

# Purchasing performance management systems: an empirical investigation

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## 1. Introduction

Several authors accounted for the strategic importance and the competitive potential of purchasing and supply management (among others: Reck and Long 1988, Pearson and Gritzmacher 1990, Welch and Nayak 1992, Spekman *et al.* 1994, Carter and Narasimhan 1996, Anderson and Katz 1998). The literature acknowledged that the pivotal role purchasing is gaining in many companies by defining a general and comprehensive framework for conducting purchasing research. In particular, authors like Harland *et al.* (1999) and Gonzalez-Benito (2007) extended the widely agreed and tested operations management model of Hayes and Wheelwright (1984) and Vickery (1991) to the purchasing area. According to this framework, the purchasing strategy is directly linked to the overall business strategy, as other authors agreed (e.g. Ellram and Carr 1994, Cox 1996, Cousins 2005, Nollet *et al.* 2005). Corporate strategy may be defined as a set of prevailing competitive priorities, which have been first listed by Porter (1980) and then completed by Ward *et al.* (1990) and Watts (1992). Main typologies of competitive priorities are: cost, quality, time, flexibility and innovation. As a consequence, defining competitive priorities is also crucial in understanding purchasing strategy.

Coming to the most recent contributions, Baier *et al.* (2008) demonstrated that the ideal profile

of purchasing competitive priorities differs across strategic business units (SBUs) following different business strategies. Drawing on the study by Gonzalez-Benito (2007), the authors position themselves within the research stream of alignment-performance link. According to this perspective, purchasing contribution to business performance depends on the extent to which purchasing is aligned to business strategy.

However, the construct of strategic alignment is usually measured by comparing perceived or declared purchasing strategy to business strategy. Rather, it would be more relevant to measure actual purchasing performance, being then able to state whether or not they are fostering company core competitive priorities. If purchasing performance has a direct impact on overall company results, then they need to be accurately measured and monitored through appropriate purchasing performance management systems (Perkins and Gunasekaran 1998, Monczka *et al.* 2004, van Weele 2004). As a matter of fact, performance measurement can be considered a more reliable indicator of the real priorities of the purchasing function and its contribution to competitive advantage.

On the one hand, purchasing literature partially supports this view by acknowledging that performance is no more a single company's affairs: the entire supply

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chain comes in place when dealing with performance (Hofmann and Locker 2009). For instance, scholars investigated the topic of performance measurement by conceiving encompassing models for the extended enterprise (Folan and Browne 2005) or the global supply chain (Dreyer *et al.* 2009). However, most studies focus on the operational, algorithmic approach to measure performance (Bayrak *et al.* 2007, Bhagwat and Sharma 2007a, 2009) rather than providing a strategic viewpoint on the topic. Furthermore, the vast majority of past studies focus on suppliers' performance (Yang 2010, Humphreys *et al.* 2011) rather than considering the company's internal purchasing process.

On the other hand, performance measurement literature provides many insights regarding the way performance measurement systems (PMSs) are designed, implemented and used (Bourne 2001, Nudurupati *et al.* 2011). Yet, very few studies explicitly consider the purchasing perspective, which is likely to require specific considerations.

Starting from these two streams of research (i.e. performance measure and purchasing literature), we are therefore aiming at developing a framework to study a purchasing PMS (PPMS). In particular, we are interested to understand how the PPMS is structured (i.e. what key performance indicators – KPI can be monitored), how PPMS processes are managed and how the PPMS architecture is adapted to the purchasing organisation.

To this purpose, a framework for describing PPMS will be proposed, as a synthesis of several consolidated contributions from the scientific literature. Subsequently, such framework will be used as a reference for the empirical investigation of the implementation of PPMS in nine in-depth case studies in large organisations coming from different industries. PPMS will be analysed not only in terms of KPI structure, but also of the process and architecture.

This article is structured as follows: firstly, the research background on PMS – generally and within the purchasing domain – is discussed. Subsequently, the research framework derived from the literature is presented. Then, research objectives and methodology are described. Next, findings are discussed and finally conclusions are drawn.

## **2. Research background**

### **2.1. From performance measurement to performance management**

Given the relative lack of the literature specifically addressing PPMSs, we drew our research framework starting from the broad literature about

performance measurement. With no presumption of being exhaustive, we are summarising main principles and characteristics of a PMS that are relevant to the purpose of this study.

