integration. The analysis of the PCM practices revealed how the use of integration mechanisms need to be aligned to the context, in terms of which mechanisms, and how many to select, according to the needed level of integration. In advanced stages of designing PSM organisations, purchasing categories represent an important organisational element utilising several integration mechanisms simultaneously, such as purchasing category managers, cross-functional teams and matrix organisational structures.

The study contributes to the purchasing practice in three ways. First, companies need to consider purchasing categories as an important organisational design element, facilitating the formation of manageable entities within the entire purchasing spend of the firm. Second, the study suggests that when moving to more complex purchasing contexts, companies need to use several parallel integration mechanisms to accomplish the increasingly complex purchasing task. To successfully implement PCM the study emphasises the need for a purchasing category manager's role in the organisation and a formal structure to create shared PCM principles. Third, we emphasise the value of PCM in co-ordinating the purchasing tasks with the other parts of a firm's organisation. Thus PCM can serve as an important integration mechanism for companies to successfully implement the increasingly strategic role of PSM.

The paper reports findings from four companies, and is thus limited to the practices of the selected firms. It was revealed that PCM is a common practice in industrial firms, and therefore focused case studies with more comprehensive data sets on PCM are needed to increase the understanding of PCM in different environments and contexts. More research is still needed to develop a theoretical understanding of forming and managing purchasing categories with the multi-level hierarchical structure of purchases. As an area for future research, we support Ateş (2014) and Hesping and Schiele (2015) in their proposal for continued investigation of how to structure the purchasing spend and the supply base to support certain competitive priorities in different business contexts.

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