



Einkauf, Logistik und
Supply Chain Management

Hrsg.: Christopher Jahns

Michael A. Stolle

From Purchasing to Supply Management

A Study of the Benefits
and Critical Factors of Evolution
to Best Practice

GABLER EDITION WISSENSCHAFT

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Herausgegeben von
Professor Dr. Christopher Jahns

Die Schriftenreihe stellt den State-of-the-art betriebswirtschaftlicher Forschung am Supply Management Institute SMI™ im Bereich Einkauf, Logistik und Supply Chain Management dar. Die Verbindung von Theorie und Praxis steht dabei ebenso im Vordergrund wie die internationale Ausrichtung und die unmittelbare Verknüpfung der Themen Einkauf, Logistik und Supply Chain Management.

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With a foreword by Prof. Dr. Christopher Jahns

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Foreword

Supply management has received increased attention both in research and practice only recently. For decades, purchasing management was considered one of the least complex business functions. However, in a world of decreasing in-house value add in nearly all industries, it has become strategically critical for most companies to pay closer attention to purchasing spend. Many companies found that there is a lot more to have from suppliers than "the right goods at the right place at the right time".

Several researchers investigating the transition from traditional purchasing to strategic supply management found a discrepancy between the general discussion of strategic supply management and reality in most companies. Given the well-known examples of high-performing purchasing organizations and the myriade of books both by researchers and practitioners on what good practices in supply management look like, this is an interesting observation.

This dissertation investigates reasons for this discrepancy to help companies overcome the barriers of purchasing evolution. Michael Stolle combines organizational theories on organizational learning, resource-based view, and principal-agent conflicts to explain the challenges such a profound change of mindsets and culture presents. He develops a theoretical framework of purchasing evolution that shows the complex interactions of different driving factors that have to go together to make a successful transition possible. Finally, an interview-based empirical study is used to verify this framework empirically.

To research, this thesis is a significant contribution in two distinct ways: On the one hand, Michael Stolle is the first to present a comprehensive and empirically verified framework of purchasing evolution. Prior research has always been limited to either partial problems or conceptual frameworks only. On the other hand, the evaluation of interview-based survey data using Partial Least Squares structural equation modeling provides researchers across business research disciplines with an interesting alternative to questionnaire-based empirical research.

Practitioners who want to understand what it takes to make a real difference in their purchasing organization, will find this book particularly helpful. Michael Stolle describes the critical building blocks of successful supply management in detail. More important though, his empirical research shows how these building blocks

interact and influence each other. It becomes clear that implementation of individual "best practices" is not effective, maybe even impossible. Purchasing organizations have to go through a holistic evolution.

Univ.-Prof. Dr. Christopher Jahns

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First of all, I would like to thank Dr. Nicolas Reinecke with McKinsey & Company, Inc., for providing me with the unique opportunity to participate in this research effort as part of my professional career and for allowing to use the findings for my doctoral thesis. His practical experience, intellectual curiosity, and valuable guidance made this research effort possible and successful.

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Michael A. Stolle

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List of abbreviations

ADF	asymptotically distribution free
bn	billions
COGS	cost of goods sold
CPO	chief purchasing officer (or equivalent title)
EBIT	earnings before interest and tax
EBITDA	earnings before interest, tax, depreciation, and amortization
EDI	electronic data interchange
ERP	enterprise resource planning
e. g.	exempli gratia, for example
HR	human resources
IT	information technology
i. e.	id est, that is
ML	maximum likelihood
mn	millions
M&A	mergers and acquisitions
NA	North America
OEM	original equipment manufacturer
OLS	ordinal least squares
PLS	partial least squares
PSM	purchasing and supply management
RFx	request for x, e. g., proposal (RFP)
ROA	return on assets
ROI	return on investment
RoW	rest of world
SEM	structural equation modeling
TCO	total cost of ownership
TQM	total quality management
TRS	total return to shareholders
ULS	unweighted least squares
USD	U.S. dollars
VAF	variance accounted for
VIF	variance inflation factor
WLS	weighted least squares

1 Introduction

More than twenty years ago, Peter Kraljic wrote: "Purchasing must become supply management" (1983, p. 109). However, even today many companies have not come beyond early phases of this transformation from a purely tactical purchasing to strategic supply management (Jahns 2005, pp. 115-144). This research project will try to explain why so many companies face difficulties on this journey – and how those companies could speed up the evolution process to improve their performance output.

Business in most industries is characterized by growing competitive pressure and increasingly demanding customers. Besides reducing cost (Chapman *et al.* 1997, p. 31), the current situation forces companies to re-think their strategic priorities, re-structure their value chains, and speed up innovation and improvement processes (Burt *et al.* 2003, p. 95). This can only be achieved by focusing on core competencies (Prahalad and Hamel 1990, pp. 79-82) and cooperating closely with suppliers for non-core activities (Kannan and Tan 2003, pp. 472-473). The purchasing function – which has for many years only focused on administering orders and negotiating prices – has to step up to become the manager of this integration (Burt and Doyle 1994, p. 11; Das and Narasimhan 2000, p. 17). Some researchers have even identified supply (chain) management as "the new font of competitive advantage, and more and more CEOs want to bathe therein." (Quinn (1998, p. 38), see also Chapman *et al.* (1997, pp. 31-34), Spekman *et al.* (1999, p. 103), Eltantawy (2005, p. 1)). Every purchasing practitioner has heard about the names of leading companies in the area of supply management and their successful practices are well-documented in literature (e.g., Burt *et al.* (2003), Monczka *et al.* (2005b), Lyons and Farrington (2006)). So why have other companies not simply copied these practices?

1.1 Problem definition

There has been plenty of purchasing research literature focused very much on describing, categorizing, and empirically proving purchasing and supply management best practices (see chapter 2.1.1). Today, most purchasing practitioners have some picture of what the end state of strategic supply management could look like in terms of cooperative supplier partnerships, cross-functional involvement, or volume bundling. The reasons why many have not implemented these best practices

(Chapman *et al.* 1997, pp. 33-35) are certainly manifold. However, the literature review will show that there has been little research on how Chief Purchasing Officers or their equivalents (referred to as CPOs in the following) and Chief Executive Officers (CEOs) could make this transformation happen (see chapter 2.3). Therefore, practitioners might be lacking guidance on the way to supply management best practice, especially when the gap to best practice is too big for one leap.

1.1.1 Well-described "best practices" in research literature

Since the mid-80's, many researchers in the area of purchasing have published thoughts on the transformation from tactical purchasing to strategic supply management. It has probably been the single most investigated topic in this research domain over the last decades both conceptually (an overview of different evolution models will be given in chapter 2.2.2) and empirically (e.g., Anderson and Katz (1998), Carr and Pearson (1999; 2002), and Ellram, Zsidisin, Siferd, and Stanly (2002)). The high research interest also indicates the importance of the new concept of supply management for management practice. The "National Association of Purchasing Management" in the United States even changed its name to "Institute for Supply Management" after a poll among its members to reflect this profound change in mindsets (Jahns 2005, pp. 29-30).

Many articles and books discussing strategic supply management suggest to offer "best practice" advice (e.g., "Advanced Supply Management – The Best Practice Debate" by Cox and Hines (1997) or "Strategic Supplier Segmentation: The next "Best Practice" in Supply Chain Management" by Dyer, Cho, and Chu (1998)). A multitude of empirical studies has investigated associations between strategic purchasing practices and performance outcomes offering "best practices" in many areas of the purchasing field. Several studies (e.g., Vonderembse and Tracey (1999), Janda and Seshradi (2001), Sanchez-Rodriguez, Martinez-Lorente, and Clavel (2003)) investigated the link between specific purchasing management practices and performance. Others (e.g., Tan, Kannan, and Handfield (1998), Goh, Lau, and Neo (1999), Ellram *et al.* (2002)) followed a broader approach to investigate impact of purchasing best practices on performance overall across industries. Based on the research results and anecdotal evidence from leading companies like Toyota, IBM, or GE, probably no practitioner or researcher would doubt that it makes sense for any company to think about implementing strategic purchasing practices. One should expect that most companies have done so over the years and show a consistently high level of sophistication with regards to their supply management.

1.1.2 Many companies struggling with transformation

In a recent empirical study, Jahns (2005, pp. 141-144) clustered companies into supply management beginners, basics, and champions. Interestingly, only 16% of the survey participants fell into the cluster "supply management champions". More than 20 years after first publications on the challenge to evolve to strategic supply management noticed by a broader public (Kraljic 1983), this is very surprising. However, it is in line with experience in practice – even in industries with sophisticated purchasing functions such as Automotive – very few companies consistently perform on a advanced strategic purchasing practice level (Ellram and Pearson 1993). Chapman et al. (1997) quote a purchasing executive who said that his company is "stuck in first gear" (p. 35) because they are not able to overcome the internal barriers. This seems true for many companies across industries world-wide. Jahns (2005, pp. 7-10) even concluded that a management deficit in many companies may exist in implementing the change from purchasing to supply management.

But what could be the reasons that so many companies obviously struggle to implement strategic supply management although the benefits are generally well-known and accepted? There might be plenty reasons – and most of them at the same time, for example:

- (1) Low performers do not see the potential because they do not realize the gap to best practice (Ellram *et al.* 2002, p. 14) and the potential benefits.
- (2) Many CPOs miss guidance with regards to critical issues. It seems they have to improve everything so they pick some projects and get stuck with them.
- (3) Other functions are resistant to accept a strategic role of the purchasing function (Ellram and Pearson 1993, p. 4). They are afraid to lose power and flexibility in their supplier interactions.

These barriers certainly sound familiar for some practitioners and some of them have been mentioned in research literature before. However, the literature review did not reveal in-depth empirical studies on how to overcome these barriers holistically.

1.1.3 Little prior research on how to manage PSM evolution

In fact, the research on "How to make it to "best practice"?" has been largely limited to a number of descriptive models of different evolution stages (to name a few Reck and Long (1988), Freeman and Cavinato (1990), Burt and Doyle (1994)). However, those models cannot answer the questions how a company could step up from one level to the next, or whether it is possible to "jump" levels entirely.

In terms of empirical studies investigating the impact of purchasing practices on performance, most had a limited scope with regards to the purchasing practices investigated. Accordingly, the synergistic effect of a broader set of purchasing and supply management practices is rarely understood (this is also true for other management research areas, e.g., human resource management (Ahmad and Schroeder 2003, p. 21)). One of the broadest approaches to date was taken by Ellram et al. (2002) who measured the impact of 42 purchasing practices on TRS (total return to shareholders). Similar to other recent empirical studies (e.g., David, Hwang, Pei, and Reneau (1999), Morita and Uehara (2004)), they faced partly counter-intuitive results and concluded that traditional survey methodology might not be best-suited to measure complex organizational practices (Ellram *et al.* 2002 p. 14). Another limitation for many of the prior empirical studies is that they relied on subjective performance measurement only (e.g., Carr and Smeltzer (2000), Janda and Seshadri (2001), Sanchez-Rodriguez et al. (2003)). These limitations made it difficult for practitioners to conclude what areas they should really focus on to improve their performance.

The only empirical indication has been found by Das and Narasimhan (2000) who were able to show that purchasing competence as an overarching construct significantly determines purchasing performance outcomes. This implies that the capability to implement certain specific practices depends on the current situation of the purchasing function which, in turn, supports the hypothesis of a consistent evolution over time. However, the question what a Chief Purchasing Officer should mainly focus on to transform his or her function successfully, remains largely unanswered. On the contrary, this finding even questions (1) whether – from a research perspective - the results of other studies neglecting the overarching construct of purchasing competence were actually meaningful and (2) – from a practitioner perspective - whether a focus is possible at all.

Other studies have investigated general influencing factors on a strategic role of purchasing and its involvement in corporate decision making. For example, Johnson

et al. (2002) found that centralization of the purchasing organization fosters a strategic role of purchasing which again has a positive influence on purchasing involvement in internal teams and councils. However, the share of variance explained for purchasing's strategic role was at and below 15 percent so there seem to be plenty of other influencing factors apart from industry, firm size, and organizational structure which support or hinder an evolution to a strategic role of purchasing and supply management.

Some of these other influencing factors and barriers to the evolution to strategic supply management might not be related to "hard" issues such as structures, but could rather be found in the area of soft issues. For example, mindsets and aspirations of top management and senior executives in other functions, as well as mindsets and knowledge of purchasing professionals might influence the ability of a purchasing function to take on a strategic role. In a guest editorial in *Journal of Operations Management*, Samson and Whybark (1998) point to a major research gap in this area:

"Unfortunately, our knowledge of soft issues is primitive relative to that of hard issues. [...] Why is the success rate of [operations management] hardware implementations low? What explains the high variance in outcomes of these investments? Executives and some research studies are telling us the answer is operational soft issues. [...] A number of cross-sectional studies suggest that the explanatory power of the soft factors on performance, taken together, is an order of magnitude higher than achieved in many of the hardware studies [...]. [A type] of research we see growing, but still insufficient in operations management, are rigorous studies of real world data used to test hypotheses about connections between strategy, practices and performance in operations. Many of these empirical studies still focus on the 'hardware' aspects of operations such as technology, capacity, scale, focus, scheduling, inventory, and their impacts on performance, and ignore or under-emphasize the 'soft' issues related to people, teams, accountability, culture, motivation, and discipline." (pp. 3-4)

Accordingly, this research project will try to combine soft and hard issues in a quest to find answers to the question "What are the critical drivers of a purchasing evolution from a purely tactical function to strategic corporate value creation – and how should a Chief Purchasing Officer tackle such a transformation to be successful?" Especially the first question has been requested by other researchers before (Jahns 2005, pp. 10-11), the second is a logical next step once the first is accomplished.

1.2 Research objectives

"The fundamental goal of any researcher is to create knowledge." (Melnik and Handfield 1998, p. 311) In operations management research, most authors agree that the mission of research is twofold: On the one hand, research should contribute to the field as a scientific discipline, on the other hand it should generate knowledge valuable for managers in practice (Melnik and Handfield 1998, p. 312; Jahns 2005, pp. 15-17).

The practical relevance of the question how managers could overcome the hurdles of purchasing evolution towards supply management seems evident. But what could such a research effort add to the scientific discipline of operations management? As mentioned before, several researchers have tried to investigate a broader set of purchasing and supply management practices before and ended up with partly counterintuitive results (a detailed discussion of prior empirical studies is given in chapter 2.3.3). Accordingly, if this study followed down the same road of traditional survey methodology and first generation statistical evaluations again, the probability of success would be limited. It seems that a completely new approach to this question is necessary, both in the area of data collection and evaluation.

However, leaving the traditional methodological paths of knowledge generation in the field is also a risky venture. If researchers were really evaluated mainly based on whether what they do is right in terms of traditional thinking only, and "substance gives way to form" (Schmenner and Swink (1998, p. 100) quoting Kaplan), the author would have to be worried. There are plenty of areas where the approach of this study will differ from prior empirical studies. Yet, the author and his co-workers on this study are convinced that these differences all come with a good reason. Accordingly, the key objective of this study in terms of its contribution to management research is to introduce and discuss the survey approach taken. This book will try to show that, although the construct development, data collection approach, and evaluation concept differ significantly from a long tradition of research methodology, it fulfills the requirements of good scientific work and offers an alternative for future research not only in operations management, but in management science in general.

Content-wise, this study will try to provide answers, or at least initial insights as a starting point for further research, to three primary research questions:

- (1) Does an evolution from purchasing to supply management make sense across industries?

(2) If yes, why have so many companies not transformed their purchasing function and practices over the last decades?

(3) What are the critical drivers of PSM evolution a CPO has to focus on to finally make it happen?

Regarding the first question, there are both theoretical and empirical indications from prior literature. On the one hand, it has been argued based on resource-based view and its different sub streams that purchasing and supply management can indeed be a source of sustained competitive advantage (see chapter 3.1). On the other hand, several empirical studies found that an evolution of purchasing and supply management to a strategic role is indeed associated with higher company performance. However, these studies have been largely limited with regards to industry coverage, the scope of considered purchasing practices, and the selection of performance measures (see chapter 2.3). To address these gaps, this study will investigate the relationship between purchasing and supply management practices and a broad set of both subjective, self-reported and objective, financial performance measures in large companies across all industries on a global scale (see chapter 5).

The question of why so many companies have not evolved to the degree one could expect over the past decades is much more difficult to answer based on existing purchasing and supply management literature. Organizational learning literature emphasizes how difficult it is for complex organizations to change the direction they are heading in. However, such a complete change of mindsets seems necessary to initiate PSM evolution. The general discussion of organizational adaptation processes has interesting implications regarding how to initiate and sustain momentum in PSM evolution – and it questions the assumption that CPOs, and other managers, are able to assess their relative competitive position objectively. These considerations question whether traditional questionnaire-based surveys, based on self-assessment of the participants, could actually be misleading for such complex organizational practices.

The critical drivers of purchasing value creation and the evolution from tactical purchasing to strategic supply management have to be empirically explored. Several authors have developed purchasing evolution models before, describing the change of purchasing practices across different stages of this evolution (see chapter 2.2). Unfortunately, to our knowledge none of these models has ever been tested empirically to understand the inner workings in more detail. Past empirical studies suggested that plenty of different practices are associated with performance (see

chapter 2.3). However, the questions whether these effects are direct or indirect and how those practices are interrelated have not been investigated in a broader empirical study before. This study will apply principal agent theory to develop hypotheses on what areas of purchasing and supply management a CPO can actually manage and control, as opposed to others where his or her influence is at best an indirect one (see chapter 3.3).

This study will not focus on the value creation at the buyer-supplier interface. Design and implementation of cooperative supplier relationships and their value add has been in focus of several empirical and conceptual studies before (e.g., Noordewier et al. (1990), Stuart (1993), Spekman et al. (1998; 1999), Dyer et al. (1998; 2003), Carr and Pearson (1999; 2002), Shin et al. (2000), Tan et al. (2002), Benton and Maloni (2005), Cousins and Menguc (2006), Moser (2006)). However, internal evolution of purchasing to supply management and the integration with other functions has been less often empirically investigated in the past (see chapter 2.3.3). This is surprising as internal integration seems to act as a catalyst for effective external integration (Das *et al.* 2006, p. 577). Accordingly, the internal focus of this study complements the studies focusing on external integration by shedding light on the prerequisites of strategic supplier management.

1.3 Study outline

The structure of this book reflects the objective to develop a theoretically and empirically substantiated model of purchasing evolution drivers. It follows the classical structure for empirical research in management science (Corsten 2003, p. 55), comprising the steps problem definition (chapter 1), review of existing literature (chapter 2), development of theory-based propositions (chapter 3), discussion of the research framework (chapter 4), description of the survey methodology (chapters 5.1 and 5.2), and discussion of empirical results (chapter 5.3). Finally, implications of the entire study are summarized and discussed (chapter 6).

In chapter 1, it was argued that the understanding of the evolution from purchasing to supply management is limited both in theory and practice. Thus, three main research questions were developed to address these gaps.

The literature review in chapter 2 will consider a broad range of publications in the areas of purchasing and supply management literature. First, a more in-depth investigation of the current state of purchasing and supply management in theory and practice will support and clarify the research gap outlined in chapter 1. In a second

step, theoretical models of purchasing and supply management and its evolution are discussed. A third section of chapter 2 structures prior empirical studies on related topics and discusses the implications of the most influential ones.

Chapter 3 serves to broaden current thinking about PSM evolution based on general organizational theories and transfers from related fields of management research. Resource-based view, dynamic capabilities, and knowledge-based view support the assumption that purchasing and supply management could in fact be a source of sustained competitive advantage, and thus an investigation of PSM evolution is not only of interest to the research community, but relevant for top management across industries. To gain a better understanding of the inner workings of PSM evolution, this study draws on literature on organizational learning and change. It helps to understand potential barriers in the process of PSM evolution and offers initial indications on how to overcome them. Finally, principal-agent theory helps to model delegation processes within the PSM function to separate management and employee tasks and areas for effective management intervention.

Chapter 4 summarizes the earlier discussion in a new conceptual framework of PSM evolution. The variables of the model are discussed in detail, and hypotheses on their interrelations are developed based on the literature discussed before. It serves as a basis for the subsequent empirical study in chapter 5.

The empirical test of the suggested framework is partly different from most empirical studies before. It relies on an interview-based survey approach to collect data on purchasing practices in large companies. The empirical data is evaluated using a sequential process of controlling for noise and afterwards evaluating the hypothesized relationships. As this methodology differs from several traditional methodologies, the approach, and reasons why the research team chose it, are discussed in detail. Afterwards, the structural equation model is validated and results are discussed.

Chapter 6 integrates the insights from the study in a summary and discusses implications for both management research and management practice. Moreover, it shares some thoughts on limitations of this study and provides suggestions for further research.

2 A brief overview of the status quo in PSM evolution research

Before developing an own perspective on the inner workings of the evolution from purchasing to supply management, it seems important to understand the status quo in both research and practice. Accordingly, prior PSM literature will help to understand current knowledge about the phenomenon of PSM evolution, and current gaps to be addressed by this study.

2.1 Purchasing and supply management – Claim and reality

As discussed before, purchasing has in recent years received increased interest as a company function. The first subchapter will describe this evolution the discipline of purchasing and supply management has gone through, discuss its current status in practice, and define and differentiate important terms and concepts.

2.1.1 Historic review of purchasing and supply management in literature

Until late 1970s, purchasing was generally regarded a routine clerical or service function (Kraljic 1983, p. 109). Although some researchers requested a more prominent role of purchasing in corporate strategic planning (Farmer 1972), this call remained largely unheard in practice. Buyers focused on pure purchase prices and "the prevention of line shutdowns" (Dobler and Burt 1996, p. 7). The emphasis was on materials management, comprising inventory control, production control, subcontracting, stores, purchasing/procurement, transportation, and salvage (Pinkerton 2002, pp. 510-511). This focus on securing supply, especially in the 1970s, was partly due to supply shortages experienced, for example, during Vietnam War (Kaufmann 2002, p. 7; Monczka *et al.* 2005b, p. 23).

However, the pure focus on materials management proved insufficient for the new challenges companies faced in the early 1980s (Monczka *et al.* 2005b, p. 23). The global economic recession caused, among other influencing factors, by the oil embargos drove up materials costs. Companies changed their materials management behavior by reducing inventory levels to avoid the high cost of capital invested (Dobler and Burt 1996, pp. 7-8). In parallel, the world's largest firms started to aggressively extend their operations beyond their home markets. Global competition emerged, requiring new strategies, organizational structures, and

management techniques from those more and more multi-national companies (Kaufmann 2002, p. 8; Monczka *et al.* 2005b, p. 23). Purchasing had to broaden its focus from largely national activities to the world market to supply global operations.

Although the idea of managing suppliers according to their strategic importance for the company (Kraljic 1983) was not new, it was only in the early 1990s that more companies realized the importance of purchasing as a contributor to company success (Ellram and Pearson 1993). With their article about core competences, Prahalad and Hamel (1990) had made a whole generation of managers reconsider the degree of vertical integration at their companies. In the following years, many companies outsourced non-core activities aggressively, resulting in a significant increase in purchasing volumes (Dobler and Burt 1996, p. 8; Kaufmann 2002, p. 8). However, this reduction in vertical integration made companies more reliant on suppliers than ever before (Kannan and Tan 2003, p. 473). Japanese supplier management techniques, such as closely integrated keiretsus, seemed to be a promising way of dealing with this problem (Womack *et al.* 1990) but such purchasing and supply management practices required a complete change in mindsets and behaviors of the entire organization (Burt and Doyle 1994, p. 11). Moreover, those practices were partly bound to Asian culture and therefore not easily realizable for Western companies (Kaufmann 2002, p. 8). At that time, many senior managers realized that a transformation of their purchasing and supply management practices will be crucial to their company's success (Dobler and Burt 1996, p. 8; Monczka *et al.* 2005b, p. 24).

Although purchasing expenditure had always been a large share of total costs especially in manufacturing companies, it was only in the last decades that the share of external expenditure increased to around 50 percent and more in many industries (Dobler and Burt 1996, pp. 7-8; Chapman *et al.* 1997, p. 31; Jahns 2005, p. 121). This further increased the potential lever of purchasing cost reductions and cash flow optimization (Kaufmann 2001, pp. 2-4; Ellram and Liu 2002). If one assumed, for example, a share of 60 percent external expenditure and a gross margin of 5 percent for a company, a one percent material price reduction would have the same effect as a 10 percent increase in sales volume (Wildemann 2000, p. 2).

Today, global competition, especially from low-cost country producers, forces companies around the world to simultaneously reduce cost and innovate products to keep ahead of their competitors (Burt and Doyle 1994, p. 11; Monczka *et al.* 2005b, p. 24). Because of the reduced vertical integration in many companies, suppliers have to play a critical role in both cost reduction and innovation efforts (Kannan and

Tan 2003, pp. 472-473; Carter *et al.* 2005, p. 9). Thus, the purchasing function has to integrate suppliers and internal customers to foster exchange and collaboration (Dobler and Burt 1996, pp. 10-11). It becomes a source of not only cost savings but also of broader competitive advantage (Chapman *et al.* 1997, pp. 31-34). As Spekman *et al.* (1999, p. 103) put it: Purchasing has the chance "to shift from denominator management (i.e., a focus on cost reductions) to becoming a major contributor to the numerator – corporate revenue". Some authors even argue that traditional optimization within companies reaches natural limits, thereby providing the purchasing function with the opportunity to become the next big lever in cost reduction and value creation (Das and Narasimhan 2000, p. 17). To fill this new role, purchasing and supply management functions in leading companies have evolved to strategic managers of complex global supplier networks and key sparring partners of other functions such as engineering (Jahns 2005, pp. 45-46; Monczka *et al.* 2005b, p. 24).

2.1.2 Indication on the current status in practice

The prior subchapter indicated that purchasing practices have indeed changed significantly over the last decades in many companies across industries. However, there is some indication that not all companies have evolved consistently and many are stuck at the very beginning of this transformation process (Jahns 2005, p. 115-144). The question is: What is the average current level of purchasing practices in real world – and what is the spread? Or, as Carter and Narasimhan (1996, p. 20) phrased it: "Is purchasing really strategic?"

Some authors suggest that the purchasing function has already stepped up to a standing similar to marketing or accounting in many companies (Arnold *et al.* 1999, pp. 20-37). Based on a survey among more than 200 companies world-wide, A. T. Kearney (2004) reported that the share of purchasing organizations with explicit objectives in the area of strategic value creation has more than doubled from 28 percent in 1999 to 66 percent in 2004. Monczka *et al.* (2005b, p. 24) conclude that "...the reshaping of purchasing's role in the modern economy is underway."

However, there are also some studies questioning that the evolution from purchasing to supply management has already gotten very far. In 1999, Harland *et al.* described the discrepancy between claim and reality as follows:

"The desire on the part of some of its proponents for purchasing to be seen as strategic has not been supported in practice by the manner in which the function has been conducted or managed. On the one hand, skill levels have repeatedly been

found to languish at clerical levels, while the limitations of the transactional or buying mentality appear to prevent purchasing from breaking through to a level of strategic vision. Purchasing, it must be concluded, is naturally focused on the buying and acquisition process, which may itself be strategic. When attempts are made to lift it to the level of addressing the business context [...], it is found wanting." (p. 658)

But is this critical assessment still true? Based on the results of an empirical study by Johnson et al. which was later published in *Journal of Operations Management* (2002), Moody (2001, p. 18) came to a similar conclusion that "the purchasing function is caught in a gap between strategic intentions and tactical realities". In fact, the survey results showed that even for the highest-ranked indicator, involvement in outsourcing decisions, the mean score for purchasing involvement was only 3.46 on a Likert scale from 1 (none) to 5 (extensive). Already the mean of 2.84 for the second highest of the investigated practices, involvement in information systems planning, was below 3 which was described as "moderate" in the questionnaire. Other practices such as involvement in merger and acquisition projects or marketing planning were rated even lower with means of 2.05 and 2.01, respectively (Johnson et al. 2002, p. 82).

In a recent empirical study among large German and Swiss companies across industries, Jahns (2005, pp. 115-144) clustered the 180 participating companies by their use of 9 strategic purchasing practices into 3 groups. The strategic purchasing practices measured in this study comprised, for example, having a supply management vision developed and communicated, having e-procurement implemented, and having a human resource management program in place. Jahns (2005, pp. 138-144) differentiated the 3 groups by the number of implemented strategic purchasing practices: "Beginners" (0-3), "Basics" (4-6), and "Champions" (7-9). Interestingly, 35 percent of the participants had less than 4 of the 9 strategic purchasing practices implemented and thus fell into the cluster "Beginners". Only 16 percent of the participants could be grouped into the cluster "Champions" with 7 or more of the strategic purchasing practices implemented. These results imply that more than 80 percent of the companies are far from using best practice broadly in strategic purchasing and supply management. In fact, about a third of the companies in the sample have only a few basic strategic purchasing practices in place, if at all. These findings are in line with the self-assessment of the respondents: Only 29 percent of the participants felt that purchasing currently has a significant influence on corporate value creation in their company (Jahns 2005, p. 124). Jahns (2005, pp. 47-48) argues that European companies may be lagging behind in the purchasing transformation compared to their North-American peers. His findings generally

suggest that there is a large spread in the use of strategic purchasing practices of companies today.

There is further support from other regions of the world. For example, Chief Purchasing Officers of Japanese manufacturing companies rated their level of involvement in corporate strategic decision making, such as make-or-buy, mergers and acquisitions, or organizational structure decisions, 2.4 on average on a scale from 1 (lowest involvement) to 5 (highest involvement). This rating was by far lower than the average ratings of all other decision-making categories including restructuring the supplier system (3.8), strengthening the supplier system (3.7), total cost optimization (3.1), and supply chain integration (3.0) (Morita and Uehara 2004). These results also question the change of purchasing's perception towards strategic value contribution. For the US, the statement of consultants Chapman, Dempsey, Ramsdell, and Reopell nicely summarizes their experience from discussions with clients world-wide: Most companies are familiar with the "mantra (of strategic purchasing and supply management), but few have really seized on it." (Chapman *et al.* 1997, p. 33)

It seems that there is a large spread in the use of strategic purchasing practices in companies today. Most companies seem to be in the middle of a transition from purely tactical to strategic purchasing. This supports the relevance of the primary research questions discussed before: What does such an evolution look like? And what barriers do companies have to overcome in order to succeed?

2.1.3 Differentiation and definition of purchasing and supply management

So far, the term "purchasing and supply management" has been used in this study without clearly defining it. Both in literature and in practice, purchasing and supply management and related terms have been used differently in the past [for a discussion of different streams see Kaufmann (2001, pp. 36-37) or Jahns (2005, pp. 25-26)]. Accordingly, it seems important to clarify what is meant by purchasing and supply management and discuss related terms.

The first challenge in defining the term *purchasing* is obviously that "purchasing is a functional group (i.e., a formal entity on the organizational chart) as well as a functional activity (i.e., buying goods and services)." (Monczka *et al.* 2005b, p. 7) A functional group or function is "a unit or department in which people use specialized skills, knowledge and resources to perform specialized tasks." (Lysons and Gillingham 2003, p. 3) To distinguish the functional group from the functional activity, this study will refer to the functional purchasing group as "purchasing function". This

term encompasses not only staff in a central purchasing department but also purchasing professionals in other organizational units dealing mainly with transactional or strategic purchasing/supply management tasks and reporting directly or indirectly to a head of purchasing, Chief Purchasing Officer, or equivalent senior manager, also through dotted-line relationships. Thus, the purchasing function is not necessarily the same as the (corporate or business unit) purchasing department (Dobler and Burt 1996, p. 24)

Most authors define purchasing as a chain of activities. Mostly, it encompasses mainly transactional tasks like supplier identification, buying, negotiating, contracting, or expediting (Dobler and Burt 1996, p.37; Kaufmann 2001, p. 36; Monczka *et al.* 2005b, pp. 7-8) with a focus on administration of supply (Jahns 2005, pp. 26-27). Opposed to this, *supply management* is often seen as a comprehensive management concept (Jahns 2005, pp. 29-30). It describes all tasks related to the "...identification, acquisition, access, positioning, and management of resources the organization needs or potentially needs in the attainment of its strategic objectives." (Institute for Supply Management, www.ism.ws) Because of this contribution to corporate success, supply management – although it encompasses traditional purchasing activities (Dobler and Burt 1996, p. 37) – is argued to be strategic by nature (Burt and Doyle 1994, p. 11). As mentioned in the introduction, this description does not match reality in many, if not most, of the companies today (Jahns 2005, pp. 115-144).

Some authors do not differentiate purchasing and supply management but use it synonymously (Lysons and Gillingham 2003, p. 8). But even among those who do, there is no agreement on what supply management actually looks like in practice (Jahns 2005, pp. 25-26). There is some common ground, e.g., management of collaborative relationships with key suppliers (e.g., Monczka *et al.* (2005b, p. 8), Cox and Lamming (1997, pp. 26-27), Jahns (2005, p. 30)) but it seems that the term supply management keeps evolving along with the practices of leading companies in this field. Thus, Monczka *et al.* (2005b, p. 8) simply describe supply management "as a progressive and supercharged version of basic purchasing."

In fact, if supply management is really strategic by nature, i.e., able to generate sustained competitive advantage (Carr and Pearson 2002, p. 1036), this ambiguity of what it looks like and its evolution over time have to be inherent in its nature. If it was possible to describe supply management practices generating competitive advantage comprehensively and in detail, they would become imitable for other firms (Barney 1991, pp. 108-110; Ramsay 2001a; Mol 2003). Thus, to sustain an advantage,

leading firms have to continuously improve and innovate their supply management practices. These thoughts will be further elaborated in chapter 3.1 based on a discussion of resource-based view theory. However, already these ideas have one important implication for the definition of supply management: Any model describing supply management practices can only be a summary of temporary knowledge or beliefs – and will inevitably become outdated sooner or later. For this reason, the author suggests to think of supply management as 'the dynamic vision of strategic purchasing generating maximum value for the company'. Accordingly, supply management is "an ever-moving target" (Burt and Starling 2002, p. 95).

To discuss in more detail whether purchasing can really take a strategic role in the organization, it is obviously necessary to agree on the meaning of the word "strategic". It is used in different ways in literature (Mintzberg 1995). In this study, a strategy will be defined as an "intended course of action" (Lysons and Gillingham 2003, p. 94) for an organization to support corporate objectives. Accordingly, strategic management is concerned with the "formulation, implementation and evaluation of strategies designed to achieve the objectives of an enterprise and functions within that enterprise." (Lysons and Gillingham 2003, p. 94) The decisive aspect for purchasing and supply management is a holistic perspective on enterprise level as opposed to an optimization of specific lower level areas.

Carr and Pearson (2002, p. 1033) provide a good differentiation of a strategic and non-strategic purchasing function:

"The purchasing function can be described as non-strategic or strategic. A non-strategic purchasing function is clerical in nature, reactive to other functions, non-integrative and focuses on short-term issues. A purchasing function is strategic in nature when it is proactive with respect to the firm's goals, integrative and has a long-term focus. A firm's purchasing function may be operating at a non-strategic level or a strategic or somewhere in between."

The definition of supply management as a dynamic vision as opposed to a strategic purchasing function implies that all companies are embarked on a transformational journey from non-strategic purchasing to supply management (Carr and Pearson 2002, p. 1033) without ever being able to reach this final goal. To describe the changing behaviors on this continuum, this study will use the term "purchasing practices". Purchasing practices describe the observable – strategic and non-strategic – purchasing activities performed by companies in practice.

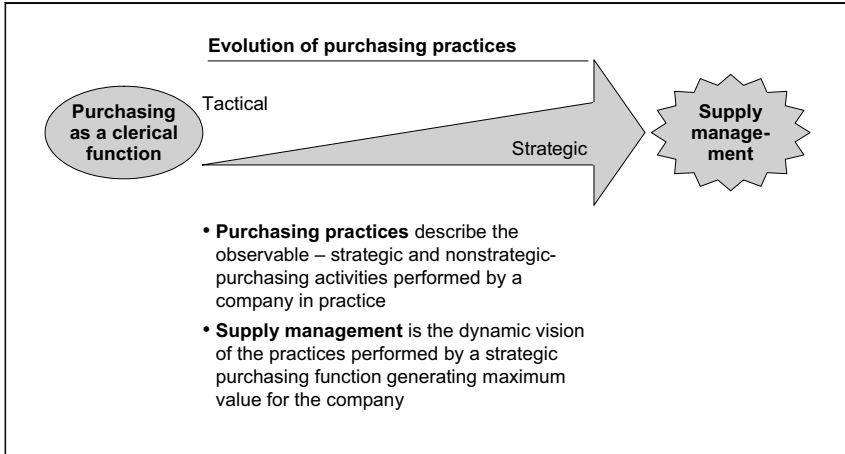


Figure 1 - The continuum from purchasing to supply management

When talking about purchasing and supply management, this study will only consider activities linked to the sourcing of materials, services, rights, and assets (Monczka *et al.* 2005b, p. 7), not of other resources like personnel. The reason for this limitation is that the latter inputs, e.g., recruiting personnel, are typically not handled by the purchasing function of a company (Kaufmann 2001, pp. 38-39).

Many authors additionally differentiate the term 'procurement' from 'purchasing' as an activity or process (Dobler and Burt 1996, p. 37; Lysons and Gillingham 2003, p. 7; Jahns 2005, p. 27). This study will follow Monczka, Trent, and Handfield (2005b, p. 8) who use these terms interchangeably. Dobler and Burt (1996, p. 37) define procurement as an intermediary stage in between transactional purchasing and strategic supply management. This concept is not significant under the assumption of a continuous transformation from purchasing to supply management, as opposed to the step-wise purchasing evolution models often suggested in literature. Accordingly, this study will refer to the most senior purchasing executive as Chief Purchasing Officer, although some companies use the abbreviation CPO for Chief Procurement Officer.

2.2 Theoretical models of purchasing evolution

Several authors have described the process of purchasing evolution, or the set of purchasing best practices for a strategic PSM function. The most influential of those models will be discussed in the following subchapter.

2.2.1 Prior purchasing evolution models in literature

There are a large number of evolution models describing different stages of purchasing development. The first and most influential was the one presented by Reck and Long (1988). Based on interviews in 15 different companies in the consumer and industrial products industry, they differentiated four stages of purchasing evolution: Passive, independent, supportive, and strategic purchasing (Reck and Long 1988, pp. 3-6).

Afterwards, several other authors suggested amendments to this model or developed alternative models. These later models reflect the progress of purchasing and supply management as a discipline. Table 1 gives an overview of models from different authors. Rozemeijer (2000, pp. 61-62) pointed to some similarities all these models have in common:

- (1) Integrated final stage: In the final stage of development, purchasing is integrated with other functions and business units. Line management and purchasing professionals cooperate in the development of purchasing strategies. Purchasing processes are organized around cross-functional teams.
- (2) Purchasing's organization status: Purchasing reporting level increases during the evolution as well as (in a business unit structure) the central coordination of purchasing activities.
- (3) Supplier management: The management of supplier relationships changes from reactive or opportunistic behavior to an approach of selective long-term partnerships where suppliers are closely integrated. In parallel, the number of relevant suppliers is reduced considerably.

	Passive	Independent	Supportive	Integrative
Definition	The purchasing function has no strategic direction and primarily reacts to the requests of other functions	The purchasing function adopts the latest purchasing techniques and practices, but its strategic direction is independent of the firm's competitive strategy	The purchasing function supports the firm's competitive strategy by adopting purchasing techniques and practices which strengthen the firm's competitive position	Purchasing's strategy is fully integrated into the firm's competitive strategy and constitutes part of an integrated effort among functional peers to formulate and implement a strategic plan
Characteristics	- High proportion of purchaser's time is spent on quick fix and routine operations - Purchasing function and individual performance are based on efficiency measures - Little interfunctional communication takes place because of purchasing's low visibility - Supplier selection is based on price and availability	- Performance is primarily based on cost reduction and efficiency measures - Coordination links are established between purchasing and technical disciplines - Top management recognizes the importance of professional development - Top management recognizes the opportunities in purchasing for contributing to profitability	- Purchasers are included in sales proposal teams - Suppliers are considered a resource which is carefully selected and motivated - People are considered a resource with emphasis on experience, motivation, and attitude - Markets, products, and suppliers are continuously monitored and analyzed	- Cross-functional training of purchasing professionals executives is made available - Permanent lines of communication are established among other functional areas - Permanent development focuses on strategic elements of the competitive strategy - Purchasing performance is measured in terms of contributions to the firm's success

Figure 2 - Purchasing evolution model by Reck and Long

(Source: Adapted from Reck and Long (1988, p. 4))

Besides these commonalities in describing the evolution from purchasing to supply management, most of the models share the following measurement dimensions (Rozemeijer 2000, pp. 62-63): Top management commitment, functional leadership style, purchasing strategy development, purchasing activities, supplier management, organizational structure, people management, performance measurement, and systems infrastructure. These content items will – among others – be integrated into the model used for empirical investigation of purchasing evolution drivers in this study. They will be discussed in more detail in chapter 4.

What can these models, because of the pure number of models apparently perceived as very insightful by researchers, tell practitioners for the management of such an evolution? Burt and Starling introduce their evolution model as a "road map for implementing World Class Supply ManagementSM" (Burt and Starling 2002, p. 96).

The question is whether companies have to follow these roads or whether there are shortcuts. For example, does the reporting level of purchasing really have to change

at least three times during the evolution from purchasing to supply management? Is it helpful for a CPO at the beginning of the transformation to tell him or her that instead of processing paper work, his organization should develop a transactional focus? It seems that such a model is indeed helpful in assessing the status quo (Burt and Starling 2002, p. 95) but not sufficient as a road map to design an improvement program. Jones criticized them to be "non-operational" (Lysons and Gillingham 2003, p. 9). Such evolution models merely describe different points in time of an evolution from purchasing to supply management. What seems to be largely missing are the roads and vehicles to get from one point to the other. Moreover, the selection of measurement variables may – at best - not be comprehensive, if not partly arbitrary (Lysons and Gillingham 2003, p. 9) as they miss empirical validation.

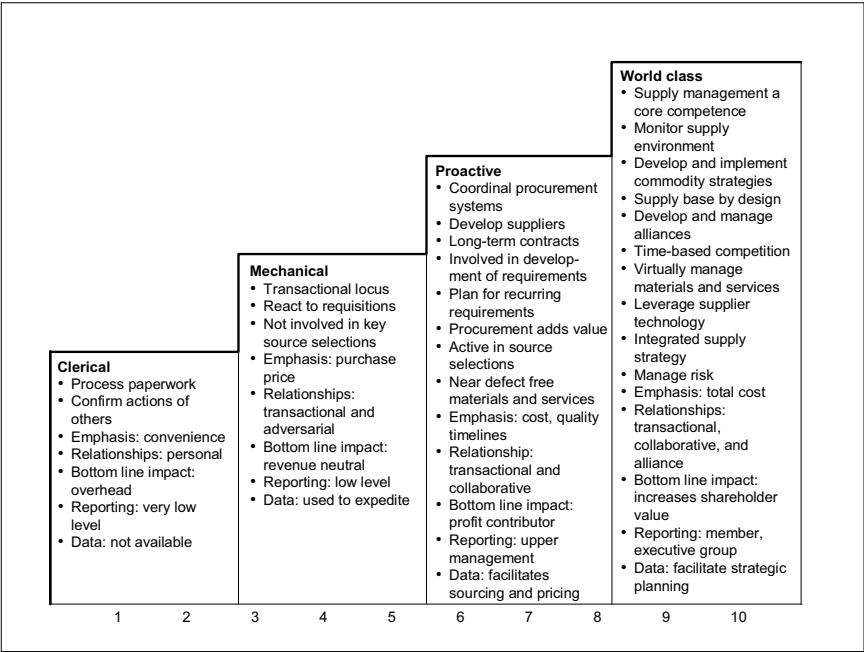


Figure 3 - Purchasing evolution model by Burt and Starling
(Source: Burt and Starling (2002, p. 96))

From a dynamic capabilities perspective (see chapter 3.1), all these models could be criticized not to describe sources of sustained competitive advantage. They try to describe best practices. Intuitively, if it was possible to describe the sources of sustained competitive advantage leading companies enjoy, competitors could easily

copy their behavior so that the competitive advantage could not be sustained (see Eisenhardt and Martin (2000, pp. 1108-1110) for a discussion why dynamic capabilities cannot be a source of sustained competitive advantage in mature markets). Descriptive models of strategic purchasing and supply management will therefore inevitably become outdated as both leaders as well as followers develop further in their processes, strategies, and capabilities. Sustained competitive advantage can only be generated by building these capabilities faster and using them sooner than the competition to create a continuous "series of temporary advantages" (Eisenhardt and Martin 2000, p. 1117) For this reason, the empirical measurement model developed in this study will not be positioned as a theoretical framework but only as a temporary measurement scale to show the inner workings of an evolution from tactical purchasing to strategic supply management.

2.2.2 Models of purchasing and supply management in literature

To date, there is no common agreement on a theoretical paradigm of purchasing and supply management. Similar to strategic management, the field seems to be too complex and eclectic as a research field to fit one common paradigm (Jahns 2005, p. 52). However, several authors have made significant contributions to the development of theory in the area of supply management. The most influential models will be discussed in the following subchapter.

The "Supply Management Value Chain" developed by Kaufmann (2002) is based on Porter's concept of the value chain (Porter 1991; 1998a). It contributes the differentiation of cross-transactional enabling or support processes and transaction-specific core or primary processes in supply management. "Support processes create the supply management system of an organization and primary processes make use of this system." (Kaufmann 2002, p. 13).

Porter's work is based on the assumption that mainly external factors determine the behavior of a company (Porter 1998b; 1998a). It seems that Kaufmann implicitly adopts Porter's assumption, as he restricts his framework largely to visible and concrete processes of supply management to deal with challenges to supply management itself.

However, this assumption in Porter's models has been challenged by authors arguing for a the resource based view theory (Barney 1991, pp. 99-100). They believe that internal resources are key drivers of corporate success (Wernerfelt 1984). Informal processes and organizational capabilities could be a source of sustained competitive advantage because they are difficult to imitate by competitors (Teece *et al.* 1997). If

this was true, Kaufmann's model could potentially miss out on important "soft" factors such as people's mindsets and individual and collective knowledge, relationships to other functions, or power of the purchasing organization. This impression is further supported by the fact that Kaufmann states "Managing Human Resources" as one of the 7 enabling processes but limits his description in the text to the statement that it "does in general not differ significantly from common human resource management." (Kaufmann 2002, p. 22) The only area he explicitly mentions as a gap that needs improvement is the mutual cooperation between companies and universities in the area of purchasing and supply management research (Kaufmann 2002, pp. 22-23).

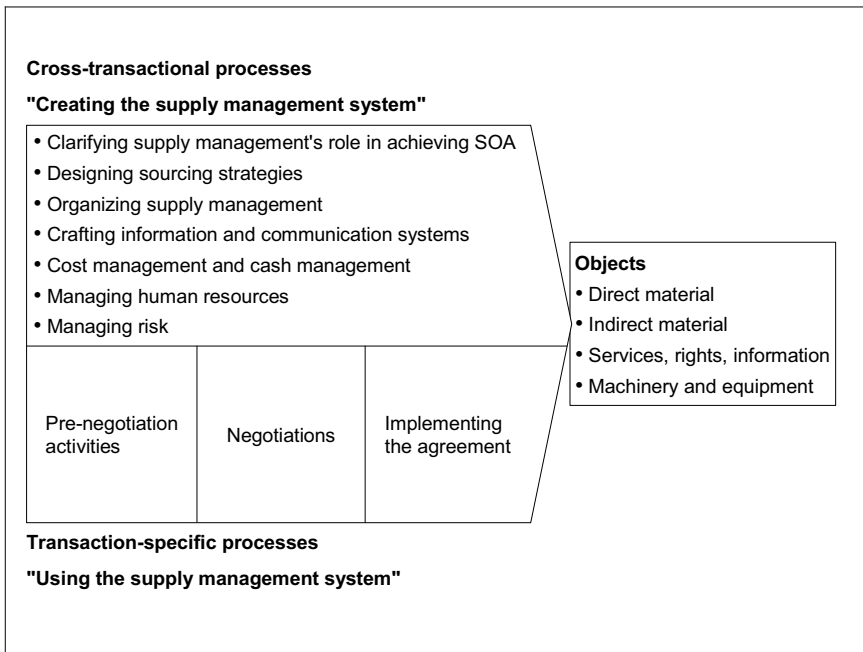


Figure 4 - Supply Management Value Chain by Kaufmann
 (Source: Kaufmann (2002, p. 13))

Jahns (2005) provided a systematization of supply management based on the general systems theory. The main contribution of his "Supply Management Navigator" is the transfer of established and relevant concepts, e.g., human resource management, from other management disciplines to the area of supply management which had been largely out of scope for practitioners before (Jahns 2005, p. 68). Conceptually, his work is based on the "St. Galler Management Navigator" which

introduced the differentiation of management processes, business processes, and support processes (Müller-Stewens and Lechner 2005). Jahns (2005, pp. 69-75) differentiates 8 "management modules", 1 "core module" called "purchasing and performance management", and 5 "support modules".

