INVESTIGATING THE LINK BETWEEN PURCHASING AND SUPPLY MANAGEMENT (PSM) PRACTICES, PSM PERFORMANCE AND COMPANY PERFORMANCE – EVIDENCE FROM A STRUCTURAL EQUATION MODEL

Abstract
Realizing that the 'purchasing and supply management (PSM) practice-performance link' is conceptually well established, but lacks large scale empirical investigation is the starting point of this paper. Empirically testing a broad research model of selected PSM practices and their impact on the buying firm's performance, we are able to assess the relative performance impact of selected PSM practices. The study combines three data collection approaches for the operationalization of the constructs in order to reduce the impact of method bias in the analysis. In particular the PSM performance is perceptually measured while company performance is measured using objective performance data. All data was collected in a global survey of 148 companies across different industry sectors with revenues above USD 3 billion. To test our hypotheses the data is evaluated in a structural equation model. We find strong support for the hypothesized PSM practice-performance link. In particular our findings show that firms with high levels of strategic purchasing are more likely to achieve cost reduction, but also to eliminate obstacles that cause delivery delays and quality problems of purchased goods and services. Moreover, our analysis identifies the strong direct impact of supply talent management on PSM performance and its importance to fully master PSM's transition towards a function of high organizational status and influence. Our findings confirm PSM performance as a strong value driver of overall company performance.

Keywords: Strategic PSM practices, enabling PSM practices, performance, and path analysis.

INTRODUCTION

Three decades ago, the purchasing function was treated as a low level operating function that only made minor contributions to organizational competitive strategy (Ammer 1974). At the time, researchers focused their attention on the elevation of purchasing towards a more strategically oriented and integrated supply management function (Farmer 1972). As the development of competitive advantage is at the heart of strategic management (Carter and Narasimhan 1996), the purchasing and supply management (PSM) research was challenged to prove that the PSM function is in fact capable to contribute to overall corporate success in order to strengthen the perception of its strategic relevance. Consequently, the performance impact of PSM, its value contribution to the organization as a whole and its ability to render sustainable competitive advantage for an organization has been in the focus of a group of researchers. The majority of publications addressing these issues concluded in the existence of a positive relationship among PSM practices and performance (Watts, Kim, and Hahn 1992; Carter and Narasimhan 1996; Narasimhan and Carter 1998, Tan, Kannan, and Handfield 1998, Carr and Pearson 1999, Carr and Smeltzer 1999, Carr and Smeltzer 2000, Das and Narasimhan 2000, Narasimhan and Das 2001, David et al. 2002, Ellram and Liu 2002, Ellram et al. 2002, Chen, Paulraj and Lado 2004, Pauljaj and Chen 2005, Paulraj, Chen, and Flynn 2006, Cousins Lawson Squire 2006 , Paulraj and Chen 2007), referred to as the *PSM practice-performance link* throughout the course of this paper. However, according to Paulraj, Chen and Flynn (2006) the majority of publications focused on the theoretical derivation and conceptualization of frameworks based on a small number of case studies. The prior mentioned large scale empirical works only constitute a small proportion of the overall publications on the issue, thus the scan of literature provides first evidence that the PSM practice-performance link is still under-researched in terms of large scale empirical investigations.

Moreover, those outstanding articles empirically testing the PSM practice-performance link, often select very specific aspects of PSM such as strategic purchasing and the buyer-supplier relationship (Carr and Pearson 1999, Paulraj, and Lado 2004, Paulraj and Chen 2005, Chen), purchasing skills (Carr and Smeltzer 1999, Carr and Smeltzer 2000) or purchasing integration (Narasimhan and Das 2001, González-Benito, 2007). This confirms our notion that PSM research still lacks empirical validation of broad frameworks investigating the interrelationship of multiple PSM practices and their effects on performance. Especially the article by Ellram et al. 2002, leading to partly counter-intuitive results testing a broad spectrum of PSM practices, suggests that broader frameworks of the PSM practice-performance link deserve further investigation.

Additionally, such research is also of interest to he practical community.Despite, research has contributed to the establishment of PSM best practices, many firms struggle with their implementation (Dyer, Cho, and Chu 1998; Vonderembse and Tracey 1999; Janda and Seshadri 2001). Explanations for this struggle are grounded in the internal resis-

tance from other functions, PSM's exclusion from corporate planning and strategy development rounds (Carter and Narasimhan 1996) and in PSM's own inability to spot the gap between their own practices and the best practices (Ellram and Pearson 1993; Ellram et al. 2002). Consequently, PSM professionals' still lack evidence of their value contribution to date (Carr and Pearson 1999, González-Benito 2007).

The purpose of this study is to address the aforementioned research gap by investigating the PSM practice-performance link in a broader context than previous studies have done. The selection of four PSM practices allows detecting the relative performance impacts of each PSM practice not only in an isolated context, but in a broader context of interdependencies between constructs. Evidence on the relative performance of selected PSM practices allows judgment which practices exhibit the highest performance impact and if their effects are partially or fully mediated by other practices. Consequently the main research question underlying this paper is: *What is the pattern of relative effects of the selected PSM practices on PSM performance and company performance?*

We investigate our research model in the context of a global sample of multinational companies (MNCs). As opposed to previous outstanding works in the field analyzing data collected in a particular country relying on traditional secondary data collection methods (e.g. Narasimhan and Das 2001, Paulraj, Chen, and Flynn 2006, González-Benito 2007) we decided to collect global data leveraging three data collection techniques. Further this enables addressing the issue of common method bias (Podsakoff, MacKenzie, and Lee 2003). Thus we combine an interview-based survey approach to assess PSM practices with a traditional paper-based questionnaire querying PSM performance and objective company performance metrics retrieved from publicly available databases. To our knowledge such a combination of data collected on a global scale has not yet been applied to the field of PSM, thus the provision of reliability and validity measures for those scales is a particular asset of this paper.

To address the identified knowledge gaps, the article is structured as follows. In Section 2 we conduct a literature review before we develop our hypotheses and research framework in Section 3. Given the lack of empirical prove of PSM theory (Das and Handfield 1997) we rely on knowledge from broader management literature developing these hypotheses. In Section 4 we present the methods of data collection and data analysis. In Section 5 we first present the results of the measurement model before we test our hypotheses underlying the structural model. In Section 6 we discuss the implications of our findings for managerial research and managerial practice, before the paper is concluded in its limitations and our suggestion for further research.

LITERATURE REVIEW

The ability of the PSM function to contribute to sustainable competitive advantage and the imperative for PSM to be regarded as a strategic function has been broadly discussed (Carter and Narasimhan 1996, Ramsay 2001, Mol 2003, Day and Lichtenstein 2006, Schiele 2007). Empirical works in the field have mostly relied on the investigation of one or two selected PSM practices and their impact on performance. A considerable amount of literature has investigated the performance impact of strategic purchasing using causal models. Carr and Pearson (1999) find support for the direct positive impact of strategic purchasing on financial performance. Strategic purchasing's direct link to operational and/or financial performance is confirmed in later studies (Carr and Smeltzer 1999, Carr and Smeltzer 2000, Chen, Paulraj, and Lado 2004, Paulraj and Chen 2005, Paulraj and Chen 2007).

Given the strong performance link of strategic purchasing scholars also investigated its antecedents. In particular, the skills possessed by the purchasing professionals within the organization seem to be a strong enabler of strategic purchasing (Carr and Smeltzer 1997, Carr and Smeltzer 2000). Moreover, a positive direct effect of technical skills on financial performance is confirmed. Others studies have shown that benchmarking is positively related to strategic purchasing and firm performance (Carr and Smeltzer 1999), while other authors find support that performance measurement in PSM is positively associates with a higher level of strategic purchasing (Wagner and Kaufmann 2004) and PSM performance. These statements are consistent with a recent paper claiming that the antecedents of PSM proficiency, thus strategic purchasing, also have a direct impact on PSM performance (Hoffmann, van Raaij, and Wynstra 2008).