It is a fact that PMSs evolved over time (Bourne 2001, Nudurupati *et al.* 2011, Bititci *et al.* 2012). Until 1970, Japanese companies were mostly concerned with quality issues (and so were their PMSs and tools, like TQM or JIT) whereas Western companies mostly faced sales and service capacity issues, thus stressing financial indicators such as sales, productivity and ROI (Neely and Austin 2002). In the 1980s, new dimensions of business performance such as quality, time, cost and flexibility came into picture (Slack 1983), even though most accounting systems included only financial information. From the 1990s onwards, a first revolution took place: academics start criticising traditional financial measures based on internal and historical data (Dixon *et al.* 1990, Kaplan and Norton 1992, Neely *et al.* 1995) and a number of performance measurement framework emerged as a way to quantify the 'efficiency and effectiveness of actions' (Neely *et al.* 1995). Since then, non-financial indicators such as quality, customer satisfaction, cycle time and innovation were recognised as the leading indicators for the financial performance (Suwignjo *et al.* 1997, Ittner and Larcker 1998). Besides, in recent years also environmental and social sustainability gain a pivotal role as far as performance is concerned (de Burgos Jiménez and Lorente 2001, Porter and Kramer 2006). As a consequence, multidimensional models arose. Garengo *et al.* (2005) consider six of the most popular ones in the last 15 years (two of which are specifically dedicated to SMEs). Other authors, like Bititci *et al.* (2005a, b) and Neely (1999), propose similar classifications. Following this trend, many different models have been developed: strategic measurement and reporting technique (Cross and Lynch 1988), the performance measurement matrix (Keegan *et al.* 1989), performance pyramid system (Lynch and Cross 1991), results and determinants framework (Fitzgerald *et al.* 1991), macro process model (Brown 1996), balanced scorecard (Kaplan and Norton 1992, 1996, Bhagwat and Sharma 2007b), Cambridge PMSs design process, (Neely *et al.* 1996), integrated PMSs (Bititci and Carrie 1998), performance prism (Neely and Adams 2001; Neely *et al.* 2002) and FFQM business excellence model (EFQM 1999).

While all these models and frameworks were concerned with what to measure and how to structure the PMS, this is not the sole question you need to answer in order to get a PMS to work. As a matter of fact, the literature acknowledges three main stages of the PMS lifecycle, i.e. *design, implementation* and

use/update (Bourne 2001). *Designing* a PMS requires to establish a set of performance measures aligned to the company strategy and/or organisation. The 1980s revolution mentioned above clarified that several performance dimensions should be considered. Despite the wealth of the literature of all possible measures to use, there is little evidence of systematic empirical research on the *implementation* of PMS (Bourne *et al.* 2000, Neely *et al.* 2000). Poorly defined measures, time and effort required, inappropriate information, resistance to performance measurement and new parent company initiatives are among the barriers to effective PMS implementation (Schneiderman 1999, Bourne 2001). Top management commitment and perceived benefits arising from the PMS are drivers for its success. Finally, the use of a PMS is concerned with people's behaviour with the information, i.e. the *use* of the system (Marchand *et al.* 2000, Bititci *et al.* 2002). In this ever-changing business environment, companies are becoming more dependent on sharing (Aedo *et al.* 2010) and using performance information dynamically and hence becoming more knowledgeable and proactive. Hence, a PMS should include an effective mechanism for reviewing targets (Ghalayini and Noble 1996) and a process for developing measures or indicators as circumstances change (Maskell 1989, Dixon *et al.* 1990, Meekings 1995, Kennerley and Neely 2002).

According to Bourne *et al.*'s (2000) three-stage model as the PMS lifecycle, there has been a constant progress in designing PMSs. However, implementation as well as using and updating PMS has received attention only in recent years (Bourne and Neely 2000, Kennerley and Neely 2003, Bititci *et al.* 2006).