Thus, the Supply Management Navigator provides Chief Purchasing Officers and equivalent purchasing managers with a comprehensive map and structure of relevant areas they have to manage.

Influenced by his systems theory perspective, Jahns (2005, p. 61) models supply management as a subsystem of an organization defined by the difference to its environment inside and outside the company. Each subsystem follows idiosyncratic, sometimes conflicting objectives to fulfill its role for the overall system. This is also true for the different modules of the Supply Management Navigator. Systems theory explicitly allows (temporary) conflicting behavior of different subsystems, thus defining a specific impact potential of every module. Overall systems performance is therefore a combined outcome of individual effects (Jahns 2005, p. 111-112). This implies empirical measurability of the impact potential of specific subsystems from a theoretical perspective.

Jahns emphasizes the stand-alone character of supply management as a part of the organization developing and implementing a supply vision and supply strategies. This was a helpful perspective to make Chief Purchasing Officers more self-confident and aware of their potential entrepreneurial degrees of freedom, especially given the generally low status of purchasing, Jahns (2005, pp. 124-126) found in his empirical study (see chapter 2.1.2). However, this definition of supply management implied a clear separation between supply management and other company subsystems. Supply management is defined by its relations to external suppliers and internal customers (Jahns 2005, pp. 63-67). Explicitly, Jahns sees internal customers as "Bedarfsträger" (p. 66), requirements, whose demand has to be supplied by the purchasing function. Accordingly, Jahns suggested to introduce "supply key account managers" (2005, pp. 213-231) to manage internal customers. The question is whether such a structure would foster cross-functional collaboration mentioned as a critical factor in strategic purchasing value creation by many authors (for example Burt and Soukup (1985), Ellram and Pearson (1993), Giunipero and Vogt (1997)). This integrative role of purchasing and supply management as a mediator between suppliers and other company functions such as research and development, manufacturing, or marketing and sales is not explicitly covered in the Supply Management Navigator.

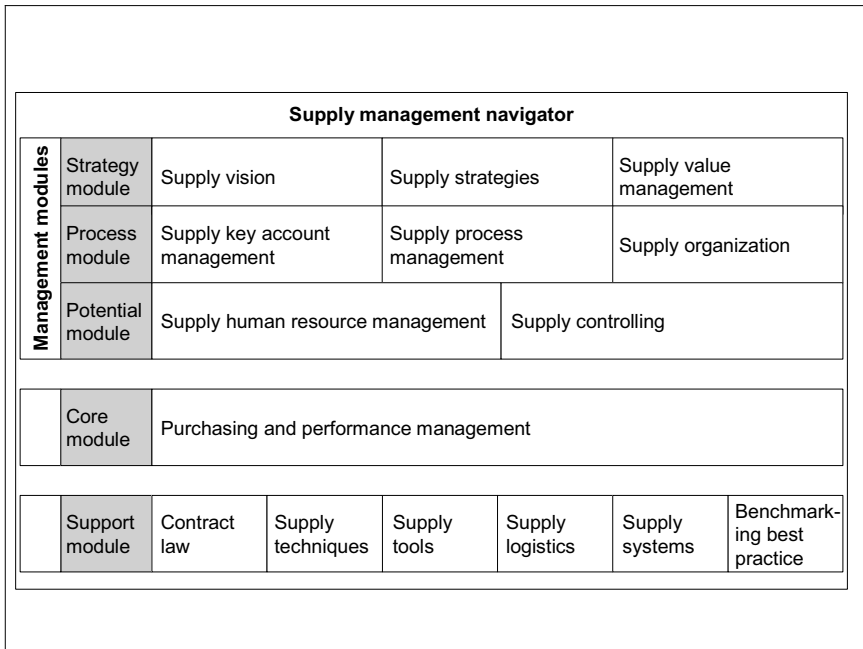


Figure 5 - Supply Management Navigator by Jahns

(Source: Adapted from Jahns (2005, p. 70))

The Supply Management Navigator has been empirically tested to an extent that Jahns asked Chief Procurement Officers of Swiss and German companies about the expected importance of the different modules in 5 years time (Jahns 2005, pp. 115-144). It is interesting to see that 18 percent of the participants did not feel that supply key account management will be important in the near future. Similarly, 16 percent do not believe in the importance of supply human resource management (Jahns 2005, p. 136). It seems that some of the modules are controversial in the supply management community. That's why Jahns (2005, p. 370) explicitly requested further research on the performance impact of the different modules of Supply Management Navigator.

A framework of purchasing and supply (chain) management especially emphasizing soft enablers is the one presented by Monczka, Trent, and Handfield (2005b, pp. 16-20). Based on observations and beliefs of practitioners rather than conclusions from management theory, they identified human resources, organizational design,

information technology, and measurement as important enabling capabilities for superior performance:

"What separates organizations that achieve real benefits from those that fail to reap any benefits is a commitment to the four enablers of purchasing and supply chain excellence. These enablers provide the support that makes the development of progressive strategies and approaches possible." (p. 16)

Accordingly, they call their framework "Four Pillars of Purchasing and Supply Chain Excellence". The main contribution of this framework is the hypothesis that business requirements and guiding principles (modeled as "I.") are "the foundation of all supply chain activities" and influence both enabling capabilities ("II.") and proactive strategies ("III."). These business requirements and guiding principles determine the general mindset of purchasing and supply management professionals. Most of the examples given by Monczka et al. (2005b, pp. 16-17), e.g., total quality management, supply chain integration, or total cost management, are relatively young supply management concepts. Many companies have not even implemented those concepts today (Jahns 2005, pp. 132-133). This implies that those principles will most likely differ in practice, giving leading companies a competitive advantage (Barney 1991), and change over time (Teece *et al.* 1997).

Implicitly, the "Four Pillars of Purchasing and Supply Chain Excellence" framework is based on the resource based view theory (Wernerfelt 1984; Barney 1991). However, it has to be criticized for not making this theoretical foundation explicit. Such a discussion could have provided the framework with additional depth and credibility. Moreover, the effectiveness of this framework has – just like the other two discussed before – not been validated empirically.

For this study, these three frameworks systemizing purchasing and supply management practices provide a very valuable basis for the development of a comprehensive set of PSM practices. These practices are supposed to be validated empirically with regards to their impact on performance, as requested by Jahns (2005, p. 370).

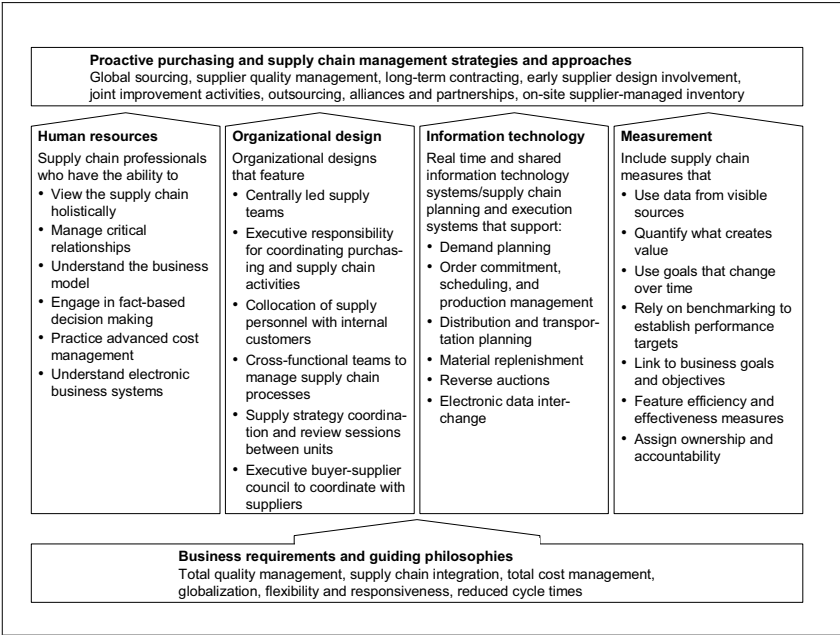


Figure 6 - Four Pillars of Purchasing and Supply Chain Excellence by Monczka, Trent, and Handfield (Source: Monczka et al. (2005b, p. 17))

2.3 Empirical evidence on the benefits of PSM evolution

A vast number of empirical studies on the impact of purchasing and supply management practices on corporate performance have been published. These studies will be systematized and selectively discussed in the following chapter. On the one hand, this review of prior studies could help to come up with initial propositions for a research framework for this study. On the other hand, it will provide the reader with an understanding of the current state of research.

2.3.1 Systematization of studies

Some studies focused on the impact of specific purchasing and supply management practices on performance, e.g., the impact of supplier selection criteria and involvement (Spekman *et al.* 1998; Vonderembse and Tracey 1999; Shin *et al.* 2000; Michael and Tan 2001; Kannan and Tan 2003), the alignment of purchasing strategy with corporate strategy (Narasimhan and Carter 1998) or benchmarking of the

purchasing function (Sanchez-Rodriguez *et al.* 2003). These empirical studies produce very insightful results. The implications relevant for both practitioners and researchers will be considered in the construction of the empirical measurement scales for this study. However, it remains unclear whether the impact on performance shown by these studies is not in reality an effect of other purchasing practices and capabilities outside the scope of the respective models. Thus, because of their limited scope, they cannot contribute significantly to the main research question of this study: How does an evolution from tactical to strategic purchasing influence corporate performance?

This is also true for a second set of empirical studies. These studies (e.g., De Toni and Nassimbeni (1999), Hult, Ketchen, and Nicolas (2000), Janda and Seshadri (2001), Sharland, Eltantawy, and Giunipero (2003)) focused on tactical objectives of purchasing, such as increasing productivity or reducing inventory and cycle time, instead of broader business performance. Their results show to what extent the use of specific purchasing practices effectively improves purchasing performance. Accordingly, results from these studies will also be considered when developing empirical constructs for this study. However, because of their limited focus on purchasing performance measures, such studies cannot answer the question whether an evolution from tactical purchasing to supply management improves corporate performance.

There is a third stream of empirical research studies this study is founded on and legitimated by. These studies try to investigate the impact of purchasing and supply management practices on corporate performance based on a broad scope in both performance measures and practice constructs. The most influential and recent of these will be discussed in more detail in the following subchapter. Before going into detail for the individual studies, the discussion has to be structured along some distinguishing characteristics.

There are three important differentiating factors: Evaluation approach, content scope in terms of PSM practices covered, and the performance measurement data used (objective versus subjective). Figure 7 classifies the most relevant empirical studies along these three dimensions.

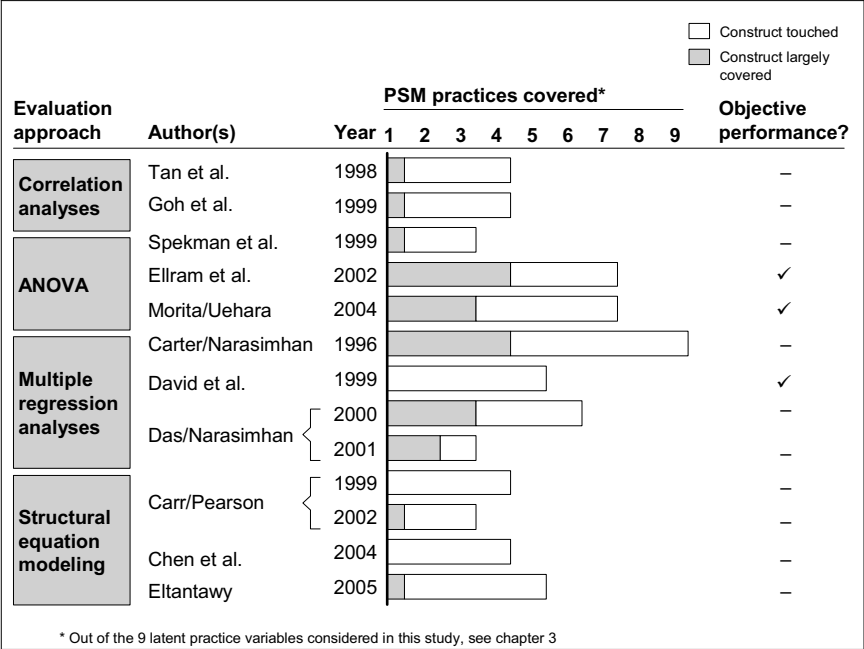


Figure 7 - Overview of selected prior empirical studies

It shows that in terms of content scope, the oldest study of the entire set by Carter and Narasimhan (1996) took the broadest approach to date, at least touching on all of the practice constructs that will also be considered in this study later on. However, most of the studies were largely focused on one or two core areas. Performance measurement was mostly done using subjective performance data. Only three studies (David *et al.* 1999; Ellram *et al.* 2002; Morita and Uehara 2004) evaluated a link to objective financial performance. Finally, in terms of the evaluation approach, the statistical methodology used ranged from simple bivariate correlations (Tan *et al.* 1998; Goh *et al.* 1999), over ANOVA (Spekman *et al.* 1999; Ellram *et al.* 2002; Morita and Uehara 2004) and multiple regression (Carter and Narasimhan 1996; David *et al.* 1999; Das and Narasimhan 2000; Narasimhan and Das 2001) to structural equation modeling (Carr and Pearson 1999; 2002; Chen and Paulraj 2004; Eltantawy 2005). Leaving aside the studies using objective performance data, there seems to be a general evolution towards more sophisticated statistical evaluation methods. This observation is in line with a general trend towards structural equation modeling in operations management research (Shah and Meyer Goldstein 2006, p. 148).

Accordingly, structuring the discussion of empirical studies along the statistical evaluation methods used seems to reflect the progress in empirical insights into the nature of PSM practices' influence on company performance best.

2.3.2 Empirical studies using first generation evaluation methods

As mentioned before, the studies by Tan, Kannan, and Handfield (1998) and Goh, Lau, and Neo (1999) investigated PSM best practices by running simple correlation analyses. The work of Tan et al. (1998) was a survey with 313 participants on vice president level from medium-sized companies across industries. They found significant bivariate correlations between several of the ten purchasing practices and nine self-reported firm performance measures investigated. Although the evaluation method may sound oversimplified, their results show an interesting phenomenon experienced by many of their colleagues (e.g., Ellram et al. (2002)) in later studies:

Purchasing practices	Performance measures								
	Market share	Return on assets	Growth			Production costs	Customer service	Product quality	Competitive position
	Market share	Return on assets	Market share	Sales	ROA	Production costs	Customer service	Product quality	Competitive position
• Commodity teams set supplier goals	0.105	0.220*	0.184*	0.249*	0.244*	0.067*	0.114*	0.055	0.157*
• Decentralized purchasing	0.095	0.077	-0.006	0.055	0.010	-0.058	0.041	0.021	0.062
• Individual plants source low-volume, low-cost items	0.112	0.084	-0.027	-0.026	-0.024	-0.012	0.041	0.051	0.080
• Supplier certification – product	0.147*	0.136*	0.139*	0.146*	0.151*	0.041	0.213*	0.226*	0.219*
• Supplier certification – process	0.095	0.243*	0.139*	0.167*	0.210*	0.025	0.141*	0.185*	0.129*
• Use suppliers' technical support and test capabilities	0.057	0.126*	0.181*	0.193*	0.119*	0.113*	0.092*	0.098*	0.181*
• Visit supplier facilities regularly	0.274*	0.259*	0.247*	0.190*	0.212*	0.080	0.219*	0.210*	0.279*
• Notify supplier of new product designs	0.002	0.061*	-0.015	-0.011	0.080	-0.017	-0.115	-0.062	-0.083
• Share confidential information	0.165*	0.233*	0.211*	0.170*	0.206*	0.052	0.123*	0.102	0.188*
• Annual price negotiation on key items	0.147*	0.166*	0.160*	0.112*	0.126*	0.003	0.171*	0.168*	0.168*

* Significant at 0.05 level

Figure 8 - Correlation results found by Tan, Kannan, and Handfield
(Source: Adapted from Tan et al. (1998, p. 7))

Most of the correlations seem "randomly spread" across all performance measures, no clear patterns evolve. Moreover, the significant correlations are sometimes counter-intuitive, for example in the case of using suppliers' technical support which is positively correlated with production costs although "one would expect production costs to decrease" (Tan *et al.* 1998, p. 7). Thus, in reflection the main learning from this early study was that establishing empirically sound relationships between purchasing practices and corporate performance seems to be no simple task.

In 1999, Goh, Lau, and Neo surveyed 89 CEOs of Singaporean companies. Their research model describes a relationship between the CEO's perception of the importance of purchasing, the purchasing "practices" integration with other functions, purchasing-supplier partnerships, and involvement in team decisions, and (self-assessed) business performance. Goh et al. (1999) hypothesize that (1) the more important purchasing is perceived by the CEO, the greater the use of the three strategic purchasing practices and (2) the greater the use of the three purchasing practices, the better business performance.

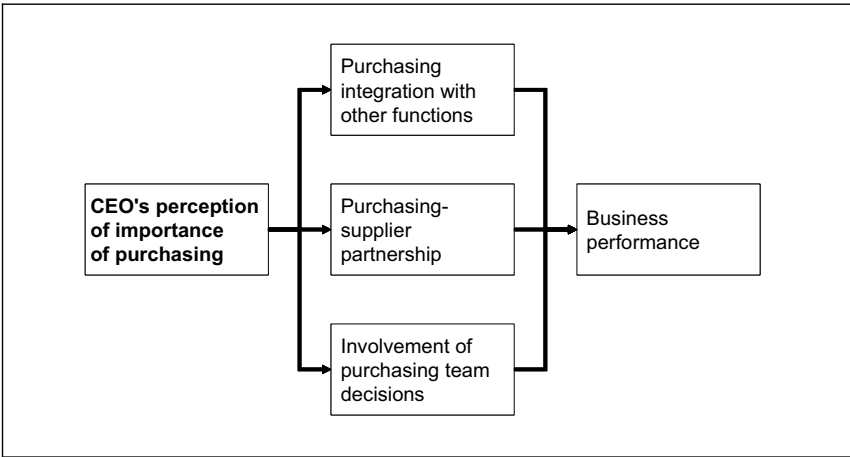


Figure 9 - Framework of strategic role of purchasing by Goh, Lau, and Neo
(Source: Adapted from Goh et al. (1999, p. 14))

To test these hypotheses, they use bivariate correlation analysis. The first hypothesis is only supported for the relationship between the CEO's perception and the use of purchasing-supplier partnerships. This is surprising as one would have expected that a higher perception by the CEO would not only improve the self-confidence of purchasing managers but also the willingness of other functions to have purchasing

participate in team decisions. On the other hand, the association between purchasing practices and corporate performance is significant for all three constructs. Goh et al. conclude that "pursuing close knit supplier partnerships, involving purchasing extensively in team decision making, and encouraging the purchasing function's integration with other corporate functions can lead to improved business performance." (1999, p. 19) However, this would require a change in the attitude of purchasing managers as well as top management. Although this latter statement is only weakly supported by the data, this aspect can be seen as a major contribution of this study.

A second popular evaluation method was the comparison of significant inter-group differences by ANOVA analyses (Field 2005 chapter 8). Ellram, Zsidisin, Siferd, and Stanly (2002) as well as Morita and Uehara (2004) took this approach to find differences in PSM practices among companies showing low, medium, or high performance in terms of objective company financials. However, an earlier study also chose this evaluation method based on subjective performance measures. Spekman, Kamauff, and Spear (1999) used a paper-based survey to investigate supply chain practices in 22 complex supply chains across industries, resulting in 160 survey participants. They did not only approach buyers or sellers, but all companies across the entire value chain of a focal firm, so their sample covered both buyers and sellers. The authors divided participants into low and high performers based on their self-assessed customer-oriented performance comprising the indicators contribution margin improvement, customer satisfaction, value added, customer value, and increased account penetration. This pure focus on revenue-enhancing performance measures is questionable because in an earlier publication based on the same data set, the authors found that buyers are skeptical about the benefits of close supplier relationships and therefore tend to emphasize cost-related targets over revenue-enhancing effects (Spekman *et al.* 1998, p. 647). Spekman et al. (1999, p. 109) argue that "focusing on revenue enhancing factors permit the most robust evaluation of performance since fewer supply chains attempt to gather such information". However, this implies that survey participants could simply rate themselves similar in practices and performance, simply because most of them do not know their actual performance in those areas, let alone relative to others. From this perspective, it is hardly surprising that the authors found highly significant differences between low and high performers for nearly all the supply chain management practices considered in their study. Opposed to this, later studies following a similar approach but relying on objective performance data found no consistent differences.

Ellram et al. (2002) tried to validate best practice beliefs in purchasing and supply management. They also investigated differences in the purchasing behavior of companies at different performance levels, but in terms of objective performance measured by total return to shareholders. They collected 246 responses to a mail survey from participants in the U.S., primarily at vice president and director level across industries. In its scope, this study was similar to Carter and Narasimhan (1996) as it tried to investigate strategic purchasing practices holistically. Many interesting findings emerged. Compared to medium performers, low performing companies were statistically more likely to rate themselves as applying purchasing best practices. In fact, those low performers scored very similar to above-average performers in their perceived use of purchasing best practices. It remains unclear whether those companies are really leading-edge in purchasing and supply management, e.g., because they try to boost TRS aggressively or whether there is a gap between perception and reality. Differences in the implementation of "best practices" could be another possible explanation. The authors concluded that "this study reinforces the difficulty of trying to study the complex interactions among systems and outcomes using traditional survey methods alone." (2002, p. 14). Additionally, a broader set of objective performance measures was recommended for future studies.

Morita and Uehara (2004) collected 123 data sets from Japanese manufacturing companies and separated them into above- and below-performing companies regarding their average sales growth and average earnings growth before taxes for the years 1999 to 2001. However, they found most of the hypothesized differences between below- and above-average companies to be non-significant. The authors summarized that "although there were several areas that are commonly thought to improve the performance of a firm, this study does not provide any statistical evidence to support this thinking." (Morita and Uehara 2004, p. 18)

The first study that attempted to establish a causal link between strategic purchasing practices and firm's financial performance using multiple regression was published by Carter and Narasimhan (1996). Survey responses from 302 purchasing professionals at all hierarchy levels were used to develop strategic purchasing constructs and measure their influence on (self-reported) business performance. By conducting an exploratory factor analysis, the authors compressed the 26 strategic purchasing practice items to the following seven factors: Importance of the purchasing function, interaction with suppliers, level of interaction with other functional areas, human resource management, influence over suppliers, competitive focus, and purchasing organization and structure. To test the relative importance of those factors, Carter

and Narasimhan (1996) calculated a composite index of the firm's performance by compressing the various annual sales, market position, achievement of business goals, and market share of the company through an exploratory factor analysis. A subsequent multiple regression analysis showed interesting, partly counter-intuitive results. The seven factors accounted for more than 40 percent of the variance of the composite performance index, which, according to the factor analysis results, seems to be primarily influenced by the achievement of business goals such as total quality targets and customer satisfaction. The high share of variance explained might be due to the subjective character of this influential performance variable. However, all but one factor coefficient in the multiple regressions were significant at 0.05 levels. With beta coefficients of 0.41 and 0.32, importance of purchasing and human resource management seemed to be the most important drivers of composite performance. On the other hand, influence over suppliers and purchasing organization and structure showed a significant negative beta coefficient. Influence over suppliers represents the ability of a purchasing function to exert power over suppliers, the existence of close supplier relationships and the availability of supplier information. Purchasing organization and structure is made up of the items degree of decentralization, purchasing involvement in manufacturing, degree of assigned responsibility for total quality management and customer satisfaction to purchasing, and the degree of risk sharing with suppliers. While the negative beta coefficient certainly comes unexpectedly for the first construct, Carter and Narasimhan argue for the second that "a significant degree of centralized control" (1996, pp. 24-25) might help to improve purchasing's contribution to firm performance. The authors conclude from their results that purchasing can indeed have a major strategic impact on the firm.

Another very insightful study using multiple regression analysis was published in 1999 by David, Hwang, Pei, and Reneau. David et al. (1999) investigated the impact of purchasing on return on assets through a meta study of CAPS benchmarking surveys from 1989 to 1996 across industries. The financial performance data was collected from COMPUSTAT database. This restricted the sample to publicly traded U.S. firms. The final sample consisted of 328 observations, i.e., different firms that had participated in the CAPS benchmarking studies were analyzed. Based on a seminal paper by Fisher (1997), the authors hypothesized that superior performance from purchasing management could only be generated if purchasing management strategy is aligned with the product strategy of the company. Purchasing management strategy was represented by the two organizational structures of the purchasing function (level of decentralization and amount of partnering with suppliers) and scope of purchasing activities (inter organizational integration through

EDI, scope of activities under the purchasing umbrella, share of professionals among purchasing staff). To make up for environmental influences, David et al. (1999) used control variables both on industry and company levels. In the multiple linear regression analysis performed, neither of these two constructs showed a significant direct influence on the dependent variable return on assets. However, when matched with the product strategy "product uniqueness", both purchasing management strategies are significantly associated with higher returns on assets. This implies that the purchasing activities investigated have to be tailored to the product market strategy. Interestingly, neither the purchasing efficiency nor inventory costs showed a significant link to firm performance. David et al. (1999) conclude that these traditional purchasing objectives seem to be secondary to the value creation potential of strategic purchasing activities, if aligned correctly to competitive strategy. This study was the first to establish a sound empirical link between strategic purchasing practices and an objective corporate performance measurement, namely return on assets. David et al. (2002) later extended these findings by showing that purchasing efficiency is more likely to appear in cost-focused, centralized than differentiation-focused, decentralized organizations.

Das and Narasimhan (2000) introduced the concept of purchasing competence. They found that this overarching construct summarizing purchasing practices of a company holistically is stronger as a driver of manufacturing performance than any of the individual purchasing practices. The latent construct purchasing competence was defined as "the capability to structure, develop, and manage the supply base in alignment with the manufacturing and business priorities of the firm." (Das and Narasimhan 2000, p. 18) From a wide range of possible purchasing practices, Das and Narasimhan considered four "that might be encountered in many purchasing environments" (2000, p. 18): Supply base optimization (later renamed to "parts bundling" based on the results of a confirmatory factor analysis), buyer-supplier relationship development, supplier capability audit, and purchasing integration. To test the construct, they implemented a mail survey among members of the National Association of Purchasing Management at manufacturing companies resulting in 322 usable responses. They conducted a second-order confirmatory factor analysis to validate the purchasing competence construct. They found all relationships between purchasing competence and the four purchasing practice constructs to be significant. In a linear regression analysis, purchasing competence explained 12 percent of the variance in aggregate manufacturing performance with a beta of 0.334. Opposed to this, the four purchasing practices collectively explained 14 percent of the variance in aggregate manufacturing performance in a multiple regression analysis with betas

between 0.078 (parts bundling) and 0.197 (purchasing integration). This supports the strong influence of purchasing competence as a latent overarching construct. The main contribution of the study by Das and Narasimhan was that an independent implementation of strategic purchasing practices "might not lead to best results (because of) a synergistic interrelationship among the factors" (2000, p. 24). Instead, significant inter-correlations, i.e., dependencies among practices, have to be considered when implementing strategic purchasing activities. Das and Narasimhan requested further research on "issues of order and sequence among the component factors of purchasing competence" (2000, p. 27) to better understand the process of building purchasing competence over time. However, it has to be noted that there is one systematic doubt one could have against the evaluation of Das and Narasimhan: Aggregating the four purchasing practices to one, purchasing competence, leads to a reduction in measurement error. Accordingly, an aggregated measure is always more likely to show significant and substantial results than individual variables. This effect has not been taken into account by the authors. It is unclear what impact considering this limitation would have had on the conclusion.

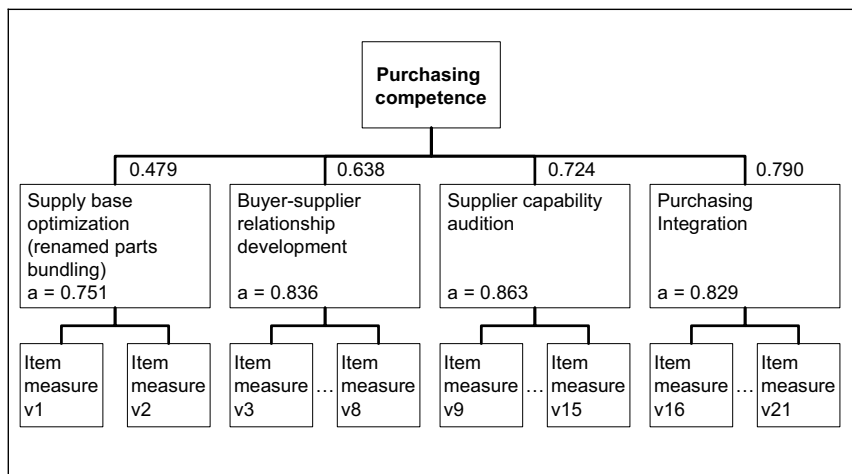


Figure 10 - Confirmation of purchasing competence construct by Das and Narasimhan
(Source: Adapted from Das and Narasimhan (2000, p. 22))

One year later, Narasimhan and Das (2001) published a second article based on the same data set. In this article, they explored the relationship between purchasing integration and supplier management practices (buyer-supplier relationship development, supply base leveraging, and supplier performance evaluation). From a

comparison of alternative statistical models, they concluded that purchasing integration has a moderator effect on the impact of supplier management practices on manufacturing performance. This study suggested that only a combination of externally and internally focused purchasing initiatives may be able "to elevate purchasing into a strategic function." (Narasimhan and Das 2001, p. 607). Purchasing integration, summarizing practices such as purchasing strategy alignment with corporate strategy, involvement in new product design and process improvements, and focus on corporate value creation, seems to be a prerequisite to capture the value from strategic supplier management and cooperative supplier relationships.

2.3.3 Empirical studies using structural equation modeling

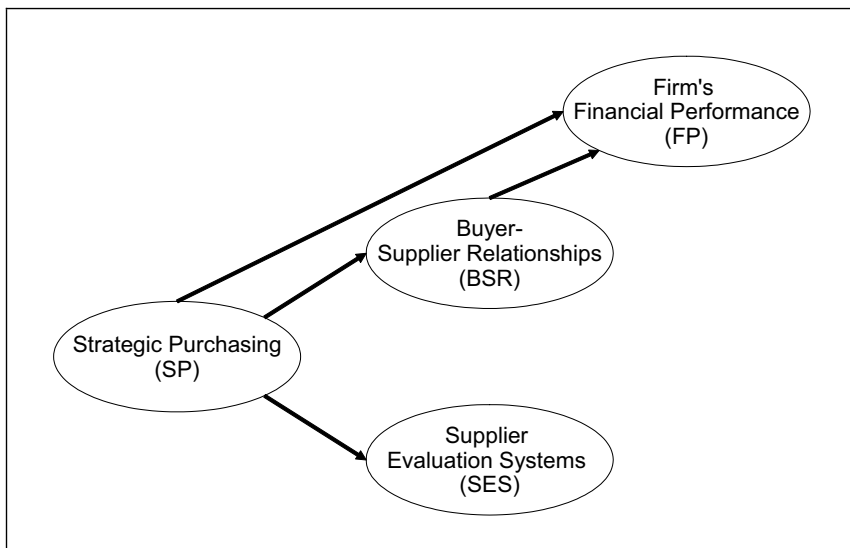


Figure 11 - Model of strategically managed buyer-supplier relationships by Carr and Pearson (Source: Carr and Pearson (1999, p. 502))

Carr and Pearson (1999) were the first to investigate more complex causal relationships using structural equation modeling. Based on transaction cost theory, they argued that a strategic purchasing approach would foster the implementation of supplier evaluation systems and initiate relationships with key suppliers. Both the strategic purchasing approach and close buyer-supplier relationships are

hypothesized to have a direct influence on (self-assessed) the firm's financial performance.

Based on data collected earlier (Carr and Smeltzer 1997), Carr and Pearson (1999) evaluated survey responses from 739 firms across a broad set of industries with respondents primarily at a director and vice president level. 45 percent of the respondents provided both a subjective evaluation of their firm's financial performance as well as objective data on return on investment. In 78 percent of the cases, the subjective assessment matched the objective data directionally. Although the authors argue that this indicates reasonable reliability, it implies that nearly a quarter of all self-assessments seemed at least questionable. In the data analysis, Carr and Pearson (1999) found no significant difference between the industries for "strategic purchasing" consisting of indicators measuring the implementation of long-range strategic planning in purchasing. This is surprising as "it was believed that firms in some industries place more emphasis on strategic purchasing." (Carr and Pearson 1999, p. 506)

To test the causal relationships, they used structural equation modeling. All the path coefficients in the structural model were positive and significant when considering the entire data set. Across industries, the authors found a significant direct and indirect effect of strategic purchasing on the firm's financial performance. This finding was a major contribution to the empirical research on this topic. However, it appears that the results of this study apply more to larger firms because for the majority of smaller firms most of the relationships in the model did not prove significant. Later, Carr and Pearson (2002) published a similar article showing the positive impact of purchasing and supplier involvement on strategic purchasing, and of strategic purchasing on firm performance based on structural equation modeling. As opposed to the first article, they argued based on a resource-based-view theory that strategic purchasing could create sustained competitive advantage.

Chen, Paulraj, and Lado (2004) added a new perspective to this field of research by applying dynamic capabilities theory to the supplier management processes at the inter-firm interface. They shed some light on the relationships between strategic purchasing, the management of close supplier relationships, customer responsiveness, and (self-reported) the firm's financial performance. Based on dynamic capabilities theory, Chen et al. hypothesize that "purchasing must facilitate the development and deployment of dynamic supply management capabilities for effectively managing supply-chain partnerships" (2004, p. 507). The mail survey administered to test the research model covered 221 participants from U.S.

manufacturing companies, primarily at a purchasing director level. The authors found that strategic purchasing, a construct focusing on purchasing's strategic planning activities and a mindset of corporate value contribution, significantly influences strategic supplier management, namely buyer-supplier communication, close relationships with a limited number of suppliers, and long-term orientation in buyer-supplier relationships. No significant relationship was found between the construct "limited number of suppliers" and customer responsiveness. This supports the dynamic capabilities view that merely reducing the number of suppliers to work with is a perfectly imitable approach and may therefore not be sufficient to create superior performance. Instead, it seems that it needs a "change in strategic behaviors (and mindset) conducive to fostering supply management capabilities, such as promoting open, two-way communication, and building trust and cooperation and adopting a long-term orientation with suppliers" (Chen *et al.* 2004, p. 518). Thus, Chen *et al.* (2004) were able to show that the generation of sustained competitive advantage at the buyer-supplier interface can be explained by the development and deployment of dynamic supply management capabilities.

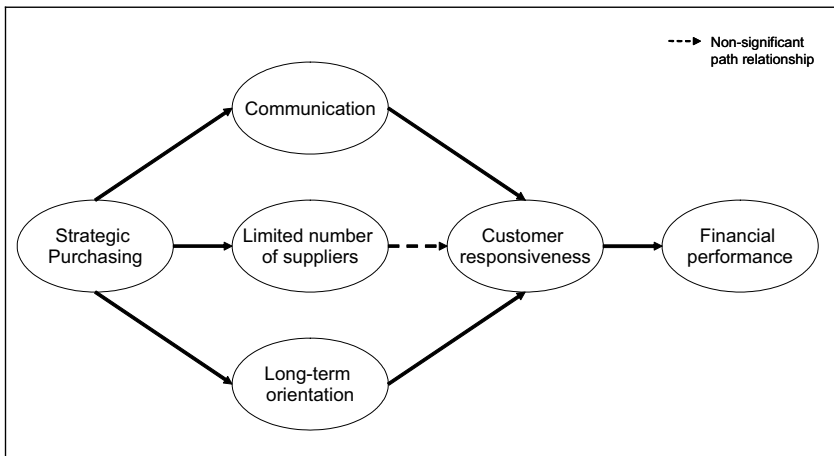


Figure 12 - Model of strategic purchasing and supply management by Chen, Paulraj, and Lado (Source: Adapted from Chen *et al.* (2004, p. 515))

Finally, Eltantawy (2005) took a similar theoretical perspective in his dissertation investigating the influence of strategic supply management skills on performance from a resource-based view. Based on data from a mail survey covering 152 respondents at director level or above, the author tested a structural equation model of strategic supply management skills, supply management function's perceived

status, supplier integration, and (subjective) supply management performance. The existence of a significant relationship between purchasing skills and financial performance had been established before (Carr and Smeltzer 2000). Although the structural equation model of Eltantawy (2005) shows a good fit with the data and 4 out of 5 hypotheses are supported at a significance level of 0.05, some of the cause-and-effect relationships seem questionable from a theoretical perspective. For example, the author hypothesized that a unidirectional cause-and-effect relationship exists between strategic supply management skills, supply management function's perceived status and supplier integration. A direct effect of supplier integration on supply management performance is assumed. From a resource-based view (e.g. Barney (1991)), the purchasing practices subsumed under supplier integration, e.g., strategic cost management and sharing of forecasting data with suppliers, does not seem difficult to imitate by competitors. Accordingly, the assumption that they are the primary source of sustained competitive advantage in purchasing and supply management seems odd. On the other hand, a team of qualified strategic purchasing professionals could "allow supply management professionals and suppliers to work together from product conception to final design" (Eltantawy 2005, p. 33) and, by doing this, generate sustained competitive advantage. This would rather imply a mediating or moderating role of strategic supply management skills in the model instead of causing supplier integration. Other authors, e.g., Carr and Pearson (2002), have modeled such an indirect influence of supplier integration on firm performance before.

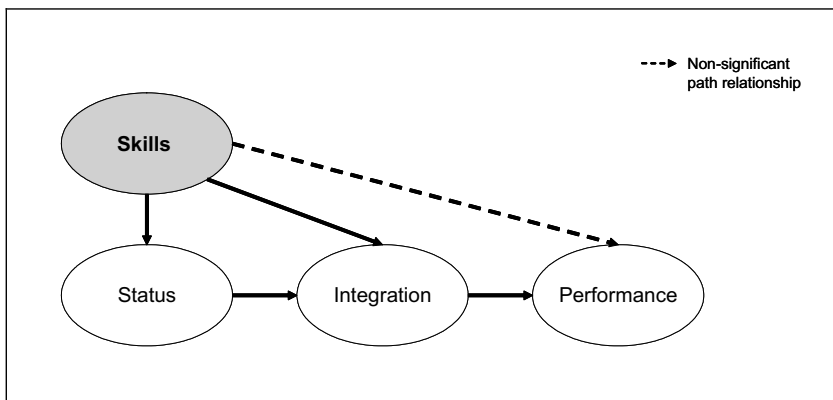


Figure 13 - Model of the impact of strategic skills by Eltantawy
(Source: Adapted from Eltantawy (2005, p. 66))

Several studies found significant associations between strategic purchasing and supply management practices and superior corporate performance (e.g., Carter and Narasimhan (1996), Goh et al. (1999), David et al. (1999)). Therefore, one can conclude that purchasing can make a strategic contribution to corporate performance in practice – and generates sustained competitive advantage in leading companies.

However, this review of recent empirical studies also shows that the "inner workings" of purchasing and supply management are far from being fully understood. 10 years ago, the study by Carter and Narasimhan (1996) indicated that mindsets of the organization and capabilities of purchasing professionals might be important drivers of purchasing performance. It is surprising to see that – except for some studies on the skills required to implement strategic purchasing practices (Carr and Smeltzer 2000; Giunipero and Pearcy 2000; Eltantawy 2005) – no researchers tried to explore the sources of purchasing competence (Das and Narasimhan 2000) in more detail. Current knowledge remains limited to the statement that a strategically managed purchasing function, acting in line with business and corporate objectives (David *et al.* 1999; 2002), is a prerequisite to being able to tap into the full potential of close supplier relationships (Narasimhan and Das 2001).

Last, it is interesting to note that most authors testing purchasing and supply management "best practices" against objective company performance experienced unexpected difficulties and found partly counter-intuitive results (Ellram *et al.* 2002; Morita and Uehara 2004). The authors questioned whether traditional mail survey methodology is best-suited to explore "the complex interactions between systems and outcomes" (Ellram *et al.* 2002, p. 14). Differences in implementation quality, e.g., caused by a different basic mindset might influence performance outcomes. Recently, a team of economics researchers successfully applied an interview-based approach to measure management practices (Bloom *et al.* 2005) which may be a way to cope with the problems reported. It will be discussed in more detail later on.

2.4 Interim summary

This literature review revealed that many researchers have investigated evolution from purchasing to supply management, explicitly or implicitly. Their contributions can serve as a basis for this study. However, several questions seem to remain unanswered.

First, purchasing evolution is modeled as a linear, stepwise process. Frameworks list and systematize relevant practices but do not provide insights into how practices link

together. Among other factors, this oversimplification in prior research models seems to imply limited applicability in management practice and, accordingly, limited evolution levels in practice. Outcomes of PSM evolution are not clear, either. Several earlier empirical studies found significant associations of purchasing practices and performance outcomes. However, the findings are partly controversial, some even contradictory, and no prior study investigated causal links among a broader set of PSM practices in their influence on performance. Accordingly, this literature review supported and clarified the research gap identified in chapter 1. It seems that many companies are indeed stuck in early phases of purchasing evolution, despite broad knowledge of how best practices in purchasing and supply management would generally look like.

However, prior literature also provides first hints on how to answer the research questions developed before. These implications will be briefly summarized here as a basis for the theoretical discussion and the development of the conceptual research model in the next chapters.

(1) There seem to be typical behaviors and characteristics of PSM organizations on different levels of PSM evolution. Prior purchasing evolution models agree that there are certain commonalities of PSM organizations across industries. This implies that it should be possible to develop a framework of PSM evolution based on some commonly relevant PSM practices valid across industries. A broad set of such general 'best practices' will be developed in chapters 4.1 and 4.2, and empirically tested in chapter 5.

(2) Relevant PSM practices could be structured into enablers and core value creation practices. Recent theoretical frameworks of PSM value creation emphasize the role of enablers in PSM evolution. Implicitly, this differentiation is based upon the assumptions of principal-agent theory that employees have to be managed in appropriate structures to avoid shirking. By taking this discussion to a higher, more general level, principal-agent theory could provide more valuable contributions to explain best practice in managing PSM evolution. Accordingly, the separation of enablers and core value creation practices will be discussed in chapter 3.3, before implementing the implications in the new conceptual framework in chapter 4.

(3) Empirical findings suggest that strategic PSM practices are significantly associated with superior company performance along several dimensions. However, the question is whether these associations are ones of covariation

or causation. Given the lack of experiments to clarify cause and effect in purchasing value creation, only a theoretical discussion could provide some indications. This discussion will be done based on resource-based view theory and its later sub streams in chapter 3.1.

(4) Purchasing's perceived status seems to determine a CPO's degrees of freedom in shaping his or her PSM organization. Several empirical studies found a significant influence of a purchasing function's status on different PSM practices. Based on organizational learning literature, it will be discussed in chapter 3.2 what needs to happen to initiate a change in the perceived status, and how such a change could influence PSM evolution subsequently. In the model presented in chapter 4, mindsets and aspirations will also be modeled as the one most basic enabler influencing all other PSM practices.

(5) Some empirical findings seem to question the suitability of traditional survey methodology to explain objective performance differences from purchasing behavior. An alternative methodology, and an explicit separation of objective and perceived performance outcomes, could help to validate the observations made by Ellram et al. (2002) and others. From a theoretical perspective, potential explanations for this phenomenon will be discussed in chapter 3.2. However, these findings primarily influence research design and methodology in chapter 5.

3 Organization theories perspectives on PSM evolution

The last chapter showed that many questions on the evolution from purchasing to supply management remain unanswered by prior literature. To broaden the perspective and provide some new aspects to explain PSM evolution phenomena in practice, general organizational theories will be discussed in the following chapter for their contribution to the research questions.

3.1 PSM evolution as a source of sustained competitive advantage

Since the mid-80's, there has been an ongoing discourse on whether the purchasing function can add strategic value to a company or not. While most practitioners would probably agree with Carr and Pearson (2002, p. 1033) who state that a purchasing function "may be operating at a non-strategic level or a strategic or somewhere in between" arguing for the evolution from transactional purchasing to strategic supply management, some theorists might disagree. Recently, Ramsay (2001a) argued that purchasing as a strategic function is largely irrelevant from a resource based perspective. He concluded that it is possible for the purchasing function to "generate and protect competitive advantage, but it is extremely difficult, and will tend to be the exception rather than the rule" (Ramsay 2001a, p. 261) If this statement was true then much of the research in the area of purchasing and supply management – including this dissertation – would be largely irrelevant. It would imply that although empirical studies found that high-performing companies are more likely to adopt some strategic purchasing practices, these practices are not able to influence corporate performance, at least not in a sustainable way. Discussing the potential contribution of purchasing and supply management from a theoretical perspective could provide an indication whether the relationship between purchasing practices and performance is merely one of covariation or really of causation (York and Miree 2004). Therefore, this question is vital to the academic field and an important foundation for any new model of purchasing and supply management evolution assuming cause-and-effect relationships between practices and performance outcomes.

Moreover, this question is not only of theoretical relevance and interest but also very relevant for practitioners. As Ramsay (2001a, p. 262) points out:

"At a human level, the fact that the purchasing function is only rarely regarded as a location for a core competence has a direct bearing on the quality of working life for

purchasing staff. Functions routinely associated with core competences tend to get a lot of organizational attention and thus most of the resources – status, salaries, cars and so on. If status is a concern for practitioners, then it matters if purchasing is permanently branded as 'only' operational."

To follow the discussion and – potentially – come to one's own conclusions, some basic understanding of the resource based view theory and its historical background in strategic management theory is necessary.

3.1.1 Introduction to resource-based view theory

The generation and achievement of competitive advantage has received widespread attention especially in the last two decades (Wernerfelt 1984; Prahalad and Hamel 1990; Barney 1991; Porter 1998a). Whereas Porter (1998b; 1998a) argued from a market based view that optimal corporate strategy could be derived by looking at a company's environment, others (e.g., Itami (1987)) argued that corporate strategy has to fit both external environment and internal resources and organizations. Wernerfelt (1984) and Barney (1991) focused on the idiosyncratic resources of the firm to find sources of competitive advantage. Following the concept of corporate resources proposed by Andrews (1974, pp. 89-102), Wernerfelt (1984, p. 172) defines a resource as "anything which could be thought of as a strength or a weakness of a given firm [or expressed differently] those (tangible and intangible) assets which are tied semi-permanently to the firm."

Barney (1991, pp. 99-100) argues that strategies focusing solely on external information about market structure, competitors, and suppliers may not lead to a sustainable advantage because competitors would always be able to imitate them. Accordingly, the basic assumption of resource-based view as a new theory of the firm (Conner 1991) is that resources "may be heterogeneous and immobile" (Barney 1991, p. 105) as opposed to Porter (1998b; 1998a) and other strategy scholars who neglected specific company characteristics to a large extent.

"Heterogeneity implies that firms of varying capabilities are able to compete in the marketplace and, at least, break even. Firms with marginal resources can only expect to break even. Firms with superior resources will earn rents." (Peteraf 1993, p. 180)

This argument is based on the classical concept of Ricardian rents. In a perfectly competitive market with homogeneous products, companies would be price takers. Thus, they only compete by cost. In such a situation, those firms with superior, scarce resources would be able to produce at lower cost and therefore earn supra-

normal profits (Peteraf 1993, pp. 180-182). This simplified example is based on the assumptions of perfectly competitive markets and homogeneous products to illustrate the potential influence of idiosyncratic resources. However, superior resources could also create distinctiveness in the product offering as a source of competitive advantage. The rents generated from a sustained competitive advantage will typically be shared between the firm and the contributing resources. The resources play a valuable role in generating the rents so they have to be compensated but they may be less valuable in a different setting. This makes resources imperfectly mobile. "The firm and the factor are, in essence, a team." (Peteraf 1993, p. 184). The key assumption of rent generation from a resource-based view is that distinctiveness in the product offering or in the cost position are both "tied directly to distinctiveness in the inputs – resources – used to produce the product." (Conner 1991, p. 132) In a way, resource-based view theory is therefore based upon basic neoclassical assumptions of the firm as an input-combiner (Alchian and Demsetz 1972, p. 778), although also encompassing thoughts from earlier literature and other strategic management theories (Conner 1991).