A further prominent area of investigation is the impact of buyer-suppler relationships on performance. Carr and Pearson (1999) found that different buyer-supplier relationships deliver different levels of financial performance. Realizing that the buyer supplier relationship is characterized by multiple constructs researchers have found that supply base reduction leads to enhanced communication and long-term orientation between the two parties involved ultimately resulting in enhanced dyadic quality performance (Chen, Paulraj, and Lado 2004, Paulraj and Chen 2005). This finding is supported in a later study concluding that that relational capabilities lead to operational and financial performance improvements (Paulraj, Chen, and Flynn 2006). Further, it was found that firms pursuing collaborative and integrative organizational relationships have the opportunity to achieve collaborative competitive advantage (Carr and Pearson 2002, Paulraj and

Chen 2007). In line with these findings Cousins Lawson Squire (2006) provide evidence that a more mature PSM functions, characterized by a close alignment with other functions, high skill levels and high status at the top-management level, achieve higher outcomes from supplier relationships resulting in higher operational performance. Yet they do not find support that the benefits flow to the bottom-line in terms of financial performance.

Another group of researchers have focused on the performance effects of alignment between purchasing practices or capabilities and product strategy (David et al. 2002), manufacturing strategy (Pagell and Krause 2002) and business strategy (González-Benito 2007). They all concluded in a positive performance effect of purchasing alignment with the respective strategies. David et al. (2002) find support for their hypothesis that the higher the level of congruency between an organization's product strategy and PSM's organizational design is positively related to elevated financial performance. Pagell and Krause (2002) sustain that plant's in which there is consensus between the manufacturing and the purchasing function concerning the plant's strategic priorities have higher plant performance than plant's in which this is not the case. This idea is transferred to business level strategies by González-Benito (2007). They conclude that PSM's contribution to business performance depends on two elements: the alignment between purchasing strategy and capabilities and purchasing's strategic integration reflecting the degree of alignment between purchasing and business strategy.

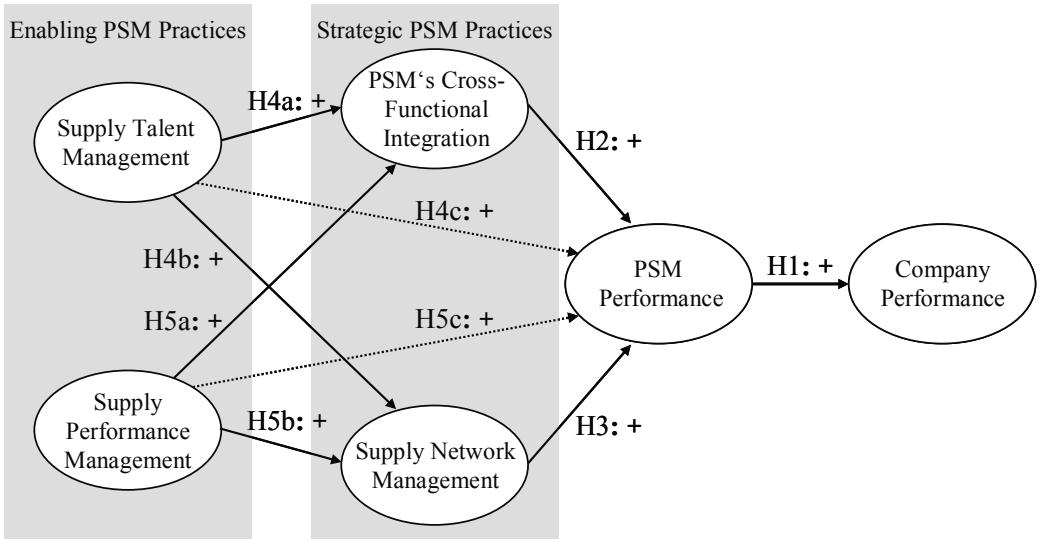
However, González-Benito (2007) was not the first to acknowledge the important role of PSM's strategic integration. Narasimhan and Das (2001) find that purchasing integration moderates the relationship between PSM practices (e.g. buyer supplier relationships, parts bundling, supplier performance evaluation) and manufacturing performance, leading to the conclusion that purchasing integration is an individual competitive competence. This is supported by recent literature incorporating this effect into a more holistic conceptual model (Day and Lichtenstein 2006).

Firstly, the literature review illustrates fragmented evidence of the PSM practice-performance link (Hoffmann, van Raaij, and Wynstra 2008). Despite the literature review provides evidence for the common notion that strategic PSM practices are directly related to elevated levels of PSM performance and company performance, it remains unclear whether the enabling PSM practices are simply mediated by strategic PSM practices or whether they also a more direct impact on PSM performance and company performance. Secondly, a more holistic framework incorporating either internal (e.g. purchasing integration, skill development and strategic alignment) or external PSM practices (e.g. long-term supplier relationships, supply base leveraging and supplier evaluation) seems to be necessary to shed light on to the PSM practice-performance link. It remains unanswered whether internal or external PSM practices are more fruitful in terms of performance. Moreover, we could not identify an empirical tested framework of PSM practices enabling judgement about the relative performance impact of its respective practices

For the purpose of this paper we adapt the perspective of Narasimhan and Das (2001) stating that internal development of the PSM function is the basis for sound external PSM practices. Consequently, we develop and test a research framework concerning the performance impact of four internal PSM practices presented in the section to come.

HYPOTHESES DEVELOPMENT AND THE RESEARCH FRAMEWORK

FIGURE 1: The Research Framework



The research model presented in Figure 1 depicts the hypothesized relationships among *supply talent management* and *supply performance measurement* identified as enabling PSM practices and *PSM's cross-functional integration* and *PSM's cross-locational coordination* identified as strategic PSM practices, along with their impacts on *PSM performance* and *company performance*. It illustrates the importance of investigating multiple PSM practices in a broader framework to detect relative strength of their performance implications, as opposed to the more isolated approach prevalent in literature up to this point. The differentiation between enabling PSM practices (Kaufmann 2002; Monczka, Trent, and Handfield 2005) and strategic PSM practices (Carr and Pearson 1999, Paulraj, Chen, and Lado 2006) is adapted from earlier works in the field. In the next subsections we present the theoretical foundation for the hypotheses summarized in Figure 1 based on a review of related PSM and broader management literature.

PSM Performance and Company Performance

The view that PSM can no longer be seen as a pure cost cutting function only effecting the bottom-line, but as a holistic value contributing function capable of exerting top-line as well as bottom-line impact is widely spread (Reck and Long 1988, Ramsay 2001, Chen, Paulraj, and Lado 2004, Paulraj, Chen, and Flynn 2006). This notion is supported by literature incorporating traditional metrics such as time, cost and quality as well as customer focused metrics such as responsiveness and innovation when assessing PSM performance (Das and Narasimhan 2000, Krause, Pagell, and Curkovic 2001, Pagell and Krause 2002).

PSM's contribution to the firm's bottom-line enhances firm value and, thus, shareholder wealth (Janda and Seshadri 2001; Carr and Pearson 2002, Ellram and Liu 2002). Moreover, it has been confirmed that PSM positively affects a firm's top-line in terms of sales growth and increased market share (Tan, Kannan, and Handfield 1998; Spekman, Kamauff, and Spear 1999, Ellram and Liu 2002, Paulraj, Chen, and Flynn 2006). This relationship is founded in the argument that PSM positively contributes to the value of the firm's products and services offered in the marketplace delivering value to the customer (Janda and Seshadri 2001). Consequently, PSM performance should explain a part of the variance in company performance due to its bottom-line as well as its top-line impact, thus leading to our first hypothesis:

Hypothesis 1: A higher level of PSM performance results in higher company performance.

PSM's Cross-Functional Integration and Performance

For the purpose of this study we adapt the definition of Pagell (2004, p. 460); thus PSM cross-functional integration is stated to be "a process of interaction and collaboration in which … [the PSM function works together with other functions] … in a cooperative manner to arrive at mutually acceptable outcomes for their organization."