Finally, PMS evolution also reflected recent economics macro-trends such as the pivotal role of emerging countries and the consequent attention to multicultural networks (Hansen and Birkinshaw 2007, Chesbrough and Garman 2009), the emphasis on servitisation (Lovelock and Gummesson 2004, Neely 2007), the peculiar needs of SMEs (Garengo *et al.* 2005, Sharma and Bhagwat 2005, 2007a, Garengo and Bititci 2007, Hudson-Smith and Smith 2007) and the raise of supply chain management as a source of competitive advantage (Chan and Qi 2003, Gunasekaran *et al.* 2004, Caniato *et al.* 2005, Huang *et al.* 2005, Bhagwat and Sharma 2007a, b, 2009, Sharma and Bhagwat 2007b, Bhagwat *et al.* 2008, Vachon and Klassen 2008, Acar *et al.* 2010, Kroes and Ghosh 2010). As far as the latter is concerned, most supply chain PMSs consider operational measures such as inventory cost, inventory turnover, truckload saturation and lead times. Very few recommendations are made regarding how to monitor performance delivered

by suppliers and the company purchasing function overall. This is one of the reasons why we decided to further investigate this subject.

Given the strategic role of purchasing strategy inside a company, performance measurement becomes critical to manage this area in consistence with the overall corporate strategy. The evaluation of purchasing activities is crucial for a number of reasons (Monczka *et al.* 2004, van Weele 2004). It supports better decision-making processes based on strategies and obtained results; it supports the communication of objectives and responsibilities across the purchasing organisation; it drives people's behaviours and actions through motivation and feedbacks on their results; finally, it allows possible benchmarks with other companies.

## 2.2. Purchasing performance management systems

Literature review is the starting point underpinning the research. It allowed us to identify almost a hundred of purchasing KPIs and the relevant classification dimensions. We classified 305 scientific papers focused on purchasing management and published between 1996 and 2008, mainly coming from the following journals: *Journal of Operations Management*, *International Journal of Operations and Production Management*, *Production Planning & Control*, *Supply Chain Management: An International Journal*, *Journal of Purchasing and Supply Management* and *International Journal of Production Economics*. Among these, almost 30 papers somehow regarded the topic of performance measurement within purchasing.

First contributions related to PPMS were published at the beginning of the last century (Gushee and Boffey 1928, Lewis 1933). The first research was focused on the fixed cost of labour related to personnel involved in purchasing activities. The second one was more focused on the inputs costs and their impacts on the cost of final products. Although quite trivial and limited, those contributions highlighted two major components that are still debated in PMS: efficiency and effectiveness. In the past years, the purchasing department increased in importance within the firm and some authors proposed more sophisticated models.

Chao *et al.* (1993) identify 10 KPIs for the purchasing department, among on-time deliveries, accuracy, quality and professionalism. Beamon (1999) introduces performance measures used in supply chain models and also presents a framework for the selection of PMS for manufacturing supply chains. Knudsen (1999) elaborates a PPMS based on

purchasing processes, thus involving different actors such as the purchasing department, suppliers and internal customers. Gunasekaran *et al.* (2001) develop a framework for measuring the strategic, tactical and operational level performance in a supply chain, grouping performance measures in terms of suppliers, delivery performance, customer service and inventory and logistics costs and relating them to customer satisfaction. An interesting contribution has been developed by Easton *et al.* (2002). It is based on data development analysis and introduces one single indicator measuring the total efficiency of the purchasing department. This indicator is given by the ratio between a general output (including total spending and percentage of that spending directly managed by the purchasing department) and a general input (including operational costs of the purchasing department, number of purchasing professionals, administrative personnel within the department and number of active suppliers). Axelsson *et al.* (2002) introduce in their balanced scorecard, new classes of performance including the overall purchasing department, its impact on the company organisation, the single products and the total cost of ownership for each product or internal customer. van Weele (2004) roots his approach in the original effectiveness and efficiency criteria, measuring the effectiveness through price/cost, quality and logistics, and the efficiency through organisational aspects. Kumar *et al.* (2005) develop a PMS based on supply links, including the purchasing department, suppliers, internal customers and the relationships existing among them. Rafele (2004) considers the purchasing department as a service centre and measures its performance according to tangible components, execution modes and information flows. Finally, Carter *et al.* (2005) propose one of the most complete approach designing a balanced scorecard including nine categories of indicators, ranging from cost to availability, from quality to internal customer satisfaction.

### 3. Research framework

From the seminal works of Lynch and Cross (1991) and Johnson and Kaplan (1987) onwards, PMSs were recognised an important role in supporting managerial development in manufacturing firms (Neely 1999). However, a comprehensive and shared definition of PMS is missing: Franco-Santos *et al.* (2007) counted no less than 17 definitions of PMS, highlighting that a no-consensus situation on PMS definition can 'inhibit the development of the field'. Given the purpose of this study we looked at the literature in order to establish

what are the relevant elements composing a PMS that – in the empirical stage – will be investigated within the purchasing context.