Barney (1991, pp. 105-106) differentiates three classes of resources: (1) physical capital resources including plants and equipment, location, or access to raw material; (2) human capital resources including the knowledge, skills, and talents of individual employees; and (3) organizational capital resources including reporting structures, formal and informal planning, controlling, and coordination systems, as well as other informal relations within the firm and to outside groups. These classes of resources differ in their potential to generate sustained competitive advantage. It depends on the ability of a company to protect these resources by "resource position barriers", a concept introduced by Wernerfelt (1984, p. 173) analogous to market entry barriers in the external competitive environment.

To understand these differences, it is important to clearly define the term sustained competitive advantage. Barney (1991, p. 102) suggests that

"a firm is said to have a sustained competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy."

Sustainability is not necessarily linked to any certain period of time (Barney 1991, pp. 102-103). "It only suggests that [the competitive advantage] will not be competed away through the duplication efforts of other firms." (Barney 1991, p. 103) Thus, the

inability of competitors to duplicate the benefits of a competitive advantage is the defining criterion for sustained competitive advantage.

Resources with the potential to become a source of competitive advantage have to be (1) valuable for the value creation process of the company, (2) rare in a sense that supply for these resources is limited, (3) imperfectly imitable, and (4) not easily substitutable by competitors. While the first two characteristics obviously define the potential of a resource to generate competitive advantage, the latter two determine its sustainability (Barney 1991, pp. 105-106). There are three reasons why a firm resource can be imperfectly imitable: It may require unique historical conditions, the link between firm resources and competitive advantage is not or only partly understood, or the cause of sustained competitive advantage may be partly influenced by outside direct management because of its social complexity. (Barney 1991, pp. 107-110).

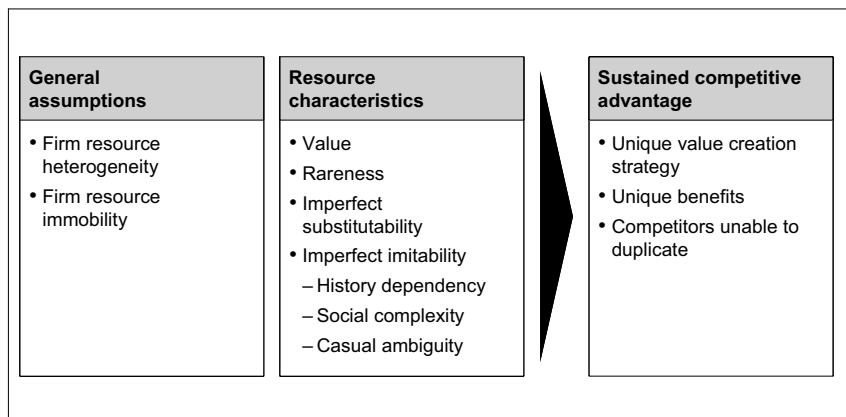


Figure 14 - Basic assumptions of resource-based view theory by Barney
(Source: Adapted from Barney (1991, p. 112))

These considerations have interesting implications for the evaluation of different resources as potential sources of sustained competitive advantage. For example, physical technology is typically either not rare or imitable by nature. Therefore, physical technology by itself can (normally) not be a source of sustained competitive advantage. However, some firms may be able to exploit their physical technology more completely than other firms based on socially complex firm resources. Such resources might enable these firms to realize a sustained competitive advantage from their physical technology (Barney 1991, pp. 110-111). Similarly, formal

processes such as formal strategic planning will always be likely to be imitable. Only if informal processes come into play, sustained competitive advantage can be generated. However, formal processes might support or complement these informal processes (Barney 1991, pp. 112-113). The same is true for information processing systems which may contribute to sustained competitive advantage if they are "deeply embedded" (Barney 1991, p. 114) in the firm's formal and informal management processes.

This implies that sustained competitive advantage from physical or organizational capital resources is rather generated by "the firm's capacity to deploy resources" (Amit and Schoemaker 1993, p. 35) than by the resources themselves. For this reason, several scholars claim that intangible assets such as collective knowledge of an organization are the ultimate source of competitive advantage, as they make firms truly distinguishable and unique (Rumelt 1986, p. 156; Prahalad and Hamel 1990, pp. 81-83; Mueller 1996, pp. 769-776; Spender 1996; Carr and Smeltzer 2000, p. 41).

It is important to understand that valuable and rare resources have the potential to generate competitive advantage, but their existence is not a sufficient criterion for superior performance to follow (Barney 1991, pp. 105-107). Thus, the generation of competitive advantage from valuable and rare resources is a stochastic process (Priem and Butler 2001, p. 60). The main reason is that discrete individual resources might only have an indirect effect on performance. In many cases, competitive advantage will result from an effective combination of multiple resources, e.g., the excellent implementation of superior strategies (Hao 2000, p. 24).

3.1.2 Introduction to dynamic capabilities theory

Such a combination of resources cannot be bought on factor markets, it can only be built internally over time (Dierickx and Cool 1989, p. 1506-1509) and has to be dynamically adjusted to a changing environment (Teece *et al.* 1997, p. 515). This internal accumulation of strategic resources over time is at the heart of dynamic capabilities theory (originally by Teece, Pisano, and Shuen (1997)), a sub- or parallel stream of resource based view theory which will briefly be introduced in the following section.

Teece *et al.* (1997, p. 516) define capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments." Their dynamic capabilities theory is based upon the seminal article by Dierickx and Cool (1989) stating that some assets or resources may not be tradable on "strategic factor markets", as suggested by Barney (1986), but can only be

accumulated internally over time (Dierickx and Cool 1989, pp. 1506-1509). Accordingly, they define strategic assets as "the cumulative result of adhering to a set of consistent policies over a period of time." (Dierickx and Cool 1989, p. 1506) Firms might explicitly try to achieve them or accumulate them by chance "as by-products of daily operations" (Itami 1987, p. 25). Wernerfelt recognized already in 1984 that companies – consciously or unconsciously – take critical decisions which resources or capabilities to focus on (Wernerfelt 1984, pp. 174-175). These decisions define the resulting asset stocks in the long run. "A crucial point [...] is that while [investments into asset stock building] can be adjusted instantaneously, stocks cannot." (Dierickx and Cool 1989, p. 1506) This implies that firms, "at various points in time, make long-term, quasi-irreversible commitments to certain domains of competence" (Teece *et al.* 1997, p. 515). This path-dependency of the resource accumulation process makes strategic capabilities very difficult to imitate for competitors. (Dierickx and Cool 1989, p. 1507)

Dierickx and Cool (1989, pp. 1507-1509) suggested five main barriers of imitation of strategic asset stocks: Time compression diseconomies, asset mass efficiencies, interconnectedness of asset stocks, asset erosion, and causal ambiguity. Time compression diseconomies describe the phenomenon that even with all other inputs doubled, a company may not be able to halve asset accumulation time. This implies that catching up with leaders will typically be difficult. Moreover, further asset accumulation in one area becomes even easier the more assets you already have. Asset mass efficiencies mean that "success breeds success" (Dierickx and Cool 1989, p. 1507). Because of interconnectedness of asset stocks, companies are likely to be on quite consistent levels regarding their capabilities in related areas. This implies that improvements in one asset stock may depend on improvements in others to tap the full potential. However, even if competitors do not try to imitate strategic assets, a competitive advantage may not be sustainable because of asset erosion. Only a continuous in-flow can keep stock levels stable over a longer period of time. Finally, causal ambiguity describes the fact that management cannot identify, manage, and control some of the relevant variables in the process of asset stock accumulation. The process is partly stochastic and discontinuous.

Recently, some authors have suggested to re-conceptualize the traditional view of dynamic capabilities towards capabilities to manage change and knowledge (Eisenhardt and Martin 2000; Winter 2003). This perspective focuses even more narrowly on the accumulation of tacit knowledge in organizations. The authors argue that capabilities such as superior deployment of resources might be a source of competitive advantage, and not of sustained advantage because they can also be

built by other companies (Eisenhardt and Martin 2000, p. 1110). Instead, they suggest organizational knowledge to be the only potential source of sustained competitive advantage. The critical role of knowledge in supply chains has recently been empirically supported by Hult et al. (2006). As this study focuses on the evolution of PSM capabilities, it will stick with the slightly broader concept suggested by Teece et al. (1997). However, the focus will clearly be on the process of evolution, or resource accumulation, rather than resource deployment. Accordingly, the perspective is quite close to the knowledge-based view introduced above and the criticism against dynamic capabilities theory is incorporated. Moreover, the new model of the PSM evolution process will draw heavily on insights from organizational learning literature, which is closely linked to the knowledge-based view.

Capabilities, as defined by Teece et al. (1997), meet all the resource characteristics requested by Barney (1991, pp. 105-107) as potential sources of sustained competitive advantage:

Based on the assumption that capabilities are "resident in the firm's [formal and informal] organizational processes, that are in turn shaped by the firm's assets and its evolutionary path" (Teece *et al.* 1997, p. 524), capabilities have to be heterogeneous by definition. Moreover, they cannot be separated from a company. A part of the capabilities are even independent of the staff employed by the company. Teece (1997, p. 524) argues that "as long as the internal processes and structures remain in place, performance will not necessarily be impaired." Therefore, capabilities are also – at least partly – highly immobile (Fahy 2001, p. 82).

Can capabilities be valuable and rare? The correct answer is in all probability yes. For example, the capability to build trust in a close supplier relationship may not be a given. However, because of causal ambiguity (Dierickx and Cool 1989, p. 1507), the discussion of individual capabilities will always be misleading. Ultimately, it comes down to the question of whether there is a limited number of firms with a set of distinct capabilities delivering sustainable benefits to their company – and reality certainly supports this. Because of the barriers mentioned before, namely; time compression diseconomies, asset mass efficiencies, interconnectedness of asset stocks, asset erosion, and causal ambiguity (Dierickx and Cool 1989, pp. 1507-1509), these companies are in an advantaged position to sustain this competitive advantage. Considering the argument of Eisenhardt and Martin (2000) discussed above, this seem particularly true for the process of resource accumulation, or evolution for a certain area of capabilities.

3.1.3 Discussion of implications for the potential impact of PSM evolution efforts

What implications do these theories have for the question of whether purchasing can add strategic value for a company? At first sight, purchasing cannot be strategic from a resource-based perspective. Several of the leading resource-based view theorists have stated that purchased items cannot be a source of sustained competitive advantage (Ramsay 2001b, p. 40) "because they are freely tradable" (Dierickx and Cool 1989, p. 1506). However, Barney (1991, p. 115) explicitly mentions a firm's reputation among suppliers as one potential source of sustained competitive advantage. This supports the view of other management theories, e.g., the "five forces" framework by Porter (1998b), which views purchasing and supplier relationships as strategically important. Obviously, there may be some purchasing activities that have the potential to generate sustained competitive advantage – and may therefore be strategic by nature.

The statement that purchasing cannot be strategic because it deals with freely tradable assets is based on strong assumptions, Ramsay (2001b, p. 41) describes as follows:

"In such a world, every purchasing function would first possess identically qualified and talented staff with identical knowledge and experience, serviced by identical technical support facilities, with equal access to the necessary funds to cover the search and supplier development costs of resourcing or new product development, and with the same knowledge, or the ability to acquire the same knowledge, of all possible sources in all relevant factor markets. Second, it would be impossible for any individual organization to locate and trade with a supplier without the knowledge of its competitors. Third, there would be no assets whose nature prevented competitive imitation by rival purchasing functions. Finally, imitating the purchasing behavior of competitors would always be attractive."

All of these assumptions can be questioned in reality. On the contrary, they seem to point to potential sources of sustained competitive advantage generated by the purchasing function. "Unique purchasing activities, that are strategically oriented towards accomplishment of the firm's goals" (Carr and Pearson 2002, p. 1036) could make the difference whether a firm is able to enjoy competitive advantage from its PSM function or not (Rumelt 1986, p. 156; Prahalad and Hamel 1990, pp. 81-83; Mueller 1996, pp. 769-776; Carr and Smeltzer 2000, p. 41). However, the question is whether such an advantage could be sustained, given that most major companies have started efforts to change their transactional purchasing function to strategic supply management.

Eisenhardt and Martin (2000, p. 1118) argued that especially in high-velocity markets, superior capabilities can only create a series of temporary competitive advantages. They could potentially collapse with the change of the market. The current race from tactical purchasing to strategic supply management may well be compared to a high-velocity product market – in both cases, the key success factor seems to be speed. If a company ceases to develop further, other companies will catch up sooner or later, if they feel such an effort would pay off. However, if the other companies also ceased their efforts, competitive advantage could be sustained.

From that perspective, it becomes clear that one very important aspect of sustainability seems to be whether companies recognize the potential benefits of PSM evolution, and act accordingly. It comes down to the question how the purchasing function as a whole is perceived and deployed by a company. Those companies recognizing the potential contribution of PSM and configuring its involvement best will be able to sustain competitive advantage over others who do not recognize these potentials – and accordingly stop their evolution efforts earlier.

In summary, there is some theoretical evidence that generating sustained competitive advantage from purchasing and supply management evolution is possible if companies realize potential strategic contributions and act accordingly. Thus, investigating the process of PSM evolution and its potential benefits seems a rewarding investment. It could provide both leading companies and laggards in PSM evolution with insights on why such an effort could pay off and how to overcome the barriers to reap these rewards.

3.2 The PSM evolution process from an organizational learning perspective

As the process of PSM evolution and the role of recognizing potential benefits seem critical to generate competitive advantage, it seems intuitive to investigate potential contributions of organizational learning literature. It could help to understand barriers in organizational transformation efforts and provide insights on how to overcome them.

3.2.1 Introduction to organizational learning theory

Early organizational theories modeled employees as mechanistic machines with specific characteristics (March and Simon 1993, chapters 1-3). Cyert and March (1963) questioned these simplifying assumptions of Taylorism and scientific

management in their book on a "behavioral theory of the firm". They suggested the concept of bounded rationality to model employee behavior in organizations. It says that individual's objectives are only partly founded in rationality, whereas most of them are based on a complex set of individual preferences unknown to the outside world (Cyert and March 1995, p. 35). Based on this assumption of non-rational objectives, Cyert and March (1995, pp. 29-32) conclude that organizations cannot be based upon consistently shared objectives, as posited by earlier theories. On the contrary, they suggest that organizations are only temporary coalitions of individuals, unified by a set of high-level interests. Common objectives are typically inconsistent and controversial and have to be continuously readjusted through negotiation among participants, or adaptation of the organization (Cyert and March 1995, pp. 29-32).

Modeling organizations in such a way as living systems subject to continuous change allows introducing the concept of organizational learning. Organizational learning describes the process of knowledge accumulation in organizations. It takes place if individual knowledge becomes organizational (Argyris and Schön 1999, pp. 31-32). Hedberg (1981) notes:

"Although organizational learning occurs through individuals, it would be a mistake to conclude that organizational learning is nothing but the cumulative result of their members' learning. Organizations do not have brains, but they have cognitive systems and memories. As individuals develop their personalities, personal habits, and beliefs over time, organizations develop world views and ideologies. Members come and go, and leadership changes, but organizations' memories preserve certain behaviors, mental maps, norms, and values over time." (p. 6)

Organizational learning can either result from experience by chance, or deliberate search for better answers to certain questions than the ones currently available. This implies that deliberate and focused organizational learning through search efforts needs some questions where current answers are not satisfactory. In general, learning processes are always driven by some kind of stress, or tension between expectations and outcomes (Fiol and Lyles 1985, p. 805). Cangelosi and Dill (1965, pp. 200-202) introduced different kinds of stress as drivers of learning on an individual and organizational level. They identify discomfort stress, i.e., pressure resulting from resource constraints, and performance stress, driven by aspirations, incentives, and task-related challenges, as drivers of individual or subgroup learning. According to their model, organizational learning is also driven by performance stress, but also by disjunctive stress, resulting from excessive divergence and conflict in the ways individuals and subgroups behave. They argue that managers would try to focus organizational learning on certain topics

"with the focus of attention dependent on such factors as the perceptual biases acquired in prior training and experience, personal interests in and preferences for different activities, environmental cues about what needs attention, and hypotheses about the boundaries between variables which management can control." (Cangelosi and Dill 1965, p. 202)

Cyert and March (1995, pp. 90-92) assumed that managers would only allocate resources to search efforts if they expect to find outcomes far over-compensating the cost of search. However, as opposed to earlier models, they did not assume that the likelihood of all outcomes, or even the set of possible outcomes, are known upfront (Cyert and March 1995, pp. 50-51). Instead, they modeled expectations, and therefore allocation decisions, as partly driven by irrational preferences of the individuals. This implies that these individual or collective expectations may differ significantly from reality – and from expectations of other individuals or groups in the organization (Cyert and March 1995, p. 95).

In their "general model of adaptive motivated behavior", March and Simon (1993, p. 68) assumed that search efforts for better solutions are driven by dissatisfaction with current solutions. They modeled dissatisfaction as the gap between current performance and the individual level of aspirations. Search efforts are initiated whenever the gap becomes bigger than a constant dissatisfaction threshold (March and Simon 1993, pp. 68-69). Assuming that performance is more or less constant when no search efforts are undertaken, the aspiration level seems to be the primary driver of satisfaction, and therefore of resource allocation decisions to search efforts for better solutions.

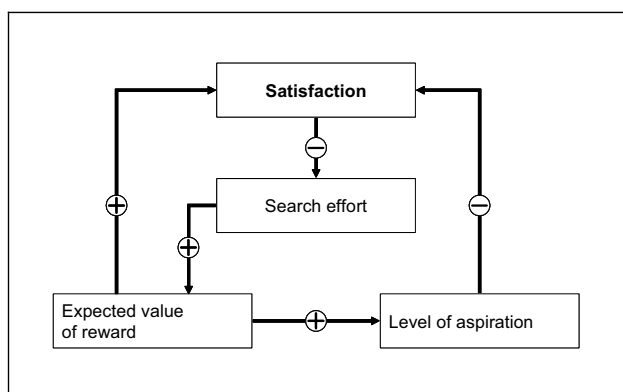


Figure 15 - General model of adaptive behavior by March and Simon
(Source: Adapted from March and Simon (1993, p. 68))

In fact, several other authors also posited a strong influence of aspiration levels on the likelihood of organizational learning. Greve (2003, pp. 61-62) found that a non-linear relationship among perceived performance and the probability of organizational change exists, with the aspiration level of the organization being a critical threshold (see figure 16). If performance does not meet aspirations, the probability of organizational change is found to be consistently high. As soon as performance exceeds aspirations, the probability of change decreases rapidly. However, aspirations must not be too high. Levinthal and March (1993, p. 108) posited that if "aspirations are tied to the performance of superior performers in a population, aspiration adjustment tends to make most actors fail". This implies that aspirations should be adjusted slowly but regularly to set stretch targets for organizational learning and motivate employees to appropriate risk taking.

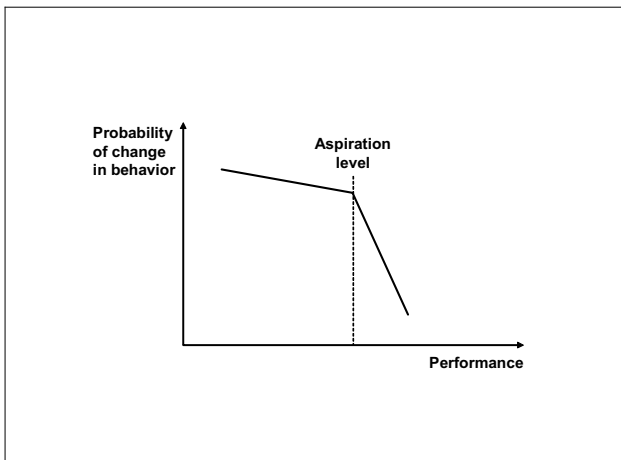


Figure 16 - Theory of performance feedback by Greve
(Source: Adapted from Greve (2003, p. 61))

Given the discussion above, it becomes clear that getting aspiration levels right is critical to initiate organizational change. Cyert and March (1995, pp. 156-157) differentiated two distinct dimensions of this problem: In a first step, the scope of what is perceived as important in an organization is consciously or unconsciously defined. This scope determines where, in a second step, aspiration levels are actively managed, oriented at prior aspiration levels, prior performance, or performance of other comparable organizations. Implicitly, this separation suggests that many potentially relevant topics are not even considered when defining performance targets.

In fact, several studies showed that managers are extremely rigid in their personal beliefs of what actions and orientations should be considered as relevant drivers of company success. This implies a constant focus on some issues, while other topics are consistently ignored. Miller and Friesen (1980) described the resulting dilemma for organizational adaptation very nicely:

"Because of the complexity of adaptive behavior, only some of the firm's practices are likely to be consciously viewed as causes of success [...]. The balance will be ignored. The perceived causes will be reversal-resistant because of their supposed utility, and the ignored factors will be resistant to change because they are not examined and their imbalances will be overlooked. [...] The less explicit elements [of an existing strategy and structure] are not included in the manager's model of reality and therefore are not tracked even though they may be flagging a crucial need for reorientation." (p. 604)

This dilemma implies that "any emerging organizational tendency, whatever its direction, will tend to have momentum associated with it" (Miller and Friesen 1980, p. 592). Reversals in the direction of organizational change were found to be extremely rare. A shift in focus would require replacing deeply embedded norms and values, as well as seemingly tried and true formulas with new ones (Nystrom and Starbuck 1984; Fiol and Lyles 1985, p. 808). Such revolutionary changes are very seldom because they imply significant risks for the management. Accordingly, managers would always try to avoid such moves. As a result, "organizations often resist change even when their environments threaten them with extinction" (Miller and Friesen 1980, p. 591). In practice, reorientation occurs more or less only when there is a major shift in power, e.g., because of a change in leadership (Miller and Friesen 1980, pp. 607-610). Only new managers, with differing ideologies and preferences, seem to be willing to take the risk and reverse organizational momentum. Interestingly, similar phenomena have been observed in the research community, where nearly all fundamental inventions were made by people either very young or very new to their respective fields (Kuhn 1970, p. 90). This observation supports the difficulty of leaving beaten paths even for very creative women and men such as leading researchers. Instead, people, as well as organizations, seem to follow down one path consistently. It seems that "[perceived] success is the enemy of experimentation" (Levitt and March 1988, p. 334).

Learning can take place on different levels. Ashby (1960, pp. 71-75) introduced the concepts of single-loop learning and double-loop learning for individual learning processes. Single-loop learning refers to a change in actions, strategies, or perceptions without changing the underlying values and beliefs. Examples in organizations are reactions of quality control engineers to specific failures in

manufacturing processes or a reaction of marketing managers to a short-term revenue decrease. Actions are taken to ensure that the original values and expectations can be met.

Opposed to this, double-loop learning refers to a more profound way of learning where underlying values and beliefs are changed. It occurs in organizations "when the organization is willing to question long-held assumptions about its mission, customers, capabilities, or strategy" (Slater and Narver 1995, p. 64). The term double-loop learning refers to the two separate feedback loops in this learning process: On the one hand, there is a feedback resulting in short-term changes of actions, strategies, and perceptions. On the other hand, this learning process triggers a second feedback loop resulting in changes in values and beliefs of individuals or the organization as a whole (Argyris and Schön 1999, p. 36). Double-loop learning requires challenging deeply embedded beliefs of the organization. It changes the way individuals or groups in an organization think about the relevant systems and relationships of cause and effect to realize their objectives (Senge 1990, p. 92). This type of learning is a cognitive process driven by "the use of heuristics, skill development, and insights" (Fiol and Lyles 1985, p. 808) in an ambiguous and ill-defined context. Accordingly, it is much more difficult to achieve than single-loop learning which often results from repetitive behavior. However, double-loop learning is also more likely to identify the root causes of organizational problems beyond marginal improvements at the surface (Argyris and Schön 1999, p. 36).

Fiol and Lyles (1985, p. 803) refer to single-loop and double-loop learning in organizations as organizational learning and organizational adaptation, respectively. They define organizational adaptation as the development of completely new structures, systems, or actions. This definition implies a close relationship to the concept of organizational evolution. Accordingly, further investigation will focus on the processes of organizational adaptation to understand potential barriers and drivers of evolution processes. However, the terms organizational learning and organizational adaptation will be used interchangeably in this study, as is done by most researchers.

Levinthal and March (1993) introduced three types of myopia of organizational learning to describe why it is so difficult for managers to engage in effective change efforts: First, managers seem to be overlooking distant times. As discussed above, managers tend to invest into knowledge efforts that seem promising for them in the short run. However, such specialized adaptation leads to disparities in the development of adaptive capabilities. Learning in one domain may imply a longer-run

decay of adaptive capabilities in other domains (Levinthal and March 1993, pp. 101-102). This problem is further fueled by the finding discussed before that each successful learning effort is associated with momentum, which makes it a self-reinforcing process. The problem of managers overlooking distant times in their organizational adaptation efforts adds to the potential benefits of effective change. As discussed in chapter 3.1, time compression diseconomies are one important characteristic of dynamic capabilities (Dierickx and Cool 1989, pp. 1507-1509). Time compression diseconomies imply that, "by the time the knowledge is needed, it is too late to gain it" (Levinthal and March 1993, p. 103). Accordingly, managers investing in the right knowledge early on are able to generate sustained competitive advantage.

A second mistake made by managers in organizational change efforts is to overlook what Levinthal and March (1993, p. 103) call distant places. Learning makes organizations well adapted to their current environments. However, any exogenous changes of the environments put organizations well-adapted to the previous environment at risk. Other organizations that are, for some reason, better equipped to strive in the new environment are likely to replace the existing organizations. This implies 'self-destructive' properties of learning in organizations, leading to the replacement of obsolescent organizations in the population. These statements are in line with population ecology theory (Hannan and Freeman 1977; Carroll 1984). This theory explains survival and success of individual companies in populations, depending on their specific genetic competences (McKelvey and Aldrich 1983). It assumes that companies can change some behaviors, but they cannot change their core genes, such as the organization's mission, authority structure, core technology, and high-level marketing strategy (Hannan and Freeman 1984, pp. 156-157). Recent empirical studies supported the assumption that organizations are simply too slow to adapt to changes in their environment, especially when it comes to core functions. Such time lags in the implementation of changes explain a large share of the variation in industry growth over time (Ruef 2004, pp. 84-85). However, large companies seem to be able to survive more or less independently from their competitive strength because they are able to buffer their weak units from selection pressures. Barnett (1997, p. 155) found that "as time passes large organizations become less competitive than their small counterparts, despite and probably because of their ability to survive".

A third and final myopia of learning is overlooking failures. Learning generally creates a bias toward doing more of the same. Levinthal and March (1993) reason:

"In every domain of learning, the likelihood of success tends to increase with competence (even allowing for aspiration level adjustments). [...] As successes translate into knowledge and knowledge into successes, not only do capabilities increase but also self-assurance. Organizations and the individuals in them become more confident that they have the skills to deal with the problems that lie within their domains. [...] In these ways, confidence finds confirmation in its own imagination." (p. 104)

This phenomenon is typically further enhanced by the fact that only people with a successful track record are promoted to positions of power and authority. Accordingly, people from parts of the organization where earlier change efforts have generated successful outcomes will be promoted to decide about future learning investments, and the likelihood of overlooking failures in other relevant domains is even increased. In other words, organizational learning and adaptation restrict the ability of organizations to learn effectively by themselves. Organizations get caught in a competence trap (Argyris and Schön 1999, p. 34).

That is why Wildavsky (1972) promoted the "self-evaluating organization", continuously monitoring its activities and their outcomes to judge whether it is heading in the right direction, and whether the organizational goals are still appropriate. However, he admits that employees for such an ideal organization could be hard to find in reality. He describes the requirements as follows:

"[Evaluative man] believes in clarifying goals, relating them to different mechanisms of achievement, creating models (sometimes quantitative) of the relationships between inputs and outputs, seeking the best available combination. His concern is not that the organization should survive or that any specific objective be enthroned or that any particular clientele be served. Evaluative man cares that interesting problems are selected and that maximum intelligence be applied toward their solution." (Wildavsky 1972, p. 510)

A recent empirical test of Wildavsky's model supported the hypotheses that strong leadership support, close involvement of employees, and a clear focus on a few core issues could really foster self-evaluative behavior of an organization (Boyne *et al.* 2004). However, it has to be summarized that organizations are not likely to realize need for change in other than the domains traditionally in focus, let alone initiate change, "unless prompting signals are very loud, received from multiple sources, and the effort seems to have a satisfactory probability of success" (Huber 1991, p. 98). Or, in other words, "managers seem willing to believe that all is well until they have been presented with strong proof to the contrary" (Greve 2003, p. 4).

3.2.2 Discussion of implications for a dynamic model of the PSM evolution process

Organizational learning literature can contribute to answering two aspects of purchasing evolution: On the one hand, it provides valuable explanations of why so many companies have not significantly evolved towards a more strategic role of purchasing to date. On the other hand, it offers a starting point to develop a more realistic alternative to the linear purchasing evolution models presented in prior literature (see chapter 2.2.1). The first of those aspects are discussed in the following paragraphs, whereas the conclusions for an alternative theoretical model are drawn in chapter 4.3.3.

As discussed in chapter 2.1, the purchasing function was traditionally perceived as purely transactional support unit to execute supply orders. Other functions, such as marketing, finance, or research and development, have been in focus of most top managers across industries. This implies that aspirations towards PSM value creation have always been minimal. Managers were satisfied if goods and services were supplied in time, in the right quantity, and to the right destination. Prices were typically compared merely among the limited set of long-term suppliers. Accordingly, meeting expectations was extremely easy from a strategic perspective, and measurable contributions to company success were more or less non-existent. Given this situation, it seems intuitive that the purchasing function used to be a pool of purely administrative staff without career aspirations.

Combining this knowledge with theoretical contributions from organizational learning literature, two reasons become clear why purchasing evolution is extremely difficult. First of all, the ability to adapt is very low in such a function due to missing experience in organizational change processes. Considering March and Simon's (1993) "General model of adaptive motivated behavior" introduced above, the necessity of real search for innovative solutions in traditional purchasing functions must have been minimal. Due to the low aspiration levels, it seems safe to assume that purchasing functions in large and generally successful companies simply met the expectations, and were rewarded with stability. This safety and security again attracted people who did not want to be involved in continuous change and excessive challenge. Accordingly, traditional purchasing functions are likely to be more or less free of entrepreneurial change agents, which seems to make the initial phase of purchasing evolution very difficult without significant staffing efforts.

Moreover, as a second aspect, the phenomenon of momentum in organizational learning described by Miller and Friesen (1980) suggests that top management in

large and successful companies is very likely to limit search activities to the areas which have been in focus traditionally. They are very unlikely to realize shortcomings or improvement potentials in the PSM function, let alone to invest in PSM evolution in the first place. This tendency is further enhanced by the fact that the head of purchasing typically reported only to lower level management, and only employees from traditionally innovative functions would be promoted to top management, as posited by Levinthal and March (1993).

These considerations imply that the level of stress in the organization (Cangelosi and Dill 1965) has to be significant to make managers start an investment in PSM evolution to change its role substantially. This is not only true for the initial step from a support function to a function delivering measurable cost savings, but also for the second substantial step from a cost focus to an integrated strategic role. The differentiation of these two development stages, and its implications for the PSM evolution process in general, are discussed in more detail in chapter 4.3.3.

3.3 PSM value creation as a principal-agents conflict

Resource-based view and dynamic capabilities theories indicate that companies evolving from transactional purchasing to strategic supply management may strengthen their competitiveness. Organizational learning literature implies that the CPO is in a critical position to manage the evolution process and keep momentum up. But what is it that a CPO can actually influence to make PSM evolution successful? Agency theory (Ross 1973) might help to find some first indications to this research question.

3.3.1 Introduction to agency theory

Agency theory is based on the question of optimal contracts in agency relationships (Eisenhardt 1989, p. 58). Such a relationship between two parties is defined to exist "when one, designated as the agent, acts for, on behalf of, or as a representative of the other, designated the principal, in a particular domain of decision problems" (Ross 1973, p. 134) Applied to a firm, an example of such a contractual relationship is the one of employer and employee. Alchian and Demsetz (1972, p. 777) pointed out that contracts must not be misinterpreted as formal agreements in this context:

"To speak of managing, directing, or assigning workers to various tasks is a deceptive way of noting that the employer continually is involved in renegotiation of contracts on terms that must be acceptable for both parties. [...] Neither the employer nor the employee is bound by any contractual obligations to continue their

relationship. Long-term contracts between employer and employee are not the essence of the organization we call a firm."

In general, such delegation is driven by resource constraints or limited competence of the principal (Harris and Raviv 2005, p. 375). In such cases, delegation can be assumed to be preferable in terms of marginal costs for the principal. Yet, delegation poses a risk to the principal for two reasons: Both parties have individual utility functions and respectively try to maximize their expected utility so there is a natural difference in interests. While the principal is obviously interested in getting a certain task done at minimal costs, the agent wants to maximize his or her salary, prestige, and spare time (Alchian and Demsetz 1972, p. 780). Unethical and opportunistic practices are explicitly considered as one possible way of human behavior to realize individual utility maximization. In a world of perfect information, this assumption alone would not be a problem. However, agency theory also acknowledges the fact that the principal faces uncertainty regarding the agent's utility function and his or her real behavior. A principal cannot completely judge the agent's competences before signing the contract ("hidden information"), nor observe all the actions of the agents during execution of the delegated tasks or exactly assign the agent's performance contribution afterwards ("hidden action") (Ross 1973, pp. 134-135; Kieser 2002, p. 211-214). These problems become even more difficult in a more realistic multi-agent situation where each agent has an individual unknown utility function and hidden competences (Mookherjee 1984).

Jensen and Meckling (1976, pp. 5-6) introduced the concept of agency costs as the sum of (1) the monitoring expenditures by the principal to reduce information asymmetry, (2) the bonding expenditures by the agent representing any resource investment by the agent beyond execution of the task itself to ensure satisfaction of the principal, and (3) residual loss from divergence between the agent's actions and those actions which would maximize the welfare of the principal. Accordingly, agency theory can be expressed as "the trade-off between (a) the cost of measuring behavior and (b) the cost of measuring outcomes and transferring risk to the agent" (Eisenhardt 1989, p. 58). Although agency costs are "as real as any other costs" (Jensen and Meckling 1976, p. 72), they are difficult to quantify (Fama and Jensen 1983). However, meaningful recommendations can be derived on a conceptual level (Kaufmann 2001, pp. 90-91).

The differences in interest and the existence of unethical and opportunistic practices can be seen as a defining part of any contractual relationship. If they did not exist, no contract would ever be needed. Yet, the assumptions of hidden information and

hidden action have some valuable implications for management practice on how to choose, manage, and control agents in such a relationship through appropriate governance mechanisms (Kieser 2002, p. 214). Theoretically, a principal has to optimize agency costs by selecting an optimal level of incentives for the agent and control systems over the agent (Eisenhardt 1989, p. 60). Although this mathematical optimization is not possible in practice, the concept clearly outlines the areas of influence for any manager – and their limits.

3.3.2 Discussion of implications for the management of PSM evolution efforts

For purchasing and supply management evolution, the following implications can be drawn: Assuming some complexity of the purchasing tasks, delegation of tasks to specialized employees seems reasonable for any CPO. At the same time, this implies that a CPO cannot influence all purchasing and supply management activities but has to trust his subordinates to a certain extent in their daily work. However, agency theory suggests some measures to ensure consistent performance of such a relationship.

One of the key responsibilities of the CPO seems to be the selection and development of employees. By reducing the information asymmetry as much as possible upfront, agency costs during contract fulfillment could be avoided. Although the theory suggests that a CPO cannot eliminate hidden information, it seems safe to conclude that selection of the agents, in this case the PSM professionals, will have a significant influence on their behavior, and subsequently performance outcomes. Additionally, training and development could help to improve the fit between existing employees' existing and the optimal skill set to deliver maximum value for the principal, in this case the CPO.

Another key approach to managing uncertainty in decentralized purchasing value creation. In general, the CPO has two alternatives there (Eisenhardt 1989, p. 61): He or she could either invest in information systems and control mechanisms to enhance transparency of the employees' actual performance. The other option is to reward individuals based on performance outcomes to motivate them to perform at their best. Anyway, defining clear deliverables and creating transparency about actual performance against these objectives could foster actions aligned with the CPO's requirements (Alchian and Demsetz 1972, pp. 778-779). Implementing such a system requires some degree of centralized power and good transparency in terms of systems integration. Only if both transparency over and influence on spend are

enforced, setting targets and measuring performance against them can be effective (Stiglitz 1975, p. 572).

Agency theory suggests that the influence of the CPO is largely restricted to selecting the resources and manage the infrastructure for his subordinates to work in. To be able to get involved in some critical content issues, a CPO has to delegate most of the operational work and limit his involvement there to high-level supervision. Accordingly, agency theory gives first indications for the question, what a CPO should focus on: Besides some critical content questions, the role of the CPO is to manage agency costs by selecting the right people, setting meaningful targets, providing an optimal infrastructure, tracking actual performance, and rewarding individuals based on their contribution.

3.4 Interim summary

Based on the contributions from three broadly accepted organizational theories, the current knowledge about PSM evolution processes, as discussed in chapter 2, was challenged in this section.

First of all, there is theoretical support for the hypothesis that PSM evolution may really transform a transactional purchasing department into a potential source of sustained competitive advantage. Based on resource-based view and dynamic capabilities theories, it was argued that companies tapping the potential contribution of a strategic PSM function to corporate decision-making may enjoy competitive advantage from the knowledge collected in these cross-functional cooperations. Moreover, a head start in PSM evolution could be sustainable because of time compression diseconomies, making it difficult for followers to close the gap. Accordingly, companies leading in PSM evolution are expected to earn superior returns.

Instead of a linear, stepwise evolution process assumed by prior purchasing evolution models, organizational learning literature suggests a series of S-curved learning processes with at least two different levels of advanced purchasing evolution. Each of these S-curve changes requires a complete change of mindsets by both PSM professionals and other people in the organization. Such a change in mindsets seems extremely difficult to initiate, except for situations of extreme stress either from within the organization or, more likely, from the environment. Top management needs to realize the potential contributions purchasing could make, and adjust aspirations accordingly. Such an external stimulus seems necessary to start

PSM evolution. Afterwards, the PSM function should be able to develop internal change momentum to overcome barriers in the evolution process within an evolution circle. However, for the second significant step from a cost management function to an integrated strategic role, it takes strong forces for top management to realize and believe in the potential benefits. Only companies that also manage to take this second step could enjoy sustainable competitive advantage over others that restrict evolution efforts to PSM contribution to cost reductions.

To implement the increased aspirations toward PSM value creation, a CPO must focus on some critical levers. Principal-agent theory suggests that his or her capacity is best used if the CPO focuses on selecting the right people, setting appropriate targets, and designing and implementing an optimal infrastructure for employees to work in. Development of strategies on a more detailed category level, and implementation of the same, has to be done by the PSM professionals in the organization. Accordingly, the direct influence of the CPO on actual performance outcomes is limited at best. However, similar to top management for the overall organization, he or she sets the agenda, determines the direction of organizational adaptation, and rewards performance outcomes. This makes the CPO the most critical person in PSM evolution. Whether he or she gets the job right, is decisive for the success of PSM evolution, and the future role of the PSM function.

Given these insights based on organizational theories from broader management research, it seems possible to develop a first model of cause and effect in PSM evolution.

4 A new conceptual model of drivers of PSM evolution

Based on the relevant PSM literature and the contributions of general organizational theories discussed before, a new conceptual framework of PSM evolution has been developed. This framework, shown in figure 18 below, will be discussed in detail in the following chapter. It is based on 9 PSM meta practices, which are linked by theory-based hypotheses. In a first step, the meta practices will be conceptualized individually, before developing and discussing the hypothesized causal effects among them.

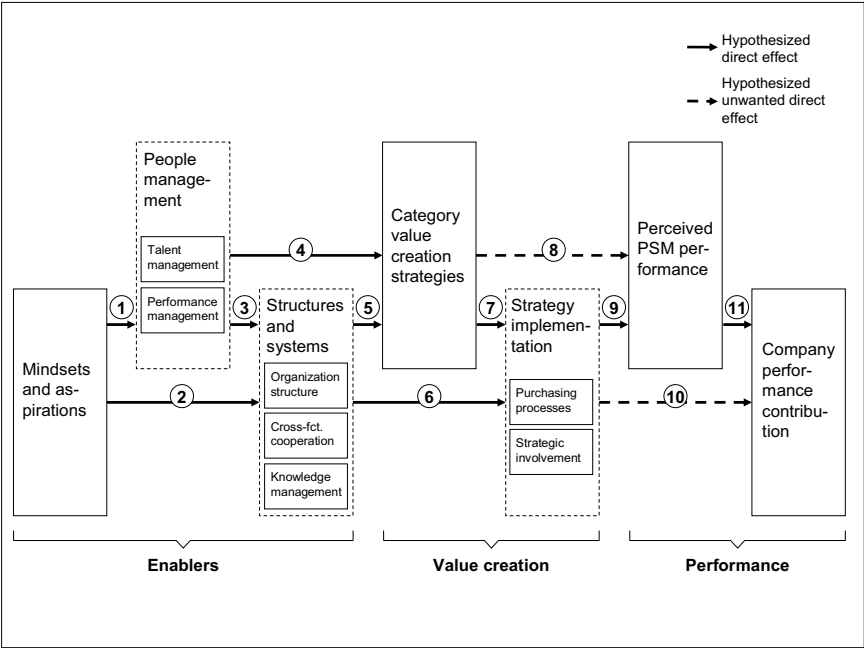


Figure 17 - Conceptual research framework

On a very high level, this framework suggests that mindsets and aspirations are the basic underlying enabler of PSM evolution, driving an evolution in other enablers within the PSM function, which in turn drive value creation practices effecting performance outcomes directly. Accordingly, this framework combines the insights of prior PSM literature discussed in chapter 2 with the conclusions from the discussion of organizational theories in chapter 3. By doing so, this framework addresses a

major gap in prior literature (see also Pagell (2004, p. 464) who reported similar problems for a framework modeling purchasing integration) and provides a first suggestion on how those practices could influence each other in the process of PSM evolution.

However, before hypothesizing the relationships among important drivers of purchasing value creation, the meta practices have to be conceptualized in detail to enable empirical validation of the model presented above (Corsten 2003, pp. 55-57).

4.1 Enablers of PSM evolution

Several authors emphasized the importance of enabling factors for PSM value creation and the evolution of the PSM function. Although such enablers do not influence performance directly, they set the stage for advanced supply management practices. Accordingly, several PSM frameworks differentiated enablers from actual value creation (see chapter 2.2.2). For example, Kaufmann (2001, p. 13) suggested to differentiate enabling processes and core purchasing processes, where value is actually generated, in his Supply Management Value Chain. Similarly, Jahns (2005, p. 70) separated a core module from management and support modules. Several empirical studies also supported an indirect effect of purchasing and supply management enablers on performance (Carr and Pearson 1999, p. 502; Chen *et al.* 2004, p. 515; Eltantawy 2005, p. 4).

To investigate the role of drivers and barriers in the purchasing and supply management evolution process comprehensively, it seems relevant to also consider these underlying dimensions of purchasing practice. This is also supported by the findings of Bartlett and Ghoshal (2002) who concluded from a qualitative study in more than 20 companies that

"as difficult as the strategic challenges may be, they are acted on faster than the organizational transformation needed to sustain them. [...] Today's managers are trying to implement third-generation strategies through second-generation organizations with first generation management." (p. 35)

From a theoretical perspective, several reasons support such a differentiation. For example, if mindsets and aspirations influence performance directly, it would always be possible to increase performance outcomes by just raising expectations, without changing any "real" behaviors. Obviously, this assumption is counter-intuitive. However, raising expectations may motivate people to change their behavior in day-

to-day business, so there might well be an indirect effect on performance. Similar arguments could be developed for other enablers along the same lines.

Moreover, principal agent theory suggests that a CPO is limited in his or her resources to get involved in everyday work, as discussed in chapter 3.3.2. Accordingly, value creation has to be largely delegated so the influence of the CPO is restricted to selecting the resources and managing the infrastructure and setting for them to perform at their best. Based on this theoretical consideration, a critical role of enablers in purchasing and supply management value creation has to be expected. If a CPO gets involved in some selected value creation steps or spend areas instead of focusing on getting the enablers right, he or she would inevitably miss other areas of value creation. In these areas of low CPO involvement, principal agent theory assumes that agents would be tempted to shirk (Alchian and Demsetz 1972, p. 790). The potential damage could, depending on the share of spend, easily exceed the positive impact of the CPO in the high-involvement areas.

4.1.1 Mindsets and aspirations

Mindsets and aspirations seem to be one important enabler of purchasing value creation. As stated before, several prior studies have hypothesized that the function's perceived status in the organization, as well as general level of strategic purchasing, may influence other purchasing practices. However, the constructs considered in these prior studies have been quite narrow in their scope, mostly limited to the question of perceived status in the organization, i.e., outside PSM. Yet, mindsets and aspirations not only of people outside PSM, but also of the CPO and his or her staff members may actually influence purchasing practices. Accordingly, it seems necessary to develop a broader concept of mindsets and aspirations, representing attitudes of relevant people from both within and outside the purchasing function. It was hypothesized in the above chapters that such mindsets might influence all actual purchasing and supply management practices. In this context, relevant people could include the CEO as well as other top managers in business units and other functions, the Chief Purchasing Officer (CPO) him- or herself, and purchasing professionals on all levels of the organization.

Several authors recently emphasized the importance of top management involvement in purchasing and supply management (Carr and Pearson 2002, p. 1034; Kaufmann 2002, p. 14; Chen and Paulraj 2004, p. 123). Keough even positioned CEO support as "a sine qua non for the transformation to world-class purchasing" (1991, p. 29). Only the CEO can make value creation from the supply

market a business issue by taking purchasing directly under his or her responsibility (Rozemeijer *et al.* 2003, p. 11). In a recent empirical study, Trent even found direct access to the CEO to be the design feature correlating highest with the achievement of procurement and supply objectives (Monczka *et al.* 2005b, p. 139).

But it is not only access to top management that seems to matter. There are differences in what is expected from purchasing. During the evolution from transactional purchasing to supply management, the basis for evaluation changes from internal customer complaints to realized cost savings and supplier performance, and again to competitive objectives and strategic contribution (Reck and Long 1988, p. 5). Accenture (2002, p. 14) found similar evolution levels of expectation towards purchasing value creation empirically: The purchasing function develops from a support function responsible for administrative tasks only (8% of the participating companies) or negotiating contracts (24%) to a contributor to profit through cost reduction (37%), and finally to a function having strategic impact on overall company performance (31%). Such strategic contributions to overall company performance could for example be innovations in the supply market or improvements in product quality or reaction time (Dobler and Burt 1996, p. 10).

Top management expectations could also influence the perception of other functions (Carr and Pearson 2002, p. 1034) "by various spoken and unspoken indications" (Cavinato 1987a, p. 14). Only if purchasing earns a similar status to other major functions in the firm and is fully accepted as a peer by other functions, it can take a strong role in discussing strategic issues such as outsourcing of non-core competences or contribute significantly to new product development (Freeman and Cavinato 1990, p. 10). Accordingly, 89 percent of companies identified as leaders in purchasing and supply management – as opposed to only 61 percent of the followers – reported in a recent A. T. Kearney study (2004, p. 10) that purchasing has a comparable standing to finance, marketing, and sales in their organization. However, some empirical studies had difficulties in showing this hypothesized association in the past: Goh *et al.* (1999, p. 18) found no significant correlation between the CEO's perception of purchasing's importance and purchasing's integration with other functions or its involvement in strategic team decisions. Similarly, Ellram *et al.* (2002, p. 9) found no significant differences in the perceived importance of purchasing and supply management between low, medium, and high performers based on total return to shareholders.

Cavinato (1987a, p. 15) states that the "major areas of image building for a purchasing department are all controllable by purchasing itself." This implies that

mindsets and aspirations must not neglect purchasing's internal mindsets and their management by the Chief Purchasing Officer or equivalent senior purchasing manager.

One of the major functions of leaders in an organization is to influence the setting of organizational values to improve performance (Chen and Paulraj 2004, p. 123). To steer purchasing evolution, the Chief Purchasing Officer has to develop and communicate a purchasing and supply management vision (Jahns 2005, pp. 76-78). Following Mintzberg et al. (1998, p. 124), a vision can in general be defined as a "mental representation of strategy, created or at least expressed in the head of the leader [...] both as an inspiration and a sense of what needs to be done." It has to be communicated to purchasing staff and internal stakeholders to enable a change in mindsets and drive activity (Carter *et al.* 2005, pp. 15-16; Jahns 2005, pp. 77-78). Only if purchasing professionals are aligned in their assumptions and beliefs, they will act according to the strategies (Hsieh and Barton 1995, pp. 71-72). This requires a vision to be comprehensive, consistent, and coherent as well as very specific to impact people's behavior (Jahns 2005, p. 77). It has to describe "a realistic, credible and positive projection of the future state" (Lysons and Gillingham 2003, p. 112).