Scholars agree that PSM's active integration into corporate planning results in functional alignment of priorities by mutual consent, leading to an increased likelihood for firms to realize competitive advantage (Hayes and Wheelwright 1984, Das and Narasimhan 2000). Pagell and Krause (2002) argue that in today's high uncertainty environments strategic consensus between the PSM and the manufacturing function leads to enhanced operational performance. Moreover, PSM alignment through integration is a prerequisite to effectively address the organization's strategic objectives in the supply market (Das and Narasimhan 2000). For instance PSM might pursue a cost reduction strategy leveraging its bidding power through multiple bidding rounds, volume concentration or standardization, although the success of the company's overall strategy is strongly dependent on innovation sourcing. In this case PSM should focus on supplier relationships and their early involvement in the product or service development processes as opposed to supplier squeezing. Accordingly, PSM requires full team membership in inter-functional projects and strategy development in order to contribute to the overall strategic goals of the organization (Gadde and Hakansson 1994). More recent empirical findings support this argument concluding that the strategic reach of PSM is a determinant of its ability to contribute to performance (Carter and Narasimhan 1996, Narasimhan and Das 2001, González-Benito 2007). Hence, we hypothesis:

Hypothesis 2: A higher level of PSM's cross-functional integration results in higher PSM Performance.

PSM's Cross-Locational Coordination and Performance

Trent and Monczka (2003) do not only call for cross-functional coordination of purchasing activities, but also for cross-locational coordination, in particular for the coordination of common materials, technologies and suppliers across the worldwide buying organization of MNCs. The development of common sourcing strategies across locations and business units (BU) is essential to best capture the potential synergies available for global PSM operations (Ellram et al. 2002; Trent and Monczka 2003a). Such a strategy attempts to simultaneously gain competitive advantage from the ex-

ploitation of country- and supplier-specific advantages in terms of labor cost advantages, product quality or technological advantages (Janda and Seshadri 2001), implying that organizations coordinate their PSM activities in order to leverage the cumulated purchasing volumes of BUs to achieve better agreements in terms of price, quality of goods and on-time delivery with suppliers (Petersen, Frayer, and Scannell 2000). Despite these benefits, companies must carefully balance between conflicting dimensions of international coordination and local responsiveness. Thus, in order to optimally render the potential benefits available from sourcing coordination, organizations must adjust between these two dimensions on a decision-by-decision basis (Doz and Prahalad 1991; Kaufmann and Hedderich 2004). In this research framework it is thus to be tested if cross-locational coordination is in fact a means to achieve enhanced PSM performance, leading to the following hypothesis:

Hypothesis 3: A higher level of PSM's cross-locational coordination results in higher PSM performance.

Enabling Aspects of Supply Talent Management

From the literature on human resource management (HRM) three major HRM systems have been identified: Employee skills and organizational structures, employee motivation and structure of jobs (Delaney and Huselid 1996). Here these three human capital enhancing systems are applied for the conceptual development of the performance link of supply talent management. Studies have shown the importance of HR practices in the PSM function. A higher level of technical skills of PSM professionals is sought to positively affect company performance (Carr and Smeltzer 2000) and to result in a positive influence on strategic PSM practices (Carr and Smeltzer 1997, Cousins, Lawson, and Squire 2006). Thus, in order to lift the PSM function to a strategic level, PSM professionals require the adequate skills to perform strategically (Carr and Smeltzer 1997) and balance the demands of multiple stakeholders (Giunipero, Handfield, and Eltantawy 2006). It has been confirmed that skill techniques are a predecessor of strategic PSM practices, while technical skills are a predecessor of firm performance, thus providing evidence which skills are important to achieve particular objectives (Carr and Smeltzer 2000).

Given this arguments we conclude that a high level of supply talent management guides higher levels of strategic PSM practices leading to the following hypotheses:

Hypothesis 4a: A higher level of supply talent management results in higher levels of PSM's cross-functional integration.

Hypothesis 4b: A higher level of supply talent management results in higher levels of PSM's cross-locational coordination.

Supply Talent Management and Performance

Multi-skilled and flexible labor with several career paths continuously enhancing their knowledge and education level was identified as one major 'have' in the context of PSM (Harland, Lamming, and Cousins 1999). Moreover, individually developed trainings provide PSM personnel with appropriate skills and competences (Batt 2002) and increase job motivation (Wexley and Latham 2002), which in turn should enhance job performance. This is in line with the findings of Feisel, Hartmann, and Giunipero (2008) stating that the PSM function must become comparable to other functions not only in terms of pay, but also in terms of professional development opportunities in order to attract high-performers. Therefore, in line with previous works in the field, claiming a direct performance effect of purchasing skill levels (Carr and Smeltzer 2000) we hypothesize the following:

Hypothesis 4c: A higher level of supply talent management results in higher PSM performance.

Enabling Aspects of Supply Performance Measurement

We posit supply performance measurement to be the second enabler of strategic PSM practices in our research model. When referring the term *performance measurement* we focus on the three phases of performance planning, performance review and performance improvement (Bredrup 1995) within the PSM function. Its ultimate goal is to enable efficiency and effectiveness improvement of PSM practices (Lebas 1995; Lardenoije, van Raaij, and van Weele 2005) thereby leading to enhanced performance of the function and the organization as a whole. It has been established that performance measurement techniques can be enormously useful to implement PSM strategy and to contribute to a company's competitive position, thus functioning as a powerful performance enabler to the PSM function (Axelsson, Laage-Hellman, and Nilsson 2002, Evans 2004, Wagner and Kaufmann 2004). Measuring performance against targets derived

from the overall functional strategy allows prompt detection of deviation enabling prompt counteractive measures to be taken. Moreover, a formally agreed on supply performance measurement makes PSM's value contribution tangible to other functions, thus enhancing its acceptance among these functions (Rozemeijer, van Weele, and Weggeman 2003). Based on the analysis we hypothesize an enabling effect of supply performance measurement for the strategic PSM practices:

Hypothesis 5a: A higher level of supply performance measurement results in higher levels of PSM's cross-functional integration.
Hypothesis 5b: A higher level of supply performance measurement results in higher levels of PSM's cross-locational coordination.

Supply Performance Measurement and Performance

Furthermore, meaningful performance measurement is said to influence the behavior of PSM professionals in pursuing functional and organizational objectives (Carter, Monczka, and Mosconi 2005). Carter and Narasimhan (1996) state that setting individual performance targets and linking those to individual incentive structures is expected to enhance PSM performance. Consequently, we conclude in certain performative aspects of performance measurement. Being aware that one is held accountable for certain performance metrics is likely to affect ones effort to attain these performance targets. Ellram et al. (2002) found that high performing firm's carry a more elaborate supply performance measurement than average or under-performing firms. Consequently the following direct performance effect of supply performance measurement is hypothesized:

Hypothesis 5c: A higher level of supply performance measurement results in higher PSM performance.

RESEARCH METHOD

Sample Frame

The target population for this global survey was identified to be all companies with revenues above USD 3 billion across different industry sectors obtained from the OneSource database. This revenue threshold of USD 3 billion has been chosen to guarantee sufficient organizational complexity, ensuring that cross-functional coordination structures or cross-locational coordination practices are meaningful. No industry sector was excluded per se, leading to an initial sampling frame of 2,251 companies. From this list, a stratified random sample of 1,000 firms was selected (Ellram et al. 2002; Chen, Paulraj, and Lado 2004). In 232 cases neither a CPO nor any other knowledgeable senior purchasing manager in a comparable position could be detected. The remaining 768 firms were contacted via telephone to solicit their cooperation. After our first contact wave 566 companies refused to cooperate. The remainder of 202 organizations agreed to participate in our research. In some cases, the desired interview partner was short of time at our first contact initiation but otherwise interested in participation. In such acase he/she was contacted again after two weeks time. Those participants were designated late respondents, whereas those who participated immediately after our first contact initiation were designated early respondents (Lambert and Harrington 1989).