As anticipated above, Marchand and Raymond (2008) observe that basic notions that underlie PMS have evolved over time to arrive at the present ways in which these systems are conceptualised, designed and implemented in organisations. These notions include: the *focus* of PMS (namely the notion of performance itself and its dimensions); the *performance logic* that guides the design of PMS (architecture and performance measurement framework) and the *system characteristics* of PMS (definition, organisational role and information output). Similarly, Franco-Santos *et al.* (2007) summarise PMS characteristics according to several authors' perspectives. As a result, the authors show that a PMS can be defined through: *features* of the PMS (including performance measures and supporting infrastructures); *role(s)* that the PMS plays (including measuring performance, strategy management, communication, influencing behaviour, learning and improvement) and *processes* that are part of the PMS (including selection and design of measures, collection and manipulation of data, information management, performance evaluation and reward and system review). Finally, Neely *et al.* (2005) highlight the fact that a PMS can be examined at three different levels: the *individual performance measures*; the *set of performance measures* (i.e. the PMS system as an entity) and the *relationship between the PMS and the environment* within which it operates.

All in all, the literature clarifies that defining a PMS is not just a matter of structuring the measures (i.e. KPIs) but also requires planning the objectives the PMS is made for and, as a consequence, the way it should be managed in order to support such objectives (i.e. how and by who the PMS is designed, where and when data are collected and how they are analysed and reported). This is, to some extent, a step forward with respect to the multidimensional models listed previously, since they were very much focused on defining and selecting the bunch of measures to monitor, losing touch with PMS design, implementation and use. For this reason, we propose to refer to PMS as 'performance management system' rather than just 'performance measurement system', adopting the suggestion by Marchand and Raymond (2008). The resulting framework (Table 1) is described hereafter.

Building on the literature considered so far, we developed a framework to classify the various purchasing performance dimensions and perspectives. The framework is made of three perspectives: *structure* (i.e. which KPIs are to be measured), *process* (i.e. how the

Table 1. The research framework.

Structure (measurement)	Process (management)	Architecture
KPI tree: <ul style="list-style-type: none"> <li>• Purchasing performance</li> <li>• Internal purchasing process</li> <li>• Suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Design</li> <li>• Role</li> <li>• Data collection and management</li> <li>• Implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Horizontal (category level)</li> <li>• Vertical (organisation level)</li> </ul>

PPMS is designed and implemented) and *architecture* (i.e. what customisations are necessary to reflect vertical and horizontal differences in the organisation chart). These perspectives directly refer to research questions listed below.

First of all, being able to measure purchasing alignment to the company strategy is of capital importance in order to assess the value of the overall purchasing function (Gonzalez-Benito 2007). A natural way to do that is grouping KPIs according to competitive priorities, which are one of the most common ways to define business strategy (Slack 1983). Thus, PPMSs built on competitive priorities may easily allow us to evaluate whether or not the purchasing function is aligned to the company. Coherently with contributions in the literature (Porter 1980, Hayes and Wheelwright 1984, Ward *et al.* 1990, de Burgos Jiménez and Lorente 2001, Porter and Kramer 2006, Zheng *et al.* 2007, Luzzini and Ronchi 2011), we defined six performance areas: cost, time, quality, flexibility, innovation and sustainability. While the former areas are known since long, sustainability recently became part of companies' agenda, in line with the triple-bottom-line approach proposed by Elkington (1998). As a consequence, in our view sustainability KPIs encompass both environmental (e.g. carbon footprint, water consumption and energy efficiency) and social aspects (e.g. workers rights, health and safety and child labour). This approach is strongly in line with purchasing competitive priorities introduced by Krause *et al.*'s (2001), and emphasises that the purchasing function should not focus just on simple saving measures (Nollet *et al.* 2008).