Good practice in many companies seems to be improved by introducing a shared mission and vision statement in purchasing. Several empirical studies found that a big part of the participating companies have a supply management vision in place (Accenture 2002, p. 11; Jahns 2005, p. 133). In the study by Jahns (2005, p. 140), the existence of a supply management vision even was the most powerful factor to distinguish supply management beginners and basics from supply management champions.

One further aspect of mindsets and aspirations may be the mindset towards strategy execution both on a corporate and a functional level. "Creating a vision is the first step toward results, but without implementation (action) – the vision is just words on paper", as Banfield (1999, p. xi) put it. However, implementation success seems to differ widely (Porter 1998b, p. 144), depending on the spirit of implementation (Ellram *et al.* 2002, p. 12). This soft characteristic makes strategy execution mindset a resource which seems hard to imitate by competitors and might therefore be a source of sustained competitive advantage itself (Barney 2001, p. 54)

Based on case study research, Rozemeijer et al. (2003) found that a lack of clear corporate strategy, an integrated corporate structure, and a strong corporate culture were major roadblocks for successfully implementing a purchasing strategy. "Even when opportunities for a corporate advantage were high from a purchasing

perspective [...], initiatives to materialize these opportunities in some cases were not taken" (Rozemeijer *et al.* 2003, p. 7). This finding is in line with practical experience. Several cases in history have shown that a strong CEO or top management team can – just by role-modeling change – profoundly change the mindset of his organization towards implementing innovative strategies (see for example Duffy (1999)). This implies that corporate culture partly determines strategy execution at a functional level.

However, implementation success depends not only on external factors. Lysons and Gillingham (2003, pp. 115-119) argue that strategy implementation relates to organizational structures, resource allocation, policies, and procedures controllable by the purchasing function. This is supported on a general level by Mankins and Steele (2005) who emphasize the importance of realistic implementation plans, rigorous performance monitoring, and clear responsibilities for implementation success. From a perspective of mindsets and aspirations, it comes down to a question of how serious the CPO is about implementing his vision and the strategies derived from it. Resource allocation and other activities to support implementation seem to be visible outcomes and effects of the strategy execution mindset of the CPO, which is in turn influenced by corporate culture and top management priorities. Accordingly, strategy execution mindset is assumed to influence the execution and implementation speed of innovative purchasing and supply management strategies, processes, and structures, in line with the hypothesized relationships discussed in the above chapters.

Following the definition above, mindsets and aspirations should cover all internal stakeholders. So far, the mindsets and aspirations of purchasing professionals in the organization have not been in focus. The author suggests that the most critical mindset of purchasing professionals in the evolution from transactional purchasing to strategic supply management is change readiness.

Based on insights of the organizational learning literature discussed before, it seems to be common wisdom that

"people usually respond to change with hostility and apprehension due to numerous factors, including insecurity, lack of information regarding proposed changes, the break-up of work groups, perceived threats to expertise, status or earnings, inconvenience of new working conditions and changes in management and supervisory personnel." (Lysons and Farrington 2006, pp. 175-176)

There may be ways to overcome such resistance to change (Lysons and Farrington 2006, pp. 176-177). However, the level of change readiness probably also depends

on the individual purchasing professionals in the organization. Thus, this mindset of purchasing staff could determine the implementation speed (if not implementation success) of change in purchasing and supply management organizations. The share of purchasing professionals who welcome and proactively drive change within the purchasing function and across the entire organization could indicate a measure of change readiness. From this perspective, change readiness cannot be influenced by management directly. However, a CPO might encourage risk-taking and initiative to create an atmosphere that is attractive for people enjoying change as a new challenge instead, in order to improve change readiness of his or her organization over time.

In summary, this study defines *mindsets and aspirations* as *the aspirations and beliefs of all relevant internal stakeholders regarding purchasing and supply management's current and future role, and the changes required to get there*.

4.1.2 People management

Although the right mindset and high aspirations are certainly one very important enabler of purchasing and supply management value creation, there are additional enablers that cannot be neglected. Two very important aspects not only in PSM but in management in general are quality and motivation of professionals (Bertrand and Schoar 2003). Based on a qualitative study of more than 20 companies, Bartlett and Ghoshal (2002) point to a critical dilemma in modern management:

"Most managers today understand [...] that skilled and motivated people are central to the operations of any company that wishes to flourish in the new age. And yet, [...] in many companies only marginal managerial attention – if that – is focused on the problems of employee capability and motivation. Somewhere between theory and practice, precious human capital is being misused, wasted or lost." (p. 34)

Accordingly, it seems very relevant to consider these aspects in a framework trying to explain critical drivers of purchasing and supply management evolution. To do so, talent management practices will be considered to investigate how people quality is ensured, and performance management practices will shed some light on management and motivation of people.

Talent management

In a longitudinal study of purchasing positions, Pooley and Dunn (1994) found a shift from clerical to professional purchasing and supply management employees. In fact, Japanese CPOs even feel that the education of their staff members is the most important barrier in the purchasing and supply management evolution process

(Morita and Uehara 2004, pp. 12-13). However, even in many modern supply management organizations, tasks of a strictly tactical nature remain part of the responsibilities of purchasing and supply management employees (Muller 2001, pp. 10-12). Accordingly, the vision of the supply management professional being "first and foremost, a strategic thinker and creator of competitive advantage" (Burt *et al.* 2003, p. 93) seems too optimistic to describe the current state in practice. Yet, it seems intuitive that the skill set required of the supply management professional is likely to change during an evolution from purchasing to supply management (Eltantawy 2005, p. 25) as the role of purchasing employees changes from being transaction managers to information brokers in the value chain (Spekman *et al.* 1998, p. 633). This change in required skill sets has been reported and investigated by several researchers (e.g., Cavinato (1987b), Carr and Smeltzer (2000), Giunipero (2000), Eltantawy (2005)). Especially a sound technical understanding and general management skills – as opposed to team working skills - seem to be critical for supply management professionals to be successful (Carr and Smeltzer (2000, pp. 45-47), see also Killen and Kamauff (1995) and Giunipero and Percy (2000)).

To upgrade the talent pool appropriately, selection criteria in the recruiting process have to change to reflect the new required skill sets. In many companies, purchasing has been "the home of engineers who can't add, accountants who can't foot, and operators who can't run their machines" (CEO quoted by Chapman *et al.* (1997, p. 36)). Obviously, such people would not be very likely to acquire a strategic mindset, let alone add significant value to other functions in cross-functional integration. Accordingly, both external and internal recruiting practices have to be re-considered. However, less than 40 percent of the companies surveyed by Jahns (2005, p. 133) had systematic human resources management for purchasing and supply management implemented, the lowest share among all supply management modules considered in his study. On the other hand, leading organizations such as Honda invest heavily into hiring the best talent for purchasing and supply management positions (Nelson *et al.* 1998, p. 114). Such dedicated recruiting efforts seem to be necessary in the current market to find qualified purchasing and supply management professionals. 78% of participants in an Accenture (2002, p. 8) survey on best HR practices in procurement report difficulty in recruiting senior buyers. The skill shortage is further complicated by the fact that the level of expected education has risen dramatically within a relatively short period of time: From 1997 to 2002, the share of PSM professionals with a college degree increased from 30% to 42%.

Once talented people have been recruited, their skills have to be developed further by systematic training and focused development measures such as job rotation. Carr

and Pearson (2002, p. 1034) found significant differences in capability building of non-strategic and strategic purchasing functions. This is supported by findings of other researchers. Most companies focus PSM training modules on specific category knowledge, laws and regulations, negotiation skills, and cost analysis (Carr and Smeltzer 2000, pp. 40-41; Morita and Uehara 2004, pp. 9-10). This focus largely neglects the required skills in the areas of strategic management (Carr and Smeltzer 2000, pp. 45-47). Even worse, about 70% of the participants in the study by Morita and Uehara (2004, pp. 9-10) plan to do more of the same in the future: They state that they want to further intensify training on cost analysis and negotiation skills – compared to only 50% who want to cover strategic topics more broadly. Leading companies do not only offer by far more strategic training courses and tailor training to individual skill gaps, they also apply job rotation both within PSM and across functions to broaden the experience of their staff members (ATKearney 2004, p. 15).

Finally, career paths and talent retention seem to be a third relevant aspect of talent management in PSM. Mainly, this is a question of how long people stay in purchasing on the same position – and what the company does to provide them with a perspective beyond this point. 50% of the companies surveyed by Accenture (2002, p. 9) reported that they keep losing most of their employees to other companies' procurement organizations. It seems that those organizations have missed to provide their PSM professionals with an attractive long-term perspective. In fact, a major part of the survey participants reports they do not have defined career paths for purchasing and supply management – and only 15% consider a development beyond the PSM function in such plans (Accenture 2002, pp. 10-11). Carter and Narasimhan (1996) state that the importance of a process within an organization can be assessed by whether people from that particular process are promoted into top management and whether that process is viewed as an important job rotation for those slated for top management. The first statement is empirically supported by ATKearney (2004, p. 15) who report that supply management veterans from the best practice companies identified in their survey more often move to head other units than their equivalents from other organizations.

Considering the empirical support for the relevance of talent management in PSM, it is interesting to note that these aspects have mainly been covered in prior surveys conducted by consultancies, not researchers. Measurement difficulties and the absence of good quality data may have been reasons for researchers not to consider these soft issues (Bloom *et al.* 2005, p. 2). However, the statements from conceptual papers quoted above seem to indicate that these topics are indeed very relevant. For the further analysis, *talent management* will be defined as *all practices of a company*

to attract, develop, and retain qualified purchasing and supply management professionals able to act on a strategic level.

Performance management

Setting meaningful targets and measuring performance against them is critical for any CPO for – at least – two reasons: On the one hand, meaningful targets should influence the behavior of the purchasing employees in the organization towards the CPO's strategic objectives (Carter *et al.* 2005, p. 9). On the other hand, being able to provide detailed data regarding purchasing and supply management's performance contribution should add to the credibility of the purchasing function in the organization (Rozemeijer *et al.* 2003, p. 12). However, measuring purchasing and supply management performance is a very complex task. To date, there is not even agreement on how to measure cost savings, e.g., considering the price development in the economy and competitor/best practice benchmarks (Kaufmann 2002, p. 20). For many of the strategic value creation dimensions of purchasing and supply management, most companies lack performance measures completely (Carter *et al.* 2005, pp. 46-47). Only very few leading companies have actually solved these problems. Accordingly, it is not surprising that recent empirical studies found a significant relationship between advanced purchasing and supply management performance measurement and company success (Ellram *et al.* 2002, p. 9; Evans 2004, p. 230).

In a non-strategic purchasing function, purchasing is evaluated on clerical process measures such as number of orders processed and actual versus projected costs (Reck and Long 1988, p. 4; Carr and Pearson 2002, p. 1034). To step up into a strategic role, purchasing and supply management has to prove its value contribution in terms of their contribution to speed and success of innovation projects and other non-financial performance dimensions (Kaufmann 2002, p. 20). A multi-dimensional measurement approach such as a balanced scorecard (Kaplan and Norton 1992) comprising dimensions as diverse as impact on profitability, relationships with internal customers and suppliers, process efficiency, and people management/satisfaction is necessary to reflect this complexity (Banfield 1999, p. 237; Carter *et al.* 2005, p. 1).

But it is not only about the scope of performance measurement. Targets have to be dynamic and aggressive, though realistic, they need to be communicated proactively across the organization, and managers have to track performance consistently and continuously against these targets to motivate employees to action (Ellram *et al.* 2002, p. 10; Carter *et al.* 2005, pp. 13-14). In fact, best practice companies have IT systems and dedicated purchasing and supply management controllers implemented

to track and report purchasing and supply management performance consistently and comprehensively based on rigorous data collection processes (Kaufmann 2002, p. 19; ATKearney 2004, p. 8; Carter *et al.* 2005, p. 47). Moreover, performance outcomes are directly linked to individual employees' compensation, either through bonus systems or by linking salary increases to performance (Accenture 2002, pp. 19-20; Carter *et al.* 2005, p. 15).

There is one further aspect of performance management which differentiates leading companies from laggards: Best practice companies do not only align targets with business units and other functional units (Ellram *et al.* 2002, p. 10), but also share responsibility. This implies that purchasing and supply management objectives are consistently cascaded down not only within PSM but also to responsible managers in the business units and functional units to ensure support (Carter *et al.* 2005, pp. 10-11).

Based on these aspects, the following definition is suggested: *Performance management comprises all practices of a purchasing and supply management function to translate top management aspirations and the CPO's vision into measurable targets, to track actual performance against these targets, and to link individual and collective rewards to the performance outcomes both within the purchasing function and in internal customer units.*

4.1.3 Structures and systems

So far, mindsets and aspirations as well as different aspects of people management have been covered as enablers of purchasing value creation. However, there is a third aspect, which can be summarized as structures and systems in purchasing and supply management. It covers organizational structure of purchasing and supply management, organizational structures of cross-functional cooperation, and IT systems to manage purchasing and supply management both tactically and strategically. Most purchasing evolution models considered these dimensions to be relevant indicators in purchasing and supply management evolution (e.g. Reck and Long (1988), Freeman and Cavinato (1990), Burt and Doyle (1994)). The question is what role they play in terms of actually driving evolution.

Organizational structure of PSM

Over the last decades, CPOs realized that neither of the traditional purchasing organization structures - highly decentralized or highly centralized – would be able to cope with the new challenges of a strategic role of purchasing (Rozemeijer *et al.*

2003, p. 11). Accordingly, between 1995 and 2003 alone, 42% of the participants in a CAPS study by Johnson and Leenders (2004, pp. 9-10) reported changes in their purchasing structure. Hybrid purchasing and supply management organizations balancing centralized and decentralized characteristics became more and more common. A hybrid structure can be defined as a structure which "shared its purchasing activities between corporate office and business units, plants and/or divisions." (Johnson *et al.* 2002, p. 83) Ideally, it combines the flexibility and close link to other functions and local units of a decentralized organization with the strategic control of a centralized organization (Burt and Doyle 1994, pp. 115-116; Lysons and Gillingham 2003, pp. 132-133). However, the optimal balance between centralization and decentralization has to be evaluated from a broader perspective, also considering corporate strategy and specific category characteristics (David *et al.* 1999, pp. 18-19; ATKearney 2004, p. 10-11).

One important influencing factor is allocation of power in an organization (Lysons and Gillingham 2003, p. 147). Typically, hybrid organizations rely on category lead buyers with differing levels of formal and informal power. Although lead buyers can be seen as a way to coordinate purchasing activities centrally, they do not necessarily have to be co-located in a corporate center. Today, many advanced purchasing and supply management organizations have a virtual central purchasing unit with the category lead buyers spread all over the globe in strategically important units or locations (Uttenweiler 2001, p. 34).

Another potentially important aspect is the separation of strategic and transactional activities. In fact, more than 80% of the companies surveyed by Accenture (2002, p. 15) reported that their purchasing professionals spend 25% or more of their time working on purely transactional issues. This burden of transactional work could be a significant barrier to further purchasing and supply management evolution as it may not leave enough capacity for PSM professionals to tackle new strategic challenges (Jahns 2005, pp. 80-81).

In summary, *purchasing organization structure* will for this study be defined as *the allocation of purchasing power and purchasing strategic and transactional responsibilities within the purchasing function, regardless of location or company business unit*. This definition excludes the reporting level of the CPO within the company organization. Although this aspect has been shown to be relevant in empirical studies (e.g., Ellram *et al.* (2002, p. 10), Accenture (2002, p. 15)) and has been used as an indicator of purchasing and supply management evolution by purchasing evolution models (e.g., Burt and Doyle (1994, p. 1994)), it is not a

purchasing and supply management practice the CPO could directly influence. Therefore, it is not considered as part of purchasing organizational structure in this context.

Cross-functional collaboration structures

One topic which is closely linked to purchasing and supply management empowerment is participation in cross-functional cooperation (Giunipero and Vogt 1997). Actual impact of purchasing and supply management on corporate strategic decisions has already been covered in the purchasing value creation chapter under strategic involvement of PSM. However, the existence and use of cross-functional cooperation structures such as formal teams and committees, or participation in informal networks could be seen as an underlying enabler to such value contribution of the purchasing function (Carr and Pearson 2002, p. 1037).

In general, cross-functional cooperation is assumed to provide added value from combining the skills and expertise of a diverse group of people to develop better solutions than any of the involved functions could individually by itself (Ellram and Birou 1995, p. 87). Moreover, working in cross-functional teams could strengthen the alignment of perceptions, goals and objectives in general and beyond the actual problem to overcome the frequently visible "silo mentality, in which functional turf battles occur among these internal fiefdoms" (Spekman *et al.* 1999, p. 105).

Very often, people tend to think solely of cost reduction and new product development teams when talking about cross-functional cooperation, especially from a purchasing and supply management perspective (Burt and Doyle 1994, p. 45). Yet, there are a lot more areas where cross-functional teams may perform better than individual functions, for example standardization efforts, quality management, or strategy development (Giunipero and Vogt 1997, p. 13). Today, most practitioners seem to share this perspective and value purchasing and supply management participation in different cross-functional setups. However, the acceptance of purchasing practitioners as full peers in cross-functional working groups seems to depend on general purchasing maturity and the topic of cooperation (Accenture 2002, p. 16). Moreover, interaction remains mostly limited to one-time cross-functional meetings instead of close, long-term cooperation (Morita and Uehara 2004, p. 11).

In general, merely telling people from different departments to cooperate seems not sufficient to ensure success. "Success rests on the way these teams work together, whether they get measured as a team, and on the coordination across these teams."

(Kaufmann 2002, p. 18). Accordingly, the author suggests defining *cross-functional cooperation structures* as *all formal and informal organizational measures to foster alignment among and cooperative problem solving of experts from different company departments with purchasing being involved as a true peer*.

Knowledge and information management

Besides organization, creating a powerful IT systems environment could certainly be a powerful enabler of superior purchasing and supply management performance (Lysons and Farrington 2006, pp. 184-185). As Dobler and Burt (1996, p. 91) pointed out:

"The significance of computerization for purchasing and materials management is readily understood when one considers the amount of purely administrative work involved in the procurement cycle of the average company."

Although this statement emphasizes improved process efficiency in the administrative work, freeing up capacity of category managers to perform strategic tasks, there are also potential direct improvements of effectiveness, for example in the area of decision support systems.

Although formal responsibility of purchasing and supply management over spend has steadily increased over the last decades (Johnson and Leenders 2004, p. 10), the purchasing function partly lacks one important precondition to effectively managing non-traditional categories such as marketing spend: complete transparency over spend. Accordingly, companies focus on implementing integrated systems to comprehensively track purchase spend and on developing specific purchasing performance measures for nontraditional categories (Carter *et al.* 2005, pp. 33-34). Such transparency helps purchasing functions to enforce compliance to agreed purchasing policies and implement appropriate consequences in case of non-compliance.

Generally, the lack of an appropriate materials management system limits any purchasing function's ability to perform at a strategic level (Carr and Pearson 2002, p. 1034). A few years ago, many companies had no information available on how much they sourced from individual suppliers (Burt and Doyle 1994, p. 129). Today, most companies use globally integrated Enterprise Resource Planning (ERP) systems to manage their purchasing operations (Kaufmann 2002, pp. 18-19). The system "tracks the purchasing process from requisitioning to the payment of suppliers and monitors delivery of supplies and supplier performance" (Lysons and Gillingham 2003, p. 292). Worldwide part and supplier coding systems ensure the availability of consistent,

good quality data without major manual efforts (Kaufmann 2002, p. 18; Carter *et al.* 2005, p. 49).

The decision support systems mentioned above are typically integrated into a holistic knowledge management system today (Ellram *et al.* 2002, p. 8). It has to provide information on relevant cost data, supply market trends, supplier economics (Chapman *et al.* 1997, p. 37) and disseminate internal best practices (Rozemeijer *et al.* 2003, p. 4) available to all relevant staff members, for example on a Intranet platform (Ellram *et al.* 2002, p. 8). Such an infrastructure, along with informal knowledge sharing processes, should foster organizational learning in supply management which has been empirically shown to be associated with several positive consequences (Hult *et al.* 2003, pp. 551-552).

It is typically argued that the use of e-procurement tools such as electronic data interchange (EDI) and e-catalogues can help to improve process efficiency through standardization, automation, and improved transparency (Spekman *et al.* 1999, pp. 107-108; Hill and Scudder 2002, p. 383; Lysons and Gillingham 2003, pp. 185-186; Eltantawy 2005, p. 26). However, neither Ellram *et al.* (2002, pp. 8-10) nor Morita and Uehara (Morita and Uehara 2004, p. 16) found a significant positive influence of e-procurement implementation on corporate success. Based on an empirically substantiated structural equation model, Vickery *et al.* (2003, p. 535) argue that the mixed results in literature may be due to the fact that IT's impact on performance is an indirect one only, completely mediated by internal and external process integration. Moreover, benefits of complex IT systems are often offset by implementation and maintenance costs (Lysons and Gillingham 2003, pp. 185-186). Accordingly, the implementation level of tools such as reverse auctions or e-marketplaces is still very low today, especially vis-à-vis suppliers (Hill and Scudder 2002, p. 380; Morita and Uehara 2004, p. 10).

To summarize, *knowledge and information systems* are defined as *all IT-enabled systems to ensure transparency, support processes, and foster knowledge sharing among all parties involved in corporate purchasing planning and execution processes*. Their implementation is assumed to improve purchasing and supply management effectiveness and efficiency.

4.2 PSM value creation

In the past, several empirical studies found a significant link between advanced purchasing practices and different kinds of performance drivers (see chapter 2.3).

This empirical indication supports the theoretical argument, especially from a capabilities-based view, that advanced purchasing and supply management practices could indeed be a source of at least temporary, if not sustainable competitive advantage (see chapter 3.1).

Regarding purchasing practices, this study wants to comprehensively model relevant internal behaviors. Obviously, there is a risk of excessive complexity by using such a broad approach. Accordingly, the scope of this model has to be defined carefully. Many recent studies have focused on the supplier-buyer interface, investigating supplier relationships and their performance outcomes (Spekman *et al.* 1998; Vonderembse and Tracey 1999; Shin *et al.* 2000; Michael and Tan 2001; Kannan and Tan 2003). Some of the studies hypothesized that strategic purchasing is an underlying enabler of strategic supplier relationships (e.g., Carr and Pearson (1999), Chen *et al.* (2004)). However, a more detailed examination of drivers of strategic purchasing and its evolution has not been done to date (see also chapter 2.2.3). To address this gap, this study will emphasize on the inner workings of purchasing and supply management and only touch on the management of supplier relationships as one side-aspect of purchasing value creation.

4.2.1 Category value creation strategies

The fact that PSM strategies such as supplier relationships have been investigated extensively shows that category value creation strategies is perceived as the actual core of purchasing and supply management by many practitioners and researchers. Accordingly, it seems there is not so much a need to argue for the relevance of such a meta practice, than to argue why there should be only one covering all relevant strategic PSM practices on a category level. The reasoning behind this decision was twofold: On the one hand, an implementation of such practices seems to be a good indicator of strategic behavior of PSM professionals in general. On the other hand, the applicability and appropriateness of individual strategies may differ by category, industry, or culture. However, it seems safe to assume that implementing a thoughtful selection of such strategies could generate superior performance, regardless of the company's individual situation and environment. Nevertheless, conceptualizing this meta practice exhaustively requires covering a broad set of content domains.

As mentioned before, strategic management of the supply base is certainly one very important aspect of managing categories (and supplier relationships) strategically. Especially cooperative relationships with key suppliers have been in focus of recent theoretical academic discourse (e.g., Ramsay and Wilson (1990), Ramsay (2001b;

2001a), Cox (2006)), case-study and other qualitative research (e.g., Landeros and Monczka (1989), Dumond and Newman (1990), Dyer and Ouchi (1993), Dixon and Porter (1994), Wu and Choi (2005), Goffin et al. (2006)), and empirical studies (e. g., Noordewier et al. (1990), Stuart (1993), Spekman et al. (1998; 1999), Dyer et al. (1998; 2003), Carr and Pearson (1999; 2002), Shin et al. (2000), Tan et al. (2002), Benton and Maloni (2005), Cousins and Menguc (2006), Moser (2006)). In summary, it seems evident that strategic management of supply base size and complexity (Chen *et al.* 2004; Choi and Krause 2006) and close, long-term oriented, and trust-based relationships with a limited set of key suppliers can have major positive impact on corporate performance if those key suppliers are effectively selected (for empirical support on these issues see for example Janda and Seshadri (2001) or Das et al. (2006), Chapman et al. (1997) provide convincing anecdotal evidence).

Involving these so-called strategic suppliers in the value chain of a company is another topic which has been discussed in several areas over the last decades: Companies focused on systems integration such as EDI (empirically investigated in several studies, e.g., David et al. (1999), Ellram et al. (2002), and Morita and Uehara (2004)) and the optimization of inventory and manufacturing processes such as just in time delivery (see for example Dixon and Porter (1994), Germain and Dröge (1998), and Kaynak (1997; 2005)). Moreover, they have also started to involve key suppliers early on in new product development projects. Empirical studies showed that such an involvement can significantly improve new product success (for example Birou and Fawcett (1994), McGinnis and Vallopra (1999), Vonderembse and Tracey (1999), Michael and Tan (2001), and Carr and Pearson (2002), Primo and Amundson (2002)).

In general, an integration with both suppliers and customers across the entire value chain could generate significant performance improvements (Frohlich and Westbrook 2001, p. 195; Rosenzweig *et al.* 2003, pp. 449-451). The value chain concept has been suggested by Porter (1998b; 1998a). He defined a value chain as a "collection of activities that are performed to design, produce, market, deliver, and support (the) product (of a company)" (Porter 1998a, p. 36). Accordingly, it is conceptually much broader than supply chain. Monczka et al. (2005b, p. 9) defined supply chain management as "proactively managing the two-way movement and coordination of goods, services, information, and funds (i.e., the various flows) from raw material through to end user."

A relevant perspective that has partly been neglected by researchers investigating strategic supplier partnerships is a category view: It seems not sufficient to focus on

a supply base perspective only. Category strategies have to be developed to decide which kind of supplier partnership is best suited for the specific situation. Such category strategies have to answer "the most basic questions[,] what to source and where to source" (Kaufmann 2002, p. 15). To be able to answer these – basic, but not necessarily simple – questions, category strategies have to be based on reliable and comprehensive spend data (Banfield 1999, pp. 181-182), a systematic supply market analysis and insights about the future demand of internal users (Burt and Doyle 1994, pp. 119-120). Especially the last question requires cross-functional involvement, e.g., in a cross-functional category team (Spekman *et al.* 1999, p. 105).

Regarding the question as to what to source, one important aspect that has to be covered in a category strategy is the degree of standardization across businesses and locations (Kaufmann 2002, p. 14). This decision influences organizational structures, e.g., the degree of central coordination and mechanisms enforcing it, as well as supplier selection strategy. Potential synergies have to be traded off against differentiating customer needs (Jahns 2005, pp. 79-80). Regarding the question as to where to source, global sourcing has become a frequently used buzzword in practice and research (Monczka and Trent 2003, p. 27). However, in academic publications, most authors agree that global sourcing is "the coordination and integration of procurement requirements across worldwide business units" (Lysons and Farrington 2006, p. 514). Accordingly, a global sourcing strategy can be seen as one aspect of the question as to where to source. Sourcing from international suppliers, e.g., in so-called low-cost countries, is typically termed international purchasing (Monczka and Trent 2003, pp. 27-29). International purchasing strategy refers to the question as to where to source. It has to be strategically decided whether to source from national or international suppliers (Gruschwitz 1993, pp. 83-84), considering all potential benefits and risks (Dobler and Burt 1996, pp. 268-275). Companies in several industries have generated significant cost reductions by resourcing products from suppliers in so-called low-cost countries (Stolle *et al.* 2005, pp. 326-327). Recent empirical studies seem to indicate that such cost advantages might not be sustainable long-term as they can be acquired by other companies also (Lockström [upcoming], pp. 37-38). However, considering international purchasing and capturing potential value from managing distant suppliers will be critical for any firm to avoid competitive disadvantage compared to competitors (Spekman *et al.* 1999, p. 106; Kaufmann and Carter 2006).

A second aspect of purchasing value creation strategies is the strategic optimization of value creation across the value chain. Companies seem to focus on three main directions in this area: First, companies optimize their degree of vertical integration by

outsourcing non-core activities to reliable and competent suppliers. Second, they invest in developing suppliers to meet their strategic needs, e.g., in low-cost countries. And third, they proactively manage risk in their supply chain.

Companies increasingly outsource non-strategic activities. More than 50 percent of the manufacturing companies surveyed by Tan et al. (2002, p. 618) reported an increased outsourcing activity for primary materials and components. Such activities require highly developed skills and profound supply market expertise on the part of PSM professionals (Spekman *et al.* 1999, p. 107). However, the actual involvement of purchasing and supply management in outsourcing decisions varies widely between companies even within the same industries (Morita and Uehara 2004, pp. 7-8) although empirical studies showed that purchasing involvement is significantly linked with greater success (Monczka *et al.* 2005a, p. 39).

Another way to extract increased strategic value from existing suppliers that has recently become more and more popular (Watts and Hahn 1993, p. 13) is supplier development. Supplier development describes efforts of the buying firm to help its suppliers to meet the buying firm's objectives in critical areas such as quality, cost improvement, delivery performance, new technology adoption, and financial health (Krause and Ellram 1997, p. 39). As Lamar Lee phrased it: "You cannot find quality suppliers, you have to create them" (Burt and Doyle 1994, p. 29). Anecdotal evidence (Stolle *et al.* 2005, pp. 342-343) as well as empirical results (Krause and Ellram 1997, p. 43) suggest that supplier development, if done properly, can result in major positive effects for the buying firm although a recent empirical study found no significant influence of direct supplier development on supplier performance (Wagner 2006, p. 691).

Last but not least, recent empirical studies showed that supply chain glitches can have significant negative impact on company performance and share price development (Hendricks and Singhal 2003). At the same time, the trend towards global sourcing and international purchasing led to significantly increased risk positions in the supply chain, especially for manufacturing companies (Krampf 2000, pp. 176-177). Accordingly, it seems vitally important to manage economic risks, communication risks, cultural risks, and political/legal risks specifically for every supplier relationship and continuously over time to reduce the risk of such glitches (Kaufmann 2001, p. 45). A few years ago, most companies limited risk management to risk avoidance by adjusting their supplier selection behavior to perceived risk (Tullous and Munson 1991). Companies more or less relied on the willingness of suppliers to cooperate in difficult times (Burt and Doyle 1994, p. 43-44). Today, many

companies have started to proactively evaluate potential risks to balance them against the cost of analyzing and eliminating them, e.g., by using early warning systems or negotiating risk sharing agreements (Kaufmann 2002, p. 23). However, it is important to note that risk management has to balance control and avoidance against the strategic value of ambiguity, opportunities, and failure (Lewis 2003, pp. 219-221).

The author suggests defining *category value creation strategies* as *all planning, decision, and implementation activities of a purchasing function or individual purchasing professionals in the area of category management or supplier management driven by a long-term perspective towards corporate objectives*. Such a long-term perspective towards corporate objectives is typically not existent in the very beginning of purchasing and supply management evolution. Accordingly, the implementation of category value creation strategies by itself differentiates purchasing evolution stages to a certain degree (Jahns 2005, pp. 137-144).

4.2.2 Strategy implementation

In the theory section on the strategic role of purchasing and supply management from a resource-based perspective (chapter 3.1), it was argued that deployment of capabilities and implementation of practices is critical to turn advanced strategies into superior performance. Accordingly, these aspects have to complement category value creation strategies to explain PSM performance contribution comprehensively. It seems that there are two very different areas of PSM strategy implementation and value creation in advanced organizations. On the one hand, purchasing evolution is likely to influence the way classical core purchasing processes are executed to generate more value in the day-to-day business of classical purchasing tasks. On the other hand, purchasing could use the increase in status to contribute strategically to cross-functional decisions, thus creating value in ways that have not been possible before.

Core purchasing processes

Core purchasing processes are the classical backbone of any purchasing function. Although the way they are designed and implemented changes completely during an evolution from transactional purchasing to strategic supply management (Monczka *et al.* 2005b, p. 24), they have to be in place one way or another to do purchasing. In other words, core purchasing processes cover the operational core processes of purchasing which are specific to individual transactions or a single contract

(Kaufmann 2001, pp. 41-42). Monczka et al. (2005b, p. 34) differentiate six major stages (a similar model is also presented by Lysons and Farrington (2006, p. 4)):

- 1) Identify the users need for the product or service
- 2) Evaluate potential suppliers
- 3) Bidding, negotiation, and supplier selection
- 4) Purchase approval
- 5) Release and receive purchase requirements
- 6) Measure supplier performance

Step (5) seems "fairly routine" (Monczka *et al.* 2005b, p. 52) for any purchasing department. However, there might be major differences in the other steps.

Purchasing departments in early phases of an evolution from transactional purchasing to strategic supply management are typically confined to processing purchase orders (Dobler and Burt 1996, p. 6). They are not in a position to challenge user needs or to push for rationalization or standardization of demand (Freeman and Cavinato 1990, p. 10). Accordingly, A. T. Kearney (2004, p. 8) found that around 75 percent of the leaders in supply management systematically rationalize specifications, but only about 30 percent of the followers. Morita and Uehara (2004, p. 7) reported a generally low involvement of Japanese manufacturing companies in standardization efforts.

Supplier evaluation criteria typically considered are price, delivery reliability and quality (Billesbach *et al.* 1991, pp. 26-27). However, Kannan and Tan (2003, pp. 482-483) showed that soft evaluation criteria such as strategic commitment and buyer-supplier fit are correlated with firm performance. Low-performing companies seem to neglect such aspects. Moreover, many firms have implemented total cost of ownership (TCO) models comprising the total landed cost, internal costs of the buying organization, and external costs such as intellectual property, services, and customer return shipments (Burt and Doyle 1994, pp. 38-39; Spekman *et al.* 1999, pp. 106-107) instead of subjective weighting schemes and other categorical methods (Krampf 2000, pp. 210-211; Monczka *et al.* 2005b, p. 44). However, implementation quality and rigidity seem to be crucial for the effectiveness of TCO models because

Ellram et al. (2002, pp. 9-10) did not find significant differences in the extent to which TCO models were used by low-, medium-, and high-performing companies.

Regarding requests for quotation and negotiation processes, it is interesting to note that only 59 percent of the companies surveyed by Jahns in 2002 reported that they had implemented systematic supply management processes by then, compared to more than 80 percent for supply management strategies and supply management systems (Jahns 2005, p. 136). This is surprising because those processes could in principle be standardized and automated quite well. Systematic process management could result in efficiency improvements and improved outcomes due to consistent good practices (Jahns 2005, p. 236). Systematic processes do not necessarily imply the use of computer systems. In the area of negotiation, systematic processes could for example be used to build a strong fact-base upfront in cross-functional teams (Ellram *et al.* 2002, p. 8) or to focus on an atmosphere of trust and mutual support during the negotiations (Janda and Seshadri 2001, pp. 295-296).

Purchase approval processes touch upon the point of compliance to formal purchasing regulations. Only if users act in agreement with purchasing policies and rules of the organization and involve the purchasing function accordingly, purchasing can actually add value. To address this issue, many companies focus on implementing integrated systems to comprehensively track purchase spend and define consistent consequences in case of non-compliance (Carter *et al.* 2005, pp. 33-34).

Supplier performance measurement has an important feedback function in the purchasing process (Monczka *et al.* 2005b, pp. 54-55). However, empirical studies showed that only companies in advanced stages of purchasing evolution systematically manage supplier performance (Carr and Pearson 1999, p. 513). Only after a limited set of strategic key suppliers has been created, individual performance measures for every supplier relationship can be defined, agreed, tracked, and discussed regularly (Burt and Doyle 1994, pp. 208-211). Such a discussion can positively influence supplier commitment and performance (Prahinski and Benton 2004).

To differentiate core purchasing processes from category value creation strategies, the author suggests the following definition: *Core purchasing processes implement tactical supply management objectives and category value creation strategies in formalized routines and practices.* As opposed to both category value creation systems and strategic impact beyond PSM, such processes have also been existent in "classical purchasing" to fulfill tactical objectives. However, it is important to repeat

that the character of these processes is assumed to change completely along the evolution. Accordingly, it seems relevant to investigate their role in the evolution process.

Strategic involvement of PSM

The second arena for significant purchasing and supply management value creation is involvement in internal strategic decisions (Goh *et al.* 1999, p. 19). To realize this potential, purchasing professionals should link up with business units and other functions on a regular basis, both in strategically relevant day-to-day work and specific projects. Such an integration fosters an integrated view across functional silos to consider the complex interdependences in a real-world value chain in strategic decisions (Spekman *et al.* 1998, p. 633). However, this requires a high status of purchasing in the organization which is often not existent in current practice (Moody 2001, p. 18). Accordingly, purchasing integration has been introduced as the last step in the model of purchasing competence evolution of Das and Narasimhan (2000, pp. 18-19). Similarly, most conceptual purchasing evolution models describe integration as an end state only (see chapter 2.2.1).

Empirical findings showed that purchasing and supply management can in general only generate superior performance when the practices are aligned with corporate and business strategy (David *et al.* 1999, pp. 5-6) instead of only focusing on its own narrow objectives (Lysons and Gillingham 2003, p. 100). This implies not only that purchasing strategies have to be derived from business and corporate strategy (Jahns 2005, p. 163) as well as aligned with other functional strategies such as manufacturing strategies (Pagell and Krause 2002). Purchasing should also be actively involved in the corporate strategic planning process (Burt and Doyle 1994, p. 45). On the one hand, purchasing managers can provide valuable insights for corporate strategy development, based on their supply market expertise (Kaufmann 2002, p. 14). On the other hand, involvement in the corporate strategic planning ensures that purchasing managers fully understand corporate strategy and have access to relevant information to make purchasing decisions fully aligned with the firm's strategic goals (Carr and Pearson 2002, p. 1034). However, similar to other "soft" purchasing and supply management practices, some prior empirical studies faced difficulties to show a significant impact of purchasing involvement in corporate strategic planning on corporate performance (Ellram *et al.* 2002, p. 10; Morita and Uehara 2004, p. 15).

Early involvement in new product development projects has probably been the most prominent example of strategic involvement of PSM over the last two decades (e.g.,

Farmer (1981), Pearson and colleagues (Ellram and Pearson 1993; Mendez and Pearson 1994; Carr and Pearson 2002), and Murphy (1997)). To avoid expensive design changes in later stages (O'Neal 1993, p. 4), purchasing professionals support and coordinate supplier involvement to discuss initial product design suggestions, technical contributions, and quality considerations (Burt and Soukup 1985, pp. 92-93; Chen and Paulraj 2004, p. 126), and screening of the supply market for innovations early on in the process (Burt and Doyle 1994, p. 43). In general, a strategic purchasing function "proactively seeks opportunities to provide inputs that will have a significantly positive impact on the quality of a firm's product and future growth of the firm" (Carr and Pearson 2002, p. 1034) beyond a well-defined supporting role in new product development projects. However, both Morita and Uehara (2004, p. 8) and A. T. Kearney (2004, pp. 4-6) found that this statement does not describe current practice in most of the companies they surveyed: In both studies, less than 30 percent reported a significant involvement of purchasing in the early stages of product development.

Another area where integration of purchasing and supply management professionals could add value is marketing and sales strategy development. Not only would an increased interaction between marketing and purchasing improve purchasing's ability to strategically plan based on projected sales forecasts (Williams *et al.* 1994; Carr and Pearson 2002, p. 1037). Purchasing could also contribute specific expertise, for example in the development and upfront evaluation of special promotions (Ellram and Birou 1995, p. 79). However, the interaction of purchasing and marketing and sales function has not been very much in focus so far. For example, Lysons and Gillingham (2003, pp. 152-153) limit the interaction of purchasing and marketing in one of the most popular purchasing and supply management text books to rather transactional cooperation issues such as exchanging forecasts and information regarding customers and suppliers. Accordingly, the involvement of purchasing and supply management in strategic marketing and sales decisions has been found to be very limited in practice (Moody 2001, p. 18).

A last area of potential strategic impact beyond classical purchasing tasks is the involvement in mergers and acquisition decisions. The consultancy Accenture (2002, p. 4) even argues that increased M&A activity is one of the reasons for the rise of the PSM function. This statement is supported by Chapman *et al.* (1998, pp. 2-4) who reported that an analysis of 50 high-value mergers and acquisitions revealed average realized purchasing synergies of 10 to 15 percent of total cost of goods and services purchased, which equaled more than half of the average merger premium. Accordingly, it seems that an involvement of purchasing and supply management

professionals in the due diligence phase already could help to assess the synergy potential at hand realistically before taking the decision. However, most CEOs and CPOs reported that they had significantly underestimated the challenge of realizing this potential upfront. It seems that developing routines for purchasing involvement and capturing experiences for future M&A situations could help to capture the full potential (Winter 2003, p. 994).

In general, *strategic involvement of PSM* could be defined as *the involvement of purchasing and supply management in strategic company decisions to generate additional value either inside the purchasing function or in other functions or business units*. This definition is different from category value creation strategies in a way that it deals with strategic decisions that are not obviously part of purchasing and supply management responsibility. It is important to note that the value generated by strategic involvement of PSM could show up in other parts of the company, so PSM performance management is likely to miss out on a part of this impact.

4.2.3 PSM performance contribution

Performance measurement in prior empirical studies follows three major streams (see chapter 2.3): Some studies tried to measure purchasing and supply management performance directly (e.g., Narasimhan and Carter (1998), Das and Narasimhan (2000), Janda and Seshadri (2001)). Others focused on a potential influence of purchasing and supply management practices on company (financial) performance (e.g., Tan et al. (1998), Carr and Pearson (1999; 2002), David et al. (2002)). A third group of authors used both specific purchasing and supply management and broader company performance measures (e.g., Carr and Smeltzer (2000), Sanchez-Rodriguez et al. (2003), Moser (2006)). Although some studies did not find significant associations between purchasing practices and company financial performance (Ellram *et al.* 2002; Morita and Uehara 2004) and prior studies differ widely in their operationalization of performance, the existence of a relationship between purchasing and supply management and performance seems well established.

It seems that the association of purchasing and supply management practices with both specific PSM performance and company financial performance has to be investigated to ensure a comprehensive coverage of the relationships. As Carter et al. (2005, p. 8) pointed out, purchasing and supply management's evolution into a strategic role "has lead to the need for reliable and valid measures that reflect this strategic contribution." It is at least questionable whether performance measurement

today actually reflects the contribution of purchasing and supply management to corporate value creation in a comprehensive way. If appropriate performance measures are in place, CPOs should be able to assess their contribution to corporate performance realistically. In this case, no direct relationship between purchasing practices and company performance would exist. However, if not the entire value contribution is captured in today's performance measures, the research model would miss out on a part of the potential impact. Prior studies have either not assumed such a direct relationship (Carr and Smeltzer 2000, p. 43; Moser 2006, p. 146), or found counter-intuitive results, such as a significantly negative direct path from purchasing benchmarking to company performance (Sanchez-Rodriguez *et al.* 2003, p. 467).

Accordingly, the concepts of PSM performance and company performance have to be distinguished in a framework of purchasing and supply management evolution.

Perceived PSM performance

Regarding purchasing and supply management performance measurement, there are several conceptual problems (Van Weele 1984, p. 18): Firstly, a widely accepted definition of PSM performance cannot be found in literature. Secondly, PSM performance outcomes are very often a mixture of several interfering activities, partly executed by different functions, so there is no clear input-output relationship. Lastly, the scope of PSM activities and thus PSM performance contribution changes significantly during purchasing evolution. Accordingly, researchers face a lack of generally applicable and available performance measures not only in empirical research but also in terms of concepts for theoretical frameworks.

Today, PSM performance measurement in leading companies comprises several dimensions (Carter *et al.* 2005, p. 17) and goes well beyond classical cost reduction (Ellram and Liu 2002, p. 30) and process efficiency measures (Monczka and Morgan 1994, p. 30). Cost reduction is still an important part of PSM performance, but it has been extended from a pure purchase price perspective to a total cost perspective (Ellram 1994).

However, further dimensions of purchasing value creation have to complement this cost aspect to represent the broad scope of potential purchasing and supply management activities. It is important to note that some of these dimensions partly limit or even contradict each other so priorities are likely to depend on strategic priorities and objectives of each purchasing organization. Purchasing and supply management could contribute to overall supply chain performance by improving supplier cycle time, delivery reliability and service (Das and Narasimhan 2000, p. 20).

Moreover, improvements in the quality of supplied goods and services could increase the performance in subsequent process steps, down to satisfaction of the final customer (Janda and Seshadri 2001, p. 299). Another aspect which has recently been in focus of both research and practice is the management of supply risk (Moser 2006, pp. 156-157). It seems to become relevant especially in complex international sourcing networks (Krampf 2000, p. 89).

Many benchmarking efforts focus on efficiency measures such as purchasing operating expense to total purchase dollars spent, or purchasing volume per purchasing employee (Janda and Seshadri 2001, p. 295). However, in line with prior empirical findings (David *et al.* 1999, p. 21) and a trend in practice (Lysons and Farrington 2006, p. 22), this conceptualization emphasizes effectiveness of purchasing strategies and their implementation compared to efficiency gains in purchasing processes (see also Monczka and Morgan (1994, p. 30)). The reason is that the cost of purchasing is typically only about one percent of purchasing spend on average across industries (CAPS 2005) so the potential impact of effectively managing the purchasing spend is about 100 times as big as the one of improving purchasing cost efficiency.

In summary, *perceived PSM performance* could be defined as *all outcomes of purchasing and supply management activities that are formally measured or informally perceived by the organization and influence status and rewards of purchasing managers and professionals in the organization*. This implies that perceived PSM performance is heavily dependent on strategic scope and priorities as well as aspirations of the individual organization.

Contribution to company financial performance

If purchasing and supply management is indeed a potential source of sustained competitive advantage, advances in purchasing practices should become visible in company financial results (Tan *et al.* 1998, pp. 2-9). In fact, there seem to be plenty of levers for purchasing to contribute to company financial performance (Ellram and Liu (2002, p. 35) provide a comprehensive overview of potential influences). Besides reduction of cost of goods sold which has traditionally been in the focus of PSM managers (Michiels and Eckardt 2001), advanced supply management activities may also influence other dimensions of company performance: First of all, purchasing and supply management may influence profitability in broader terms than only in terms of cost of goods sold. On the one hand, purchasing may be able to contribute savings in non-traditional areas such as contract labor, maintenance, or travel expenses. On the other hand, purchasing and supply management activities may also at least support

a sustainable price premium. Reduction of capital employed could be achieved by purchasing involvement in strategic outsourcing and materials management/supply chain optimization decisions (Carr and Smeltzer 1999, p. 57; Carter *et al.* 2005, p. 21). Moreover, sales growth may be positively influenced by innovations from the supply market, or superior customer service in terms of quality and speed due to superior supply chain performance (Spekman *et al.* 1999, p. 109; D'Avanzo *et al.* 2003, p. 43). The influence on cash management beyond the areas of impact mentioned before is largely limited to order cycles and payment terms but such tactical activities are beyond the focus of this study of evolution towards strategic supply management. Accordingly, cash flow has, similar to other empirical studies in this context, not been considered as relevant as the other company performance variables in studying the influence of purchasing and supply management evolution.

As opposed to perceived PSM performance, *company performance contribution* is supposed to be *the actual influence of purchasing and supply management activities on corporate success*. The two concepts may differ significantly because on the one hand, some contributions may not be recognized by the organization, while on the other hand some benefits may be offset by disadvantages in other parts of the organization. For example, extreme price reductions from supplier negotiations have been rewarded in many companies in the past, although subsequent quality problems may occur.

4.3 Development of hypothesized relationships

In the last subchapters 4.1 and 4.2, the different relevant meta practices for a comprehensive framework of purchasing and supply management evolution have been introduced and discussed. In the following subchapter, these meta practices will be linked by hypothesized relationships structuring purchasing and supply management value creation. Such a structured framework could help both researchers and practitioners to understand some of the interdependencies among purchasing and supply management meta practices to identify potential bottlenecks in purchasing and supply management evolution and investigate ways to overcome them.