Following a modified version of the total design method (Dillman 1978), the CPOs, who showed interest and will to schedule an interview were sent a mailing package containing an outline of the research project, the questionnaire querying PSM performance and a reply paid return envelope. This was followed by a reminder postcard approximately two weeks after. Throughout the period of July 2005 and June 2006, we obtained 148 complete pairs of responses to the interview-based survey on PSM practices and the paper-based questionnaire querying PSM performance. Other responses were excluded from further analysis due to excessive missing data equaling an effective response rate of 19.3 percent. The demographics of those organizations fully represented in the latter analysis are presented in Table 1.

The authors tested for the fit between the sample and the population along the three dimensions presented in Table 1 (Massey Jr. 1951). The analysis revealed an under-representation of organization from the ROW and a preponderance of European organizations in our sample. Otherwise this analysis did not yield statistically significant difference between the sample and the population at the 0.05 level.

TABLE 1: Representation of Industries / Respondents' Sales

Classification	Percentage
Types of Industry	
Automotive and Assembly	8.8
Chemicals and Pharmaceuticals	9.5
Energy and Utilities	13.5
Financial Institutions	10.8
High Tech and Telecommunication	14.9
Materials and Construction	15.5
Packaged Goods	18.2
Others	8.8
Annual Sales Revenues in billion USD	
< 5$ billion	31.8
> 5$ billion to 10$ billion	23.0
>10$ billion to 20$ billion	20.9
> 20$ billion	24.3
Region	
Europe	57.4
North America	33.1
ROW	9.5

Instrument Development and Pretest

Following the procedure for item-generation (Churchill Jr. 1979), the items of the interview guide as well as the items to assess PSM and company performance were developed in a combination of literature review and three day workshops involving five practitioners and five academic researchers. Adopting the widely held belief that there are PSM best practices, which cut across industries and firms (Carr and Smeltzer 1997; Ellram et al. 2002, Cousins, Lawson, and Squire 2006, Schiele 2007), the workshops were targeted at codifying what constitutes 'good' or 'bad' PSM practices. The collective experience of the expert practitioners provided the research team with anecdotal evidence in favor of their proposition for the operationalization of the latent constructs. We relied on previously tested and validated items for the measurement of our latent constructs whenever necessary.

Company performance is assessed on the basis of the following five items applied by previous works in the field; ROA, ROE, reduction of COGS, EBITDA growth and annual sales growth (Tan, Kannan and Handfield 1998, Carr and Smeltzer 2000, David et al. 2002, Ellram and Liu 2002).

PSM performance is operationalized along the following five dimensions: Annual savings, landed cost, quality of products and services, delivery speed and contribution to innovation (Spekman, Kamauff, and Spear 1999, Krause, Pagell, and Curkovic 2001; Das and Narasimhan 2002, Ellram and Liu 2002, Pagell and Krause 2002, Schiele 2007). Although organizations do not necessarily seek to optimize all dimensions at once (Watts, Kim, and Hahn 1992), we assume that successful companies pursue multiple performance objectives simultaneously (Roth and Miller 1990).

PSM's cross-functional integration is operationalized by four items drawn from a combination of previous studies (Das and Narasimhan 2000, Paulraj, Chen, and Flynn 2006, González-Benito 2007); PSM's integration in the corporate planning process, PSM's functional integration with manufacturing, product development and marketing and sales.

PSM's cross-locational coordination is operationalized by the following three items: international sourcing strategy, organizing principles of international sourcing and the approach of the supply base. We draw on the knowledge derived in previous studies, yet we do not know of previous works operationalizing this construct in a similar fashion.

Supply talent management is also measured by three items; training and development initiatives, planning of career paths in PSM, and the separation of roles between strategic and operational buyers. To our knowledge these measures have not been applied to the field of PSM before.

Supply Performance Measurement is operationalized by four items dealing with the performance management process; Target setting mechanisms in PSM, performance tracking and reporting, incentives and individual performance management, and the target accountability of performance beyond PSM. The items were jointly developed from performance management and PSM literature (Carter and Narasimhan 1996, Evans 2004, Carter, Monczka, and Mosconi 2005)

The survey instruments were pre-tested in a multi step approach. The questions and the scoring grid evaluating the PSM practice level and the questionnaire querying PSM performance were send to five academic experts in the field and then

to five practitioners who were asked to assess the content and clarity of the survey instruments. Finally a pilot study was conducted a pilot study with a MNC. Here the goal was to further refine procedures for the actual interviews, and to estimate the time required to conduct the interviews. Several minor changes were made as a result of the pre-test.

Data Collection

The latent constructs of our research framework required operationalization on reliable scales enabling later analysis in a SEM. All indicators of the constructs were measured on 5-point or percentage scales. All latent variables were operationalized on a multi-item scale where each indicator was only assigned to one of the latent constructs for analysis (Anderson, Gerbing, and Hunter 1987; Aaker, Kumar, and Day 2001). Moreover, this study leverages objective sources for retrieving data, with perceptual means of data collection, thereby minimizing the danger of common method bias. These methods of data collection for the constructs of company performance, PSM performance and PSM practices are presented consecutively in the following section.

Objective Data Collection: This data on company performance was collected from three publicly available databases: Research Insight, Bloomberg and Amadeus. All retrieved data was found to be consistent in at least two of the applied sources. This data was then used to calculate percentage figures for items of ROA, ROE, EBITDA growth, reduction of COGS and Sales growth.

Perceptual Data Collection: The items forming the PSM performance construct were queried in the mail survey relying on perceptual scales. It is established that companies frequently track PSM performance. Yet, PSM performance measures are an element of internal reporting for which there exists no standardized measurement method across firms. Deliberately permitting differences in how these performance metrics are measured at the surveyed companies, respondents were asked to judge their performance relative to their major industry competitors on a 5-point scale where 1=far better and 5=far worse (Beard and Dess 1981). This method was used by previous large-scale empirical research in the field issues (Carr and Pearson 1999; Carr and Smeltzer 1999; Carr and Smeltzer 2000; Krause, Pagell, and Curkovic 2001; Narasimhan and Das 2001) due to the difficulty of obtaining reliable primary data on such performance metrics.

The Interview-Based Survey: Data on PSM practices was collected through an interview-based survey approach (Pagell 2004; Bloom and van Reenen 2007). According to Ellram et al. (2002, p. 14), it is doubtful whether traditional questionnaire-based surveys are able to provide valid and reliable measures of "the spirit and the overall system with which the PSM best practices are implemented". In accordance with Bloom and van Reenen (2007), it is concluded that from a traditional survey it is hardly possible to distinguish whether a certain practice is only prominent in the mind of the respondent or whether it is really implemented and executed. We argue that only an interview-based approach is suitable to capture such fine and multifarious aspects of organizational behaviors (Knight 2000) which allows to reduce the problems associated with biases inherent in managerial responses (Huber 1985).

Consequently, this study relies on external assessment of PSM practices, combining the two survey approaches applied by Pagell (2004) and Bloom and van Reenen (2007). We use a pre-defined interview guide and scoring grid to assess PSM practices. Its final version consists of 14 PSM indicators. For each of those indicators, one open lead question and a funnel of more detailed follow-up questions was defined to guide interviewers to a reliable assessment. Answers were provided by a detailed scoring grid that forced the interviewer to rate each PSM practice items on a 5-point scale, with 1 reflecting the minimum practice level and 5 reflecting the best practice level. The detailed scoring grid is provided in Table 7 in the Appendix.

Two interviewers conducted the 90-minute telephone interviews with CPOs and independently rated their answers according to the descriptions in the scoring grid. After the interview, the interviewers discussed each question, agreed on a common rating, and wrote down a comment to justify their joint assessment (Bloom and van Reenen 2007). As average deviations between the assessments of the two interviewers were found to be less than 0.50 for each of the 14 PSM indicators, the scoring grid appeared to constitute a reliable and concise tool to measure PSM practices.