In addition, Day and Lichtenstein (2006) – besides confirming the relevance of strategic alignment – clarified that purchasing overall results depend, on the one side, on the internal supply management process and, on the other side, on the buyer–supplier relationship. That is to say that the PPMS should have both an internal focus and an external focus. Other authors share such reasoning: Kumar *et al.* (2005), for instance, distinguish between these two perspectives (i.e. internal and external) in the healthcare industry. Hence, each category of competitive priorities is clearly not related to activities going on merely within the

company internal boundaries; it is increasingly influenced by supplier's actions. As a matter of fact, the more outsourcing practices spread across sectors, the more suppliers become a source of competitive advantage (Quinn & Hilmer 1994, Krause *et al.* 2000). For this reason, it is useful to define both internal and external sets of indicators for each category.

The final result, the purchasing KPI tree is shown in Figure 1. Overall purchasing performance is determined by internal processes within the company and external processes managed by suppliers. For instance, the total lead time from a request for purchase to the order fulfilment is a composition of internal scouting and supplier selection lead time, supplier lead time and again internal order processing and administration time. Other KPIs are not meant to be summed up like the lead time: quality measures about suppliers are mostly measuring the conformance of products whereas internal quality is related, for example, to the number of errors in managing request for purchases, purchase orders, receipt of materials, invoicing and so on. In other words, purchasing performance can be seen as a combination of efficiency/effectiveness delivered by suppliers and efficiency/effectiveness in managing the internal purchasing process. Overall, six categories of KPIs need to be measured at different levels: purchasing performance – measuring the overall performance as perceived by the internal customer; internal processes – measuring the performance of the internal purchasing processes and suppliers – measuring the performance of suppliers.

However, the literature clarified that defining the PMS structure (i.e. the KPIs) is clearly not sufficient to grant a full operating PMS (Franco-Santos *et al.*, 2007, Marchand and Raymond 2008). As a matter of fact, we also have to consider how measures are selected and why, what is the purpose of the PMS and how it is implemented and when are data collected. We are therefore explicitly considering aspects that the literature is associated with processes that are part of the PMS, namely: *design*, i.e. how is the PMS designed and by whom?; *role*, i.e. what is the goal of the PMS (e.g. control, improvement and decision-making support); *data collection and management*, i.e. what are the sources of information and how frequently are they

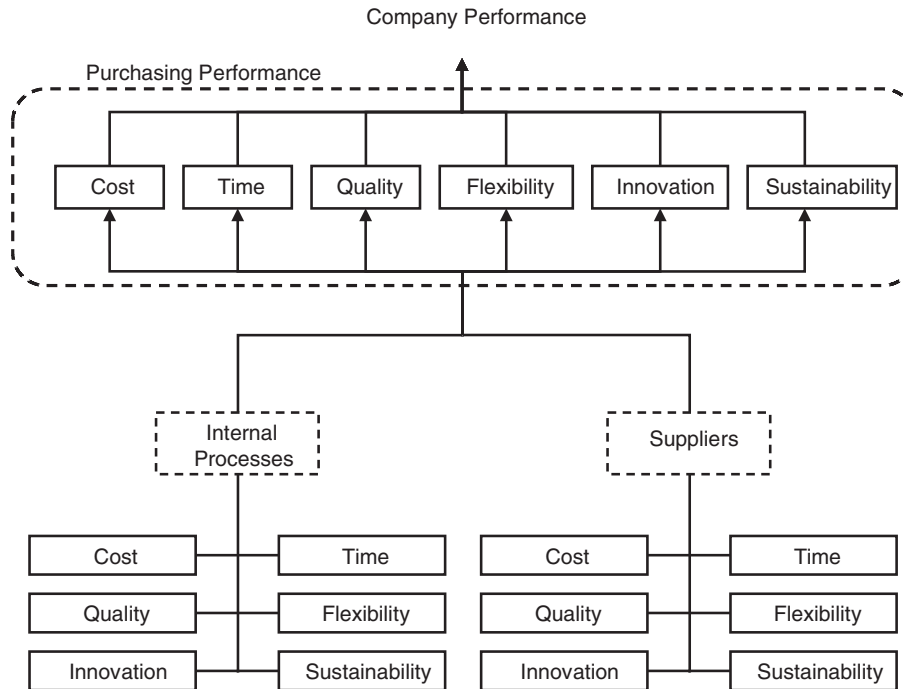


Figure 1. Purchasing KPI tree.

collected? and *implementation*, i.e. who introduced the PMS within the company and took care of its implementation?