The hypotheses discussed in the following subchapter will partly be grouped, so one hypothesis may represent several cause-and-effect relationships in the final framework. This approach is good practice to avoid repetition and unnecessary overlaps (Chin 1998a, p. VIII).

4.3.1 Influence of enablers on PSM value creation

As mentioned before, purchasing and supply management enablers are assumed to influence purchasing and supply management value creation, not performance directly. Similar structures have been modeled in prior PSM frameworks (see chapter 2.2.2). Prior empirical studies also supported such an indirect effect of purchasing and supply management enablers on performance (Carr and Pearson 1999, p. 502; Chen *et al.* 2004, p. 515; Eltantawy 2005, p. 4). From a theoretical perspective, several reasons support such a differentiation. For example, if mindsets and aspirations influence performance directly, it would always be possible to increase performance outcomes by just raising expectations, without changing any 'real' behaviors. Obviously, this assumption is counter-intuitive. However, raising expectations may motivate people to change their behavior in day-to-day business, so there might well be an indirect effect on performance. Similar arguments could be developed for other enablers along the same lines.

Moreover, principal agent theory suggests that a CPO is limited in his or her resources to get involved in every aspect of everyday work. Accordingly, value creation has to be largely delegated so the influence of the CPO is restricted to selecting the resources and managing the working environment for them to perform at their best (see chapter 3.3). Based on this theoretical consideration, a critical role of enablers in purchasing and supply management value creation has to be suspected. If a CPO focuses most of his or her capacity on some selected value creation steps or spend areas instead of focusing on getting the enablers right, he or she could miss other areas of value creation. In these areas of low CPO involvement, principal agent theory assumes that agents would be tempted to shirk (Alchian and Demsetz 1972, p. 790). The potential damage could, depending on the share of spend, easily exceed the positive impact of the CPO in the high-involvement areas.

It is the task of the CPO and his or her PSM management team to consolidate mindsets and aspirations of the different stakeholders into a vision of purchasing transformation and motivate the organization to implement it. These challenges leaders not only in purchasing face have been described nicely in the documentation of the Baldrige Quality Award, one of the most influential frameworks for organizational performance measurement (Evans 2004, p. 221):

"Leaders should set directions and create [...] clear and visible values, and high expectations. [...] Your leaders should ensure the creation of strategies, systems, and methods for achieving performance excellence, stimulating innovation, building knowledge and capabilities, and ensuring organizational sustainability. [...] Major challenges [...] include (1) demonstrating your leaders' commitment to your

employees' success, (2) providing recognition that goes beyond the regular compensation system, (3) offering development and progression within your organization, (4) sharing your organization's knowledge so your employees can better serve your customers and contribute to achieving your strategic objectives, (5) creating an environment that encourages risk taking, and (6) creating a supportive environment for a diverse workforce." (NIST 2006, pp. 1-2)

As discussed in chapter 3.3 on agency theory, managers can avoid shirking by employees by selecting upright people, defining clear targets for them, and monitoring their behavior consistently (Alchian and Demsetz 1972, p. 780; Eisenhardt 1989, p. 58). Thus, it could be expected that mindsets and aspirations directly influence both talent and performance management. For example, purchasing's perceived status in the organization is likely to influence the willingness of high potentials to take on a job in purchasing (Carter and Narasimhan 1996, pp. 20-21). Similarly, the vision of the CPO should influence the way he or she sets performance targets, and tracks and rewards performance outcomes (Carter *et al.* 2005, p. 9).

Hypothesis 1: Mindsets and aspirations have a positive and direct influence on (1a) talent management and (1b) performance management.

Mindsets and aspirations seem also likely to influence structures and systems directly. For example, the perception of the PSM function's contribution may influence the barriers to implementing cross-functional teams (Ellram and Pearson 1993, p. 9), or covering specific spend areas in the PSM function's tracking systems (Carter *et al.* 2005, pp. 33-34). Moreover, the CPO's vision of the PSM function's future role is likely to influence the organizational setup, for example in terms of the degree of central coordination of purchasing activities (Keough 1991, pp. 28-32).

Hypothesis 2: Mindsets and aspirations have a positive and direct influence on (2a) cross-functional cooperation structures, (2b) purchasing organization structure, and (2c) knowledge and information management.

Additionally, a direct influence of the CPO on category value creation strategies may be given at least for some of the spend categories. However, this influence seems secondary to the general setting defined and managed by the CPO. Or, as Stiglitz (1975, p. 572) put it: "The amount (or quality) of supervision will affect both the optimal incentive scheme which will be used and the level of expected utility which the individual will attain." In other words, if a CPO has hired the wrong people working in the wrong organization based on the wrong targets, his or her (more or less marginal) personal involvement won't make the difference. Accordingly, a direct

influence of mindsets and aspirations on category value creation strategies is not hypothesized to exist in this framework.

In the discussion of mindsets and aspirations, it was already argued that people management and structures and systems may have a more direct effect on category value creation strategies. But how do these practices really link together?

First of all, there is some indication that talent and performance management could influence structures and systems. Theoretically, principal-agent theory suggests that managing employees by setting targets and measuring performance could only be effective if appropriate structures and systems ensured transparency over their behavior (Stiglitz 1975, p. 572). Accordingly, structures and systems could have a mediating role in the influence of people management on core value creation processes (Baron and Kenny 1986). But there are also practical reasons to assume such a relationship. On the one hand, having highly qualified PSM employees seems to be a precondition to implementing cross-functional cooperation structures or central coordination of PSM activities (Giunipero and Vogt 1997, pp. 10-11). On the other hand, the objectives focused on in performance management are likely to influence the emphasis in implementing cross-functional teams, central coordination, or broad transparency over spend. For example, the optimal organization for a company focusing purely on cost reduction may differ significantly from the optimal organization for a differentiation strategy (David *et al.* 1999, p. 23).

Hypothesis 3: Talent management and performance management have a positive and direct influence on (3a/b) cross-functional cooperation structures, (3c/d) purchasing organization structure, and (3e/f) knowledge and information management.

Talent and performance management could also influence category value creation strategies directly. For performance management, principal-agent theory argues that setting appropriate rewards and incentives influences the motivation of agents to increase their productive efforts accordingly (Alchian and Demsetz 1972, p. 778). This implies that setting performance targets based on the implementation of certain value creation strategies such as global sourcing or strategic supplier management could directly influence outcomes by directing the efforts of the employees. On the other hand, incentives have their limits. The concept of agency costs introduced by Jensen and Meckling (1976, pp. 5-6) implies that it is not optimal for a manager to cover every detail of a complex delegated task by a contractual agreement or an explicit performance target. Accordingly, it seems likely that explicit performance measurement only covers the strategic level of purchasing and supply management

value creation, whereas strategy implementation cannot be directly managed by setting formal targets.

A similar limitation is also assumed to exist for talent management. Could strategy implementation be improved only by changing talent management practices, i.e., recruiting and talent development? If the organization lacks an appropriate infrastructure, an increase seems highly unlikely. For example, just hiring better people would probably not lead to significantly improved strategic involvement but better qualified people could earn a higher status in cross-functional project teams, which increases access to strategic decisions and impact through strategic involvement. Accordingly, the relationship among talent management and strategy implementation also seems to be rather indirect than direct. This theoretical consideration is supported by the empirical findings of Ahmad and Schroeder (2003, pp. 33-36) who found a synergistic indirect effect of bundling such human resource management practices.

Hypothesis 4: Talent management and performance management have a positive and direct influence on (4a/b) category value creation strategies.

It follows from the discussion on the influence of talent and performance management above that structures and systems have to have a direct effect on purchasing and supply management value creation practices, if they are hypothesized to have a mediating effect in the relationship among talent and performance management and category value creation strategies. This consideration also seems reasonable from a theoretical perspective: According to agency theory, improving transparency through better systems, central coordination through a network organization, and internal alignment through cross-functional cooperation structures could reduce the likelihood of shirking by any team members (Alchian and Demsetz 1972, pp. 781-783) and therefore agency costs (Jensen and Meckling 1976, pp. 5-6). Purchasing professionals put increased effort into implementing strategies, processes, and behaviors in line with the objectives of the principal. Accordingly, one could expect that companies which have strong structure and systems implemented should be able to improve the implementation of advanced purchasing and supply management value creation practices subsequently.

Additionally, organizational learning theory supports such a relationship. It has been found by several authors that organization structures fostering knowledge sharing, while at the same time preserving some degree of local flexibility, support organizational learning and individual risk taking (Miller and Friesen 1980, p. 592; Meyer 1982, p. 533; Fiol and Lyles 1985, p. 804). Accordingly, appropriate

infrastructures and systems could encourage PSM professionals to develop new capabilities and grow into new roles to generate additional value for the organization.

Hypothesis 5: Cross-functional cooperation structures, purchasing organization structure, and knowledge and information management have a positive and direct influence on (5a/b/c) category value creation strategies.

Hypothesis 6: Cross-functional cooperation structures, purchasing organization structure, and knowledge and information management have a positive and direct influence on (6a/b/c) core purchasing processes and (6d/e/f) strategic involvement of PSM.

4.3.2 Influence of PSM value creation practices on performance

As mentioned before, there is an interesting dilemma regarding prior empirical studies investigating the influence of advance category value creation strategies on company performance: Researchers who used subjective performance measures largely reported significant findings (e.g., Carr and Pearson (1999), Goh et al. (1999), Kannan and Tan (2003)), whereas researchers using objective financial data had difficulty to replicate these results (e.g. Ellram et al. (2002), Morita and Uehara (2004)). Accordingly, there has not been much convincing empirical evidence regarding an influence of purchasing and supply management practices on company financial performance (Johnson *et al.* 2002, p. 86). There seems to be a limited set of leading companies that have implemented such advanced purchasing and supply management strategies and report subjectively increased performance from their implementation. From a resource-based view (see chapter 3.1), this suggests that advanced value creation strategies are rare and at least perceived as valuable, which makes them a potential source of competitive advantage. However, the question is whether this competitive advantage could be sustained, thus leading to superior company performance over a longer period of time. Resource-based view theory questions this assumption because advanced purchasing and supply management strategies are widely known in the community and may easily be replicated by competitors (Barney 1991, pp. 105-106). Instead, resource-based view theory and its later sub streams suggest that the informal and deeply embedded implementation and execution capabilities of an organization may be much more difficult to imitate by competitors and may therefore be more likely to be a source of sustained competitive advantage (Dierickx and Cool 1989, pp. 1506-1509; Teece *et al.* 1997, p. 515; Hao 2000, p. 24).

This theoretical argument could be one explanation for the differences between empirical studies using subjective and objective performance data. It is also supported by observations in practice that most purchasing managers seem convinced that strategic supplier partnerships may improve supply chain performance and most companies call some of their suppliers strategic – but very few success stories about effective win-win relationships have been shared in the literature (Cox 2006). One could draw the conclusion that many purchasing organizations focus on implementing advanced purchasing and supply management strategies because it makes them and others in the organization feel more successful – and, by doing so, it seems to help them to acquire a more strategic role in the company – but it seems that there is not necessarily a direct influence of having such strategies on company performance. Only if these strategies result in a changed behavior, influencing both day-to-day decisions in classical purchasing processes and the behavior and role of purchasing professionals in strategic company decisions, superior company performance seems likely to follow. Such an indirect influence of advanced purchasing strategies on performance has been suggested earlier by David et al. (1999, pp. 20-23) and Pagell (2004, p. 479). In a different operations management context, Vickery et al. (2003, p. 535) found similar results. This evidence from both theory and prior empirical studies would imply that category value creation strategies only effect company performance indirectly through strategy implementation.

Such an assumption also makes sense from a practical perspective: For core purchasing processes, implementing category value creation strategies will inevitably require major changes in the way the PSM function deals with both internal customers and suppliers (Monczka *et al.* 2005b, p. 24). For strategic involvement, it seems sound to assume that the development and successful implementation of advanced category value creation strategies such as global sourcing increases the standing of PSM professionals in corporate strategic decisions, on the one hand because of the positive track record, on the other hand because of personal relationships growing during cross-functional implementation of such strategies.

Hypothesis 7: Category value creation strategies have a positive and direct influence on (7a) core purchasing processes and (7b) strategic involvement of PSM.

The discussion above implies that, theoretically, category value creation strategies should not create value by themselves, as long as they do not result in changes in either core purchasing processes or strategic involvement. However, it could be that even an initial effort to develop and implement such advanced strategies leads to

increases in perceived PSM performance both on the side of the CPO and others in the organization outside the PSM function. Such an anticipation of performance increases would imply a bias in perceived PSM performance and could therefore be one explanation for the observations of Ellram et al. (2002) and other empirical studies, as discussed before.

Hypothesis 8: Category value creation strategies have an unwanted positive and direct influence on perceived PSM performance.

As discussed above, resource-based view theory suggests that superior strategy implementation is the basic source of sustained competitive advantage (Amit and Schoemaker 1993, p. 35). It follows that both core purchasing processes and strategic involvement of PSM have to be hypothesized to influence perceived PSM performance, as these two meta practices are assumed to be the primary ways for PSM to add value for the company: Either, strategies are implemented in the behavior toward suppliers in the market, or PSM professionals influence internal strategic decisions.

Hypothesis 9: Core purchasing processes and strategic involvement of PSM have a positive and direct influence on (9a/b) perceived PSM performance.

However, given the discussion above, it seems questionable whether perceived PSM performance maps all aspects of purchasing and supply management contribution to company performance comprehensively and with appropriate emphasis in practice. To test this question, a hypothesized direct influence of purchasing and supply management value creation practices on company performance has to be introduced in the framework. If perceived PSM performance perfectly matched actual contribution to company performance, the effects of both core purchasing processes and strategic involvement of PSM on company performance contribution would have to be perfectly covered by perceived PSM performance (Baron and Kenny 1986). Otherwise, a significant direct path would indicate an unwanted bias in perceived PSM performance.

Especially for strategic involvement of PSM, one could assume that there are no optimal PSM performance measures to represent the contribution of purchasing professionals in strategic company decisions to date (Carter et al. 2005, p. 8). Principal agent theory suggests that performance contribution in such team contexts is very difficult to measure because the production functions are very often not separable. Alchian and Demsetz (1972, p. 79) provided a nice example to make this difficulty clear:

"Two men jointly lift heavy cargo into trucks. Solely by observing the total weight loaded per day, it is impossible to determine each person's marginal productivity."

Based on this theoretical argument, it seems sound to assume that perceived PSM performance would typically either under- or overestimate the contribution of purchasing and supply management to company performance, especially in such cross-functional situations. Moreover, empirical results by Dröge et al. (2004, p. 568) suggest that there are synergistic effects of internal integration with other functions and external integration with suppliers (see also Petersen (2005, p. 384)). Such synergies are potentially also not covered by current performance measurement systems. Thus, neglecting the direct influence of strategy implementation on company performance and only hypothesizing an indirect effect through perceived PSM performance is likely to imply a bias towards perceived as opposed to real importance of purchasing and supply management practices.

To test this mediation hypothesis, two hypothesized path relationships have to be introduced additionally to the proposed influence of strategy implementation practices on perceived PSM performance (Baron and Kenny 1986). On the one hand, perceived PSM performance obviously has to explain some share of the variance in company performance. On the other hand, a direct effect of strategy implementation on company performance contribution has to be assumed to see whether this direct effect is also significant and substantial.

Hypothesis 10: Core purchasing processes and strategic involvement of PSM have an unwanted positive and direct influence on (10a/b) company performance contribution.

Hypothesis 11: Perceived PSM performance has a positive and direct influence on company performance contribution.

4.3.3 A dynamic model of PSM evolution

As discussed in chapter 3.2, the concept of organizational learning does not only help to explain why many PSM organizations have not evolved toward a strategic role so far, it also has broader implications for managing the PSM evolution process in general. Thus, it suggests an alternative to prior PSM evolution models in literature (see chapter 2.2.1). These implications are outlined in the following subchapter.

External stress (Cangelosi and Dill 1965), mainly in the form of cost pressure from the market, made many companies focus on reducing cost in their external spend over the last decades. Today, there is plenty of proof in many industries that PSM

can deliver significant cost savings. Accordingly, most companies have changed their aspirations towards PSM value creation and expect significant cost savings each year. This first significant step in purchasing evolution is also modeled in most of the purchasing evolution models in literature (e.g., Reck and Long (1988)). It brings the PSM function into a position to contribute visibly to company success by improving bottom line profits. At the same time, this evolution from a pure transactional support function to delivering measurable cost savings made many PSM functions experience organizational change.

However, it seems that many PSM organizations have become victims of just this momentum that helped them to step up from a pure support function to a valued contributor to bottom line success of the company. As discussed in chapter 2.1, most PSM functions are perceived as contributing significant cost savings from external spend today. However, it seems that only a few have been able to take the next step. Instead of broadening the scope to make PSM contribute significantly not only to bottom line success, but also to top line growth, many companies seem satisfied with the cost reduction role of purchasing. They invest in further optimizing their cost reduction approaches instead of involving PSM professionals in larger strategic decisions of the organization. The momentum of organizational learning makes them do more of the same, instead of leveraging their success for a second S-curve of evolution. The model of single- and double-loop learning introduced by Ashby (1960) and applied to organizational learning by Argyris and Schön (1999) helps to understand this phenomenon:

External pressure and evidence from competitor companies made many top managers change their perception of the potential contributions of the PSM function. They realized that purchasing may be able to deliver significantly more value than it did at that time. This insight is a clear example of a change in deeply embedded values and beliefs typical for double-loop learning. Accordingly, top management decided to change the role of PSM from transactional support to cost reduction. In line with theoretical reasoning of organizational learning literature, most companies installed a new CPO reporting higher in the organization than prior purchasing managers, and set increased aspirations with a focus on active cost management. These actions stimulated a change in the behavior of the PSM function and, over time, it adapted to the new tasks and delivered significant yearly cost reductions. PSM employees changed their self-perception and perceived themselves as cost managers, focusing heavily on reducing purchase prices. Again, this can be interpreted as double-loop learning, although in a different sample. As a result of this adaptation, performance outcomes stabilized on a significantly higher level.

At this point, further evolution would require another change in the mindsets and beliefs of top management and managers from other functions to allow the PSM function to participate in strategic decisions. Otherwise, further learning would be restricted to marginal improvements in the behavior of PSM professionals within their given roles. However, many top managers do not seem convinced that the PSM function could play a strategic role beyond cost reduction. Accordingly, the same mechanics described for the first part of PSM evolution seem to also apply for the second significant change described in most purchasing evolution models, from a supporting cost reduction role toward an integrated purchasing function.

In summary, PSM evolution seems to consist of at least two S-curves of double-loop learning, requiring profound changes of mindsets and perceptions not only within the PSM function but in the entire organization. One of the most important barriers to such an evolution seems to be largely outside the influence of the PSM function itself: Top management needs to realize the potential for competitive advantage, and decide deliberately to invest in PSM evolution, as opposed to focusing on other functions, to reap the benefits. However, the purchasing function itself could contribute to developing and sustaining evolution momentum by managing the change process, making improved performance outcomes visible, and proactively showing further contribution potential.

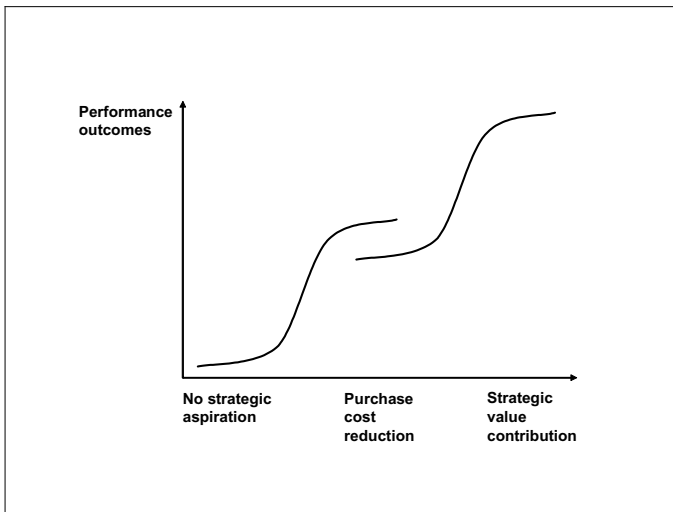


Figure 18 - The S-curves of PSM evolution

The conceptual framework developed in this chapter describes one of these step-changes each. However, it should be valid for both the first step from support status to a role of contributing significant cost reductions as well as the second step from a cost reduction player toward holistic integration as a strategic function.

Two aspects are not modeled in this framework. On the one hand, feedback loops might occur, representing lower level learning during each of the major evolution steps (Argyris and Schön 1999, p. 36). In fact, any kind of (perceived) changes in performance outcomes are likely to result in marginal adaptation of individual or collective behavior (Greve 2003, p. 4). However, such feedback loops do not question the overall relationships assumed in the framework above.

A second aspect which has been largely neglected up to now is how top management changes its mindsets and aspirations, and why. As an ignition to both S-curves of PSM evolution, such a change in mindsets has to take place, as discussed theoretically in chapter 3.2 and hypothesized in the conceptual research framework. Performance feedback is not likely to be the driver of such a step-change, as perceived performance is largely driven by the scope of what has been done before. If top management has for example expected PSM cost savings for some time, most of the performance measures are likely to be cost-focused. Accordingly, such a PSM function would seem to perform well at the end of the first S-curve of evolution so there would be no inherent reason for dissatisfaction to initiate further search efforts (March and Simon 1993, p. 68). On the contrary, the phenomenon of momentum in organizational learning could lead this organization to try even harder on cost reduction, despite decreasing returns (Miller and Friesen 1980).

These considerations imply that it takes some kind of external stimulus to initiate the changes in top management mindsets. In the case of the first S-curve of evolution, it seems that this stimulus was external market pressure for most of the companies. Heavy cost pressure made them realize that they cannot neglect a large share of their total cost base in cost reduction efforts (Burt and Doyle 1994, p. 11). However, for the second S-curve of PSM evolution, the stimulus seems to be less obvious. In the case of Automotive OEMs which are often stated as leaders in PSM evolution (Nelson *et al.* 2001, p. 3), innovation pressure seems to make companies reconsider their PSM strategies. Most of the major technological trends in the Automotive industry require close cooperation of innovative suppliers and OEMs (Wallentowitz *et al.* 2004). In fact, leading suppliers in the automotive industry are in a situation to pick their preferred customers today. Accordingly, top management at OEMs realized that

PSM had to deliver a lot more than cost reductions, at least in some categories, to make their company successful. Again, an external stimulus initiated a change in mindset.

These external stimuli to PSM evolution will be beyond the scope of the empirical validation of the suggested framework in the following chapter. However, it is important to note that such external pressure from the market seems necessary to overcome internal organizational momentum and make PSM evolution happen.

4.4 Interim summary

Based on a combination of prior PSM literature and implications from general organizational theories, a new conceptual framework of PSM evolution has been developed. The framework models one S-curve of PSM evolution respectively. It links changes in mindsets and aspirations to adaptation of PSM enablers and actual PSM value creation, and models the direct and indirect influence on perceived and objective performance outcomes.

The proposed hypotheses have been summarized in figure 18 before. It is interesting to note that the high level structure of this research framework is similar to a funnel in marketing research (see for example Albers and Söhnchen (2005, pp. 73-77)): Each of the purchasing and supply management practice meta practices is part of a causal chain, so a bottleneck in just one or two of the steps may significantly reduce the overall outcome and limit the effectiveness and/or degrees of freedom in subsequent meta practices. In other words, if a company is low, for example, in mindsets and aspirations, it is very likely also to be low in most of the subsequent steps. Performance outcome is determined primarily by the interaction of meta practices and the profile of strengths and weaknesses. Accordingly, this framework follows and details the concept of holistic purchasing competence introduced by Das and Narasimhan (2000).

These hypotheses can be seen as a first attempt to shed some light on the complex interrelations of purchasing and supply management value creation and its underlying enablers. It is important to note that potential circular effects have been neglected in the hypothesized framework for simplicity reasons, although they are likely to exist in various forms and stages of PSM evolution, following the concept of single-loop and double-loop learning introduced in chapter 3.2.1. Accordingly, this framework is supposed to set the stage for further research by building a sound basis rather than providing an ultimate solution.

5 An empirical analysis of drivers of PSM evolution

To validate the theoretical framework developed in chapter 4, an empirical study using variance-based structural equation modeling has been conducted, following the statement by Hunt (1991, p. 167): "The way to determine the truth content of any theory is to empirically test it." The empirical study approach, evaluation, and results will be discussed in detail in the following chapter.

Firms across industries can benefit from an emphasis on strategic purchasing (Carr and Pearson 1999, p. 516). Based on the belief that there is a set of PSM best practices that cuts across industries and organizations with only little specific differences (Ellram *et al.* 2002, p. 12), this empirical study tries to identify common drivers and barriers in the purchasing and supply management evolution process. However, this cross-sectional approach implies that both operationalization of the constructs and data collection will have to account for potential industry differences upfront to ensure reliability and comparability of data.

It is important to note that this empirical study is at least partly exploratory as the hypothesized causal relationships of the theoretical framework are on a higher level of abstraction than the underlying practice constructs. This is due to the fact that, as the field of supply management is very young, research often lacks reliable theoretical foundation for hypothesis testing (Jahns 2005, p. 137). For this reason, the objectives of this empirical study are twofold: On the one hand, this empirical study wants to test the general validity of the hypothesized research framework. On the other hand, the results are supposed to provide researchers with some indication on how to further develop the framework to deepen the understanding of cause-and-effect relationships in purchasing and supply management evolution.

5.1 An interview-based survey approach

In chapter 2.3, it was mentioned that some researchers using traditional survey methods did not find significant results, especially when comparing purchasing and supply management practices to objective company financial data. Ellram *et al.* (2002, p. 14) concluded:

"This study reinforces the difficulty of trying to study the complex interactions among systems and outcomes using traditional survey methods alone. While this may not be an entirely new insight, survey methods are still widely used and accepted in PSM research."

Accordingly, an alternative survey approach has been developed for this study, combining an interview-based data collection methodology introduced by Bloom *et al.* (2005) and variance-based structural equation modeling (Wold 1975).

5.1.1 Scale development and operationalization of constructs

Both the PSM meta practices and performance variables in the framework developed in chapter 4 are not directly measurable. This is a typical characteristic for empirical constructs or latent variables (Dunn *et al.* 1994, p. 145). Accordingly, a first important objective of any empirical study is to make such constructs measurable for empirical data collection (Bagozzi 1984, p. 16; Corsten 2003, p. 51). There are different concepts to measure indicators in general, which will be discussed in the following before describing the process of operationalizing the constructs and deciding on an appropriate evaluation concept.

For measuring latent variables, two approaches, measurement using reflective indicators and using formative indicators, can be distinguished (Bollen and Lennox 1991, pp. 305-306). By far more frequently used is the reflective measurement model (Moser 2006, p. 186). Reflective measurement assumes that the latent construct causes the indicators, i.e., every indicator is a direct outcome of the behavior of the latent construct (Gefen *et al.* 2000, p. 25). This implies that reflective indicators are chosen based on their capability to represent an estimate of the real construct values, which cannot be measured directly. The indicators are required to be internally consistent, uni-dimensional and equally reliable indicators can be exchanged for each other (Jarvis *et al.* 2003, pp. 199-200).

The alternative formative measurement model takes the opposite perspective assuming that the indicators cause the latent construct, i.e., the latent variable is an outcome of the collective influence of all indicators. In other words, the construct is a function of its indicators. They have an effect on the factor. This implies that reflectively defined indicators of a latent variable have to be highly correlated because they share the influence of the latent construct. Formatively defined indicators do not have to be correlated (Bollen 1989, p. 37). However, they have to be mutually exclusive and collectively exhaustive to reliably represent the latent variable (Nunnally and Bernstein 1994, p. 484; Diamantopoulos and Winklhofer 2001, p. 270). That is why reflective scales are more popular in social sciences. They are less sensitive to measurement errors, especially neglecting relevant content aspects of a construct (Homburg and Giering 1998, p. 115; Corsten 2003, p. 55). To make this conceptual difference clear, MacCallum and Browne (1993, p. 534)

suggested to call constructs with causal indicators only "composite variables" instead of "latent variables". Although the author will not follow this approach but stick to the generally accepted term latent variables, the suggestion emphasizes the difference between a formative measurement combining different aspects and a reflective measurement trying to mirror the real behavior of an unobservable variable nicely.

In the past, several studies used misspecified constructs even in high-profile research journals (Jarvis *et al.* 2003). Moreover, a recent simulation study showed that the differences resulting from such misspecification influence overall results nearly as much as flawed hypotheses on the relationships among latent constructs (MacKenzie *et al.* 2005, p. 729). Thus, it seems important to clarify the conceptual difference. A real-world example might help to differentiate: The police stops a car at night and wants to find out whether the driver is drunk. If they selected a reflective measurement approach, they might smell his/her breath, test his/her eye reactions, and make him/her walk on a straight line. If the driver was heavily drunk, he or she would probably fail in all of these tests. Accordingly, a reliable reflective measurement model would combine a multitude of tests for typical behavior of drunken people. The indicators are expected to be highly correlated. On the other hand with a formative measurement approach, the police might ask the driver whether he/she drank beer, whether he/she drank wine, and whether he/she drank hard liquor. It is obvious that answering yes to one of these questions could be sufficient to be heavily drunk (example taken from Chin (1998a, p. III)). Accordingly, the indicators do not have to be correlated. However, as stated above, it is essential to cover all content aspects in the case of formative measurement. For example, if the police would only ask for beer and wine, a driver could be completely drunk from hard liquor but the police officers would not be able to recognize it based on their questions.

In summary, there are four important differences among formative and reflective indicators (Jarvis *et al.* 2003, p. 203):

- (1) In a formative model, changes in the indicators cause changes in the construct; in a reflective model, changes in the construct cause changes in the indicators;
- (2) Dropping a formative indicator may alter the concept of a construct; reflective indicators should be interchangeable;

- (3) Reflective indicators are expected to covary; formative indicators do not have to be correlated;
- (4) The antecedents and consequences for formative indicators may differ; reflective indicators are required to have the same antecedents and consequences.

This research study wants to identify critical drivers of purchasing evolution. Accordingly, it aims at investigating how purchasing practices influence overall purchasing performance outcomes to provide practitioners with concrete recommendations. In this case, several authors (e.g., Varadarajan (2003, pp. 368-376), Nicolai (2004, p. 99-118)) have recently recommended to use a formative measurement approach at least for the exogenous latent variables, i.e., the purchasing practice constructs. Only a formative measurement approach allows modeling the multiple facets of complex organizational practices (Ulaga 2003, p. 691). Each indicators represents specific, observable practices, which cause the latent construct. Opposed to this, a reflective measurement model would imply measuring the observable outcomes of an unobservable (or at least not directly observable) latent meta practice. This latter approach would therefore imply both indirect measurement of practices and at least to a certain extent abstract interpretation of findings (Sönke and Hildebrandt 2005). Accordingly, this empirical study will operationalize the purchasing practices using formative indicators.

In prior empirical studies, performance in general has very often been measured using a reflective model (e.g., Carr and Pearson (1999, p. 508), Chen *et al.* (Chen *et al.* 2004, p. 520), Eltantawy (2005, p. 38)). It was argued that performance, especially company performance, is "more of an abstract perceptual construct" (Moser 2006, p. 188). The underlying assumption was that there is one uni-dimensional performance concept that cannot be measured directly. Thus, indicators representing good estimators of the underlying performance construct had to be identified. However, the literature is replete with examples of very different performance aspects and provides several clearly distinguishable dimensions of performance, both in the case of PSM and company performance (Carter *et al.* (2005, p. 17); see chapter 4.2.3). For example, Moser (2006, p. 193) used different constructs representing what he called strategic PSM performance, distinguishing cost reduction, contribution to sales growth, reduction of capital employed, and risk reduction. Other studies used indicators as different as "our organization's competency in supply management assures greater profits for our firm" and "our organization's competency in supply

management assures greater profits for our suppliers" (Eltantawy 2005, p. 55) in reflective measurement models. It seems at least questionable whether these indicators are interchangeable. The finding that PSM performance in terms of cost of goods and services is correlated with performance in terms of quality of incoming items (Janda and Seshadri 2001, p. 299) seems counter-intuitive. On the contrary, one would rather tend to assume that companies have to hit a balance between these two objectives to contribute optimally to company overall success (Ellram and Liu 2002, pp. 28-31). At least perceived PSM performance seems to be multi-dimensional and therefore has to be measured using a formative measurement model.

For financial company performance, a reflective construct seems more reasonable. One could argue that, for example, return on investment, profits as a percent of sales, and firm's net income before tax (Chen *et al.* 2004, p. 520) have profitability as a common antecedent. If profitability changes, it would most likely cause all these indicators to change. However, this study is not primarily interested in the abstract concept of financial company performance. Accordingly, the construct developed in chapter 4.2.3 was called company performance contribution. Purchasing is hypothesized to potentially contribute to several different aspects of company performance. That is why the construct company performance contribution conceptualized in this framework is, as opposed to financial company performance constructs in other studies (e.g., Carr and Pearson (1999, p. 508), Moser (2006, pp. 157-158)), assumed to be multi-dimensional. A formative measurement approach will have to cover the different relevant areas of potential PSM contribution. A formative approach to measuring a specific aspect of company performance, in this case the change over time, has also been chosen by Lee (1997, p. 70) in a study on risk-taking behavior.

The formative operationalization of all the constructs implied the necessity to cover all relevant content aspects of the respective variables, as discussed above. To ensure this comprehensive coverage, the author did not only rely on a broad literature review to conceptualize the different dimensions of each construct (see chapters 4.1 and 4.2). Additionally, a broad group of practitioners and researchers was systematically involved in the operationalization of constructs and validation of the hypothesized relationships.

To generate a comprehensive sample of indicators, Churchill (1979, pp. 66-68) suggested to complement a literature review with additional information sources such as expert surveys, examples from practice, and focus groups. However, most recent

studies at best mention some expert interviews involving typically less than ten people overall (e.g., Prahinski and Benton (2004, p. 47), Li et al. (2005, p. 624), Griffith et al. (2006, p. 91), Swafford et al. (2006, p. 177)). In this study, the team involved 25 practitioners and 7 senior academic researchers in the workshops mentioned before. The practitioners involved were senior PSM consultants on a partner or director level at McKinsey & Company, the corporate partner in this study. Collectively, they represented all global regions and major industry sectors. Participants from academia were professors and assistant professors from the fields of operations management, management science, and statistics. None of the experts invited to contribute was primarily involved with this research project so there is no reason to assume a confirmation bias (Pagell 2004, p. 466) for the experts involved.

In a first step, the core team consisting of two researchers and two practitioners came up with an initial suggestion for the constructs, their relationships, and their operationalization based on a comprehensive literature review. Then, this suggestion was syndicated in half-day workshops with 12 experts. After integrating the input from the workshop and revising the research model, a second workshop was set up with a similar setting but 9 new participants. The inputs were integrated again and syndicated in a third workshop, again with 11 new participants. As the overall model and the operationalization of the variables were fully accepted by the participants in this third workshop and the additional input was marginal, the team decided not to go for another round. However, the current model including the proposed indicators was sent around to all experts involved in the workshops for final approval. No suggestions for further improvement of the model were received. This implies that the research model and the operationalization of variables represent the collective expertise and aligned opinion of more than 30 senior PSM practitioners and researchers after in-depth discussion.

Obviously, this approach takes more experts to involve and a higher time investment by each of them than the standard approach of interviewing a few external people to check whether there are potential indicators that could not be extracted from literature research. However, this additional effort should, under the assumption that both the practitioners and researchers involved are among the leading experts in the field, ensure a comprehensive modeling of formative constructs to the largest extent possible. Table 1 gives an overview of the indicators used to model the different constructs of the research framework developed in chapter 4. They are in line with the conceptualized dimensions of each of the constructs as discussed in chapters 4.1 and 4.2.

Table 1 - Operationalization of constructs

Construct	Indicator	Minimum practice	Typical practice	Best practice
Mindsets and aspirations	Expectation of PSM value creation	Little to no value creation expected from PSM function	Value creation expectations on cost side but not necessarily in lead role	PSM seen and acts as a key contributor to company value along several dimensions
	PSM vision of the CPO	No clear performance aspirations	Performance aspirations not shared by most of the professionals	Generally shared performance vision and aspirations
	Change readiness of the organization	PSM professionals are resistant to change the status quo	Change is driven by a few individuals only	PSM function drives a culture of continuous improvement through the whole organization
	Strategy execution mindset	Strategies have limited to no impact on actual behavior	Strategy execution varies by area and depends heavily on individuals	Visible results can be clearly tracked to strategies
Talent management	Qualification of category managers	There is no clear description of required skills and capabilities for category managers	Category managers are typically selected based on commodity expertise and purchasing skills	Category managers combine excellent commodity expertise and management skills
	PSM career paths	PSM regarded as a dead-end job	No consistent career paths but de-facto careers, mostly within PSM	Clearly defined career paths both within PSM function as well as into other functions
	Training and talent development	No PSM-specific training or talent development	Basic PSM training focusing mostly on tactical skills	Individual development combining formal courses and job rotation
Performance management	Target setting mechanisms	No meaningful, realistic targets in place	Cost targets set but not truly challenging nor often seriously pursued	Comprehensive set of challenging targets developed cross-functionally
	Target tracking and reporting processes	No consistent performance tracking in place	Performance of major spend categories tracked regularly, but not in real time	Performance of all categories tracked systematically in (near) real time
	Individual performance management	Little/no performance feedback to individuals	Individual performance tracked and discussed, but not directly linked to personal development	Personal development and compensation linked to individual performance against agreed KPIs
	Target accountability beyond PSM	Savings targets not reflected in performance targets of budget owners	Savings targets partly reflected in budgets and budget owners' incentives	Budget owners made fully responsible for realization of savings targets in their domain
Cross-functional cooperation structures	Use of cross-functional cooperation structures	There is no systematic use of cross-functional teams	Cross-functional teams staffed regularly to tackle standard cross-functional problems	Highly flexible and focused use of cross-functional teams to tackle well-defined problems
	Role of PSM in cross-functional teams	PSM is only tolerated in some cross-functional cooperations	PSM is a participant and partly an initiator of cross-functional cooperation	PSM drives cross-functional cooperation for cost reduction and supplier integration
	Organization of cross-functional cooperation	No official assignment of PSM professionals to cross-functional cooperation	Purchasing professionals assigned as part-time project members	Temporary rotation of talented PSM professionals full-time into critical projects

Table 1 – Operationalization of constructs (continued)

Construct	Indicator	Minimum practice	Typical practice	Best practice
PSM organization structure	Global purchasing office structure	Purchasing offices in important demand locations only	Purchasing offices in most important demand and supply locations	Balanced structure of local purchasing offices in all current and future supply markets
	Corporate coordination of category management	There is no formal central coordination or it does not work in practice	Formal category authority in place but strong local units and some intransparency	Category-specific optimal degree of authority implemented and working
	Separation of transactional and strategic roles	No separation of strategic and transactional roles	Formal separation of strategic and transactional roles within the PSM function	Clear focus of PSM function on strategic tasks; transactional tasks handled decentrally
Knowledge and information management	PSM knowledge management	Incidental dissemination and basic applications of PSM knowledge management only	PSM knowledge management is based on individual pull and dispersed applications	Active dissemination of PSM knowledge through company-wide applications
	PSM systems support	ERP systems are not integrated and barely support basic PSM analysis needs	Partly integrated ERP systems featuring standard PSM process functionalities	ERP systems thoughtfully designed to support effective, company-wide PSM management
	E-literacy of the organization	Only partial use of basic e-tools such as e-RFQ, if any	Local use of e-tools in most common PSM applications such as e-catalogs, e-RFQs, ...	Integrated use of e-tools in all relevant areas based on a company-wide e-PSM strategy
	Transparency over PSM spend	PSM function has little/no transparency over much of PSM spend	PSM function has transparency only over "traditional" categories	PSM function has full transparency over entire PSM spend for all categories
Category value creation strategies	Category strategy approach	A formal sourcing strategy exists for no or only a few categories	A systematic strategic sourcing approach exists in mostly traditional categories	A systematic strategic sourcing approach exists for all categories
	Supply base strategy	PSM function does not actively manage supply base	PSM function generally manages supply base by focusing on selected key suppliers	PSM function actively shapes the supply base on a category-specific level
	Global sourcing strategy	Global sourcing happens accidentally or not at all	Some category-specific global sourcing initiatives exist but no comprehensive strategy	Clearly formulated and cross-functionally aligned strategy implemented for all relevant categories
	Value chain optimization strategy	Value chain interface to suppliers managed by other functions, such as manufacturing	PSM participates in value chain optimization decisions such as make-or-buy	PSM function drives value chain optimization such as make-or-buy analyses
	Supplier development strategy	No systematic supplier development strategy in place	Supplier development efforts frequently undertaken but only partly successful	Supplier development by dedicated teams following a successful strategic approach
	Risk management strategy	Continuous fire fighting due to lack of PSM risk management	Basic PSM risk management locally implemented, focusing on tier 1 suppliers	Systematic PSM risk management and risk sharing across the entire value chain

Table 1 – Operationalization of constructs (continued)

Construct	Indicator	Minimum practice	Typical practice	Best practice
Core purchasing processes	Demand management processes	Standardization of demand and demand guidelines exist only in very few categories	Use of basic demand and specification management in many categories	Use of cross-functional demand and specification management across the company
	RFx processes	Neither formalized nor professional RFx processes in place	Standardized RFx processes usually result in competitive offers from existing suppliers	RFx processes highly standardized and partly automated among full set of suppliers
	Supplier selection processes	Supplier selection focuses on securing supply and purchase price	Basic concepts of total cost of ownership or lifecycle cost and associated risks applied	Strategic evaluation of supplier development potential and relative cost and risk
	Negotiation processes	Use of "classical" negotiation approach relying mainly on psychology and tactics	Systematic negotiation approach and solid preparation for high-value categories	Consistent use of systematic approach based on solid fact base and well-defined strategy
	Supplier performance management processes	No systematic supplier performance tracking in place	Supplier performance measured and managed in some categories but partly inconsistently	Supplier performance targets formally agreed and consistently tracked and managed
	Compliance management processes	Little/no compliance with PSM process guidelines, frequent maverick spend	Purchase approval processes in place but inconsistent use of consequences	High compliance due to clear processes and consistent tracking of exceptions
Strategic involvement of PSM	Alignment with and impact on corporate strategy	PSM not informed about changes in corporate strategy	PSM not involved closely in development of corporate strategy and functional strategies	PSM is full team member in corporate strategy development; PSM strategy is fully aligned
	Impact on product development	PSM function does not contribute significantly to the product development process	PSM function only contributes to product development processes from a cost perspective	PSM function actively contributes supply base knowledge and supplier innovations
	Impact on marketing and sales	PSM function does not cooperate with marketing and sales	PSM function supports marketing and sales to exploit supply base opportunities	PSM function is involved in marketing and sales strategy development and execution planning
	Impact on mergers and acquisitions	PSM function is only involved in capturing synergies after the deal	PSM function verifies synergy potential from supply markets before final decision	PSM function is involved regularly and early in the strategy and due diligence phase
Perceived PSM performance	Annual PSM savings			
	Quality improvements			
	Supply chain performance improvements			
	Supply chain risk reduction			
Company performance contribution	Contribution to larger strategic goals of the company		N/a	
	Average EBITDA margin			
	Annual reduction of COGS			
	Average return on assets			
	Annual sales growth			

5.1.2 Data collection approach

Most of the constructs in the research framework discussed in chapter 4 refer to purchasing and supply management practices. As mentioned above, Ellram et al. (2002) doubt that 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" (p. 12). They conclude from their empirical study that from a traditional survey, it seems hardly possible to distinguish whether a certain practice is only very prominent in the mind of the CPO or whether it is really implemented and executed. Moreover, it seems difficult to test whether CPOs really understand the spirit of certain best practices and use them appropriately. Last but not least, many best practices seem to be effective only in a wider context, i.e., they have to fit corporate strategy, corporate culture, and current situation to be effective. This is also beyond traditional indicator-based measurement in a paper-based survey (see also David et al. (1999)). Knight (2000, p. 123) argues that only an interview-based approach seems suitable to capture such "subtle and complex aspects" of organizational behavior.

In fact, such doubts are not limited to the area of PSM practices. The basic assumption of traditional survey methodology that participants are generally both able and willing to assess their current practice level relative to their peers or other relevant indicators seems partly questionable. For any complex assessments, a major share of the variance in traditional survey data has been shown to be attributed to either informant bias or ignorance. For example, already in 1981, Philips (pp. 408-412) published results indicating that less than 50% of the variance in key informant reports can be attributed to the actual content issue. He argued that survey participants, especially ones on lower hierarchy levels, may not be able to make complex social judgments, thus increasing both random and systematic measurement error.

Data on purchasing and supply management practices

For the purchasing and supply management practice constructs, an alternative to traditional survey methods seems necessary to cope with their disadvantages discussed above. From the results of Philips (1981) it has to be concluded that informants are very often not able to provide valid assessments of complex organizational phenomena inside their organization due to ignorance and informant bias. Interviews with key informants may be one possibility to identify such problems. Unlike a paper-based survey, interviews allow researchers to probe for additional information to ensure valid assessments (Biemer 1988). This is supported by Pagell

(2004) who reported the following issues his research team faced in case study interviews on cross-functional integration in operations management:

"First, there is an issue of social desirability. It is possible that some of the respondents would claim high levels of integration because they assume this is what the researchers want to hear. We saw limited evidence of this type of respondent bias. But we also encountered respondents who had overly negative impressions of their own organizations because of their perception of what other organizations were achieving. Specifically, there were instances where a manager would describe the level of integration in their plant as low as compared to the best practices they had read about, even though the best practices are seemingly rare" (p. 467)

To address these issues, Pagell (2004, pp. 466-468) chose an external assessment approach for data collection: Instead of the respondents rating their practices themselves, the interviewers assessed the practice level based on the information provided by the participants. In a first step, the respondents provided their perception of the level of integration along with an explanation of what they mean by integration. Then, the researchers asked follow-up questions to see to what extent this understanding matched their pre-defined definition of integration. In a third step, respondents were asked to provide specific examples of their practices to support their contention. Based on this information, the interviewers finally assessed the practice level of the participants based on the respondents' answers and their experience from other interviews, also taking into account whether the practices are effectively aligned with the individual companies' overall strategy and environment. To avoid a confirmation bias by the primary researchers, additional secondary interviewers were involved in most of the interviews. They took their own notes and asked follow-up questions during the interview if they felt some aspects needed clarification. Before considering the data for evaluation, primary and secondary researchers had to resolve any areas of disagreement in their assessments.

A similar approach is presented by Bloom, Dorgan, Dowdy, Rippin, and van Reenen (2007) in a forthcoming article in the *Quarterly Journal of Economics* based on an earlier working paper (Bloom *et al.* 2005). They investigate differences in management practices across firms and nations, also taking an interview-based survey approach relying on external assessments. The main difference to the approach of Pagell (2004) is that Bloom *et al.* (2005, pp. 30-37) used a pre-defined scoring grid describing typical practices on different levels of management evolution rather than subjectively triangulating assessments from the interviews only. Using such a pre-defined scoring grid obviously offers the advantage of a more objective assessment process. However, it requires the researchers to develop detailed hypotheses on how minimum, average, and best practices look like. To develop

these hypotheses for all of the indicators in their study, Bloom et al. (2005, p. 8) relied on the expertise of McKinsey & Company to leverage these practitioners' broad experience based on client projects across all industries all over the world. A similar scoring grid has also been used by Carter et al. (2005, p. 51) to identify best practice companies in the area of supply performance measurement, again developed in cooperation with McKinsey & Company.

Bloom et al. (2005, pp. 9-10) took reasonable efforts to obtain unbiased responses, considering not only ignorance and informant bias of the respondent, but also potential bias induced by the interviewer and the interviewing process. First, all interviewers were specially trained to ensure a common understanding of the scoring grid. Second, the interviews were "double-blind" (p. 9). On the one hand, participating managers were not aware that they were being scored during the interview process. On the other hand, interviewers did not receive any upfront information about the companies, except for firm name and contact details of the interviewee. Third, the survey was executed using a funneling interview technique based on open questions drilling down from very broad and general aspects to specific examples to get an accurate view of the company's practices. This technique is very similar to the one described by Pagell (2004) which has been discussed before. Last, Bloom et al. (2005, pp. 9-10) introduced a broad set of control variables regarding the interview process, the interviewee, and the interviewer to identify and eliminate potential influence. In fact, they found that using these controls for interview noise in the econometric evaluations improved their results significantly.