The authors are aware that a multi-respondent interview design could improve the objectivity of the data; however, for resource, time and response-rate concerns we decided to limit the data collection to a single respondent, the most senior purchasing manager in the organization, assuming him/her to be the most reliable data source (Philips 1981; Forsman and Schreiner 1991).

Non-Response Bias

Although the response rate of this study is comparable to prior PSM research (e.g. Krause, Pagell, and Curkovic 2001; Narasimhan and Das 2001), non-response bias posed a possible limitation to our survey. As discussed by Armstrong and Overton (1977), it is suggested that late respondents possess similar characteristics as non-respondents. Under this assumption, early and late respondents were compared with each other to test for non-response bias. Significant differences between the two respondent groups would signify the presence of non-response bias (Armstrong and Overton 1977). Consequently our sample was divided in early (n=91) and late respondents (n=57) according to the previously mentioned criteria. To test for non-response bias the non-parametric Mann-Whitney U Test was applied. It revealed no differences at a significance level of 0.05 between the two groups of early (n=91) and late respondents (n=57) for neither of the items measuring PSM practices nor for the items measuring PSM performance. Therefore, it can be established that non-respondents had no significant impact on the results of this paper (Kanuk and Berenson 1975).

Data Analysis

The link of multiple independent and dependent constructs by a path analytic research framework called for an evaluation in a SEM (Gefen, Straub, and Boudreau 2000). Although SEM had only recently become popular in operations modeling (Shah and Meyer Goldstein 2006), the term SEM in business research seems to be used synonymous to the covariance-based approach implemented for instance in the software package LISREL (Chin 1998).

However, we chose the PLS approach and the software package SmartPLS 2.0 beta (Ringle, Wende, and Will 2005) to estimate the structural parameters of our model (Lohmöller, 1989, Chin 1998, Hulland 1999). The PLS approach is component based, resulting in its better applicability to this study than the covariance-based approach. It has smaller sample size requirements and is not restricted to multivariate normal data (Wold 1985, Chin 1998, Chin and Newsted, 1999), suiting our data set. Moreover, the PLS approach is more suitable for the analysis of complex constructs such as our research model depicted in Figure 1. Additionally, it supports the combination of formative and reflective operationalization of constructs at the given sample size (Hulland 1999, Jarvis et al. 2003). Moreover, given the formative operationalization of the endogenous constructs of PSM performance and company performance, one should use PLS as opposed to LISREL (Herrmann, Huber, and Kressmann 2006).

Statistical Performance Criteria

Essentially, there are two different ways to operationalize not directly measurable latent variables as the ones stated in the research framework: reflective and formative measurement (Coltman et al. 2008).

Reflectively measured latent variables cause its indicators. Consequently they are referred to as ‘effect indicators’ chosen randomly from a universe of items related to the construct. They are required to be internally consistent, unidimensional and equally reliable. Moreover, reflective indicators must be highly correlated since they share the influence of the latent construct (Bollen and Lennox 1991; Diamantopoulos and Winklhofer 2001). In Table 2 we present the quality criteria which have to be met by the reflectively operationalized PSM practices. We examine the content validity (Narasimhan and Carter 1998), the composite reliability (Nunnally and Bernstein 1994), the convergent validity (Fornell and Larcker 1981, Hulland 1999) and the discriminant validity (Chin 1998, Hulland 1999) for each of the PSM practice constructs.

Formative indicators, on the other hand, cause the latent variable and are thus referred to as ‘cause indicators’ (Diamantopoulos and Winklhofer 2001). Formatively operationalized latent variables are modeled as a linear combination of their indicators, which must be mutually exclusive, collectively exhaustive and not be correlated in order to reliably represent the latent variable (Bollen 1989; Bagozzi 1994; Nunnally and Bernstein 1994; Jarvis et al. 2003). Formative indicators are not interchangeable and the exclusion of one indicator is analogue to the exclusion of a part of the construct (Coltman et al. 2008). Accordingly, it takes a census of all relevant indicators to represent the construct holistically (Bollen and Lennox 1991). Given that we operationalized both PSM and company performance formatively, we expect, for example, that the PSM performance items affect overall PSM performance rather than the converse. We expect that PSM performance will increase when one or multiple PSM performance items increase, however we do not expect that an increase of PSM performance will require all PSM performance items to increase simultaneously. The same logic applies to the company performance construct and its items.

Given these characteristics the quality criteria for reflective measurement are inapplicable to formative operationalized measurement models (Bollen 1989). We follow the approach suggested by Diamantopoulos and Winklhofer (2001), pre-

sented in Table 2, for the assessment of the formative measurement models of PSM performance and company performance. Table 2 also lists the quality criteria for the evaluation of the structural model (Cohen 1988, Lohmöller 1989, Chin 1998, Karimi, Somers, and Gupta 2004).

TABLE 2: Quality Criteria for Structural Equation Models

	Reflective Operationalization	Formative Operationalization
Measurement Model	**Content Validity** Exploratory Factor Analysis (EFA) Factor Loading ≥ 0.4 Confirmatory Factor Analysis (CFA) Factor Loading ≥ 0.6 **Composite Reliability** Composite Reliability (CR) ≥ 0.7 Cronbach's Alpha (α) ≥ 0.6 **Convergent Validity** Loading ≥ 0.6 Average Variance Extracted (AVE) ≥ 0.5 **Discriminant Validity** Compare Cross Loadings	**Content Validity** p_{SA} close to 1.0 c_{SV} close to 1.0 **Indicator Reliability** Path weights ≥ 0.1, significant at the 0.1, 0.05 level, if t-value ≥ 1.283, 1.648 **Multicollinearity of Indicators** Threshold VIF ≤ 10 0.05 level, if t-value ≥ 1.283, 1.648
Structural Model	**Share of variance explained (R^2)**	Threshold $R^2 \geq 0.1$
	Path coefficients	Threshold ≥ |0.1|
	Significant path coefficients at the 0.05 significance level, if t-value ≥ 1,65	
	Effect size (f^2)	small; $0.02 \leq f^2 < 0.15$ moderate; $0.15 \leq f^2 < 0.35$ large; $0.35 \leq f^2$
	Prediction Accuracy - Stone-Geisser criterion (Q^2)	Threshold > 0

RESULTS

Construct Validation

Before we test the substantive hypotheses, we first estimate the validity of the measurement model. It is examined according to the criteria for the reflective and formative constructs presented in Table 2.

Content validity and unidimensionality were assessed using confirmatory factor analysis (CFA). Additionally, exploratory factor analysis (EFA) applying the principal component procedure to test whether the indicators loaded on their underlying constructs. The results of the analysis are provided in Table 4. As anticipated all indicators loaded onto their four underlying constructs with eigenvalues greater than 1.0 accounting for 57.7% of the variance. All EFA loadings were identified to lie above the cut of point of 0.4 (Hair et al. 1998). Convergent validity and unidimensionality was further confirmed by CFA with loadings of items ranging from 0.634 to 0.851 on their underlying constructs. Moreover the AVE of each construct ranges between 0.581 and 0.664 exceeding the 0.5 threshold.

Discriminant validity was established comparing the cross loadings of the items (Chin 1998). All items load highest on their respective constructs. This was further confirmed by looking at the construct correlation matrix and the square root of the AVE explained (Hulland 1999). From Table 6 it can be seen that each construct shares a greater variance with its measures than it does with the other constructs.

Further, composite reliability was assessed inspecting the CR scale (Fornell and Larcker 1981, Hulland 1999) and the internal consistency method estimated by Cronbach's α (Nunnally and Bernstein 1994). While the CR scores for the four constructs ranged from 0.807 to 0.887 exceeding the threshold of 0.7, the values of Cronbach's α ranged from 0.640 to 0.831 exceeding the threshold of 0.6. Thus we can conclude in good psychometric properties of the four theoretical PSM practice constructs.