Third, in the context of purchasing, it is widely known that companies frequently buy differently by category (i.e. a specific group of items, also known as a ‘purchasing group’ or ‘commodity’). For instance, differences in the purchasing strategies are noted between direct and indirect goods and among categories that are positioned differently within the Kraljic matrix (Kraljic 1983). As a consequence, we expect that different purchasing commodities would stress different competitive priorities. This is in line with Garengo and Sharma (2012), who see the PMS as influenced by possible contingencies. We therefore expect a horizontal differentiation of the PPMS emphasising different sets of KPIs according to the considered purchasing category. Furthermore, we also know that buyers are generally evaluated on performance ensured on the purchasing category they are responsible for, whereas Chief Purchasing Officers (CPOs) are evaluated on more general and encompassing indicators. Thus, we wonder how does the PMS *architecture* adapt to different organisational roles and to different purchasing categories.

In conclusion, we follow the suggestion by Marchand and Raymond (2008) to investigate PPMS research through comparative field studies using the proposed classification framework.

#### 4. Research objectives

Based on the contributions discussed so far, we focused our research on purchasing performance management systems (PPMSs). In particular we set three main research questions.

*RQ1. According to the presented PPMS framework (Figure 1), what are the KPIs actually measured by companies?*

Starting from the six categories identified in the literature (cost, time, quality, flexibility, innovation and corporate social responsibility) along the identified levels (overall purchasing performance, internal processes and suppliers), we aim at understanding what are the performance dimensions actually measured by companies. We are not interested in the specific metric, which is likely to be different from company to company, but rather on the type of indicator adopted.

*RQ2. What are the key elements characterising the purchasing performance management process?*

As already stated, in line with recent literature, we focus on the wider concept of PMS rather than the pure performance measurement indicators. Therefore, our aim is to study who defines the set of indicators and what are the main drivers fostering measurement of performance within the purchasing department. We will also focus on the frequency of measurement and how long the PPMS has been in place. Finally, we will

try to highlight the main benefits perceived and criticalities or barrier to adoption.

*RQ3. How does the PPMS change along different organisational levels and purchasing categories within the purchasing department?*

After studying the general PPMS structure, the research aims at defining major differences among different organisational levels within the purchasing department and among different purchasing categories.

## 5. Research methodology

In order to answer the three research questions, we selected a case-based research methodology. Even though most of the operations management research is primarily based on statistical surveys analysis and mathematical modelling, according to Meredith (1998), the explanation of quantitative findings and of consequent theory will ultimately have to be based on qualitative understanding. Indeed, all the literature listed within Section 1 explained the strategic relevance of purchasing and, consequently, the need for further understanding of PMS. Case-based research then comes to provide new and creative insights, develop new theory and have high validity with practitioners (Voss *et al.* 2002). As a matter of fact, according to Benbasat *et al.* (1987) and Yin (1994) it allows questions of why, what and how that are aimed at fully understanding the nature and complexity of a phenomenon (in our case the design structure and use of PPMSs). Moreover, it is also useful for investigating constructs and variables still unknown or not completely understood: in our case the literature provided dimensions suitable for describing PMSs, but case studies tend to describe in depth the content of such constructs.

With this purpose, we selected nine companies: each one of them represents a separate unit of analysis, thus a single case study. Case studies allowed us to gather an in-depth understanding of how these firms are actually structuring their purchasing performance management systems in order to sustain purchasing strategy. Our purpose was then exploratory in nature, even though – given that we grounded our constructs on the literature – our methodology is also consistent with theory building.

Having said that, we designed the research methodology following the indications by Voss *et al.* (2002). First of all, we would like to remind that, no matter how theory development oriented are research questions, a prior view of general constructs to study is needed (Miles and Huberman 1994). For this reason,

we built a conceptual framework based on the existing literature, as explained in the previous section. The framework also allowed us to effectively focus the research: with cases the amount of data to analyse is potentially vast. So, the *a priori* definition of precise areas of investigation made the study protocol design easier and maximised accuracy as well (Eisenhardt 1989). To some extent, we also experienced unexpected evolution over time of the research questions themselves: indeed after the very first cases we were able to better frame our objectives.

Given that there is no ideal number of case studies (Voss *et al.* 2002), we chose multiple case studies not to limit generalisability of the conclusions and avoid observer bias (Leonard-Barton 1990). We adopted a retrospective approach: we investigated the current PMS structure, which most of the times is the result of an evolution over time.