Bloom et al. (2005, pp. 11-12) evaluated the measurement error in the management practice scores from their interviews by conducting repeat interviews on more than 60 firms with different managers and subsequently decomposing variation and measurement error. They found that measurement error accounts for 42% of the variation on question level and 25% of the variation on firm level (taking a simple average of all question scores). These values are clearly below the bias of more than 50% reported by both Philips (1981) and Ketokivi and Schroeder (2004) for traditional survey methodology and support the reliability of this interview-based survey approach.

This study combined and further enhanced the two approaches presented by Pagell (2004) and Bloom et al. (2005) to measure the purchasing and supply management practice indicators to cope with the difficulties reported by earlier empirical studies. The final data collection approach will be described in more detail in the following paragraphs.

The team conducted telephone interviews with Chief Purchasing Officers or their equivalents. In line with many prior operations management studies (e.g., Kannan and Tan (2003, p. 476)) and findings from other areas of management research (e.g., Philips (1981, p. 412)), it is assumed that high-ranking respondents tend to be generally more reliable sources of information than their subordinate ranks. In the case of this study with most of the survey questions addressing high-level strategies and overarching practices and a special focus on soft factors such as "mindsets and aspirations", it seems even more intuitive to assume that the CPO is by far the most knowledgeable person (Eltantawy 2005, p. 76). Interestingly, this assumption is also supported by findings of Bloom et al. (2005, p. 10) who reported that senior managers achieved significantly higher management practice scores on average than their junior counterparts. Many other empirical studies (e.g., Tan et al. (1998), Goh et al. (1999), Carr et al. (2000)) also reported that respondents held titles such as CPO, Director or Senior Vice President of Purchasing, etc. However, for paper-based questionnaires it seems at least questionable whether all those managers have really completed the surveys themselves. Lockström ([upcoming], p. 21) even reports that some companies have employees specifically dedicated to filling out mail surveys. Using an interview-based data collection approach ensures that the information really comes from the target respondent, thus increasing the reliability and validity of the data per se.

Opposed to Bloom et al. (2005, pp. 11-12) who conducted repeat interviews with other manufacturing managers on the same level in the organization to cross-validate their interview scores, the focus on the most senior PSM manager in each organization implied a natural lack of equivalent alternative interviewees. However, interviewing the most knowledgeable manager in the organization reduced the necessity to cross-validate the information (Forsman and Schreiner 1991, pp. 279-302).

The interview guide and scoring grid used to conduct the interviews and rate the purchasing practices was developed in cooperation with McKinsey & Company's Global Purchasing & Supply Management Practice. Based on a comprehensive literature review (see chapter 3) on the one hand and the collective experience of these practitioners from more than 1,000 PSM transformation studies within the past few years on the other hand, it was possible to develop detailed hypotheses on typical practices in different stages of the evolution from purchasing to supply management (see chapter 5.1.1). For each of the 37 purchasing and supply management indicators, one open lead question and a funnel of more detailed follow-up questions was defined to guide the interviews and lead interviewers to a reliable

assessment (Pagell 2004, pp. 467-468). These questions are complemented by the scoring grid to guide the interviewers to a rating on a scale from 1 (i.e., minimum practice hypothesis) to 5 (i.e., best practice hypothesis).

Using assessments from the scoring grid in any advanced statistical evaluations such as linear regression or structural equation modeling requires the assumption that the data is at least interval scaled, i.e., the ratings from 1 to 5 have to be equidistant for every dimension of the scoring grid (Jaccard and Wan 1996, p. 4). One frequently applied solution to this issue in the area of questionnaire development is to only describe the extreme values of the Likert scale orally and avoid explicit descriptions of the intermediate steps (Lalla *et al.* 2005, pp. 578-579). For this study, this would have meant only to describe minimal and best practice and leave the assessment of the intermediate steps to the interviewers. However, the disadvantage of such an approach is that subjective interpretation of the different intermediate steps may differ by participant, or in the case of this study, by interviewer. Such subjective assessments obviously contradict the objective of collecting objective and comparable data on PSM practices. Thus, optimal equidistance had to be balanced against optimal comparability of the ratings. As a compromise, the research team decided to follow the approach of Bloom *et al.* (2005, pp. 30-37) who fixed practice levels 1, 3, and 5 but allowed any integer rating from 1 to 5. When developing the scoring grid, the research team was fully aware of the problem of equidistance and it tried to formulate the description of practice level 3 for each of the dimensions in a way that equidistance to both level 1 and level 5 could be assumed.

The entity of interview guide and scoring grid for each of the 37 purchasing and supply management indicators will subsequently be referred to as dimension. One example dimension is shown in figure 19.

In line with the approaches of Pagell (2004), Carter *et al.* (2005), and Bloom *et al.* (2005), the assessment of practice levels is done by the interviewers, not by the respondent. The interviewers match the CPO's answers to the descriptions of the typical practice levels in the interview guide. Actual practice of a company has to match all indicator statements to qualify for a certain assessment level. For example, if a company's practices fit two indicator statements from level 5 but one indicator statement from level 3, it would be rated a 4. Whenever interviewers found any of the dimensions not applicable, no score was given to that particular dimension. One prominent example for such a dimension would be "PSM value creation in discontinuity situations" where the interviewers found that about a quarter of the

participating companies had not experienced (or the CPO was not aware of) major mergers or acquisitions during the past few years.

Dimension/sample questions	(1)	(3)	(5)	Your rating
Expectation of PSM value creation What is the company's expectation regarding the value creation from PSM relative to other functions? • How important is PSM? • What share of the company's value is derived from PSM? • What kind of value is PSM expected to contribute?	Little to no value creation expected from the PSM function • PSM seen as a pure support function • PSM professionals rarely seen as peers by P&L - responsible managers • Generally, cost savings targets only broken down by BU with no explicit targets for PSM • No further value creation expectations	Value creation expectations on cost side but not necessarily in lead role, shared with P&L owner • PSM seen as helpful in generating cost savings • Cost reduction targets broken down to PSM, but P&L-responsible primary owner with "PSM helping them" • Little to no value creation along other dimensions (quality, time, innovation, etc.)	PSM seen and acts as a key contributor to company value along several dimensions • Effective PSM seen as key to the company's success • PSM professionals perceived as true peers by other functions • High involvement of and interest from CEO • Usually large share of company cost reduction target explicitly assigned to PSM • PSM seen and acting as valuable contributor to other value dimensions (e.g., quality, time, innovation)	

Figure 19 - Example dimension of interview guide

To avoid a potential respondent bias, the CPO was not aware that he or she was rated based in the answers during the interview (Bloom *et al.* 2005, p. 9). Before the interview, the participants would only receive an overview of the interview structure, listing and structuring all the indicators to be discussed during the interview on one page, along with the paper-based baseline questionnaire covering question on some descriptives and perceived PSM performance measures. Neither the interview guide nor the scoring grid were shared with participants. They were only told that this is a global benchmarking effort. In order to increase the response rate, they were promised a summary of the research findings as well as a tailored feedback document, which evaluates strengths and weaknesses specifically relative to their industry peers.

Whenever possible, two interviewers were assigned for every interview. The role of the first interviewer was to discuss the questions with the interviewed CPO. The second interviewer took notes and was free to ask clarifying questions. Both interviewers rated the purchasing practices of the company independently based on the scoring grid. After the interview, they discussed each question, agreed on a common rating, and wrote down a formal comment to justify the assessment (Pagell 2004, p. 466). To ensure maximum data quality and a common understanding of the

interview questions, junior core team members were trained in a 3-day training workshop. During this workshop, two test interviews helped all participants to understand how the interview guide was to be used in practice.

To ensure consistency in interview style and realize learning curve effects, two further measures were taken: First, the group of first interviewers was kept as small as possible. Accordingly, 159 of the 202 interviews were conducted by only five different interviewers, all of them with prior practical experience in purchasing and supply management. Of the remaining 43 interviews, 29 were led by four senior McKinsey PSM experts who had participated extensively in the development of the scoring grid. Only 14 interviews were conducted by others, mostly senior PSM experts at McKinsey. Second, one full-time interviewer was assigned responsibility for interview quality. Besides doing 24 interviews herself, she participated in 60 out of the 202 interviews as second interviewer, i.e., on average she would participate in every third interview of each first interviewer. This enabled her to observe and, if necessary, address differences in interview style or rating behavior of the other first interviewers. There were 7 more trained interviewers acting as second interviewers on demand who covered 82 more of the interviews. In 36 cases, other PSM experienced McKinsey consultants served as second interviewers.

Data on performance measures

In the area of performance measurement, the dilemma of perceptual versus objective measures has also been discussed broadly, especially on the level of company performance. For example, Carr and Pearson (1999, pp. 504-505; 2002, p. 1040) investigated the differences between subjective assessment and objective data on return on investment (ROI). They asked respondents to provide their ROI over a period of five years back and compared those numbers to a subjective assessment of the development of ROI. Whenever respondents provided both the objective data and the subjective assessment, the assessments matched in about 80% of the cases directionally. The authors concluded that the subjective assessment would be reliable. Yet, there seems to be a significant bias in this evaluation: Those respondents who did not provide the objective data could still complete the subjective assessment in most of the cases. Under the assumption that the subjective assessment of most of these latter respondents is at best a good guess, the conclusion that subjective assessments are reliable seems questionable.

From a theoretical perspective, Tan et al. (2002, p. 617) argued that financial performance measures ignore "opportunity costs and the time value of money". However, this seems to be a weak advantage compared to the uncertainty of

perceptual performance measurement. Ketokivi and Schroeder (2004) summarize the basic questions and doubts as follows:

"Are the informants honest? Is their response a reflection of what is or what should be? Are they engaging in rhetoric that reflects their managerial position? Do all informants interpret the notions of "strongly agree" or "above industry average" in a similar, consistent and comparable manner?" (p. 251)

In their empirical evaluation, they found similar results to the study by Philips (1981). Over half of the variance in perceptual performance was attributed to either informant bias or error. The authors thus recommend "that in single-informant studies perceptual measures of performance should be avoided if possible." (Ketokivi and Schroeder 2004, p. 261)

Accordingly, the indicators for the construct company performance contribution will be measured using publicly available financial data. Table 2 provides an overview of how the different performance measures were calculated based on the data from the database. All financial performance measures cover the years 2002, 2003, and 2004 instead of only one year. Using a longer period seems more appropriate as it reduces the influence of one-time events for individual companies. Moreover, it seems more realistic to expect a longer-term impact of purchasing and supply management evolution (see Reinartz et al. (2004, p. 12) for a similar discussion in the area of customer relationship management). To calculate "Annual reduction of COGS", cost of goods sold in 2004 were normalized to the revenue level of 2002 to identify the sole effect of cost reduction, excluding effects from sales growth. As COGS were not available in the databases for most of the companies, they were estimated by calculating revenues minus EBITDA.

Data for financial performance measures was sourced from Bloomberg, Research Insight, and Amadeus databases and from annual reports published on the company websites. EBITDA data from the database was compared to EBIT + depreciation + amortization to additionally validate the data. Financial institutions had to be treated slightly differently because of their specific accounting system. Typically, they report price/earnings ratio and price/book value, measures, which are not comparable to EBITDA margin or similar profitability measures used in other industries. Based on recommendations of industry experts, net revenues were chosen to represent sales figures, and operating income was assumed to represent EBITDA. It seems obvious that financial performance measures are not directly comparable across industries. Even if the performance measures were calculated consistently for all industries (which is not the case for financial institutions as stated above), it would still differ

when it comes to interpreting. For example, return on assets (ROA) depends on the industry-specific level of assets necessary to run the business. Thus, interpretation of a ROA of 10 percent would be completely different in a service company, a manufacturing company, or a financial institution. However, within each industry, those performance measures are meaningful. To make up for this dilemma, control variables have to be introduced to eliminate the inter-group differences. They will be discussed in more detail in chapter 5.2.

Table 2 - Calculation of company performance measures

Performance measure		Description
Average EBITDA margin		$\frac{\sum_{i=2002}^{2004} \frac{EBITDA_i}{Revenues_i}}{3}$
Average ROA		$\frac{\sum_{i=2002}^{2004} ROA_i}{3}$
Annual reduction of COGS	of	$1 - \sqrt{\frac{COGS_{2004} * \frac{Revenues_{2002}}{Revenues_{2004}}}{COGS_{2002}}}$
Annual sales growth		$\sqrt{\frac{Revenues_{2004}}{Revenues_{2002}}} - 1$

As opposed to company performance contribution, which is supposed to be as objective as possible, perceived PSM performance is perceptual by definition. In fact, it is part of the research hypotheses discussed in chapter 4 that perceived PSM performance may not cover the entire PSM value creation due to the difficulties of measuring operational performance objectively (Chen *et al.* 2004, p. 513), especially in the case of cross-functional strategic involvement where individual contributions are very difficult to allocate. This implies that a traditional paper-based questionnaire seems best suited to collect data on the participants' self-perception – explicitly leveraging the weaknesses discussed above to mirror the difference between perceived and objective performance contribution.

Nearly all large companies track annual PSM savings as part of their PSM performance measurement. Leading purchasing organizations distinguish cost

reduction, price changes relative to market indices, and cost avoidance (Carter *et al.* 2005, p. 17). However, most companies do not cover bottom line contribution in such a sophisticated way. Accordingly, differentiating these categories in the questionnaire could induce unwanted bias in the data as participants could be tempted to estimate numbers for those categories that are not explicitly measured in their organization. To avoid such effects, the questionnaire simply asked for realized purchasing and supply management cost reductions including purchase price reductions, logistics cost reductions, and associated maintenance and service cost reductions for the years 2002, 2003, and 2004. Because of the complexity of the PSM savings concept, it seemed important to ensure a common understanding among all respondents to get comparable data.

For this reason, implausible savings statements, e.g., savings significantly different from industry average, and missing values were addressed personally in follow-up calls with those participants. The discussion of savings values led to a correction of the values in 37 cases. For 8 companies, the values were revised to exclude budget cuts and externally caused changes in demand. 29 companies explained that they do not measure realized savings because it is not a primary objective of their purchasing activities. Those companies, most of them in the early phases of purchasing evolution, focused mainly on securing supply while keeping cost stable. Accordingly, the values for realized savings were set to 0. 40 participants stated that they are not willing or allowed to share their realized savings for confidentiality reasons. Considering the companies that did not provide a baseline survey at all, this resulted in 141 usable data sets for the performance measure self-reported PSM savings.

For the other indicators of perceived PSM performance, the performance measures vary even more widely between companies even within industries (Carter *et al.* 2005). Thus, only a subjective assessment of the individual performance seems suited to provide comparable data. Accordingly, the questions regarding quality improvements, supply chain performance, reduction of supply risk, and contribution to larger strategic goals were formulated relative to the respondent's specific key competitors on a five-point Likert scale. This approach has also been used in other recent studies, e.g., Das *et al.* (2006, p. 569). According to Zahra and Covin (1993, p. 461), this approach combines two advantages: First, it forces the respondent to mentally specify his relevant environment in terms of key competitors. Second, it controls for potentially confounding industry effects.

5.1.3 Population and sample

For any empirical study, it is essential to clearly identify a specific population the results are supposed to be universally valid for (Shah and Meyer Goldstein 2006, p. 163). The target population for this study is all companies with 2004 revenues above USD 3 bn globally across industry sectors. The revenue threshold of USD 3 bn had been chosen to ensure sufficient complexity of the organization for questions regarding cross-functional collaboration or global coordination of purchasing and supply management activities to be meaningful. Many of these large companies are also mentioned in the literature as being leaders in their industry. Moreover, these firms are more likely to be successful and competitive in their industrial domain based on their profitability and growth in the past (Eltantawy 2005, p. 37). No industry sectors were excluded per se.

To identify the sampling frame, a list of all public and private companies with 2004 revenues above USD 3 bn was created from the database OneSource. It contained 2251 companies. A full survey approach was chosen to avoid sampling problems (Bamberg and Bauer 1998, p. 135). Accordingly, all companies in the sampling frame were contacted following a standardized process to invite the CPO to participate.

First, the company address and switchboard telephone number were identified from databases such as Hoovers. In about 70 cases, the company name in the sampling frame did not match any of the company names in these databases or the address data provided turned out not to be valid any more. In some cases, these databases also listed a CPO or equivalent head of purchasing and supply management. However, in most of the cases, the research team had to call the company's switchboard to ask for the CPO's contact data. In more than 500 companies, the switchboard employees either did not speak English at all, stated that the company does not have a purchasing function or a position equivalent to a CPO, or were not willing or allowed to provide the research team with his or her name and contact data. Accordingly, the available sample comprised 1655 companies.

In a next step, the research team tried to call the CPO's office to ask for permission to send a formal invitation letter by mail. In more than 350 cases, no one was ever available and no response to voice messages was received after these three phone calls. Of the other companies, more than 700 refused immediately for different reasons: Either, the CPO's office or the CPO him- or herself stated that participation in research studies is generally prohibited by company policy, or that the CPO would not be willing to participate, mostly due to resource constraints.

For 574 companies, the permission to send the formal invitation letter was received. In these cases, a personalized letter was sent to the CPO along with the paper-based baseline survey and one page showing the structure of the 90-minutes interview. To collect responses to the formal invitation, the research team contacted the CPO's office by email and/or telephone. The first follow-up by email or phone was initiated approximately two weeks after the first submission of the survey package. For those companies who had not given their response by the fourth week, another email or telephone follow-up was performed. Time and cost limitations constrained us to pursue the potential respondents for more than 3 follow-ups. These rigorous follow-up efforts seemed to pay off: Among those who received the formal invitation, more than 35 percent finally participated in the study. Accordingly, 202 interviews were conducted between July 2005 and June 2006. Figure 20 gives an overview of the contacting process.

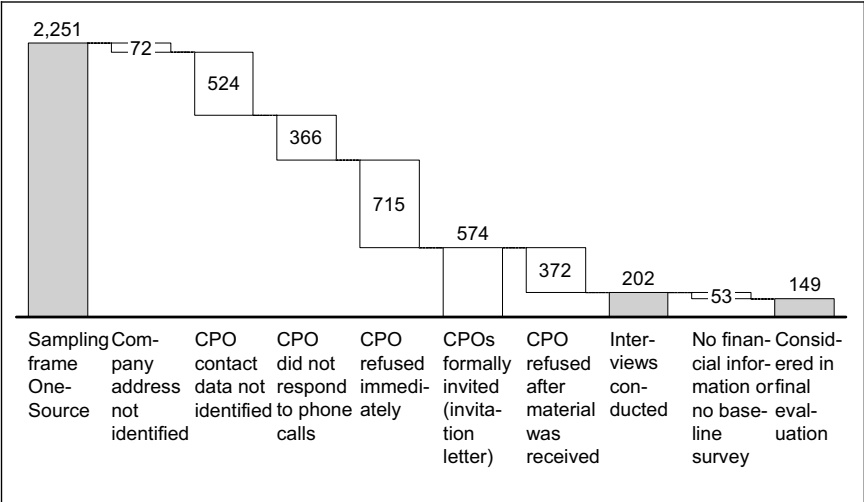


Figure 20 - Contacting process funnel

The survey response rate in empirical studies typically considers all questionnaires which were not returned due to incorrect addresses (Moser 2006, p. 181). In the case of this study, the available sampling frame of 1655 companies where a CPO could be identified and his or her contact data was provided by the company, i.e., the sampling frame after the first two steps of the contacting process, seems to be a comparable basis. Accordingly, the overall response rate in terms of conducted interviews is more than 12 percent. Given the complexity of the population, the size of the companies,

the seniority of the target respondents, and the necessary time investment of at least 90 minutes for participation, this rate seems very respectable. In fact, some paper-based surveys targeting by far less demanding samples realized similar or even lower response rates (e.g., Goh et al. (1999), Vonderembse and Tracey (1999), Carr et al. (2000)).

However, the large share of non-respondents (2049 out of 2251 companies) may have led to a bias in the evaluation if participating companies were different in their purchasing practices or performance outcomes compared to non-participants (Schnell *et al.* 2005, pp. 310-314). Two questions have to be clarified to ensure that such a bias does not exceed acceptable limits: First, it has to be evaluated whether there are major differences between sample and sampling frame in terms of available descriptives (Bloom *et al.* 2005, p. 11). This comparison showed a generally good fit between sample and sampling frame characteristics, despite some significant differences (detailed results see figure 21):

Industries: Financial institutions are underrepresented (14% in the sample compared to 21% in the sampling frame), whereas high tech and materials industry are slightly overrepresented in the sample (18% compared to 12% and 15% compared to 10%, respectively).

Regions: Europe is significantly overrepresented (57% in the sample compared to 36% in the sampling frame), whereas Asia, Australia, and Africa are underrepresented in the sample (collectively 9% compared to 28%).

Company size: There was a bias towards large companies in the sample. Companies below USD 5 bn revenues were underrepresented (32% in the sample compared to 42% in the sampling frame), whereas companies with revenues above USD 20 bn were overrepresented (24% compared to 14%).

Although these differences may limit the generalizability of results, it is important to note that most studies in the area of operations management do not report such a comparison between sample and sampling frame or target sample at all. To account for differences in the purchasing and supply management practices and the different performance measures among the different industries, regions, and company size groups, control variables for these characteristics were used in the final evaluation. They will be discussed in more detail in chapter 5.2.

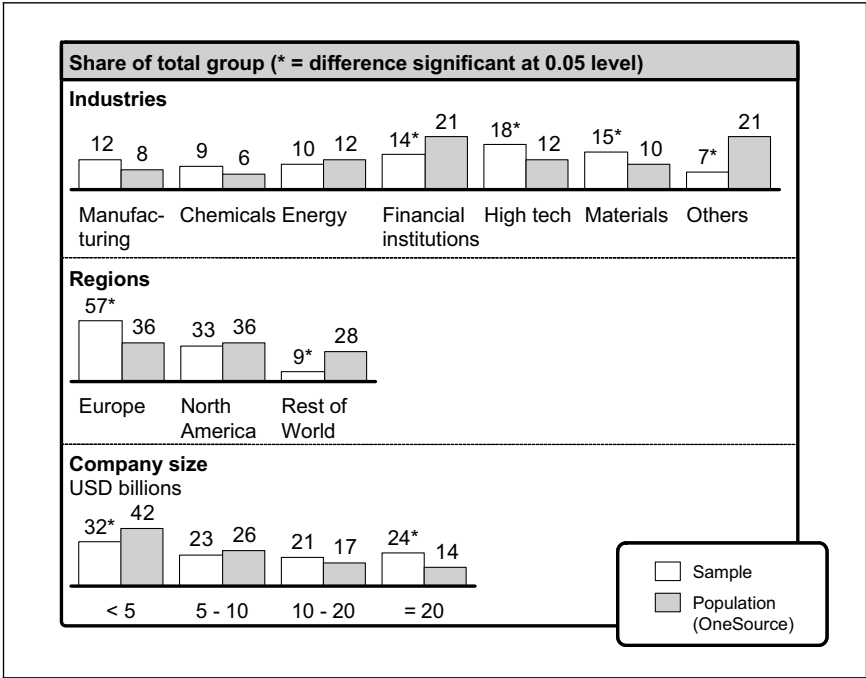


Figure 21 - Representation of the population

In a second step, the test for non-respondent bias suggested by Armstrong and Overton (1977) has to show that participants do not behave differently than non-respondents with comparable descriptive characteristics. This test assumes that late respondents tend to be similar to non-respondents in their characteristics. Accordingly, if there are no significant differences between early and late respondents, non-respondent bias is assumed to be uncritical. A Pearson's chi-square test was conducted to find whether there are differences between the first and second half of participants concerning PSM practices or performance. This test did not show any significant differences at a significance level of 0.05, neither on purchasing and supply management practice scores nor on performance measures. Accordingly, it seems acceptable to assume that non-respondents behave similarly to the companies in the sample.

It is interesting to see that most studies in such high-profile academic journals as the Journal of Operations Management only report the results of the test by Armstrong and Overton (1977) without explicitly investigating the first step, that respondents and

non-respondents are actually similar in terms of the known sample descriptives. In the case of this study, there is a bias toward European companies. If one assumes an extreme case of, for example, only European companies in the final sample with the same defined population, the assumption of Armstrong and Overton (1977) that late (European) respondents behave similar to non-respondents in the rest of the world seems more than questionable. Accordingly, the two tests for representation performed above should always complement each other in the case of a complex population. In the case of this study, the findings indicate a generally good fit with the limitations discussed above.

5.2 Evaluation approach

The interview-based survey approach introduced before raises some interesting questions regarding a valid evaluation approach. For example, it seems questionable whether measurement error from such interviews where the interviewer rated the participant based on a semi-structured discussion can be treated similar to measurement errors from paper-based questionnaires or structured interviews. Accordingly, the evaluation methodology has to be discussed in detail to avoid violations of statistical and empirical laws and requirements.

5.2.1 Evaluation concept

The structure of the framework tested in this study, with several interrelated constructs, linked by hypothesized cause-and-effect relationships, calls for structural equation modeling. Using structural equation modeling, it would be possible to test whether the hypothesized relationships are supported by the data the team collected from the empirical survey.

Structural equation modeling has only recently become broadly applied in operations management research (Shah and Meyer Goldstein 2006, p. 148). The term structural equation modeling (SEM) describes a group of second generation data analysis techniques, enabling researchers "path analytic modeling with latent variables" (Chin 1998a, p. VII), or, more broadly, "to answer a set of interrelated research questions in a single, systematic, and comprehensive analysis by modeling the relationships among multiple independent and dependent constructs simultaneously" (Gefen *et al.* 2000, p. 71). Direct and indirect effects of a latent construct on one or more others can be modeled and empirically tested (Homburg and Hildebrandt 1998, pp. 26-27). Accordingly, typically intricate real-world relationships such as the process of

purchasing value creation hypothesized in the framework presented in chapter 4 can better be modeled by structural equation modeling than simple correlation-based models or multiple regression approaches (Gefen *et al.* 2000, p. 4).

An important precondition to structural equation modeling is that the framework which is supposed to be tested is based on a consistent set of theoretically grounded hypotheses explaining both the relationships between latent and observable variables (measurement model) as well as between different latent variables (structural model) (Carr and Pearson 1999, p. 506; Ringle 2004, pp. 7-8). It is important to keep in mind that structural equation modeling cannot determine cause-and-effect relationships but only test whether a data set fits a priori hypotheses (Fornell and Bookstein 1982, p. 450; Hair *et al.* 1998, p. 579). Thus, the practical value of a structural equation model is determined entirely by the quality of the underlying hypotheses. Even if the model seems valid and reliable in terms of formal quality criteria (Homburg and Hildebrandt 1998, pp. 24-25), if theory is flawed, results become arbitrary. In the case of this study, the conceptualization of constructs in chapters 4.1 and 4.2 and development of hypotheses between the latent constructs in chapter 4.3 were supposed to establish a sound theoretical basis for measurement model and structural model respectively. However, many of the hypotheses tested in this empirical study are new and have never been tested before. Accordingly, this study is rather exploratory than confirmatory by nature. Only further empirical verification of the results can show whether the underlying hypotheses can actually be upheld.

From a statistical perspective, there are two alternative approaches to estimate the parameters of a SEM model: the covariance-based algorithm (Jöreskog 1971; Jöreskog 1973), implemented for example in the software package LISREL (Jöreskog and Sörbom 1996), and the variance-based partial least squares algorithm developed by Wold (1975). Partial least squares (PLS) algorithm has been implemented in different software packages, for example SmartPLS (Ringle *et al.* 2006) which will be used for the structural equation model evaluation in this study.

Yet, "current familiarity with PLS [...] is low" (Hulland 1999, p. 195). In fact, for most management researchers the term structural equation modeling seems to be tautologically synonymous with the covariance-based maximum likelihood approach (Chin 1998b, p. 295). Accordingly, structural equation modeling in operations management research has so far almost entirely relied on the co-variance based SEM approach (for an overview of SEM application in operations management research see Shah and Meyer Goldstein (2006); one recent example of PLS

application is the study by Moser (2006) on strategic supplier selection). However, PLS has some specific strengths which have been known and acknowledged for a long time (Jöreskog and Wold 1982). It is able to provide the researcher with robust estimates of fuzzy latent variables and their relationships even in situations where the sample size is relatively small compared to the number of indicators (Scholderer and Balderjahn 2005, p. 98). Due to these relative advantages over the covariance-based approach, it has been used in several other research disciplines before (for PLS applications in marketing and strategic management research see Hulland (1996; 1999)). Accordingly, PLS seems able to complement covariance-based structural equation modeling in some situations.

Variance-based structural equation modeling is similar to multiple linear regression as it is designed to explain variance in the model, i.e., to optimize R^2 for the dependent variables (Gefen *et al.* 2000, p. 27). PLS applies an Ordinary Least Square (OLS) estimation algorithm to estimate the parameters of the model along a 4-step repetitive process (Fornell and Bookstein 1982, p. 441) which is briefly described in the following for the most simple case of only two latent variables: In a first step, preliminary parameters for the indicators of the dependent latent variable are estimated based on the (initial) value of the independent latent variable. In the second step, the value of the dependent latent variable is calculated as a linear combination of the indicators and their estimated parameters. Steps three and four are the same for the independent variable: In step 3, the indicator weights for the independent latent variable are estimated based on the (new) value of the dependent latent variable and in step 4, the value of the independent variable is calculated from its indicators and their estimated parameters. This algorithm is repeated until it converges towards a defined abortion criterion. Finally, the path value between independent and dependent latent variable is estimated based on the final values of the latent variables (Wold 1975, pp. 307-357). There are different weighting schemes to estimate the path values, centroid weighting, factor weighting, and path weighting (Chin 1998b, p. 309). For this study, centroid weighting suggested in the original procedure by Wold (1975, pp. 312-319) will be applied as the most general weighting scheme. Anyway, the choice of weighting methods has only marginal influence on the estimation results (Cassel *et al.* 1999, pp. 435-446).

In the past, researchers have argued that PLS is preferential to covariance-based approaches if formative indicators are used in the model or if the survey data is not normally distributed (Chin 1998a, p. IX). However, if the assumption of multivariate normally distributed data is violated, alternative estimation algorithms such as Weighted Least Squares (WLS), Unweighted Least Squares (ULS), or Asymptotically

Distribution Free (ADF) can be used in the covariance-based approach which have proven to be more robust than traditional Maximum Likelihood (ML) method (Shah and Meyer Goldstein 2006, p. 158). However, in the case of formative indicators, the criticism seems at least partly right (although some authors argue that there is no difference at all, e.g., Scholderer and Balderjahn (2005, pp. 93-94)). When using formative indicators, early studies faced identification problems such as invalid estimates and statistically unidentified models. Although remedies have been suggested a long time ago (MacCallum and Browne 1993, p. 540), they require additional constraints (Shah and Meyer Goldstein 2006, p. 154). Such constraints are not necessary in PLS. Therefore, although some studies have used formative indicators in LISREL successfully (e.g., Jarvis et al. (2003)), it seems more convenient to use PLS in the case of this study with only formative indicators.

Another prominent advantage of PLS over covariance-based approaches is the lower sample size requirements. General recommendations for a minimal sample size in covariance-based evaluations range from 200 to 800 (Chin and Newsted 1999, p. 314). Accordingly, the realized sample size of 149 participants after eliminating 53 cases due to missing data would fall below this threshold. However, several published studies have also not met this criterion (Boomsma and Hoogland 2001, p. VII). The ratio of sample size per parameters estimated would be below 2.0 which is significantly smaller than any thresholds recommended in literature, typically 5:1 or 10:1 (Shah and Meyer Goldstein 2006, p. 154). Thus, the available data set does not seem to suffice to do a covariance-based evaluation due to the complexity of the framework. Opposed to this, a rule of thumb to calculate the required sample size in PLS is taking 10 times the maximum number of either indicators of a latent variable in the measurement model or independent latent variables of one dependent latent variable in the structural model (Chin 1998b, p. 311). In the case of this study, the maximum number of indicators of a latent variable is six, the maximum number of effects in the structural model is 5, both for the latent construct category strategies. Following the rule of thumb stated above, the minimal required sample size would be 60. The reason for these differences is that the power analysis (for a general overview on power analyses in structural equation modeling see MacCallum et al. (1996)) has to consider the entire model in the case of the covariance-based approach, but only the most complex multiple regression in the case of PLS (Chin and Newsted 1999, p. 314). Accordingly, the power statistical power to detect relevant effects in the 149 data sets of this study would be significantly greater for the variance-based approach so the available data would suffice for structural equation modeling.

Although these standard arguments provide some indication that PLS may be more convenient for this study and the available data set, they do not seem convincing. However, to understand the specific advantages of PLS in combination with the data collection approach chosen for this study, the conceptual differences between the two evaluation approaches have to be discussed in more detail.

The major conceptual difference between variance- and covariance-based approaches is the assumed existence of measurement errors. Whereas the covariance-based approach is based upon psychometric measurement error theory, the variance-based approach is not. Psychometric measurement error theory assumes that each observation in empirical studies comes with random error variance and measure-specific variance components which should both be excluded from the evaluation as they are not of theoretical interest (Anderson and Gerbing 1988, p. 412). This assumption is usually met for questionnaire data. However, it is typically not true for objective data such as objective financial performance measures or aggregated data (Scholderer and Balderjahn 2005, p. 97). That is why covariance-based approaches have to rely on subjective performance measures with the disadvantages discussed in chapter 5.1.2. This study uses financial company performance data, so only a PLS approach seems viable to avoid offending against psychometric measurement error theory.

Opposed to the covariance-based approach, PLS does not differentiate measurement error and true value. The variance-based approach assumes "that all observed measure variance is useful variance to be explained. [It] estimates the latent variables as exact linear combinations of the observed measures" (Anderson and Gerbing 1988, p. 412). This implies that whenever measurement error in the indicators is present, results of the variance-based approach differ from results of a covariance-based approach. PLS tends to overestimate all relationships in the measurement model and consequentially tends to underestimate all relationships in the structural model in this case (Scholderer and Balderjahn 2005, pp. 90-91). That is why the covariance-based approach is more accurate in its parameter estimates than the partial least squares algorithm (Fornell and Bookstein 1982, pp. 449-451). However, the partial least squares approach is consistent at large, i.e., the results converge towards the covariance-based estimates for large sample sizes and high numbers of indicators per latent construct (Chin 1998b, p. 329) because the measurement error is averaged out. Moreover, if a structural relationship is found to be significant in PLS, it is very likely also to be supported by a covariance-based approach. Accordingly, pure accuracy of the parameter estimates does not seem to be a major argument for the use of a covariance-based approach.

However, these differences in the basic assumptions also imply completely different target functions in the optimization algorithm. The partial least squares algorithm maximizes the share of variance explained in the structural model, i.e., the share of variance explained for all dependent latent variables in the model, based on the principle of multiple regression (Wold 1975, pp. 301-357). It explicitly estimates latent variable scores as linear combinations of the indicators in a first step before estimating the path coefficients in the structural model (Fornell and Bookstein 1982, p. 441). Opposed to this optimization approach, the covariance-based LISREL algorithm maximizes the fit between actual data and the entire hypothesized covariance matrix, typically based on a maximum likelihood estimation method. In particular, not hypothesizing a relationship between two variables has no consequences in PLS, whereas it explicitly fixes the parameter between those two variables to zero in LISREL (Scholderer and Balderjahn 2005, pp. 92-93). Thus, only the covariance-based algorithm actually tests whether the empirical data matches the a priori specified model holistically, also considering the hypothesized non-relationships (Gefen *et al.* 2000, pp. 26-27). This implies that any PLS results cannot guarantee to comprehensively model all relevant causal relationships among the latent constructs of the framework.

The accuracy of parameter estimates and the focus on testing entire data structures implies that covariance-based algorithms are preferential for theory testing (Jöreskog and Wold 1982). However, such theory tests require detailed upfront knowledge about the specific relationships, ideally based on prior empirical studies (Shah and Meyer Goldstein 2006, p. 154). For exploratory studies and theory building, partial least squares has advantages because of the lower requirements in sample size and the acceptance of non-parametric data (Götz and Liehr-Gobbers 2004, p.721). Moreover, it is advantageous when comparing parameters, e.g., the importance of different independent variables on a dependent latent variable (Fassott 2005, p. 29). Accordingly, PLS seems more appropriate to support theory building on the inner workings of purchasing and supply management evolution and provide a first starting point for future research. This is in line with the recommendations of several authors (e.g., Thompson *et al.* (1995), Chin (1998b)) to regard PLS as a "complimentary technique to covariance-based SEM [...] – possibly even a forerunner" (Gefen *et al.* 2000, p. 27) in the early phases of theory building.

As noted above, such results would not imply that further causal relationships among the constructs cannot exist. However, it seems valuable to first empirically support the hypotheses developed in this study and later build on this foundation to potentially find further relevant associations. For example, one potential future

extension of the current model could be to consider feedback loops in the framework. Although such feedback loops are likely to exist in the process of PSM evolution (see chapter 4.3.3), they have been neglected in the initial research framework of this study for simplicity reasons. Anyway, they could not be modeled in PLS as it is restricted to modeling linear causal chains (Tenenhaus *et al.* 2004, p. 166; Ringle *et al.* 2006, p. 81). Opposed to this, in covariance-based approaches, there is a possibility to model non-recursive effects such as feedback loops (Shah and Meyer Goldstein 2006, p. 156).

Last but not least, there is one major advantage of PLS specifically in the context of this study. As mentioned before, Bloom *et al.* (2005, pp. 9-10) introduced a broad set of control variables to make up for noise from the interview as well as other external influences such as industry, region, or company size. Conceptually they argue that these control variables could influence management practice scores as well as company performance measures. However, the influence on management practices could not be modeled in the multiple linear regressions they performed (Bloom *et al.* 2005, pp. 12-13). In the case of structural equation modeling, these control variables would have to be considered as influencing each of the latent constructs, if not each of the indicators (which is not possible because the indicators are assumed to be fixed). This would imply a significant increase in the complexity of the model. Overall, 35 control variables were considered in this study. They will be discussed in detail in the next subchapter. However, assuming that each of these control variables influences each of the latent variables in the framework implies that the minimal required sample size would increase to at least 350 using the rule of thumb for PLS introduced before. The model would even have become too complex for PLS with the available data, let alone any covariance-based approach.

At this point, it is possible to leverage the characteristic of the variance-based algorithm not to rely on psychometric measurement error theory. For any algorithm requiring psychometric measurement error theory, any upfront treatment of the data is unacceptable because it typically manipulates the original measurement errors and therefore distorts the significance values calculated (Fornell and Larcker 1981). That is why using aggregate data is problematic in the covariance-based approach (Scholderer and Balderjahn 2005, p. 97). However, this problem does not exist in PLS as it is not based upon psychometric measurement error theory but applies cross-validation algorithms such as blindfolding, jackknifing, or bootstrapping to determine the significance (t-values) of the path coefficients (Gefen *et al.* 2000, p. 27). These algorithms cross-validate the original parameter estimates by drawing random partial samples from the original data set following certain rules and

subsequently comparing the estimation results from these draws to the original results. This allows calculating the standard errors and t-values of the respective estimates (Tenenhaus *et al.* 2004, pp. 174-177). For this study, this characteristic implies that it is possible to eliminate noise from the control variables beforehand. In a first step, any significant influence of the different control variables on either PSM practices or performance measures can be identified and eliminated from the data. Afterwards the adjusted data is evaluated in PLS to investigate the cause-and-effect relationships hypothesized in the framework. This two-step approach avoids excessive complexity of the PLS models while allowing to consider all relevant control variables on an individual indicator level.

5.2.2 Data hygiene and control for noise

Before implementing the control variable concept discussed before, some basic questions of data hygiene have to be discussed for both PSM practice scores and performance data.

A first legitimate question is whether the scale of 1 to 5 based on the upfront descriptions of minimum and best practices was sufficient and relevant to code PSM practices observed in practice. None of the practices observed during the 202 interviews for this study was far beyond the best practice level 5 described by the indicator statements in the scoring grid for any of the questions. However, as noted before, the scoring grid would have to be updated for future studies to keep up with leading organizations in practice. The subjective assessment that the scoring grid was sufficient for a valid coding of current PSM practices was supported by the evaluation that only 7 percent of the participants scored 3.75 or higher on average and none of the organizations scored above 4.75 across all 37 dimensions. Similarly, only 6 percent of the participants scored between 1.25 and 1.75 on average, and none below. In fact, the overall distribution of average practice scores shows to be normal around a mean of 3 which was hypothesized to be typical in today's PSM organizations across industries. At the same time, the spread of average practice scores seems large enough to distinguish organizations on different levels of PSM evolution (see figure 22). Accordingly, the distribution assumptions of the scoring grid are supported on a high level.

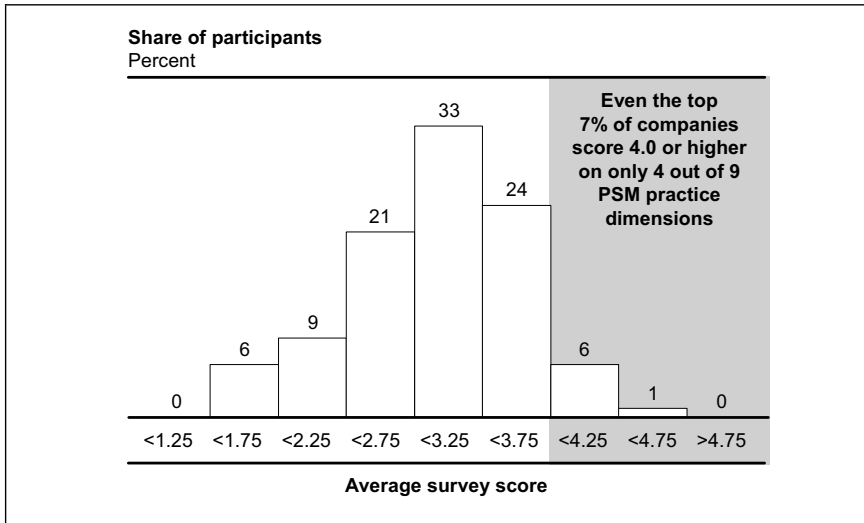


Figure 22 - Distribution of average survey scores

But is the distribution of practice scores on a question-by-question level really approximately normal? To answer this question, the standardized values of skewness and kurtosis have to be investigated. Skewness indicates whether the distribution is symmetrical, kurtosis indicates how flat or pointy the distribution is. Any values different from 0 for skewness or kurtosis imply a deviation from normal distribution (Field 2005, pp. 9-10). For large samples such as the one in this study, the values between -0.54 and +0.66 for skewness and between -1.05 and +0.24 for kurtosis indicate acceptable values for all PSM practice dimensions given the sample size in this study. Accordingly, a normal distribution can be assumed (Field 2005, p. 72).

Opposed to the assumption that level 3 describes typical current practices (and therefore the mean of the distribution across industries), the mean values for the individual questions ranged from 2.01 (low cost country sourcing organization) to 3.30 (separation of strategic and transactional tasks) (see table 3). It seems that, for some questions, the researchers and practitioners developing the scoring grid had slightly over- or underestimated the average current practice level in their descriptions. To ensure consistency in the evaluation, the ratings for each dimension were converted into z-scores by standardizing to a mean of zero and a standard deviation of one (Bloom *et al.* 2005, p. 8).

Table 3 - Distribution of interview-based PSM practice scores

Latent variable	Indicator	Nr. of data points	Mean	Standard deviation	Skewness	Kurtosis
Mindsets and aspirations	Expectation of PSM value creation	202	3.29	0.86	-0.40	0.13
	PSM vision of the CPO	198	2.99	1.01	-0.17	-0.47
	Change readiness of the organization	198	3.05	0.88	-0.27	-0.21
	Strategy execution mindset	199	3.17	0.94	0.06	-0.23
Talent management	Qualification of category managers	198	2.57	1.07	0.10	-0.81
	PSM career paths	201	2.75	1.15	0.03	-0.87
	Training and talent development	200	2.58	1.21	0.25	-0.96
Performance management	Target setting mechanisms	202	3.18	0.91	-0.44	-0.06
	Target tracking and reporting processes	201	3.13	0.95	-0.41	0.24
	Individual performance management and incentives	199	2.96	1.05	-0.18	-0.63
	Target accountability beyond PSM	199	3.19	1.16	-0.23	-0.74
Cross-functional cooperation structures	Use of cross-functional cooperation structures	200	3.13	1.00	-0.22	-0.15
	Role of PSM in cross-functional project teams	197	3.14	0.99	-0.38	0.04
	Organizational integration into cross-functional cooperation	175	2.51	1.13	0.15	-0.97
Purchasing organization structure	Global purchasing office structure	198	2.01	1.13	0.62	-0.88
	Corporate coordination of category management	173	2.97	1.09	-0.12	-0.61
	Separation of strategic and transactional tasks	200	3.30	1.15	-0.54	-0.54
Knowledge and information management	PSM knowledge management	198	2.57	1.07	0.10	-0.81
	PSM systems support	201	2.75	1.15	0.03	-0.87
	E-literacy of the organization	200	2.58	1.21	0.25	-0.96
	Transparency over PSM spend	198	3.21	0.98	-0.05	-0.44
Category value creation strategies	Category strategy approach	201	3.16	1.01	-0.24	-0.51
	Supply base strategy	202	2.78	0.90	-0.04	-0.44
	Global sourcing strategy	201	2.55	1.11	0.12	-1.05
	Value chain optimization strategy	186	2.89	1.07	-0.10	-0.59
	Supplier development strategy	196	2.26	1.18	0.67	-0.46
	Risk management strategy	200	2.41	1.00	0.37	-0.46
Core purchasing processes	Demand management processes	197	2.69	0.97	-0.11	-0.74
	RFx processes	201	2.88	0.89	0.08	-0.26
	Supplier selection processes	202	2.98	1.12	0.08	-0.50
	Negotiation processes	200	3.16	1.04	-0.27	-0.59
	Supplier performance management processes	202	2.82	1.07	-0.03	-0.74
	Compliance management	186	2.93	1.00	-0.12	-0.36
Strategic involvement of PSM	Alignment with and impact on corporate strategy	201	3.05	1.01	-0.05	-0.58
	Impact on product development	187	2.78	1.12	0.07	-0.75
	Impact on marketing and sales	198	2.39	1.09	0.25	-0.86
	Impact on mergers and acquisitions	152	2.91	1.21	-0.23	-1.01

It has been argued before that the descriptions of typical practice levels in the scoring grid ensure reliable and comparable assessments, even though different interviewers were involved in this study. If this was true, the deviations between first and second interviewer's assessment should generally be very small for each of the questions. Accordingly, an average deviation between the two interviewers was calculated on a question-by-question level by dividing the absolute deviation across all interviews by the number of available data sets from all interviews where a second interviewer was present. In fact, the average deviation between first and second interviewer assessment was found to be less than 0.5 for all dimensions. The highest deviations were found for "change readiness of the organization" and "demand and specification management" (0.49 each). These findings are in line with subjective assessments of scoring grid reliability, as many interviewers found these questions generally difficult to rate based on the indicator statements given. Accordingly, the scoring grids for these questions need revision before using them in further empirical studies. However, on an overall level, the results imply that not even in every second interview, the interviewers would disagree in their initial assessment by +/-1. This is a clear indication that the interview guide concisely outlines the differences between the different practice levels for every single survey question. It seems to provide

interviewers with a clear guide to consistently code the CPOs' answers into the scale from 1 to 5 despite the open questions and the loose structure of the discussion. Moreover, the high consistence of the ratings between first and second interviewer illustrates that the training the more junior second interviewers received to conduct a knowledgeable assessment of the interviewee's purchasing practices was both helpful and appropriate. The debrief discussion after the interview and agreement on one common assessment, along with a written explanation of why this assessment was given, should have further improved the reliability of these assessment.

Similar questions also have to be answered for the different performance measures. As opposed to the PSM practice scores, outliers and missing data are a relevant issue.

In a first step, performance data was evaluated regarding significant outliers (absolute z-score > 3.29 , i.e., 99.9% of all data points would be expected to be within this range) to avoid an undue influence of single cases on the evaluation results. Those cases were examined in more detail. In some of these cases, the data turned out to be incorrect in the original database used, and could be corrected based on consistency checks with other databases. In other cases, specific reasons such as a merger or acquisition in the case of extreme sales growth of a company could be identified. These latter cases were eliminated from the data set to improve data quality (Field 2005, p. 164). However, the maximum number of eliminated data points for any performance measure was 4 out of 202 data sets.

In a second step, all data sets where the financial performance data or the baseline survey data on perceived PSM performance was missing completely were marked with a flag field. These 53 data sets were excluded from all evaluations linking PSM practice scores and performance, resulting in an available sample size of 149 companies, as mentioned before. This reduction is reasonable to improve the quality of coefficient estimates in the PLS model. Typically, missing values are replaced by the mean of the respective variable in PLS. However, if there is a significant share of missing values for some constructs, all the parameter estimates are biased towards zero in the ordinary least squares evaluations PLS is based on, as conceptually shown in figure 23. That is why those data sets are better excluded completely. However, the full sample of 202 companies was considered in some evaluations referring to PSM practices only, such as the influence of control variables on PSM practice scores, to leverage all available information.