Turning to the formatively measured constructs of PSM performance and company performance, the expert workshops and the pretest had shown the imperative for formative measurement. The excellent p_{sa} and c_{sv} values affirmed us in this point (Tables 5) and proved the content validity of the indicators (Anderson and Gerbing 1988). All indicators show low

variance inflation factors (VIF) not exceeding the value of 2.0 neither in the PSM performance nor the company performance construct. Consequently, the issue of multicollinearity in formative modeling can be ruled out. Still, the path weight criterion was not fulfilled by two items. For PSM performance 'contribution to innovation' did not provide a significant path weight while 'sales growth' had a significantly negative path weight on company performance. The other indicators showed significantly positive path weights with their respective constructs, thus, their relative importance to the respective construct is supported. The authors chose not to eliminate the two items of insignificant path weights in order not to run the risk to neglect theoretical considerations or to substantially reduce content depth of the constructs (Bollen and Lennox 1991). Altogether, the formatively operationalized indicators provide reliable and valid measures. Thus, the measurement model combining reflective and formative measurement is suitable for further investigation of the hypothesized relationships underlying the structural model.

Hypotheses Testing

Turning to the structural model, according to the quality criteria introduced in Table 2, the overall results of the analysis are presented in Table 3. The central quality criteria for PLS SEMs, share of variance explained (R^2) and prediction accuracy (Q^2) are fulfilled (Chin 1998). Prediction accuracy indicates to what extent the actual data set can be reconstructed by the structural model and the parameters calculated by the PLS software for the endogenous variables (Fornell and Cha 1994). Values of R^2 range from 0.178 to 0.437 and values of Q^2 range from 0.019 to 0.388.

TABLE 3: Validation of the Structural Model

Effect on… / Effect of…	1.	2.	5.	6.	1.	2.	5.	6.	R^2	Q^2
	Path Coefficients				**Effect Size (f^2)**					
1. PSM's Cross-Functional Integration			0.231**				0.231**	0.097*	0.334	0.281
2. PSM's Cross-Locational Coordiantion			0.242**				.242**	0.102**	0.221	0.230
3. Supply Talent Management	0.568**	0.209**	0.274**		0.568**	0.209**	.456**	0.192**		0.288
4. Supply Performance Measurement	0.013	0.291**	0.068		0.013	0.291**	.142**	0.060**		0.388
5. PSM Performance				0.421**				0.421**	0.437	0.019
6. Company Performance									0.178	0.078

Note:
** significant at the 0.05 significance level.
* significant at the 0.1 significance level.

The path analysis reveals support for hypothesis H1, the positive relationship between PSM performance and company performance. The path coefficient of 0.421 is significant and the variance explained of company performance (R^2=0.178) can also be concluded to be substantial given the multifold determinants of company performance not underlying this study

Hypotheses H2 and H3 are also supported. PSM's cross-functional integration and cross-locational integration do have a significant impact on PSM performance with a path coefficient of 0.231 and 0.242 respectively. These findings provide evidence that higher levels of the two strategic PSM practices are associated with higher levels of PSM performance.

Also hypotheses H4a and H4b are supported by the respective path coefficients of 0.568 and 0.209 providing evidence for the strong enabling role of supply talent management for the development of high level strategic PSM practices. Thus, development programs and role allocation to PSM professionals according to their talents seems to foster PSM's acceptance and integration with other functions. Also, it enables PSM professionals to manage the internal PSM network and to develop beneficial sourcing strategies for the organization as a whole associated with higher PSM performance levels. Furthermore, the direct PSM performance impact of supply talent management expressed in hypothesis H4c is supported with a significant path coefficient of 0.274. Moreover, supply talent management has the strongest effect size on PSM performance and company performance out of the four PSM practices.

While hypothesis H5b is supported by the path analysis, hypothesis H5a has to be rejected. Thus, it is suggested that cross-locational coordination plays a mediating role for the performance impact supply performance measurement. The fact that this is not the case for cross-functional integration may be grounded in the fact that convincing other functions such as marketing or R&D of PSM's important strategic levers and its value contribution to the organization is lesser a function of hard performance metrics than of soft factors embedded within the talent management construct (cf. hypothesis H4a and H4b). The support for hypothesis H5b, on the other hand, can be grounded in the notion that performance measurement unravels areas of low PSM performance, thereby pinpointing PSM's attention to the weaknesses of the PSM function and triggering corrective action by the parties involved. Further, a more advanced performance measurement practice may uncover areas of supply base leveraging, volume concentration or parts bundling across locations, thus leading to enhance PSM performance. Turning to our final hypothesis H5c, path analysis suggests its rejection. Supply performance measurement, thus, does not directly affect PSM performance. However, given the mediating effect outlined above its significant effects size of 0.142 and 0.06 on PSM and company performance respectively seems to be explained.

Concluding on the influence of PSM practices on PSM performance, our data analysis provides strong support for the PSM practice-performance link. Firms with high levels of strategic purchasing practices are more successful in attaining cost reductions, but also in eliminating obstacles that cause delivery delays and quality problems. This is grounded in the presented path coefficients, but also in the high share of variance explained (R^2=0.421) of the PSM performance construct by the PSM practices. Further, the effect sizes of the PSM practices on company performance support our notion of the strong mediating role PSM performance when it comes to PSM's impact on company performance. Thus, the higher the profiles of the PSM function, the more it is capable to contribute to the organization's overall competitive position. Our findings suggest that supply talent management practices have the strongest impact on company performance followed by PSM's cross-locational coordination, PSM's cross-functional coordination, and supply performance measurement. These findings have some inherent implications for management research and practice, which deserve further discussion in the following section.

CONCLUSION

Implications for Management Practice

This study contributes to and expands the growing number of publications on the strategic role of PSM and the impact of selected PSM practices on the buying firm's performance. Adding to the body of literature, detecting a positive effect between higher levels of PSM practices and company performance should assist PSM professionals overcoming the resistances they face from other functions, wanting to take on a strategic role within the organization.

Firstly, this empirically substantiated framework provides some guidance on which PSM practices have the strongest potential impact on performance and implies which practices one should focus on to enhance functional as well as company performance. Our findings provide evidence that supply talent management has the strongest relative impact on performance and the level of the firm's strategic PSM practices.These findings are complementary to those of Carr and Smeltzer (2000) stating that firms should seek to develop the skills of PSM professionals in order to succeed in the transition towards a strategic function. This becomes apparent in the strong path coefficient between talent management and cross-functional integration. Furthermore, It is suggested that firms should provide career opportunities within PSM equally attractive as those in other functions in order to attract and retain capable personnel within the function. One can conclude that people matter most, within the context of the research model underlying this study, to master PSM's transition towards a fully appreciated strategic function.

The second implication is that PSM's cross-functional involvement pays off in monetary terms. In order to contribute to the competitive position of the organization, top-management should upheave PSM to full membership in cross-functional teams. Thus, our findings support the notion of prior theoretical works (Watts, Kim, and Hahn 1992; Gadde and Hakansson 1994) as well as large scale empirical works (Das and Narasimhan 2000; Pagell and Krause 2002). Still, this paper additionally detects the importance of supply talent management as an enabler for advanced levels of PSM's cross-functional integration. Thus, full membership in high level rounds is not the whole story to equal organization status. In order to gain recognition among other functions and to effectively drive decision-making, the PSM professionals must be able to balance the interests of multiple stakeholders and to project the implications of its actions. Thus, a strategic mindset of PSM professionals is important to effectively exert influence on strategic decisions and to enhance company performance (Giunipero, Handfield, and Eltantawy 2006). Consequently, CPOs should assign the most strategically capable professionals to high level cross-functional rounds to promote PSM capabilities across the organization. Thus, in line with González-Benito (2007) it is argued that PSM should not only be given equal organizational status

compared to other functions within the organization, but also receive adequate budgets to allow for the required personnel development programs to fully master the strategic transition.
Thirdly, combining the support for hypotheses H3 and H5b implies that PSM professionals should build a holistic and boundary spanning supply performance measurement to disclose areas of mal-performance within the reach of the PSM function. This should enable them to take effective corrective action leading to performance improvements along the multiple dimensions of PSM performance, eventually paying off in terms of top- and/or bottom-line impact. The notion of Axelsson, Laage-Hellman, and Nilsson (2002) that transparency on spend volumes provides the PSM organization with strong levers is thus supported in this paper.

Implications for Management Research

In addition to providing meaningful insights for PSM practitioners, this study also offers important contributions for management research. From a methodological perspective, this article combined three data collection approaches to avoid the disadvantages of common method bias (Podsakoff, MacKenzie, and Lee 2003) inherent in previous studies jointly querying indicators for the operationalization of exogenous and endogenous variables applying solely perceptual survey methods. To our knowledge, this article is the first to evaluate the scores on PSM practices collected in an interview-based survey together with perceptual and objective performance measures. This combination proves to be successful in overcoming the barriers faced by earlier empirical studies in the field.
Moreover, directly linking PSM practices to functional performance and indirectly to company performance, this study took on a wider perspective looking at the PSM practice-performance link, than previous authors in the field, who directly linked PSM practices to company or financial performance. This studies acceptance that practices must be implemented in the wider context of the organizational system (Porter 1980) seems to provide unambiguous results, whereas the direct PSM practice-company performance link applied in other studies led to rather equivocal results (Ellram et al. 2002).
Additionally, we identified the PLS approach to the methodological research problem combining formative and reflective measurement in one model at relatively small sample size to deliver reliable and valid results. PLS has been applied broadly by other research communities such as marketing, thus it can be assumed to be reliable. Hence we can conclude that, although one might forego benefits of statistical power arising from a larger sample size applying traditional survey methods, our notion that the combination of data collection techniques for the analysis of SEMs constitutes a complementary alternative.
This article complements previous works by providing extensive empirical evidence of the strategic levers the PSM function can exert to contribute to organizational performance and the firm's competitive position (Carr and Pearson 1999, Carr and Smeltzer 2000, Narasimhan and Das 2001, David et al. 2002, Ellram et al. 2002, Cousins, Lawson, and Squire 2006, Paulraj, Chen, and Flyinn 2006). Having identified significant positive relationships between PSM enabling and strategic practices, our research provides support for earlier frameworks following such a differentiation (e.g. Kaufmann 2002, Monczka, Trent, and Handfield 2005). Moreover, the support for our hypotheses also provides support for the concept of holistic purchasing competence (Das and Narasimhan 2000; González-Benito 2007). Performance outcomes of the PSM function appear to be determined by the interplay of multiple PSM practice rather than individual spikes.

Limitations and Further Research

As with all empirical research, this study has some limitations that need to be addressed and should be taken into account when conducting further research and when interpreting the findings of the here presented PSM practice-performance link.
Firstly, the selection of very large companies as the population for our sample poses a limitation for the generalizability of the results to smaller firms. We propose future research to focus on a mixed population of firms in terms of revenue to extend external validity.
Secondly, this study uses cross-sectional data. Accordingly, one should not make inferences about cause and effect relationships (Shah and Meyer Goldstein 2006). Expanding on this issue, a longitudinal study would not only allow for such inferences, but also enable the detection of lagging and leading effects of PSM practices on performance. If possible, such research should collect a larger sample to increase the statistical power of the analysis.
Thirdly, not only individual functional performance drives company performance, but so does the strategic alignment of functional strategies and practices or capabilities as well as the strategic alignment of functional strategies with corporate strategy (González-Benito 2007). Recent literature has suggested to incorporate the 'alignment-performance link'

together with the here presented 'practice-performance link' within one model (Day and Lichtenstein 2006). Although PSM's integration with other functions is analyzed in our research framework, the 'alignment-performance link' does not lie at the heart of this study.

Finally, one must state that the PSM practices underlying this study find their deployment within the organizational boundaries of the buying firm. Yet, a multitude of PSM practices not underlying this study go beyond the focal firm's boundaries, therefore future research should incorporate outward-facing practices such as supplier integration (Paulraj, Chen, and Flyinn 2006), buyer-supplier relationships (Paulraj and Chen 2005) and supplier development (Krause, Handfield, and Tyler 2007). We expect that such extension would further enhance the predictions of the model. Yet, none of these limitations seem to substantially question our overall findings.

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APPENDIX

Table 4: Validation of Reflective Constructs

Construct	Items	Mean	Standard Deviation	Loading EFA	Loading CFA	Loading*	Cross Loadings		
1. PSM's Cross-Functional Integration							**2.**	**3.**	**4.**
α=0.758	PCFI1	3.11	1.02	0.787	0.747	0,799	0,361	0,461	0,406
CR=0.847	PCFI2	2.47	1.10	0.734	0.795	0,682	0,354	0,374	0,203
AVE=0.581	PCFI3	2.73	1.07	0.691	0.786	0,791	0,431	0,489	0,322
	PCFI4	2.38	1.08	0.684	0.711	0,77	0,347	0,412	0,362
2. PSM's Cross-Locational Coordination							**1.**	**3.**	**4.**
α=0.640	CLC1	2.54	1.06	0.833	0.877	0,845	0,510	0,470	0,470
CR=0.807	CLC2	2.74	0.90	0.451	0.820	0,655	0,210	0,211	0,271
AVE=0.585	CLC3	1.99	1.14	0.845	0.634	0,783	0,466	0,274	0,255
3. Supply Talent Management							**1.**	**2.**	**4.**
α=0.710	STM1	2.72	1.01	0.469	0.796	0,897	0,619	0,302	0,736
CR=0.838	STM2	3.01	1.13	0.668	0.784	0,799	0,340	0,385	0,636
AVE=0.636	STM3	3.34	1.15	0.702	0.671	0,681	0,380	0,300	0,400
4. Supply Performance Measurement							**1.**	**2.**	**3.**
α=0.831	SPM1	3.19	0.91	0.529	0.743	0,772	0,495	0,252	0,631
CR=0.887	SPM2	3.15	1.16	0.851	0.788	0,834	0,248	0,379	0,564
AVE=0.664	SPM3	3.10	0.98	0.683	0.799	0,846	0,373	0,399	0,572
	SPM4	2.99	1.08	0.739	0.787	0,804	0,317	0,371	0,710

Note:

α: Cronbach's Alpha, CR: Composite reliability, AVE: Average variance extracted.

* All loadings are significant at the 0.01 significance level.

TABLE 5: Validation of Formative Constructs

Constructs	Items	Mean	Standard Deviation	Path Weight	VIF	p_{SA}	c_{SV}
5. PSM Performance^							
	Annual Saving	3.56	0.92	0.821***	1.021	1.0	1.0
	Landed Costs	3.64	0.86	0.551***	1.062	1.0	1.0
	Quality	3.46	0.85	0.129*	1.227	1.0	1.0
	Lead Times	3.12	0.81	0.121*	1.276	1.0	1.0
	Contribution to Innovation	3.14	0.90	0.051	1.181	1.0	1.0
6. Company Performance^^							
	Average ROA	0.04	0.05	0.617***	1.675	1.0	1.0
	Average ROE	0.13	0.15	0.638***	1.640	1.0	1.0
	Reduction of COGS	0.01	0.03	0.147*	1.054	1.0	1.0
	EBITDA Growth	0.86	8.02	0.262**	1.109	1.0	1.0
	Sales Growth	0.14	0.13	-0.165	1.048	1.0	1.0

Note:
^ All PSM Performance scales are perceptual. Respondents were asked to address their performance relative to their major industry competitors on a 5-point scale where 1= far worse
^^ All Company Performance metrics are objective measures. They were collected from publicly available sources and calculated using percentage scales.
* significant at the 0.1 significance level.
** significant at the 0.05 significance level.
*** significant at the 0.01 significance level.