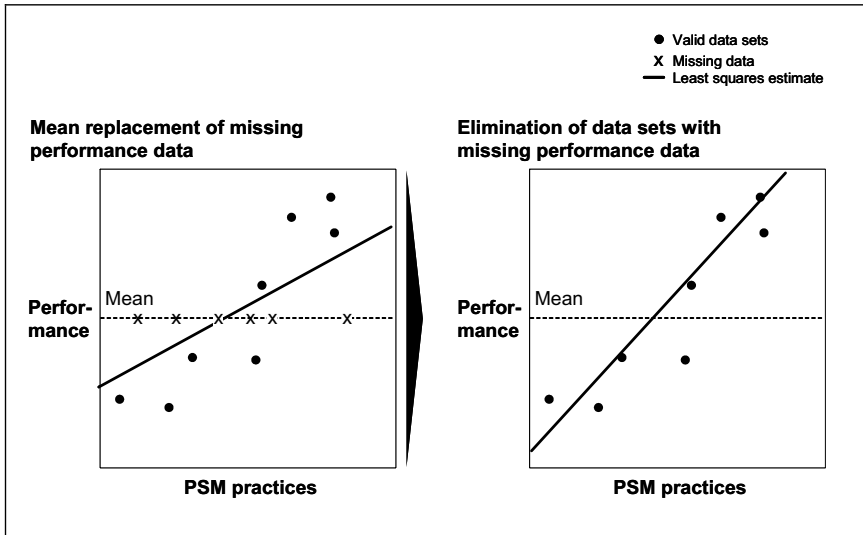


Figure 23 - Conceptual example of missing value influence

For the reduced data set of 149 companies, Little's (1988) Missing Completely At Random test revealed insignificant results at a 0.05 level for all PSM practice as well as performance variables. This implies that the remaining missing values do not seem to depend on the (unknown) values of the respective variables. In this context, it becomes clear why it was important to differentiate companies that do not realize PSM savings and companies that are unwilling to share their realized PSM savings performance data (see chapter 5.1.2). If both cases would have been treated equally as missing values, the remaining data set would have been clearly biased towards relatively high annual PSM savings. However, as missing values in the reduced data set appeared completely random for all relevant variables, there was no need to consider Missing Value Analysis to make up for this bias (SPSS 1997, p. 3). At this point, it is interesting to note that in the review of prior studies relying on structural equation modeling approaches in operations management journals, "only a handful of applications discussed missing data" (Shah and Meyer Goldstein 2006, p. 157).

After clarifying these basic questions of data hygiene, it was possible to initially investigate the performance measures. Table 4 gives an overview of important descriptives for the performance measurement data. It can be seen that one of the financial performance measures, reduction of COGS, is not approximately normally

distributed, i.e., the Kolmogorov-Smirnov test shows a significant deviation between the assumed normal distribution and the actual distribution.

Table 4 - Distribution of performance measures

Indicator	Nr. of data points	Mean	Standard deviation	Skewness	Kurtosis
Average EBITDA margin	145	0.16	0.10	0.60	-0.55
Average return on assets	137	0.03	0.05	-0.09	1.37
Annual reduction of cost of goods sold	138	0.01	0.04	1.26	4.73
Annual sales growth	143	0.14	0.14	0.36	0.18
Annual PSM savings (self-reported)	101	0.02	0.02	0.53	-0.44
Overall self-assessment of the CPO	125	3.30	0.54	0.37	0.56

Regarding the assumption of normal distribution, all values except for the kurtosis of reduction of COGS seem acceptable. For reduction of COGS, there are far too many data points very near to 0, which implies a stable cost position relative to sales growth. To remove this distribution problem, the data for reduction of COGS could be transformed using a log or a square root transformation to reduce the deviation from normality (MedCalc [no year], pp. 51-52). As most of the data is very near to zero, a square root transformation seemed promising to flatten the distribution. To cope with the fact that both positive and negative data appears, the data had to be transformed separately and merged again afterwards. After this transformation, the transformed variable showed a kurtosis value of -0.444, which is fully acceptable. This transformed variable could be used for parametric multiple regression and transformed back afterwards.

Despite of the generally good fit among first and second interviewer assessments, the interviewer and other interview- and company-related factors might influence or even bias the practice scores. As mentioned before, this study has therefore adopted and further developed the use of control variables from Bloom et al. (2005, pp. 9-10) to eliminate such noise in the data on PSM practice scores.

The control variables considered for PSM practice scores can be separated into different groups, which will be discussed in more detail in the following paragraphs: First of all, interview noise and external moderators can be differentiated. Whereas interview noise (interviewer, interview setup, interviewee characteristics) is directly linked to the data collection method and caused by the specific interview situation, external moderators (industry, region, company size) account for differences in the PSM practices of companies in these groups in general. Accordingly, the latter will provide useful and interesting implications for researchers and practitioners, whereas the first group of control variables is purely noise, which has to be eliminated to receive reliable evaluation results.

Control variables for interview noise are based on the following principle, explained for the example of interviewer differences: Interviewers were assigned randomly, without considering specific industry preferences. Assuming that each interviewer participated in a sufficiently large number of interviews, the probability that he or she was by chance only assigned low performers, or only high performers, is minimal. Accordingly, the average PSM practice score should not differ significantly across interviewers. If it did, this difference seems to be caused by a systematic measurement error or bias of the interviewer. This significant difference to a pre-defined point of reference had to be removed from the data.

The rationale for adjusting the original values for other external moderators was different. The research framework tested in this empirical study associates purchasing practice scores with company performance measures. It is well-accepted that company performance measures may vary by industry, region, or company size. That is why several studies have used these control variables before to avoid pseudo-correlations (e.g., Carr and Pearson (1999, p. 512), Carr and Smeltzer (2000, p. 45)). One possible example of such a pseudo-correlation is the association between purchasing practices and return on assets for financial institutions and automotive companies. The average PSM evolution level for financial institutions is expected to be clearly lower than the one of automotive companies. If one assumes return on assets to be generally low for financial institutions because of their large asset positions in the balance sheet but generally high for automotive companies (which is not necessarily a realistic assumption), a good correlation would result for the relationship between purchasing practices and return on assets. However, this would only be a pseudo-correlation as it combines two distinct, not directly comparable groups in one evaluation. Most financial institutions would end up in the lower left corner, whereas most automotive companies would end up in the upper right corner. However, within both groups, there might actually be a significant negative association. In this case, results would obviously look completely different when considering industry as a control variable. Thus, these external moderating factors have to be considered as control variables to identify the underlying relationship between PSM practices and performance outcomes across industries.

Control variables are considered in the evaluation before loading the data into PLS. As discussed before, this is possible because PLS is not based upon general psychometric measurement error theory and can therefore deal with such adjusted data without manually adjusting measurement errors (see chapter 5.2.1). To see whether any control variable has a significant influence on the different PSM practice dimensions, a backward stepwise linear regression was conducted with the PSM

practice dimension as dependent and all control variables except for one base case as independent dummy variables. It was necessary to exclude one base case for each of the control variable groups to avoid perfect multi-collinearity, i.e., the situation where one independent variable can be represented by a linear combination of other independent variables in a multiple regression. Moreover, the base case was required as a point of reference, so the base case was typically chosen to be the parameter value with the largest number of data points each. With all control variables being coded as dummy variables, i.e., having categorical values of 0 and 1 only, the coefficients in the multiple linear regression can be interpreted as the mean difference to the excluded base case (Field 2005, pp. 213-214). The requirement of having categorical values only implied that the continuous variable company size had to be converted into groups. The data was divided into four groups of similar size based on the companies' revenues (< USD 5 bn, 5 to 10 bn, 10 to 20 bn, more than 20 bn), similar to the approach taken by Johnson et al. (2002, pp. 83-84).

A simple multiple linear regression considering all control variables typically shows no significant results on a variable level because the individual coefficients for each of the more than 30 control variables are too small to be significant. Accordingly, irrelevant variables have to be removed to identify underlying significant influencing factors. The backward stepwise methodology removes the least relevant control variable in each step until a pre-defined abortion criterion is met. A set of significant influencing variables remains as the final result. This methodology is quite sensitive to small changes in the semi-partial correlations. That is why it is typically recommended not to use stepwise approaches but to rely on sound theoretical literature (Field 2005, pp. 161-162). However, in the case of control variables to identify systematic measurement error, the lack of theoretical guidance to identify the most relevant influencing factors lies in the nature of the problem. If the most relevant sources of systematic measurement error were known upfront, they could have been avoided. Accordingly, backward regression approach seems to be a helpful exploratory approach (Wright 1997, p. 181).

The general formula for a multiple linear regression with n independent variables x_i ($i = 1$ to n) and one dependent variable y is depicted below (equation 1). The resulting coefficients β_i ($i = 1$ to n) in the last step of the backward regression can be interpreted as the average deviation of all companies with this characteristic in common to the respective base case, and thus the systematic measurement error or external influence to be eliminated. The influence term $\sum \beta_i x_i$ shows the total "net" noise for each dimension. Accordingly, the sum of intercept β_0 and the error term ε

equals the original value y adjusted by the influence term and thus represents the data point after adjustment for noise and other external influencing factors.

Equation 1 - General multiple linear regression

$$y = \beta_0 + \sum_{i=1}^n \beta_i x_i + \varepsilon$$

The different groups of control variables, the underlying rationale and the relevant findings will be discussed in detail in the following paragraphs.

In spite of the detailed scoring grid, the training and the other measures to ensure consistency in the ratings, interviewers may interpret some of the questions differently. Accordingly, a control for interviewer names is necessary on a dimension-by-dimension level. The interviewer with the largest number of interviews overall was chosen as base case and point of reference. Interviewers with less than 15 interviews were pooled to consistent groups based on their background. As can be seen from table 5, most interviewers only differ significantly in 3-5 out of 37 dimensions which further supports the good reliability of the scoring grid. However, there is one interviewer who differs in 12 dimensions, in most of them with a positive deviation. This indicates that this interviewer tended to give higher scores in general. As this was the most junior interviewer, it could be that she challenged CPOs less in their initial optimistic assessment of their practices or was not able to identify weaknesses because of missing practical experience. This finding emphasizes the importance of having experienced interviewers for such an interview-based data collection approach.

[illegible]

Following Bloom et al. (2005, p. 9), interview time for both interviewer and interviewee were considered as control variables. It is interesting to see that interviewers seemingly tended to give lower ratings in the evening as all 9 significant deviations are negative. On the other hand, all 5 significant deviations for interviewee time evening are positive, with 3 overlapping with interviewer time evening in the same magnitude, thus compensating their influence. A similar effect can be seen for 2 dimensions where interviewer time afternoon and interviewee time afternoon have opposite signs. It seems that there was a bias of interviewer and interviewee not being in the same time zone. Interviewers in Europe or Asia obviously rated interviewees in the Americas on average lower than interviewees in their same time zones.

Most of the interviews were conducted in English. It seems realistic to assume that there could be a language bias in the ratings based on answers to complex organizational questions. If the interviewer is not completely fluent in English, some of the questions may be misleading or he or she might not get subtle points in the answers of the interviewee. On the opposite, if the interviewee is not an English native speaker, he or she may miss some of the aspects in the question or may not be able to express PSM practices of the organization appropriately. Both hypotheses are supported by the data. First of all, interviewers tended to give lower ratings whenever the interview was in their native language. It seems that they were better able to identify weaknesses the CPO tried to hide by nice prose. On the other hand, a CPO tended to receive higher ratings in his or her native language in as many as 14 out of the 37 dimensions. Only when both interviewer and interviewee were doing the interview in their respective native tongue, the influences in many of the dimensions compensated each other. This further strengthens the point that the ability to "sell" the PSM practices of the organization influenced interviewers in their ratings. However, as the data was adjusted for this influence before evaluation, it does not pose a problem for the validity of the final evaluation. It only emphasizes the importance of such control variables when using a similar interview-based approach.

Similar observations were also made for the control variables "presence of a 2nd interviewer" and "interview method". The standard interview process involved 2 interviewers in a phone interview. Whenever there was only one interviewer, significantly higher ratings were given on average in nearly 50% of the dimensions. It seems that the 2nd interviewer who could focus entirely on listening to the answers of the interviewee was helpful to catch hints for inferior implementation quality of practices and to separate nice prose from actual PSM practices within the time given. This is in line with the practical experience of the interviewers who felt that the first

interviewer is very busy formulating the questions and reacting to the interviewee's answers. Especially the last part of an answer was often overheard by the first interviewer although it prove decisive in the following debrief discussion among the interviewers. Regarding interview method, it can be seen that the majority of significant influences is negative. This implies that interviewers tended to rate interviewees lower in face-to-face situations compared to telephone interviews. Again, this makes intuitive sense because it is much easier to assess the credibility of an interviewee by his or her body language than over the phone. Accordingly, face-to-face interviews would be preferable for future interview-based studies to further increase data quality.

Opposed to these prior observations, the evaluation of the control variable "subjective overall credibility of the interviewee", adopted from Bloom et al. (2005, p. 10), shows an interesting phenomenon: It seems that interviewers were more willing to give high ratings when the interviewee seemed generally credible. Most of the significant deviations for high credibility are positive compared to the base case of medium credibility, whereas most of the deviations for low credibility are negative (although there are only very few low ratings for overall credibility). In fact, the significant deviations appear to be mainly in areas where subjective assessment is even more critical than in others, such as strategy execution mindset that is very difficult to operationalize objectively. It seems that interviewees were "rewarded" by interviewers for proactively addressing weaknesses as they rather tended to believe them when they stated strengths in other areas.

Overall, these observations have important implications for future interview-based studies: First of all, the use of control variables for interview noise seems to provide helpful and intuitive indication on interviewer, interviewee, and interview setup bias. Second, studies should rely on at least 2 senior and well-trained interviewers for each interview who conduct the interview face-to-face with the interviewee in their respective native language. It seems important to convince the participant that openness and honesty pays off in terms of more reliable results.

Another control variable for interviewer bias considered the fact that some of the interviewees were current or past clients of McKinsey & Company's global PSM practice, the cooperation partner in this research study. Whereas Bloom et al. (2005, p. 11) had excluded McKinsey clients from their sample to avoid perceived conflicts of interest and bias in the data, this study had to rely on existing client contacts to increase the response rate among the very senior managers of our target group. Anyway, the data shows that if such a bias existed, it was relatively marginal as only

6 out of 37 dimensions showed a significant difference and all of these differences were smaller or equal than 0.3.

Finally, the credibility of the CPO himself or herself was controlled for (Bloom *et al.* 2005, p. 9). Credibility was assessed on a scale from 1 (interviewee did not seem credible) to 5 (interviewee seemed highly credible). As can be seen in table 6, a high credibility rating was associated with higher PSM practice ratings for some of the dimensions. Most of these dimensions are rather soft. It seems that highly credible CPOs who addressed weak spots openly were unintentionally rewarded by the interviewers in those dimensions where it was difficult to test the validity of their statements because interviewers tended to simply believe them in such cases. However, this bias could be removed using the control variables.

The second group of control variables, external moderators, comprises industry differences, regional differences, and the association with company size.

Opposed to some prior studies have not reported industry differences (e.g., Carr and Pearson (1999, p. 506; 2002, p. 1040), Das and Narasimhan (2000, p. 21)), control variables in this study showed some significant deviations for different industries. Automotive and assembly, high tech and telecoms, and packaged goods companies turned out to be significantly superior compared to the base case materials and construction industry in their PSM practices in more than 20 out of the 37 dimensions. Compared to each other, these high-performing industries seem relatively homogeneous, thus supporting the hypothesis of PSM best practices across industries (Ellram *et al.* 2002, p. 12). Chemicals and pharmaceuticals companies were significantly better than the base case in many dimensions of PSM practice, although clearly behind the leaders mentioned before. In line with expectations, financial institutions and energy and utilities companies were found to lag behind the base case in many dimensions. Overall, these results are in line with the findings of Johnson *et al.* (2002, pp. 84-85) who found that discrete goods manufacturers are superior to process industry which again is superior to services industry. As a side aspect, it is interesting to see that there are no significant differences at all in 2 dimensions, RFX processes and e-literacy of the organization. On average, companies across industries seem to be on a similar level of evolution there.

No consistent picture emerges for regional differences of PSM practices. Although several significant differences between Northern America (NA), Europe, and the rest of the world (RoW) were found, they do not show a clear pattern as the differences are both positive and negative and spread all over the dimensions. Moreover, the differences found are generally small, with a maximum absolute deviation of 0.5 between Europe as a base case and either NA or RoW. However, it is interesting to note that a total difference of 1.0 between separation of transactional and strategic tasks in RoW and Northern America was found. Most of the companies comprised in the bucket RoW are Japanese. Accordingly, it seems to be an interesting question for future empirical studies whether there are such organizational differences between Japan and Northern America, perhaps grounded in a different management culture.

Last but not least the data revealed a strong positive correlation of PSM practices with company size, although all companies in the study were large companies with at least USD 3 bn in revenues. There are two possible explanations: Either, only the largest companies in the world have the necessary resources to implement complex PSM best practices or the necessary image to employ the best talent. This is supported by the data as very large companies are significantly better in all of the talent dimensions and most of the process questions. However, there may be another explanation pointing to a potential bias in the PSM practice scores: The largest companies in the world are obviously more likely to be known by the interviewers in advance. Their generally good image as leaders in their industries may have influenced interviewers to give higher ratings. This potential bias is why Bloom et al. (2005, p. 9) focused on medium sized firms in their survey. Unfortunately, it is not possible to separate those two alternative sources of deviation from the data. However, the fact that companies between USD 10 and 20 bn score higher in just as many dimensions as companies above USD 20 bn indicates that interviewer bias may not be the primary source of these differences. It seems realistic to assume that many, if not most of the companies between USD 10 and 20 bn in revenues are not generally known as best practice, let alone on a global scale. Accordingly, it seems that the largest companies are indeed better in their PSM practices.

Table 7 - Control variable coefficients for performance measures

Performance measure	Industry (bc: material and construction)							Region (bc: Europe)		Company size (bc: below USD 5 bn)			
	Auto and assembly	Chemicals and pharma	High tech and telecoms	Packaged goods	Financial institutions	Energy and utilities	Other industries	North America	Rest of world	5 to 10	10 to 20	20+	
Annual PSM savings			0,02	0,01	-0,01							0,01	0,01
Average EBITDA margin		0,06	0,04				0,08		0,07				
Annual reduction of COGS			0,03	-0,01									
Sales growth				-0,06	-0,18				0,07				
Return on assets			-0,05		-0,04								

In a second step, performance measures had to be adjusted to external influence using control variables. Obviously, performance measures cannot be influenced by the control variables controlling for interview noise in the PSM practice scores. Accordingly, only the external moderating factors were considered for the performance measures, otherwise following the same approach discussed before for the PSM practice scores. Table 7 gives an overview of the results. It has to be noted that the subjective factors in perceived PSM performance were not adjusted as they refer to a relative assessment anyway.

In general, there were fewer significant differences in the performance measures than in PSM practice scores. Reported annual PSM savings were quite similar across industries. Only high tech and packaged goods companies realized slightly more annual savings, possibly because of the stronger price decrease both in products and components/materials in their industries. Financial institutions reported annual savings slightly below average. Although the differences are surprisingly small with a maximum deviation of +/- 3 percentage points on average, these results are largely in line with the benchmarks reported by CAPS (2005). Interestingly, high tech and telecom companies seem to be able to further strengthen profitability through these cost reductions, whereas the above average PSM savings seem not sufficient to improve the objective cost position of packaged goods companies. The observation that energy and utilities companies, but also chemicals and pharmaceuticals and high tech and telecoms companies are on average more profitable in terms of EBITDA margin than companies in other industries certainly resonates with practical experience, as well as the finding that return on asset is lower in industries such as high tech and telecoms and financial institutions where required assets are known to be high.

In terms of regional differences, it is interesting to see that they exceeded companies from other regions significantly in both average EBITDA margin and sales growth. Countries covered in RoW are mainly Japan, Brazil, South Africa, and India. Although this is a quite diverse group, it can be seen that the latter three are

emerging markets where both sales growth and current profitability of leading companies can be assumed to be higher than in the mature markets in Europe and Northern America. With regards to company size, only marginal differences were found for the different performance measures.

5.2.3 Validation of interview-based data collection approach

After eliminating noise from the data and making it comparable across industries, regions, and company size groups, a first evaluation could show whether an association between PSM practice scores and performance can be shown significantly.

There is "scope for legitimate disagreement" (Bloom *et al.* 2005, p. 8) whether the minimum, average, and best PSM practices described in the scoring grid can be objectively proven to constitute good practice. In other words, if moving up the scale from 1 to 5 is not associated with performance improvements, either the theoretical framework or the scoring grid used to code the interview results would be flawed. Accordingly, testing whether there are significant correlations between the individual PSM practices and the performance measures used in this study is necessary to verify the basic assumptions that each of the dimensions of the scoring grid really describes an evolution of PSM practices towards higher performance.

To cover non-financial contributions beyond savings and financial company success, an aggregated self-assessment measure has been calculated for these initial evaluations. It covers the subjective dimensions of perceived PSM performance, weighted by normalized subjective importance. This importance measure had been collected together with the performance assessment for the same factors. Overall, the self-assessment figure provides the CPO's estimate of how his or her PSM organization performs compared to key competitors in the market.

Table 8 shows the bivariate Pearson correlation coefficients between PSM practice dimensions and the different performance measures. All of the significance levels in this study are one-tailed, as there are clear directional hypotheses for all relationships (Reinartz *et al.* 2004, p. 18). In terms of bivariate correlations, 35 of the 37 dimensions are associated with higher (self-reported) PSM savings at a significance level of 0.05. One of the two missing dimensions, supplier development, is highly correlated with the CPO's self-assessment, indicating that the benefits of this strategy may be largely beyond classical PSM savings. The second dimension, separation of transactional and strategic tasks, is significantly correlated with neither PSM savings nor the CPO's self-assessment. At the same time, this was one of the

dimensions with the highest overall average scores. It could be that this practice has already been largely implemented by most companies so the remaining differences do not make a major difference with regards to performance outcomes. However, it still seems to be a valid indicator for the evolution of PSM organizations along the PSM evolution process. That is why this dimension will not be eliminated. Moreover, it is significantly associated with higher ROA.

23 of the dimensions are also significantly associated with at least one of the financial company performance measures at a 0.05 level, and 7 more at a 0.10 level. Accordingly, the framework seems supported on an overall level. By far most of the dimensions are associated with average EBITDA margin (20 at a significance level of 0.10), followed by reduction of COGS (15 at 0.10), and ROA (9 at 0.10). However, none of the dimensions is significantly positively correlated with sales growth but 6 dimensions show a relevant negative correlation around 0.1. This comes surprising as Morita and Uehara (2004, pp. 14-19) found at least some significant correlations supporting the theoretical hypothesis of PSM contributing to sales growth. Two things are important to note though: First of all, the fact that none of the dimensions is directly correlated with higher sales growth does not imply that there is no such relationship. It could be that it is simply influenced by another variable or an interdependence of different dimensions that cannot be considered in a bivariate correlation. Second, although all performance measures were adjusted for industry influences on a high sector level, there might still be differences in terms of competition and maturity of the market the individual companies are in. One potential explanation of the negative correlations could be that companies in a mature and very competitive market tend to focus more on PSM practices to reduce cost than companies in a dynamic market with lots of growth potential. The contribution of PSM to sales growth could be influenced by some market characteristics, which have not been accounted for by the control variables implemented in this study. Third, it can be hypothesized that the relationship between PSM practices and cost or profitability is more direct than the relationship to sales growth. Accordingly, effect sizes would be smaller and therefore the current sample size might not be sufficient to identify significant effects (Cohen 1988, pp. 410-413). To get a deeper understanding of this relationship and derive recommendations for future research, sales growth will not be eliminated for the structural equation modeling in PLS. The PLS results may provide some indication on how to measure PSM contribution to sales growth in the future. Anyway, the fact that the association of PSM practices and sales growth is not supported here is certainly no sufficient reason to doubt the theoretical reasoning

behind this assumption and change the formative definition of the construct "PSM contribution to company performance".

Interestingly, the CPO's self-assessment is only correlated with 18 dimensions at a significance level of 0.05, and 8 more at a significance level of 0.10, compared to 35 dimensions for annual PSM savings correlated at a level of 0.05. This allows at least three alternative implications: First, the self-assessment of the CPO could be based on a limited part of PSM value creation only, thus neglecting relevant PSM practices. This would support the statement of Carter et al. (2005, p. 17) who wrote that PSM performance measurement very often only focuses on cost reductions today, largely neglecting other areas of PSM. Second, the self-assessment of the CPO could simply be wrong, meaning that he or she misjudges own performance compared to others. Such a conclusion would justify the interview-based survey approach as opposed to traditional survey methods, as suggested by Ellram et al. (2002, p. 14). Third, the measurement of self-assessment or other variables in this study could be flawed.

Table 8 - Bivariate Pearson correlation coefficients of PSM practices against performance

Latent variable	Indicator	Annual PSM savings	CPO's self-assessment	Average EBITDA margin	Average RoA	Annual sales growth	Annual reduction of COGS
Mindsets and aspirations	Expectation of PSM value creation	0,385***	0,236***	0,209***	0,027	-0,102 (I)	0,006
	PSM vision of the CPO	0,377***	-0,051	0,100	0,068	-0,064	-0,008
	Change readiness of the organization	0,195**	0,114*	0,077	0,161**	0,045	0,019
	Strategy execution mindset	0,159**	0,201***	0,140**	0,013	0,044	0,150**
Talent management	Qualification of category managers	0,304***	0,039	0,182**	0,019	-0,119 (I)	0,081
	PSM career paths	0,397***	0,145**	0,164**	-0,000	-0,004	0,135**
	Training and talent development	0,325***	0,102*	0,026	-0,033	-0,040	0,211***
	Target setting mechanisms	0,302***	0,026	0,138**	0,023	-0,082	0,106*
Performance management	Target tracking and reporting processes	0,444***	0,006	0,077	0,090	-0,126 (I)	0,087
	Individual performance management	0,252***	0,024	0,104*	0,002	-0,024	0,094
	Target accountability beyond PSM	0,242***	0,046	0,125*	-0,039	-0,060	0,066
Cross-functional cooperation structures	Use of cross-functional cooperation structures	0,282***	0,026	0,189***	0,009	-0,133 (I)	-0,015
	Role of PSM in cross-functional teams	0,274***	0,113*	0,177**	0,008	-0,022	0,010
	Org. integration into cross-functional cooperation	0,337***	0,096	0,111*	0,083	-0,078	0,009
PSM organization structure	Global purchasing office structure	0,183**	0,016	0,059	0,066	-0,109 (I)	0,091
	Corporate coordination of category management	0,334***	0,111*	0,226***	0,073	-0,045	0,075
	Separation of transactional and strategic roles	0,094	-0,021	0,023	0,157**	0,083	0,038
Knowledge and information management	PSM knowledge management	0,307***	0,127*	0,157**	0,118*	0,061	0,151**
	PSM systems support	0,283***	0,113*	0,073	0,220***	-0,005	0,220***
	E-literacy of the organization	0,174**	0,114*	0,044	0,153**	-0,035	0,270***
	Transparency over PSM spend	0,283***	0,161**	0,144**	0,150**	-0,039	0,141**
Category value creation strategies	Category strategy approach	0,343***	0,200***	0,166**	0,004	-0,022	0,112*
	Supply base strategy	0,241***	0,335**	0,060	0,047	0,007	0,180**
	Global sourcing strategy	0,319***	0,042	0,139**	0,082	-0,093	0,134**
	Value chain optimization strategy	0,368***	0,171**	0,026	0,035	-0,083	0,028
	Supplier development strategy	0,073	0,297***	0,129*	0,086	0,015	0,102
	Risk management strategy	0,239***	0,165**	0,117*	0,130*	0,020	0,116*
	Demand management processes	0,248***	0,160**	0,007	0,001	-0,011	-0,021
Core purchasing processes	RFX processes	0,259***	0,135**	0,164**	0,087	-0,040	0,164**
	Supplier selection processes	0,192**	0,177**	0,106*	0,022	-0,046	0,093
	Negotiation processes	0,366***	0,188***	0,163**	0,065	0,017	0,098
	Supplier performance management processes	0,277***	0,184***	-0,031	0,082	0,033	0,158**
	Compliance management processes	0,242***	0,179**	0,086	0,050	-0,178 (I)	0,181**
Strategic involvement of PSM	Alignment with and impact on corporate strategy	0,309***	0,112*	0,256***	0,170**	0,038	0,050
	Impact on product development	0,328***	0,206***	0,084	0,022	-0,041	-0,017
	Impact on marketing and sales	0,368***	0,153**	0,069	0,122*	-0,060	0,042
	Impact on mergers and acquisitions	0,307***	0,275***	0,084	0,021	-0,032	-0,020

Significance levels

* 0.10

** 0.05

*** 0.01

To ensure reliability of the measurement and understand these findings in more detail, the research team wondered whether the disagreement between self-assessment and PSM practice scores depends on the PSM evolution level. To simplify this evaluation, the data set was separated into three groups using a K-means cluster analysis based on average PSM practice scores across the 37 survey dimensions after adjustment for control variables. This separation is based upon the assumption that the average of interview-based practice scores is a reliable measure for the overall PSM evolution level. The cluster analysis returned clusters of 35 PSM evolution beginners, 106 PSM evolution intermediates, and 61 PSM evolution leaders. A subsequent one-way ANOVA analysis revealed that the average self-assessment of intermediates and leaders is nearly the same (3.37 for intermediates compared to 3.43 for leaders). Moreover, the average self-assessment compared to key competitors for PSM evolution beginners was 3.01. This implies that even the lowest 15% of all survey participants on average perceive themselves to be on par with their competitors. The question is: If everyone performs at least as good as or better than the competition, has this study only covered relative high performers?

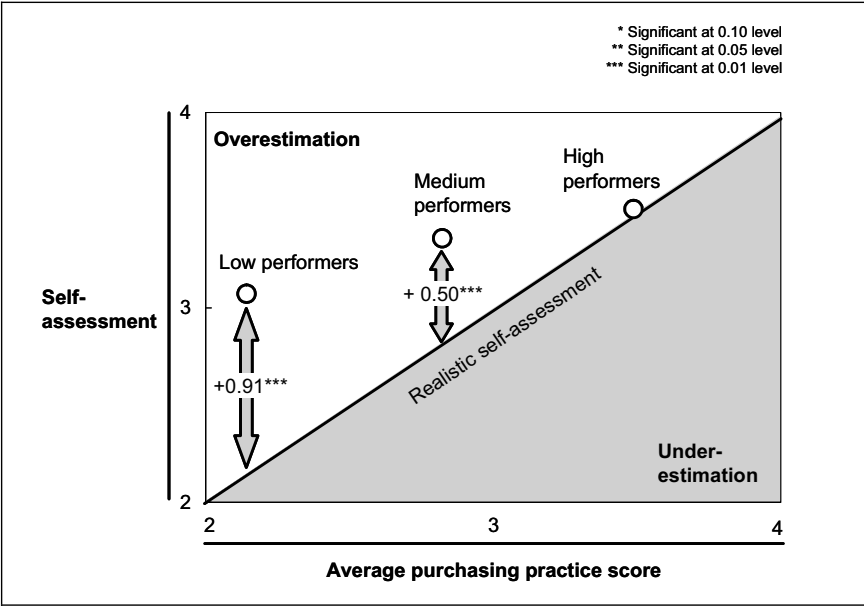


Figure 24 – Comparison of CPOs' self-assessment to average interview score

To answer this question, the average self-assessment was compared to average PSM practice scores from the interview. In fact, there was a highly significant spread between self-assessment and the average interview results for both PSM evolution beginners and intermediates. For beginners, the average PSM practice score was 2.10, indicating a practice level barely beyond first steps towards a strategic role of PSM in the organization. In fact, such companies are typically not even recognized for their substantial cost reductions, let alone other strategic contributions. A self-assessment of 3.01 seems far from realistic. Similarly, the average PSM practice score of intermediates was found to be 2.87, and therefore a highly significant 0.50 lower than the average self-assessment of these companies. However, the self-assessment of high performers nearly matched the external PSM practice scores perfectly with a difference of just 0.05. It seems that organizations in the early phases of PSM evolution are not able to judge their relative performance realistically, whereas CPOs become more and more aware of further improvement needs in later stages of evolution (see figure 24). The average PSM practice score of 3.38 for PSM evolution leaders indicates that, on average, they are far from best practice in most of the dimensions. However, these leading companies seem to recognize the journey ahead and manage the evolution process accordingly.

From a research perspective, the alignment of self-assessment and PSM practice scores for PSM evolution leaders supports the validity and reliability of the interview-based survey approach. At the same time, the large spread for beginners and intermediates emphasizes the doubts regarding the validity of traditional survey methods for research on complex organizational phenomena (see chapter 5.1.2). Given the small and partly insignificant differences of CPOs' self-assessments between the different clusters, it seems generally unlikely to find significant differences in perceived PSM practices and strong associations with objective performance based on traditional questionnaires. This is one possible explanation for the partly insignificant results faced by some prior empirical studies considering objective financial performance measures (e.g. Ellram et al. (2002), Morita and Uehara (2004)). At the same time, these findings imply one hypothesis why researchers relying on subjective performance measures tend to find significant results more often (e.g., Carter et al. (1996), Narasimhan and Das (2001), Chen et al. (2004)). Under the assumption that the ability to judge the relative competitive position of the own organization is correlated with evolution level not only in terms of PSM practices but also in terms of performance outcomes, it seems intuitive that these measurement errors partly compensate each other, i.e., beginners would not only overestimate their practices but also their performance because of ignorance. It

could be that significant correlations appear because of this systematic bias in both independent and dependent variables. The question is whether such correlations really describe meaningful cause-and-effect relationships, or only support collective beliefs of practitioners as self-fulfilling prophecies, heavily influenced by who participated in the survey.

5.3 Results of PLS model estimation

After the evaluation approach and first findings regarding noise controls and simple correlations have been discussed in detail, the PLS model will be validated and evaluated in the next subchapter. Following recommendations in the literature, the assessment of the reliability and validity of the measurement model is analyzed before evaluating the structural model (Hulland 1999, p. 198). Again, all reported significance levels are one-tailed as only directional hypotheses are tested (Reinartz *et al.* 2004, p. 18).

5.3.1 Validation of PLS measurement model

The validation of measurement constructs has been emphasized by several authors to be the "sine qua non of science" (Peter 1979, p. 6). Especially for complex evaluations such as structural equation modeling, without proper validation of measurement instruments, the interpretation of results may lead to completely wrong interpretation (Straub *et al.* 2004, p. 380). If only the significance of relationships in the structural model was evaluated,

"the test may indicate a good fit between the hypothesized model and the observed data even though both the measures and the theory are inadequate." (Fornell and Larcker 1981, p. 40)

Accordingly, the sequence of first evaluating the measurement model before drawing conclusions from the structural model seems appropriate (Hulland 1999, p. 198).

Before discussing different measures of validity and reliability, it seems helpful to differentiate these two concepts. Reliability "concerns the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials" (Carmines and Zeller 1979, p. 11). In the case of indicator reliability, reliability refers to the share of measurement error in the representation of the construct by the indicators (Straub *et al.* 2004, p. 400). Opposed to reliability, validity assesses whether any measurement really measures what it is supposed to measure (Corsten 2003, p. 52). In other words, whereas reliability refers to random measurement error,

validity refers to systematic measurement error (Peter and Churchill 1986, p. 4). Only if both errors are small compared to the true value of the variable, the measure can be a good representation of the variable (Homburg and Giering 1998, p. 116)

As discussed in chapters 5.1.1 and 5.2.1, most prior empirical studies using structural equation modeling in the field of operations management have relied on the covariance-based approach and reflective indicators to represent their latent constructs. There is a broadly accepted high level approach to verify validity and reliability of constructs in such models based on the seminal articles of Churchill (1979), Fornell and Larcker (1981) and Anderson and Gerbing (1988), although the use of specific reliability and validity measures differs widely in practice (Shah and Meyer Goldstein 2006, p. 161). However, these concepts are not appropriate for the formatively measured constructs in this study as they are based on the assumption that indicators of one construct should be highly correlated among each other whereas cross-loadings to other constructs should generally be low (Bollen 1989, p. 222; Nunnally and Bernstein 1994, p. 489). That is why, in the case of formative indicators,

"reliability in the internal consistency sense and construct validity in terms of convergent and discriminant validity are not meaningful when indexes are formed as a linear sum of measurements." (Bagozzi 1994, p. 333)

To cope with this problem, Diamantopoulos and Winklhofer (2001, p. 271) distinguished four relevant issues in the construction and validation of formative indices: Content specification, indicator specification, indicator collinearity, and external validity.

Content specification refers to the definition of the content domain the latent variable is supposed to capture (Diamantopoulos and Winklhofer 2001, p. 271). As discussed before, it is essential to cover all content aspects of a formative latent variable (Nunnally and Bernstein 1994, p. 484). As formative latent variables are very often both abstract and ambiguous, covering all content aspects is not a trivial task (Bagozzi 1994, p. 333). Accordingly, content validity of a formative measurement model is determined during construct definition already (Götz and Liehr-Gobbers 2004, p. 728). Chapters 4.1 and 4.2 were supposed to ensure such a comprehensive modeling of all constructs by a broad literature review. Validity was further enhanced by the subsequent practitioner workshops described in chapter 5.1.1, as suggested by Li et al. (2005, p. 624). This is not a numerical, but a subjective and judgmental process (Chen and Paulraj 2004, p. 131). However, two indices suggested by Anderson and Gerbing (1991, p. 734) could help to assess expert validity, one aspect

of content specification, ensuring that the indicators are perceived by experts as both relevant and clearly associated with the respective constructs: The p_{sa} index indicates what share of the experts involved assigns the indicator to the "correct" construct between 0 percent and 100 percent. It can therefore be interpreted as a measure of clearness. Opposed to this, the c_{sv} index "reflects the extent to which respondents assign an item to its posited construct more than to any other construct" (Anderson and Gerbing 1991, p. 734). It takes values between -1 (all experts assign the indicator to the same "wrong" construct) and 1 (perfect fit). It is important to note that test participants have to assign all indicators to one of the constructs. Thus, relevance of an indicator is only calculated indirectly through the distribution of "wrong" assignments (Krafft *et al.* 2005, p. 77).

To obtain these indices for this study, the research team asked 13 practitioners who had not been involved with this project before to assign the list of 46 PSM practice and performance indicators with the underlying detailed scoring grid to the 11 constructs of the framework developed in chapter 3, each described by the definition provided there. The resulting values of p_{sa} and c_{sv} are provided in table 6 for each of the indicators. 78% of the indicators show p_{sa} values of more than 0.9 and c_{sv} values of more than 0.8, indicating high expert validity. There are only three indicators with p_{sa} values below 0.8, and just one indicator with a c_{sv} value of 0.46. Thus, all indicators show at least moderate expert validity (Anderson and Gerbing 1991, p. 737).

The three weakest indicators were "Organization of PSM involvement in cross-functional cooperation" ($p_{sa} = 0.69$, $c_{sv} = 0.46$), "Alignment with and impact on corporate strategy" (0.77, 0.54), and "Transparency over PSM spend" (0.77, 0.69). For "Organization of PSM involvement in cross-functional cooperation", 9 of the 13 practitioners assigned the item to the posited construct "Cross-functional cooperation structures". However, three of the respondents assigned it to "Strategic involvement of PSM", and one to "Purchasing organization structure". It seems that making the difference between "Cross-functional cooperation structures" and "Strategic involvement of PSM" clearer could improve the validity in future studies. "Alignment with and impact on corporate strategy" was assigned to "Category value creation strategies" instead of "Strategic involvement of PSM" by three participants. Here, the reasons seem less obvious as both the definition and the name of "Category value creation strategies" clearly indicates the category level as opposed to an overall PSM level. Accordingly, this result seems less critical. Last, three test participants assigned "Transparency over spend" to others than the intended construct "Knowledge and information management". It seems that the notion of information

systems providing PSM managers with transparency could be strengthened for further studies. However, as stated above, although these values indicate some improvement potential, they support validity on an overall level.

Table 9 - PLS measurement validation

Latent variable	Indicator	Outer weight	R^2 index	c_{sv} index	VIF
Mindsets and aspirations	Expectation of PSM value creation	0.493***	1,00	1,00	1,160
	PSM vision of the CPO	0.305***	1,00	1,00	1,349
	Change readiness of the organization	0.363***	0,85	0,77	1,313
	Strategy execution mindset	0.244***	0,85	0,77	1,293
Talent management	Qualification of category managers	0.536***	1,00	1,00	1,446
	PSM career paths	0.397***	1,00	1,00	1,569
	Training and talent development	0.311***	1,00	1,00	1,279
Performance management	Target setting mechanisms	0.588***	1,00	1,00	1,393
	Target tracking and reporting processes	0.253***	1,00	1,00	1,535
	Individual performance management and incentives	0.169*	0,92	0,85	1,561
	Target accountability beyond PSM	0.259**	1,00	1,00	1,538
Cross-functional cooperation structures	Use of cross-functional cooperation structures	0.344***	1,00	1,00	1,743
	Role of PSM in cross-functional project teams	0.584***	1,00	1,00	1,642
	Organizational integration into cross-functional cooperation	0.290***	0,69	0,46	1,254
Purchasing organization structure	Global purchasing office structure	0.165*	1,00	1,00	1,088
	Corporate coordination of category management	0.678***	0,85	0,77	1,090
	Separation of strategic and transactional tasks	0.511***	0,85	0,77	1,102
Knowledge and information management	PSM knowledge management	0.331***	1,00	1,00	1,224
	PSM systems support	0.103	1,00	1,00	1,630
	E-literacy of the organization	0.299***	0,85	0,69	1,335
	Transparency over PSM spend	0.633***	0,77	0,69	1,264
Category value creation strategies	Category strategy approach	0.440***	1,00	1,00	1,355
	Supply base strategy	0.206***	1,00	1,00	1,424
	Global sourcing strategy	0.220***	1,00	1,00	1,228
	Value chain optimization strategy	0.216***	0,92	0,85	1,346
	Supplier development strategy	0.063	1,00	1,00	1,231
	Risk management strategy	0.315***	0,85	0,77	1,381
Core purchasing processes	Demand management processes	0.315***	1,00	1,00	1,189
	RFX processes	0.232**	1,00	1,00	1,308
	Supplier selection processes	0.245***	1,00	1,00	1,482
	Negotiation processes	0.348***	1,00	1,00	1,379
	Supplier performance management processes	0.208**	1,00	1,00	1,185
	Compliance management	0.206**	1,00	1,00	1,223
Strategic involvement of PSM	Alignment with and impact on corporate strategy	0.531***	0,77	0,54	1,292
	Impact on product development	0.363***	1,00	1,00	1,325
	Impact on marketing and sales	0.316***	1,00	1,00	1,231
	Impact on mergers and acquisitions	0.197**	1,00	1,00	1,062
Perceived PSM performance	Annual PSM savings (self reported)	0.665***	0,85	0,69	1,081
	Quality improvements (self reported)	0.191*	1,00	1,00	1,373
	Supply chain improvements (self reported)	0.267**	1,00	1,00	1,368
	Supply chain risk reduction (self reported)	-0.128	1,00	1,00	1,296
	Contribution to larger strategic goals (self reported)	0.386***	1,00	1,00	1,188
Company performance contribution	Average EBITDA margin	0.755***	1,00	1,00	1,148
	Annual reduction of COGS	0.295**	1,00	1,00	1,010
	Average return on assets	0.387**	1,00	1,00	1,156
	Annual sales growth	-0.165	1,00	1,00	1,025

Significance levels

* 0.10

** 0.05

*** 0.01

Because formative modeling of a latent constructs requires a census of indicators (Bollen and Lennox 1991, p. 308), content specification is closely linked with indicator specification for formative constructs (Diamantopoulos and Winklhofer 2001, p. 271). Indicator specification is also about relevance of an indicator to a construct. However, whereas content specification answers the question whether the indicator belongs to this construct content-wise, indicator specification addresses the relative importance

of this indicator compared to others for the respective latent construct. Accordingly, Götz and Liehr-Gobbers (2004, pp. 728-729) suggest to discuss size and significance of individual outer weights in the PLS model. The outer weights of a latent construct in PLS can be interpreted similar to the standardized beta coefficients in a multiple regression. Accordingly, they indicate the relative importance of a formative indicator (Chin 1998b, p. 304). It is important to note that, opposed to reflective indicators, formative indicators must not be eliminated because of an insignificant contribution. Eliminating insignificant formative indicators could change the content domain of the construct.

In the case of this study, only four of the 46 indicators did not have positive and significant outer weights at a significance level of 0.10. Accordingly, this study nearly meets the optimal requirement suggested by Ringle et al. (2006, p. 87) that the outer weights of all formative indicators should be significant with a statistical error probability of 10 percent. In fact, 39 of the indicators, equaling 85 percent, were significant at least at a level of 0.05.

Two non-significant negative outer weights were found among the performance indicators. For "Perceived PSM performance" the indicator "Supply chain risk reduction (self-reported)" and for "Company performance contribution" the indicator "Annual sales growth". In the case of "Supply chain risk reduction (self-reported)", one potential explanation could be that companies in early stages of PSM evolution perceive themselves as superior in avoiding risk in the supply chain by sticking to well-known suppliers in the neighborhood compared to competitors proactively changing their traditional supplier base. In the case of "Annual sales growth", it has been discussed before that the contribution of PSM to a company's sales growth might be influenced by factors such as market pressure and maturity of the market. However, as both outer weights are non-significant, the negative sign could as well have come by chance. Only future studies will be able to tell.

The other two non-significant indicators are "Business systems support", for the construct "Knowledge and information management", and "Supplier development strategy" for "Category value creation strategies". In the case of "Business systems support", a partial content overlap with "Transparency over spend" could have reduced the indicator weight. This hypothesis is supported by the relatively high VIF value of 1.630 for "Business systems support" (see next page). Both indicators refer to the existence of systems to support PSM processes and provide PSM managers with data for strategic decisions. However, this finding could also imply that information systems supporting efficient every-day's processes do not necessarily

contribute to PSM effectiveness in terms of performance outcomes. Or, in other words, as long as managers have transparency over how much money is spent on what and where, it does not matter what systems they have in place (see also the discussion of resource-based view theory in chapter 3.1). The non-significance of "Supplier development strategy" is even more surprising given the attention supplier development has received recently in both research and practice (e.g., Hahn et al. (1990), Krause et al. (1998; 1999)). One possible explanation for this non-finding is that the effectiveness of supplier development varies widely across industries. Whereas some industries such as automotive and assembly can significantly improve their suppliers' performance, companies in other industries may not be in a position to teach their suppliers.

As for multiple linear regression, excessive multicollinearity among the indicators of a formatively defined construct is problematic. From a statistical perspective, it makes coefficients unreliable because it is difficult to separate the individual contribution of each indicator (Bollen and Lennox 1991, p. 307). From a content perspective, it questions the added value of a formative indicator if the indicator can be almost perfectly explained by a linear combination of the other indicators (Jagpal 1982, pp. 431-432). Accordingly, such indicators might be excluded from the evaluation (Diamantopoulos and Winklhofer 2001, p. 272). The so-called variance inflation factor (VIF) is a measure of multicollinearity. Most publications agree that values of 10 or above are a clear sign of excessive multicollinearity (Hair *et al.* 1998, pp. 220-222). However, the VIF values were all far below 5, with the maximum value being 1.743.

The last indicator of formative measurement model validity suggested by Diamantopoulos and Winklhofer (2001, p. 271) is external validity. Originally, Hauser and Goldberger (1971, pp. 81-117) suggested to mirror all formative constructs with an additional latent variable each measuring the same concept by reflective indicators and assess the relationship between those conceptually synonymous variables in a two-construct MIMIC model (see also Tenenhaus et al. (2004, p. 165)). In the case of this study with a theoretical framework comprising 11 latent constructs, this approach seems not realistic due to restrictions in questionnaire length. As discussed earlier, the resource investment required to participate in this study was about two hours already. Additionally collecting data on all the constructs using reflective measures would probably have further reduced the response rate. Similar to other recent studies investigating a broad set of constructs (e.g., Moser (2006, p. 196)), this study will therefore have to follow an alternative approach based on the insight that "the best we can do [...] is to examine how well the index relates to

measures of other variables" (Bagozzi 1994, p. 333). Accordingly, Diamantopoulos and Winklhofer (2001, pp. 273-274) suggested that if the theoretically expected relationships, i.e., in the case of this study the relationships between hypothesized best practices and superior performance, are found to be significant, external validity can be assumed. A first indication for external validity was already provided in chapter 5.2.3 where the bivariate correlations between each dimension and the different performance measures were discussed. Although this is not exactly the approach suggested, it seems to be a very credible proof of external validity as the indicators of PSM practice and performance were collected using completely different data collection approaches and should therefore be free of common method bias. If the hypothesized path relationships are also found significant, external validity would be further supported. The path coefficients of the structural model will be discussed in the next subchapter. Accordingly, external validity will be revisited there.