TABLE 6: Correlations of the Latent Constructs

	1.	2.	3.	4.	5.	6.
1. PSM's Cross-Functional Integration	**0,762^**					
2. PSM's Cross-Locational Coordiantion	0.519**	**0.765^**				
3. Supply Talent Management	0.578**	0.430**	**0.797^**			
4. Supply Performance Measurement	0.443**	0.450**	0.757**	**0.815^**		
5. PSM Performance	0.545**	0.511**	0.563**	0.487**	1	
6. Company Performance	0.328**	0.270*	0.109	0.017	0.421**	1

Note:
^ Square root of the average variance extracted of each reflectively measured construct
* significant at the 0.05 significance level.
** significant at the 0.01 significance level.

TABLE 7: Items to Assess PSM Practice

Indicator		Minimum Practice (1)	Average Practice (3)	Best Practice (5)
PCFI 1	**PSM Integration with Manufacturing**	PSM function does not contribute significant value to manufacturing beyond product & service supply.	PSM involved in alignment of supply base with manufacturing objectives but not in the lead. Involvement in make or buy decisions, but not in the lead. Supplier integration with PSM support but upon manufacturing request.	PSM function involved in all important manufacturing value creation considerations such as make vs. buy, lean operations and vertical integration. PSM proactively challenges in-house processes to improve manufacturing and efficiency.
PCFI 2	**PSM Integration with Corporate Planning**	No official assignment of PSM professionals to corporate planning teams or initiatives.	No regular high-level involvement of PSM in corporate planning projects or the development of high level functional strategies. Mostly PSM is informed after decisions have been taken.	Corporate strategy is jointly developed with other functions in cross functional strategy development meetings. The PSM strategy is directly derived from corporate strategy and has equal status with the other functional strategies.
PCFI 3	**PSM Integration with Product Development**	PSM does not contribute in a meaningful way to the product development processes.	PSM contributes to product development processes only from a cost perspective. PSM represented in product development team only after the concept phase. Commercial tools (e.g., DtC) are sometimes used to optimize product cost structures but are not proactively pushed by PSM professionals.	PSM actively contributes supply base knowledge and supplier innovations to optimize cost and customer value of new products. PSM is a full team member already in early strategy and concept phase of new product development. PSM actively brings in commercial tools (e.g., DtC) to optimize product cost structure.

PCFI 4	**PSM Integration with Marketing and Sales**	PSM does not cooperate with marketing & sales. No formal or informal interaction between marketing & sales and PSM staff.	PSM supports marketing & sales to exploit supply base opportunities. PSM occasionally interacts with marketing. PSM provides supply base contacts.	PSM actively exploits supply base opportunities to provide access to new markets, new customers, and new products. International supply base contacts are used to generate additional business and access new markets.
CLC 1	**International Sourcing Strategy**	International sourcing happens accidentally or not at all. Neither international sourcing targets nor strategy in place	For some categories international sourcing initiatives exist but no comprehensive strategy. No specific international sourcing targets or strategy for PSM spend. Existing initiatives are mostly category-specific.	Clearly formulated and comprehensive strategy in place and implemented for most relevant categories. International sourcing strategy developed and regularly challenged. Senior executives get involved to create positive momentum. International sourcing is seen as a differentiator.
CLC 2	**Approaching the Supply Base**	PSM does not actively manage supply base. No explicit strategies to ensure continuity of supply. No segmented approach to suppliers applied.	PSM generally manages supply base in alignment with sourcing approach. Formal strategies for supply base management defined for the most important categories.	PSM actively shapes and recalibrates the supply base in line with company's strategic objectives. Explicit strategy defined for supply base for almost all categories, ensuring both continuity of supply and competition across suppliers. Fully implemented supplier segmentation.
CLC 3	**Organizing Principles of International Sourcing**	Almost no initiatives to leverage BUs purchasing power on a global scale. No coordination of international sourcing activities.	Sourcing offices in the most important emerging economies assisting category managers. Some attempts to capture synergies across categories and BUs but no clear coordinating process in place to capture synergies.	Mature cooperation between global category managers in order to generate synergies. Fully established coordination process in place. Local sourcing offices in all relevant emerging economies give recommendations to category managers and get involved in synergy coordination.
STM 1	**Planning of PSM Career Paths**	No clear career paths within PSM departments. PSM regarded as a dead-end job without job rotation within or in-and-out of PSM.	Career paths partly defined. Purchasing is an unpopular option for high potentials. People tend to stay in PSM for a long time – both in strategic and transactional PSM. Careers show that development inside PSM is possible but no outside perspective.	Clearly defined career paths within PSM and rotating into other functions. Previous job in strategic PSM is enabler for any senior management promotion. Controlled balance between recruiting externally and developing internal leaders. PSM careers typically proceed within 5 years.
STM 2	**Talent Development and Training**	No systematic PSM training and development program in place.	Some basic PSM trainings from internal experts focusing on tactical skills but advanced concepts and tools are not covered. No systematic determination of training requirements of staff.	Individually optimized training and development fully implemented. Broad spectrum of training available across all major aspects of PSM, conducted by internal and external experts. Individual and systematic determination of training needs.
STM 3	**Separation of Roles Between Strategic and Transactional Buyers**	No separation of strategic and transactional roles. Informal separation of roles exist but not according to individual talent or qualification.	Formal separation of strategic and transactional roles, but not fully implemented. Separation is based on seniority and not on talents or skills. No clear definition what constitute necessary skills and capabilities to become a strategic buyer.	Formal and lived separation of strategic and transactional roles. Clearly assigned tasks and responsibilities consistently applied throughout the organization according to individual skill levels. Clearly defined career paths based on talent and qualifications as opposed to seniority. Positive job history enables transactional buyers to take on strategic roles.
SPM1	**Target Setting Mechanics in PSM**	No meaningful, realistic targets in place.	Targets set neither truly challenging nor often seriously pursued. Inconsistent targets mainly focus on costs. Targets on other performance dimensions exist but secondary to cost savings. Targets mainly set by extrapolating past achievements.	Comprehensive set of challenging yet achievable targets set jointly developed by PSM, BU and senior management. Targets are balanced. Cost aspects and all qualitative aspects are included such as time, quality, innovation and risk. Cost targets follow a TCO approach.
SPM2	**Target Accountability Beyond PSM**	Savings targets not reflected in the performance targets of budget owners. No reflection of savings in budgets before or after realization.	Savings targets partly reflected in budgets and budget owners' incentives. Only a part of the targets broken down to budget owners and their individual performance targets. Savings achievements entered into financial planning only after the fact. Accountabilities not clear.	Budget owners and PSM made responsible for realization of targets upfront. Targets consistently cascaded down from top level to ultimate budget owners. Integrated in individual performance contracts. Savings targets included in financial planning, resulting in reduction of budgeted spend if realized
SPM3	**PSM Performance Tracking and Reporting**	No consistent tracking of financial or operational metrics. No actual data for prices and quantities.	Performance of major spend categories is tracked regularly, but not in real time. Performance tracking focuses on financial metrics. Periodic availability of prices and quantities. No continuous tracking of performance. Overall PSM performance reported to management.	Performance of all categories tracked systematically in near time. Tracking of financial and operational metrics. Actual data for prices and quantities available. PSM professionals have access to their latest personal performance. Performance reports are regularly discussed in performance reviews and dialogues.
SPM4	**Incentives and Individual Performance Management**	Little/no performance feedback to individuals. No performance-dependent pay, regardless of employee's true performance.	Individual performance tracked and discussed, but not directly linked to personal development. Individuals know their realized savings and receive regular performance dialogs. Performance-dependent pay not consistently applied to all PSM personnel.	Personal development and compensation linked to individual performance against KPIs. Individual and regular feedback on performance against KPIs and cost targets. Significant variable component based on performance for all PSM personnel. Stringent tracking of follow-up actions.