5.3.2 Validation of PLS structural model

In covariance-based structural equation modeling, overall goodness-of-fit measures such as the Goodness of Fit Index, the Adjusted Goodness of Fit Index, or the Root Mean Residual are typically used to assess the quality of a model (Gefen *et al.* 2000, p. 35). However, these overall measures are not available for PLS, as no separation of measurement error and true score is made (see chapter 4.2.1). Although alternative global goodness-of-fit measures have recently been proposed for PLS (Tenenhaus *et al.* 2004, p. 173), it seems at least questionable whether a comparison of different models based on one global goodness-of-fit measure makes sense given the exploratory character of PLS. Accordingly, Chin (1998a, pp. VI-VII) argues researchers should focus on the predictiveness of the model rather than global goodness-of-fit or pure statistical significance. Only if structural paths and outer weights are of substantial strength, models are able to provide researchers and practitioners with practical value and interesting insights

The most important quality criterion for a PLS study is the share of variance (R^2) explained for the endogenous variables as it is the primary optimization criterion of the PLS algorithm (Chin 1998b, p. 316). Typically, R^2 is required to be 0.10 or more for soft modeling approaches (Falk and Miller 1992; Karimi *et al.* 2004, p. 184). Chin (1998b, p. 323) labeled R^2 values around 0.65 as "substantial", around 0.35 as "moderate" and below 0.20 as "weak" in an example evaluation. However, most authors agree that the assessment of the share of variance explained has to consider the specific context (Backhaus *et al.* 2003, p. 96). Accordingly, there are no generally applicable thresholds for acceptable R^2 values (Krafft *et al.* 2005, p. 83). In fact,

many recently published PLS studies reported R^2 values between 0.10 and 0.20 for most of their variables (e.g., Dibbern and Chin (2005, p. 155), Fritz et al.(2005, p. 271) , Moser (2006, p. 202)). In the case of this study, R^2 values for PSM practice constructs are moderate to substantial, following the classification of Chin (1998b, p. 323) mentioned above. As indicated in table 10, they range from 0.353 ("Talent management" and "Purchasing organization structure") to 0.558 ("Category value creation strategies").

Because the partial least squares approach aims at predicting the value of exogenous variables in a model, prediction accuracy is a second important aspect of PLS structural equation models. Prediction accuracy for each of the latent constructs can be assessed by the non-parametric Stone-Geisser test criterion (Q^2) using a blindfolding approach (Krafft *et al.* 2005, pp. 84-85). It indicates to what extent the actual data set can be reconstructed by the structural model and the parameters calculated by PLS (Fornell and Cha 1994, p. 72). Any value above zero confirms prediction accuracy (Chin 1998b, p. 318). Other studies reported values between 0.10 and 0.20 for most of their variables (e.g., Ortiz de Guinea et al.(2005, p. 72) , Moser (2006, p. 205)). For this study, the respective Q^2 values range from 0.150 ("Purchasing organization structure") to 0.229 ("Category value creation strategies"). Accordingly, the quality criteria regarding prediction relevance and accuracy are fully met for the PSM practice constructs in this study.

Only the two performance constructs show lower R^2 and Q^2 values, with a share of variance explained of 0.235 for "Perceived PSM performance" and 0.111 for "Company performance contribution". The Stone-Geisser-Test values of 0.074 and 0.037 respectively are both relatively near to the threshold of 0 (Fornell and Cha 1994, p. 73). However, several important differences have to be noted in this context: First, from a general perspective, "Perceived PSM performance" and "Company performance contribution" are conceptually clearly different from the PSM practice constructs and from each other. However, the thresholds suggested by Chin (1998b, p. 323) are based on the assumption of conceptually similar constructs such as, in his example of IT systems, "Ease of use" and "[Perceived] usefulness". Second, the two performance measures differ in the data collection approach from the PSM practice constructs and from each other. As type and size of measurement error is likely to differ by data collection method, an algorithm such as PLS not separating measurement error is naturally limited in the share of variance explained in such a situation. Last but perhaps even most important, the imperfect prediction of both "Perceived PSM performance" and "Company performance contribution" was modeled theoretically before. In fact, the construct "Company performance

contribution" was only introduced because it was assumed that "Perceived PSM performance" may not cover the entire value created by advanced PSM organizations. Similarly, it was argued that PSM is obviously not the only function influencing company performance. Accordingly, the realized R^2 and Q^2 values for the two performance constructs are completely acceptable in the context of this exploratory study.

A second very important aspect to assess the quality of a structural model in PLS is the discussion of individual path relationships. Statistical significance is not more than a minimum requirement to interpret the path coefficient in this context, the size of the path weight and the relative effect size are decisive for the interpretation (Chin 1998a, p. XIII).

Path weights in a PLS model can be interpreted just as the standardized beta coefficients in a multiple regression analysis (Götz and Liehr-Gobbers 2004, p. 730). A rule of thumb says they should be above 0.1 and ideally above 0.2 to be considered meaningful and theoretically interesting (Lohmöller 1989, p. 60; Falk and Miller 1992; Chin 1998a, p. XIII).

Out of the 30 hypothesized causal relationships in the framework developed in chapter 4, 25 were found to be significant at a significance level of at least 0.05. In fact, only two of the hypothesized relationships could not be supported at a significance level of at least 0.10. For the 28 significant relationships (at a level of 0.10), the path weights range from 0.101 ("Purchasing organization structure" to "Core purchasing processes") to 0.639 ("Mindsets and aspirations" to "Performance management"). This implies that all of the significant path weights were above the minimum threshold of 0.1 to be considered meaningful, with 16 of them above 0.2.

Table 10 - Validation of PLS structural model

[illegible]

Significance levels

* 0.10

0.05

*** 0.01

The two non-significant relationships are (1) "Purchasing organization structure" to "Strategic involvement of PSM" and (2) "Core purchasing processes" to "Company performance contribution". In both cases, the results suggest a strong indirect effect. In case (1), the influence of "Purchasing organization structure" on "Strategic involvement of PSM" seems to be mediated by "Category value creation strategies". This makes intuitive sense as a stronger strategic involvement is unlikely to result from introducing corporate lead buyers if they do not influence the category strategies on a local and business unit level and therefore exert power and control. In case (2), the impact of "Core purchasing processes" on company performance seems to be covered entirely by "Perceived PSM performance". This is in line with theoretical expectation as it was argued that current PSM performance measurement focuses very much on traditional purchasing value creation and largely neglects potential contribution of a strategic PSM function in corporate decision making. This assumption is supported by the finding that, opposed to "Core purchasing processes", there is a significant direct impact of "Strategic involvement of PSM" on "Company performance contribution". Practical implications of this difference will be discussed in the next subchapter.

Similar to multiple regression, excessive multicollinearity has to be avoided. Accordingly, the VIF values (see chapter 5.3.1) are also provided in table 10. The maximum VIF value of 2.218 is by far smaller than 5. This implies that excessive multicollinearity is not a problem in this structural PLS model.

Effect sizes investigate the relative impact of a construct on a dependent latent variable (Krafft *et al.* 2005, p. 84). This impact can be measured by the difference in the share of variance explained with and without the respective influencing variable, the so-called effect size (f^2) suggested by Cohen (1988, pp. 410-413). Effect size values of 0.02, 0.15, and 0.35 are defined as small, moderate, and large effects of a construct on the respective endogenous variable respectively (Chin 1998b, p. 316). However, it is important to note that small and moderate effects are very common and do not necessarily imply irrelevant effects or a poor structural model (Chin *et al.* 2003, p. 211). The effect size values reported in this study are similar to those reported in other recent studies (e.g., Karimi *et al.* (2004, p. 185), Gerpott and Jakopin (2005, p. 222), Moser (2006, pp. 206-207)).

Effect sizes are only meaningful in the case of multiple independent variables for one endogenous variable. Accordingly, there are 26 relevant relationships which are both significant at a level of at least 0.10 and part of a multiple relationship. Their effect size values range from 0.011 ("Purchasing organization structure" to "Core

purchasing processes") to 0.136 ("Category value creation strategies" to "Strategic involvement of PSM") with an average effect size of 0.056. Accordingly, most of the effect sizes are small to moderate, and therefore in an acceptable range.

There are four effect sizes below 0.020. Although 0.020 is not an explicit threshold for acceptable effect sizes, it seems reasonable to discuss those cases in a little more detail to understand potential reasons for these weak effects. Two of the low effect size values appeared in relationships among PSM practice constructs, each for second level relationships. For example, "Talent management" has a significant direct influence on "Category value creation strategies" with a path coefficient of 0.117 and an effect size of 0.019. However, there is also a significant indirect influence through "Cross-functional cooperation structures", "Purchasing organization structure", and "Knowledge and information management". Accordingly, it is not surprising to find that most of the effect could also be covered by these indirect relationships if the direct relationship was removed. "Talent management" would still influence "Category value creation strategies" indirectly. This implies that the effect of "Talent management" on "Category value creation strategies" is largely mediated by the management infrastructure constructs in terms of effect size, although there is a significant direct path. The same explanation also applies to the second relationship of "Purchasing organization structure" to "Core purchasing processes" which is mediated by "Category value creation strategies".

The other two relationships with an effect size of less than 0.020 are the effects of "Strategic involvement of PSM" on "Perceived PSM performance" and "Company performance contribution". In both cases, the path weights are significant but the effect sizes are low with 0.014 and 0.015 respectively. Here, the remarks made above about the relatively low R^2 for both performance constructs apply again. In the case of "Perceived PSM performance", the small effect of "Strategic involvement of PSM" was hypothesized theoretically in chapter 3. For "Company performance contribution", the objective was to find support for a direct relationship beyond "Perceived PSM performance". To this end, the small effect size seems sufficient, especially as small effect sizes are a very common phenomenon and not necessarily a sign of poor quality of the model, as stated above.

In summary, all quality criteria for the structural model imply a good fit and validity of the model. Accordingly, an interpretation of the findings seems reasonable to highlight new insights for practice and potential continuative questions for research.

5.3.3 Discussion of empirical findings

After having validated the PLS model in the prior subchapters, the results have to be discussed and interpreted. One of the main objectives of this exploratory empirical study was to identify the relative strength of direct versus indirect effects in PSM value creation to draw conclusions for barriers and drivers of PSM evolution. To interpret the findings correctly, it seems helpful to briefly clarify the concept of direct and indirect effects:

The significant path weight of a direct path from one construct A to another construct B in a PLS model is called a direct effect. Whenever a third variable C exists in the model that is on the one hand significantly influenced by A and on the other hand significantly influences B, an indirect effect of A on B is present. The strength of the indirect effect can be calculated as path weight from A to C multiplied by the path weight from C to B. C is said to have a mediating effect in this relationship. In this case, C "represents the generative mechanism" (Baron and Kenny 1986, p. 1173) of the influence of A on B. A very prominent example of mediation is the stimulus-organism-response (S-O-R) model in behavioral research which assumes that the effects of stimuli on behavior are mediated by various transformation processes in the recipient's brain (Baron and Kenny 1986, p. 1176; Eggert *et al.* 2005, pp. 103-104). In the case of the S-O-R model, there is no direct effect of stimuli on response at all, i.e., there is no significant direct relationship between S and R. This is a case of full or perfect mediation (Eggert *et al.* 2005, p. 103). However, there are also many cases of partial mediation in practice.

In a more complex model such as the one in this study, there are typically more than one mediating variables. For example, the relationship between "mindsets and aspirations" and "cross-functional cooperation structures" is partially mediated by "talent management" and "performance management". In such cases with several mediating variables C_1 to C_n ($n > 1$), the total effect of variable A on B is not immediately obvious. It has to be calculated as the sum of the direct and all significant indirect effects of A on B (Fornell and Bookstein 1982, p. 442). By comparing direct and total effect, the share of direct and indirect influence can be investigated. The ratio Variance Accounted For (VAF) is a measure of how much of the total effect is indirect (Sobel 1982, pp. 290-312). For example, in the case of perfect mediation, either because a direct effect was not hypothesized to exist, or it turned out to be non-significant, VAF is 100%.

To interpret the findings of this study correctly, it is very important to understand that an indirect effect can be just as important as a direct effect of similar size (Vickery *et al.* 2003, p. 535). However, it is important to differentiate direct and indirect effects as they have very different implications for research and management practice:

"The explicit examination of direct versus indirect effects is important because in one industry or context, the links in the chain may be sufficiently strong that the total indirect effect is significant and thus researchers who omit intermediate constructs in the chain will still detect an effect. In another industry or context, the same links individually may be significant but the total indirect effect may be non-significant. The key point is that, even if the "true" models were substantively the same, researchers may reach completely different conclusions depending on which direct and indirect effects were tested. Similarly, managers who expect a direct effect or impact of some action and then cannot detect such an impact may conclude that the action taken was a failure when in fact it was not." (Vickery *et al.* 2003, pp. 535-536)

Building on this last example of Vickery *et al.* (2003, p. 536), one important characteristic of indirect effects becomes clear: In the case of perfect mediation, a change in the exogenous variable can only result in a change in the endogenous variable if the mediator variable has also changed. This statement may sound trivial at first glance. However, it implies that, opposed to a direct effect, the indirect effect is bound to an if-condition. Accordingly, in the case of complex organizational practices, it may be more difficult to realize indirect effects. This insight has important implications for the interpretation of this study. Table 11 provides an overview of direct path coefficients, total effects, and the share of direct effect, 1-*VAF*.

The following discussion of results will be separated into two parts. In a first step, the individual hypotheses developed in chapter 4.3 will be revisited to see whether they can be confirmed by the empirical findings. Accordingly, the first section of the following subchapter is structured along the conceptual research framework introduced in chapter 4 (see figure 18). In a second step, the author will interpret these findings more broadly with regards to their implications for management practice.

Hypothesis 1: Mindsets and aspirations have a positive and direct influence on (1a) talent management and (1b) performance management.

Hypotheses 1a and 1b can be supported as "mindsets and aspirations" explain 35.3 and 40.8 percent of the variance in "talent management" and "performance management" respectively. The path coefficients of 0.594 and 0.639 are the highest of the entire model. This finding supports the hypothesized strong influence of top management expectations and the CPO's vision on recruiting and talent development as well as target setting and performance incentives in PSM.

Hypothesis 2: Mindsets and aspirations have a positive and direct influence on (2a) cross-functional cooperation structures, (2b) purchasing organization structure, and (2c) knowledge and information management.

Hypotheses 2a, 2b, and 2c can be confirmed, too. "Mindsets and aspirations" show significant direct relationships to all three structures and systems constructs with path weights ranging from 0.230 to 0.352. For "cross-functional cooperation structures" and "purchasing organization structure", the direct effect is even stronger than the indirect effect through talent and performance management. Only in the case of "knowledge and information management", the indirect effect makes up for 59.2 percent of the influence. However, the effect size of 0.041 for the direct effect cannot be neglected. These findings further emphasize the critical importance of top management attention and a strong CPO to effectively manage a PSM organization for maximum value-add for the company. Accordingly, they are in line with the findings of earlier empirical studies focusing on the influence of the purchasing function's perceived status (e.g., Narasimhan and Das (2001), Chen et al. (2004)).

Hypothesis 3: Talent management and performance management have a positive and direct influence on (3a/b) cross-functional cooperation structures, (3c/d) purchasing organization structure, and (3e/f) knowledge and information management.

All of the path coefficients from talent and performance management to the structures and systems constructs are also significant at least at a level of 0.05. Moreover, there is least one of the two constructs "talent management" and "performance management" for each of the three structures and systems constructs that shows an effect size substantially greater than 0.02. In the case of "cross-functional cooperation structures", "talent management" seems more influential with a path weight of 0.199 and an effect size of 0.039. Opposed to this, "performance management" seems to have a stronger influence on "purchasing organization

structure" with a path weight of 0.240 and an effect size of 0.047. Both constructs show a substantial influence on "knowledge and information management".

The findings on the effect size differences in the relations to "cross-functional cooperation structures" and "purchasing organization structure" have interesting implications for PSM functions depending on their individual objectives: For companies focusing on strengthening central control, potentially to realize synergies, setting clear targets and tracking performance rigidly against them seems critical. Opposed to this, strengthening cross-functional cooperation seems to require a focus on increasing purchasing talent and professional skills. Similar recommendations have been made by other authors (Giunipero and Vogt 1997, p. 13; Johnson *et al.* 2002, p. 83), but to our knowledge no prior empirical study has compared those alternatives directly.

Hypothesis 4: Talent management and performance management have a positive and direct influence on (4a/b) category value creation strategies.

The influence of "performance management" on "category value creation strategies" can be supported because of the path weight of 0.187 and the effect size of 0.039. "Talent management" with a path weight of 0.117 and an effect size of 0.019 seems less convincing. However, because of the substantial indirect effect nearly doubling the total effect (49.6 percent indirect), it is an important influencing factor on "category value creation strategies" overall. Anyway, from a statistical perspective the hypothesized relationships are confirmed at a significance level of 0.05. These findings seem to reveal one important barrier on the way from tactical purchasing to strategic supply management for many companies mentioned by other authors earlier (Bartlett and Ghoshal 2002, pp. 34-35): The introduction speed of advanced strategies seems to be limited by the people in the organization. However, there is also good news, as setting clear targets and managing performance seems to help in the short run.

Hypothesis 5: Cross-functional cooperation structures, purchasing organization structure, and knowledge and information management have a positive and direct influence on (5a/b/c) category value creation strategies.

This hypothesis is fully confirmed for all three structures and systems constructs. With path weights of at least 0.185, all significant at a level of 0.01, and a minimum effect size of 0.050 (both for "cross-functional cooperation structures"), the direct effect seems well supported in spite of the two more influencing factors also with significant path coefficients. This finding shows the critical role of organization and

infrastructure in PSM value creation. It should help practitioners to realize that only the interplay of enablers and actual value creation strategies and practices implies superior performance outcomes. Such statements were largely limited to theoretical reasoning in the past (Kaufmann 2002, p. 13; Monczka *et al.* 2005b, pp. 26-27), lacking empirical validation.

Hypothesis 6: Cross-functional cooperation structures, purchasing organization structure, and knowledge and information management have a positive and direct influence on (6a/b/c) core purchasing processes and (6d/e/f) strategic involvement of PSM.

For hypothesis group 6, only a part of the hypothesized relationships could be supported. Some of them, such as the influence of "cross-functional cooperation structures" on "strategic involvement of PSM" (hypothesis 6d), or the influence of "knowledge and information management" on "core purchasing processes" (hypothesis 6c), seem very strong. Effect sizes above 0.10 confirm the existence of a substantial direct influence. However, a significant direct influence of "purchasing organization structure" on "strategic involvement of PSM" (hypothesis 6e) could not be found (see chapter 5.3.2). Similarly, the direct influence of "purchasing organization structure" on "core purchasing processes" (hypothesis 6b) has an effect size of only 0.011. Accordingly, it seems that the influence of "purchasing organization structure" on strategy implementation is largely indirect, thus not supporting the overall hypothesis for this construct. In summary, hypothesis 6 can only be confirmed for the two constructs "cross-functional cooperation structures" (hypotheses 6a and 6d) and "knowledge and information management" (hypotheses 6c and 6f). The finding that a direct influence of "purchasing organization structure" on "strategic involvement of PSM" could not be found could be due to the fact that central authority and control was emphasized in the operationalization of the "purchasing organization structure" construct. As posited in prior literature, a close involvement of PSM professionals is rather fostered by flexible, decentralized structures (David *et al.* 1999, pp. 14-17). However, the generally weak influence of "purchasing organization structure" on "core purchasing processes" comes surprising because stronger central coordination should be expected to support standardized processes and behaviors. It seems that "knowledge and information management" is more influential there than structural measures.

Hypothesis 7: Category value creation strategies have a positive and direct influence on (7a) core purchasing processes and (7b) strategic involvement of PSM.

Hypotheses 7a and 7b are fully supported by the empirical findings again. Path weights of 0.381 for the relationship to "strategic involvement of PSM" and 0.297 for the influence on "core purchasing processes" confirm the strong association. For "strategic involvement of PSM", "category value creation strategies" is the strongest direct influencer with an effect size of 0.136; for "core purchasing processes", the category strategies construct is a close second with an effect size of 0.094 compared to 0.125 for "knowledge and information management".

Hypothesis 8: Category value creation strategies have an unwanted positive and direct influence on perceived PSM performance.

This hypothesis modeled an unwanted side effect of PSM evolution, which should theoretically be perfectly covered by core purchasing processes and strategic involvement of PSM. It was hypothesized that perceived PSM performance increases only from development of new category strategies, although they do not really generate added value unless they are properly implemented. This hypothesis was largely supported by the empirical data with a path weight of 0.195 significant at a level of 0.05, although the effect size of 0.022 was relatively small. This result points to a reason why many companies get stuck in early phases of PSM evolution: At least some of the CPOs seem to make their employees write nice strategies, and once this is done, they seem to be satisfied and assume that performance increases are only a matter of time. In other words, some companies do not seem to follow through rigidly (Banfield 1999, p. xi).

Hypothesis 9: Core purchasing processes and strategic involvement of PSM have a positive and direct influence on (9a/b) perceived PSM performance.

Hypothesis group 9 could also only be supported partly. "Core purchasing processes" was confirmed to be the strongest driver of perceived PSM performance in this study, whereas the influence of "strategic involvement of PSM" was found to be only marginal both in terms of path coefficient (0.135, significant at 0.10) and effect size (0.014). This seems to imply that "perceived PSM performance" is mainly driven by classical purchasing value creation, rather than contributions to company strategic decisions. Assuming that perceived impact on performance is closely associated with improvement efforts (March and Simon 1993, p. 68), it seems intuitive that most purchasing functions focus more on optimizing their standard processes than contributing their expertise to broader company decisions. The momentum of organizational learning processes seems to motivate PSM organizations to do more of the same instead of taking on new roles as a strategic function (Miller and Friesen 1980).

Hypothesis 10: Core purchasing processes and strategic involvement of PSM have an unwanted positive and direct influence on (10a/b) company performance contribution.

In line with the theoretical reasoning underlying hypothesis 10, the empirical data supports a significant direct influence of "strategic involvement of PSM" on "company performance contribution" (hypothesis 10a). Although the effect size of 0.015 is small, the direct path has a weight of 0.147 significant at a level of 0.05. In fact, 83.1 percent of the influence of "strategic involvement of PSM" on "company performance contribution" is found to be direct, as opposed to only 16.9 percent mediated by "Perceived PSM performance". On the other hand, the influence of "core purchasing processes" on "company performance contribution" (hypothesis 10b) seems to be perfectly covered by "perceived PSM performance". These findings show that "perceived PSM performance" really seems to miss out on the big part of strategic value-add of PSM. Whereas "core purchasing processes" are obviously covered by current perception, the impact of "strategic involvement of PSM" seems to be largely missed. Combined with the argument of focus on perceived performance drivers, this finding reveals a critical dilemma: Although successful PSM functions do already contribute significant value-add to overall company success, this contribution is not necessarily recognized due to the difficulties of measuring such a contribution (Alchian and Demsetz 1972, p. 79; Carter *et al.* 2005, p. 3). This mismatch has two implications: On the one hand, perceived status of the function does not necessarily represent the actual performance contribution. On the other hand, the limited scope of PSM performance measurement motivates PSM professionals to focus on their traditional roles rather than broadening their scope to strategic contributions. PSM evolution is artificially slowed down.

Hypothesis 11: Perceived PSM performance has a positive and direct influence on company performance contribution.

Hypothesis 11 was supported with a path coefficient of 0.219, significant at a level of 0.01, and an effect size of 0.042. It complements hypotheses 9 and 10 in the interpretation of direct and indirect effects of strategy implementation on company performance contribution.

After discussing the findings for the individual hypotheses, the author will try to interpret the findings of this empirical survey from a broader perspective. Due to the exploratory character of this study and today's limited knowledge about PSM evolution processes, such an interpretation can only be a collection of thought-starters for further research. Every reader should therefore perceive this

interpretation as preliminary questions rather than final answers although it will be formulated largely in statements.

The theoretical framework developed in chapter 4 hypothesized that most of the PSM practices do not influence performance directly but only indirectly through other practices. The high share of significant path relationships with meaningful strength and the fulfillment of all quality criteria with only a few limitations discussed before supports the theoretical framework on a high level. Both the influence of enablers on PSM value creation practices and the influence of PSM value creation practices on performance can be confirmed. Figure 25 gives an overview of the supported path relationships. However, an interpretation regarding the primary research questions proposed in chapter 1.2 is more difficult.

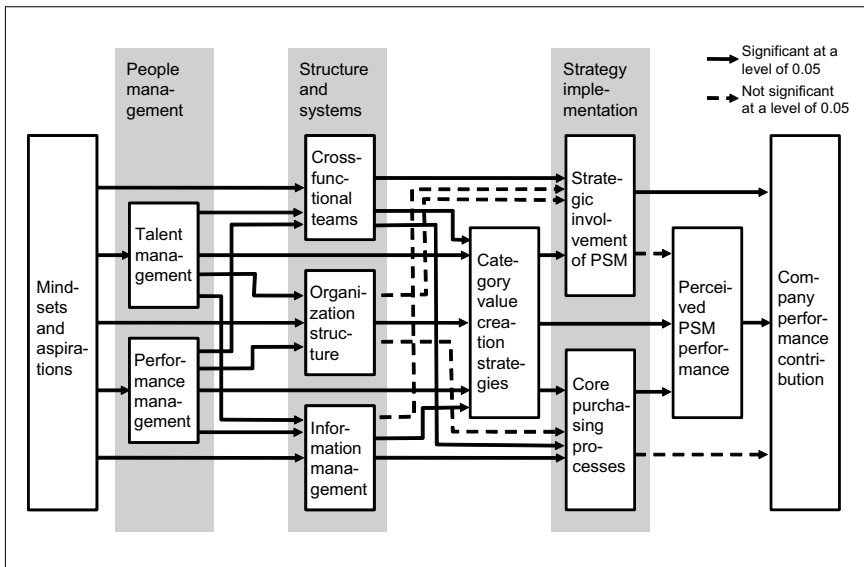


Figure 25 - Overview of significant path relationships

Obviously, the total effects on company performance are most interesting for practitioners. The highest total effect scores in the column "company performance contribution" of table 11 are "strategic involvement of PSM" (0.177), "mindsets and aspirations" (0.154), and "category value creation strategies" (0.139). These three variables are located in very different positions in the framework. Whereas 83

percent of the influence of "strategic involvement of PSM" on "company performance contribution" is direct, both "category value creation strategies" and "mindsets and aspirations" have a purely indirect effect. To realize the effect of "category value creation strategies" on "company performance contribution", three other PSM evolution constructs have to increase along the way, namely "strategic involvement of PSM", "core purchasing processes", and "perceived PSM performance". Even worse, in the case of "mindsets and aspirations" as the hypothesized foundation and origin of PSM evolution, all PSM practices are assumed to evolve to generate the calculated total effect.

So does this imply that PSM organizations should focus on increasing "strategic involvement of PSM"? The answer is a clear "yes and no". On the one hand, the significant direct effect of "strategic involvement of PSM" indicates that this way of PSM value creation is clearly underestimated, if not partly neglected, in practice today. On the other hand, there are narrow limits to increasing "strategic involvement of PSM" without improving the other PSM practice constructs in parallel. To understand this argumentation, it is necessary to reflect the very nature of cause-and-effect relationships.

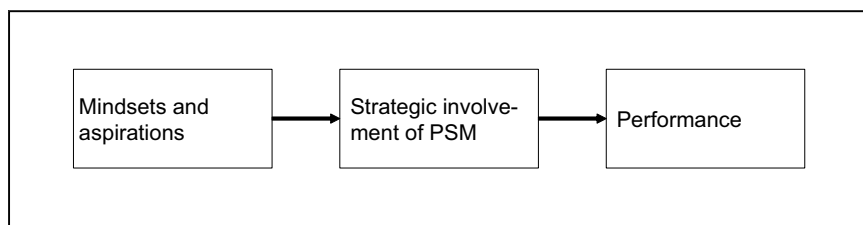


Figure 26 - Simplified example model

To reduce complexity for this theoretical discussion, a simplified framework containing only the constructs "mindsets and aspirations", "strategic involvement of PSM", and "performance" is assumed for the moment (see figure 26). "Strategic involvement of PSM" fully mediates the influence of "mindsets and aspirations" on "performance". Accordingly, the total effect of "strategic involvement of PSM" on "performance" has to be stronger than the total effect of "mindsets and aspirations" because path weights are typically smaller than 1 so the total effect of "mindsets and aspirations" results from a multiplication of the total effect of "strategic involvement" with a number smaller than 1. Intuitively, a manager would be tempted to focus on the variable "strategic involvement of PSM" because of the larger total effect. There may be some obvious short-term improvements. However, as soon as he or she

starts thinking about how to significantly improve "strategic involvement of PSM", it becomes clear that the root cause of the problem is "mindsets and aspirations". In fact, the current status in the area of "mindsets and aspirations" limits the degrees of freedom in "strategic involvement of PSM". "Strategic involvement in PSM" could not increase significantly with mindsets and aspirations unchanged. Accordingly, the manager would inevitably end up working on "mindsets and aspirations" in the long run to create degrees of freedom to further improve "strategic involvement of PSM".

This simplified example shows that focus is a question of causal sequence, or the "chain of events" (Vickery *et al.* 2003, p. 535), rather than total effect. In the long run, none of the PSM practice constructs can be entirely neglected, as each of them limits the degrees of freedom for subsequent levels in the causal chain. Accordingly, this study supports the concept of holistic "purchasing competence" as primary determinant of performance outcomes, as suggested by Das and Narasimhan (2000, p. 24-25). At the same time, these results provide researchers and practitioners with initial answers to the question what areas of PSM practice are critical for PSM competence to evolve and how to improve them, based on underlying drivers.

Based on the total effect on "company performance contribution", it was possible to identify the three most critical areas of PSM practice for a sustainable evolution. The share of variance explained by underlying PSM practice constructs indicates how much each of the PSM practice constructs is limited by the other variables in the model. For example, 55.8 percent of the variance in "category value creation strategies" is explained, but only 45.6 percent of the variance in "strategic involvement of PSM". Accordingly, the respective degrees of freedom to individually increase the evolution level without changing any underlying PSM practices seem to be larger for "strategic involvement of PSM". Following this logic, a CPO would be completely free to determine the level of "mindsets and aspirations". This is obviously not true as "mindsets and aspirations" depend on the perception of other people in the company (see chapter 4.1.1). In chapter 4.3.3, it was hypothesized that a significant change in "mindsets and aspirations" requires an external stimulus, such as market pressure, to force top management to reconsider their priorities. Future studies will have to show whether these hypothesized relationships can be supported empirically (see also Eltantawy (2005, p. 77)).

To understand how these critical areas such as "strategic involvement of PSM" can be improved in a sustainable way, a comparison of path weights and effect sizes helps to identify the most important influencing factors. In this case, "category value creation strategies" and "cross-functional cooperation structures" seem to be most

influential both in terms of path weight and effect size. However, "knowledge and information management", the third significant influencing factor, is most important for "category value creation strategies" (effect size of 0.101). Accordingly, it could become critical once the primary degrees of freedom in "category value creation strategies" have been utilized.

This discussion implies the following sequence in PSM evolution: First, short-term improvements in the most critical areas have to be made that do not require changing other PSM practice constructs. Second, the focus shifts to the strongest direct influencing factors for each of the critical areas to realize short-term improvements there. Third, total effects on the original focus areas indicate further long-term improvement areas.

The hypotheses in the theoretical framework were based on the assumption of principal-agent theory that management cannot influence PSM value creation directly (see chapter 3.3.1). This assumption has important implications for the interpretation of these results. Although "mindsets and aspirations" is one of the main areas of potential CPO intervention, the two other focus areas in terms of total effect on company performance contribution, "strategic involvement of PSM" and "category value creation strategies" are largely out of direct reach for the CPO in a complex organization. This implies that the CPO has to rely on influencing the strongest structural enablers to improve those value creation practices. A comparison of the total effects on "company performance contribution" shows that among the enablers, "cross-functional cooperation structures" and "knowledge and information management" seem most important. Accordingly, the results of this study imply that a CPO should focus his or her personal attention on getting mindsets and aspirations right, building up relevant cross-functional team structures with an appropriate role of PSM, and providing PSM professionals with good information systems to improve transparency for strategy development and implementation. However, people management cannot be neglected in the long run as it accounts for a large share of variance in the structural dimensions.

Comparing total effects on a more detailed level can generate further insights. For example, the results show that a focus on "strategic involvement of PSM" is far more important than trying to improve "core purchasing processes", although they are still the primary play ground for most of the CPOs today (see chapter 2.1.2). Moreover, the findings indicate that it is more important to create and leverage "cross-functional cooperation structures" than a sophisticated "purchasing organization structure". These findings are in line with a study by Spekman et al. (1998, pp. 645-646) who

found that sharing information across all members of a supply chain is significantly more important than optimizing purchasing processes through classical coordination.

It would be possible to interpret the results of this empirical study in much more detail. In fact, the strength of individual relationships may help researchers to identify further relevant and promising research areas and support theoretical hypotheses. However, such a detailed interpretation of results would contradict the exploratory character of this study. Nevertheless, the author would like to encourage other researchers to use the information provided in the detailed tables of results to identify findings they find interesting or counter-intuitive and validate them by further empirical studies.

5.4 Interim summary

The empirical study in this chapter combined data from interviews, questionnaires, and databases using variance-based structural equation modeling to test the framework developed in chapter 4. This approach was taken to investigate whether bias in the self-perception of CPOs and top management could be a reason for the slow advancements in PSM evolution.

The interview-based survey approach adopted from Bloom et al. (2005) and complemented by suggestions from Pagell (2004) proved to provide the researchers with reliable data on the complex purchasing and supply management practices investigated in this study. It may therefore be a suitable methodology for empirical research when participants are assumed to be limited in their ability to make the assessments required on their own.

To avoid bias in the data, control variables were introduced to control for noise as well as for external influencing factors such as industry differences. As variance-based structural equation modeling is, as opposed to covariance-based approaches, not based upon psychometric measurement error theory (Scholderer and Balderjahn 2005), it was possible to remove significant noise from the data before structural equation modeling. This reduced the complexity of the structural equation model significantly and made it possible to test the conceptual framework with only 149 available data sets for the final evaluation.

25 out of 30 hypothesized path relationships were found to be confirmed at a significance level of at least 0.05. In general, the structural equation model showed a good validity and fit for all relevant quality criteria both in the measurement model

and structural model. Given that this study combined data from completely different sources, these results support the strong relationships underlying this framework.

In summary, the following conclusions can be drawn for the primary research questions of this study:

(1) In line with prior studies (see chapter 2.3), this study supports the theoretical hypothesis that an evolution of PSM towards a more strategic role can significantly improve overall company success and may even be a source of competitive advantage (see chapter 3.1).

(2) Two reasons for the limited evolution of most PSM organizations become visible: First, beginners in PSM evolution seem to overlook shortcomings in their performance outcomes and the gap to industry peers. Second, companies that have evolved to a basic level of strategic supply management seem not to see the expected performance increases and therefore stop their efforts because PSM performance measurement does not capture the strategic contributions appropriately.

(3) CPOs should focus on improving "mindsets and aspirations" as main driver of performance outcomes. Improving the other most important PSM practice constructs "strategic involvement of PSM" and "category value creation strategies" is not possible directly in large organizations. It takes improvements in other enablers, especially "cross-functional cooperation structures" and "knowledge and information systems" to increase the likelihood of PSM professionals implementing the change in mindsets and aspirations in new strategies and deeper involvement in corporate strategic decisions.

6 Summary and conclusions

This thesis investigates benefits, barriers, and critical drivers of PSM evolution from transactional support function to an integrated strategic role. Insights are drawn both from theoretical discussion in chapters 2 to 4, as well as an empirical study discussed in chapter 5. The following, final chapter summarizes the results of this thesis, provides research conclusions for both researchers and practitioners, and conducts a brief overall evaluation of the research.

This study is based on the insights from a broad review of prior PSM literature in chapter 2. It shows that prior PSM evolution models have generally assumed a linear, stepwise development toward a strategic, integrated role of the purchasing function. Several empirical studies supported the assumption that an implementation of strategic supply management practices is associated with higher performance outcomes. However, studies relying on objective performance data consistently reported less convincing findings. Based on their results, Ellram et al. (2002) even question whether traditional survey methodology is well-suited in general to investigate complex organizational phenomena at all. In summary, several research gaps can be identified: First, it remains unclear from prior literature how PSM practices interact in the process of PSM evolution. Second, the obvious gap between theoretical endorsement and practical implementation of strategic purchasing practices cannot be explained properly. And third, prior literature does not provide CPOs with a lot of guidance on how to make PSM evolution happen. The following subchapters discuss the insights gained by this study and their implications for management research and practice.

6.1 Contributions to management research

As suggested by other authors before (Ramsay 2001b; Mol 2003), resource-based view theory and its later sub streams support the argument that purchasing and supply management could potentially be a source of sustained competitive advantage. Drawing on literature on organizational learning and adaptation, this study shows theoretically how competitive advantage from purchasing and supply management can be built and sustained. It seems that many companies get caught in a competence trap (Levinthal and March 1993, p. 102) early in the PSM evolution process. Such purchasing functions step up from a pure support function to become well-respected for their competences in reducing costs on external spend, and

optimize this competence instead of broadening their scope to become really integrated with other functions and contribute their expertise to broader strategic company decisions. This latter step requires a second profound change of mindsets and aspirations both of top management and PSM professionals. However, only very few companies seem to see the potential and push for the level of strategic integration of purchasing. These companies could get into a position where they are able to sustain their competitive advantage. This result takes the discussion of potential sources of sustained competitive advantage from purchasing and supply management one step further and should encourage further research on the dynamic characteristics of PSM evolution, and barriers to it.

Prior frameworks of supply management (Kaufmann 2002; Jahns 2005; Monczka *et al.* 2005b) only structured PSM practices, without suggesting propositions on their causal interrelations. Accordingly, it is difficult for managers to identify critical focus areas, as these frameworks treat practices as equal in their importance. To develop theoretically well-founded hypotheses on the relationships among relevant PSM practice constructs, this study draws on principal-agent-theory (Ross 1973). It assumes that managers have to delegate responsibility and therefore cannot perfectly control employee behavior. To avoid shirking, they have to select employees carefully, force them to stick to certain rules and structures, and monitor performance closely. These theoretical contributions allow developing a conceptual research framework separating PSM enablers, value creation practices, and performance outcomes. Whereas the CPO is largely limited in his influence to improving PSM enablers, employees act within these structures to generate performance outcomes. The resulting conceptual framework provides researchers in the area of purchasing and supply management with a first frame of reference for further improvement.

An empirical study, discussed in detail in chapter 5, provides a first validation of the conceptual research framework and the hypothesized relationships. Both prior empirical results and theoretical considerations suggest that traditional survey methodology could be misleading in this context. On the one hand, PSM performance measurement seems biased toward classical purchasing processes, largely neglecting contributions to strategic company decisions. On the other hand, at least some, especially low-performing, CPOs seem to neglect weaknesses of their organizations systematically to legitimate past and current behaviors. Accordingly, an interview-based survey approach combining suggestions by Bloom *et al.* (2005) and Pagell (2004) is used in this study to get an outside-in perspective of PSM practices and evolution efforts. These external assessments by the interviewers are compared

to the self-assessment of the CPOs collected through a traditional questionnaire. In fact, low-performing CPOs are found to heavily overestimate their relative performance, whereas high-performing CPOs seem to have a very realistic picture of their current evolution level. This finding adds to earlier doubts regarding the reliability of traditional survey methodology both in PSM (Knight 2000; Ellram *et al.* 2002) and in management research in general (Philips 1981; Ketokivi and Schroeder 2004). However, as the interview-based survey methodology used in this study is found to generate acceptable results, this study also provides researchers with a promising potential alternative.

Another contribution to research in terms of methodological advancements is the use of a two-step approach to evaluate the complex structural equation model. In a first step, both PSM practices and performance data is controlled for potential bias from the interview process or external influencing factors such as industry, region, or company size. Only in a second step, the adjusted data is evaluated using variance-based structural equation modeling. This is possible because variance-based structural equation modeling does not rely on psychometric measurement error theory (Scholderer and Balderjahn 2005). Otherwise, upfront data adjustment would require an adjustment of measurement errors in the subsequent evaluation. This two-step approach makes it possible to control for the influence of 35 control variables on each of the 37 PSM practice indicators with 149 complete data sets only. Handling this complexity would not be possible with an integrated approach. Accordingly, this two-step approach seems to be a promising way to reduce the complexity of variance-based structural equation models in studies with smaller samples.

Finally, the empirical results of this study support most of the hypothesized relationships in the conceptual research framework. It can be shown that current PSM performance measurement largely neglects strategic contributions and overemphasizes core purchasing processes and category strategies instead. Moreover, the critical role of mindsets and aspirations as underlying driver of PSM evolution can be confirmed. These initial findings provide researchers with a multitude of potential further research questions, which are discussed later in this chapter.

6.2 Implications for management practice

This study offers some very interesting insights for practical management of PSM evolution both in companies at the very start as well as those in later stages of PSM evolution.

First of all, this study confirms that PSM evolution efforts lead to a significant increase in both perceived and actual performance outcomes. In other words, it pays off to take purchasing from a purely transactional support function to contributing cost reductions and from there to strategic integration into corporate decision-making. This result is in line with several prior empirical findings (see chapter 2.3). However, the fact that this study relies entirely on objective company performance data to measure actual PSM performance contribution should make practitioners even more comfortable that investing into PSM evolution is the right thing to do.

The comparison of external assessments by the interviewers, the CPOs' self-assessment, and objective performance data reveals an interesting dilemma to practitioners: Low performers in terms of external assessment rated themselves as mediocre, medium performers rated themselves as mediocre, and high performers rated themselves as largely mediocre, too. However, the reasons seem to be very different. It seems that low-performing CPOs do not realize their shortcomings. That is why they have not started significant efforts to catch up with their peers. Opposed to this, high performers know that they are ahead but keep on setting stretch targets to drive PSM evolution even further and sustain their advantage. This insight has important implications for top management rather than PSM practitioners. It seems worthwhile to reconsider the current value-add of their PSM organizations and compare it to their potential contribution to strategic company decisions. It seems that, in most of the cases, a low-performing CPO would not recognize the need for action by him- or herself.

When starting a PSM evolution program, it seems helpful to think of two S-curves. First, the purchasing organization has to deliver credible net savings as a visible contribution to company success. This first step should make other executives in the organization accept the participation of PSM managers in cross-functional cooperation and encourage PSM professionals to change their roles and self-perception. However, once this change in mindsets both within the PSM function and in other parts of the organization has taken place, it seems critical not to get caught in the competence trap described by Levinthal and March (1993). For companies to enjoy sustained competitive advantage from purchasing and supply management,

such a cost reduction role can only be the starting point for a second significant change in mindsets which is less obvious for most companies: Making PSM professionals not only accepted participants in cross-functional collaboration on cost reduction issues but real peers in broader company strategic decisions seems to provide companies with significant added value, although such contributions are difficult to measure due to allocation problems (Alchian and Demsetz 1972). It seems necessary for top management to take the risk and belief in the potential contribution of PSM to put their company on this second S-curve. However, this study indicates that those who take the risk can reap significant rewards.

Finally, this study has important implications for the CPO regarding how to manage PSM evolution. The conceptual framework proposed here separates enablers from core purchasing processes, similar to prior frameworks (Kaufmann 2002). However, this study confirms a significant influence of PSM enablers on value creation processes. This implies that improving such enablers as talent management, performance management, organizational structures, and IT systems seems to influence employee behavior effectively to change their roles toward strategic supply management. At the same time, this finding implies that a CPO involving heavily in detailed category strategy development and implementation may face two complications: On the one hand, neglecting the underlying enablers implies strictly limited degrees of freedom in PSM value creation. Accordingly, this could only be a short term solution. On the other hand, he or she could most probably only focus on a few important categories which implies missing out on the others completely. These considerations imply that a CPO should prioritize improving the enablers mentioned above to make sure his employees are able to do their job well and manage them through the difficult change of mindsets a PSM evolution requires.

6.3 Limitations of the study and suggestions for further research

Although the author is convinced that this study has many valuable and important implications for both management research and management practice, it has, just as every research study, some limitations that have to be noted and acknowledged.

First of all, it has to be noted that the empirical evidence presented in this study is not sufficient to validate the conceptual framework reliably. In general, a significant empirical finding for a research hypothesis does not necessarily mean that the underlying theory is true. Only over time with several empirical results pointing in the

same direction, the probability that the underlying theory is true becomes higher (Hunt 1991, pp. 170-172).

A second important limitation is the cross-sectional character of this empirical study. Causality in a theoretical model conceptually "assumes a sequential, temporal order" (Eltantawy 2005, p. 75) which cannot be tested appropriately by a cross-sectional study (Shah and Meyer Goldstein 2006, p. 162). Accordingly, this study is not able to differentiate whether PSM best practices only covary with or actually cause superior performance. The study by York and Miree (2004) investigating cause and effect in TQM illustrated this problem very well: They found that quality award-winning companies in fact enjoyed superior financial performance 5 years after they won the reward. However, they also found that these companies had already been high-performing before they won the award. Accordingly, they were not able to show a causal effect of implementing TQM on financial performance. They suggest longitudinal studies only comparing companies on a similar performance level before the observation period. Still, even in this case differences in performance development may be due to other factors that also changed during the survey period. This example shows that convincing empirical support for cause-and-effect relationships could only be created by experiments (Licht 1995, p. 59; Field 2005, p. 269) which are, by nature, very difficult, if not impossible, to implement in management science. Nevertheless, it would be valuable to repeat this study in a few years with the same participants to see whether and how both PSM practices and performance changed over time.

A third limitation worth mentioning is that, as this study relied on PLS as opposed to covariance-based approaches, the framework could not be tested holistically. Specifically, possible but not hypothesized relationships have not been tested for non-existence (Chin 1998b, p. 329). Moreover, feedback loops have not been considered although they are likely to exist in real-world PSM evolution just as in any organizational learning processes (Cyert and March 1995; Argyris and Schön 1999).

Besides validating the findings of this study by using alternative approaches to data collection, different samples, or other evaluation methods, this study encourages further research on a number of content aspects.

First of all, it is argued that it takes at least two initiating stimuli to start PSM evolution efforts for each of the S-curves of evolution. However, these external influencing factors are largely outside the scope of this study but certainly far from understood in their relevance for PSM evolution.

Second, the indication that current performance measurement seems limited in scope, and partly even misleading, also deserves more focused research on potential reasons and improvement levers.

Finally, it seems worth-while to investigate the actual impact of the second S-curve of PSM evolution on company success more specifically. As many companies seem not to see the potential, research studies quantifying the potential rewards based on objective data could be very valuable.

In summary, this study tries to provide initial answers to some questions which have been around for more than 20 years, since purchasing was first called to become supply management (Kraljic 1983). It seems surprising that, although it is common wisdom that practice in most companies is far from best (see chapter 2.1), most of the current research in the area of purchasing and supply management focuses on specific "best" practices such as how to deal with strategic suppliers, or how to do risk management, without answering the questions of how to get the basics right. However, the findings of this study indicate that even among the largest companies in the world, there are very few in a position to implement such advanced "best" practices. Accordingly, the relevancy of such research for most of the companies stays questionable as long as the focus is on how best practices should look like, neglecting the question of how to get there. However, our study shows that the latter question requires a broader perspective, as it takes a holistic evolution of PSM competence (Das and Narasimhan 2000) rather than implementing singular best practices.

The research study this thesis is built on was initiated by and conducted in close cooperation with practitioners. It seems that a closer cooperation between academia and practice could sometimes help to focus academic efforts on the most pressing problems of practice not only for a few leading, but the big part of the companies. Just as for the research questions in this study, such cooperation could lead to simple but very challenging questions academics have not considered before, for whatever reason. However, answering those questions most relevant for many practitioners "out there" may be the only legitimation for management science after all (Ulrich 1995, p. 165).

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