The sample was designed in order to allow both literal and theoretical replication (Eisenhardt 1989, Yin 1994). As a matter of fact, we used – on one side – two basic sample controls. All the companies are multinational organisations, in which purchasing is highly relevant in terms of both total spending and impact on final performance, so the firm size and spread assure companies to be enough structured. Moreover, we obviously looked for companies having a PPMS in place. On the other side, we selected companies from different industrial sectors in order to identify and compare different strategies and performance indicators adopted by their purchasing departments (thus assuring theoretical replication).

The sample is described in Table 2: as stated before they are large companies (the smallest one is operating in the aerospace industry with 182 million € sales and 1800 employees) and belong to different sectors, ranging from the aerospace industry to the steel industry.

Since a well-designed protocol is critical in multi-case research (Voss *et al.* 2002), we structured the interviews according to a set of questions addressing each of the areas defined at the end of literature review. In order to mitigate the lack of resources for data collection, we built case studies through direct interviews and secondary sources of information. Following the funnel model, we opened the discussion with general open questions and afterwards asked for details. Open questions that have been asked are reported in the appendix, whereas Tables 3–5 reflect the coding of observations. With the exception of station and candy cases, at least two people have been interviewed per case: they were always from the

Table 2. The sample.

Case	Sector	Sales (world, million €)	Employees (world)	Interviewees
Aero	Aerospace	182	1800	Reverse Marketing, Planning and Reporting Manager
Retail	Retail	34,990	168,100	Purchasing Manager Food Purchasing Manager Management Control Manager
Station Pharma	Catering and retail Pharmaceuticals	4000 29,000	70,000 105,000	Purchasing Manager Purchasing Manager (indirect purchases) Purchasing Manager (direct purchases)
Switch	Home appliances	3737	33,000	Country CPO Purchasing Manager
Oil	Oil and gas	86,105	73,000	Purchasing Control, Planning, Reporting and Marketing Intelligence Manager Purchasing Manager
Wash	Home and personal care	12,740	51,000	Country CPO Purchasing Manger
Candy	Food	1647	14,000	Purchasing Manager
Steel	Steel	1054	3000	General Manager of the purchasing company

purchasing area as in all cases the PPMS was managed by purchasing employees. Suppliers' evaluation also required the contribution of other functions (e.g. quality, research and development and logistics) but in any case the purchasing function did coordinate the PMS design and implementation, therefore purchasing managers can be considered key informants. In order to maximise accuracy, most cases have been tape recorded with permission, given that interviews were not focused just on objective data. Two researchers have conducted interviews in order to avoid single-person bias. Interviewers' field notes were the starting point for data analysis. Then, according to Eisenhardt (1989), within and cross-case analyses have been conducted. The principal respondents have been Chief Procurement Officers (CPOs) and/or purchasing managers. Before every interview, they were sent the general interview protocol. Follow-up emails and calls have been used to complete missing information and clarify doubts. In some cases, this activity also involved employees from other functions that had a role in the design/implementation/use of the PPMS. Finally, we were able to cross-check some of the information collected through company internal documents delivered by interviewees and official documents, such as the balance sheet.

Therefore, all cases have been mapped according to different variables underpinning the research framework, thus focusing on KPIs adopted, main elements of the PPMS adoption process and different measures at different organisational levels and purchasing categories.

## 6. Results and discussion

In this section, we present the findings of our case studies and provide a discussion of the main results. The section is structured according to the three research questions previously enounced.

### 6.1. PPMS structure

The research has investigated the structure of the PPMS in nine case studies. According to our research framework, for each case we classified the KPIs on the basis of the 'purchasing KPI tree' previously discussed. Purchasing performance is clustered into six major categories (cost, time, quality, flexibility, innovation and sustainability). Besides, we classify KPIs into overall purchasing performance, internal processes and suppliers.

Table 3 summarises the PPMS adopted by each company within the sample, showing exactly which part of the model is measured through specific KPIs. Since each firm develops its own way for measuring KPIs, and considering also the heterogeneity of our sample which does not allow to give a unique definition for each performance, we do not report the specific KPI, but only whether a KPI is adopted or not. If a cell in the table is marked, it means that the firm has defined a specific KPI for that kind of performance and is actually measuring it.

A preliminary overview shows that most measured KPIs are those related to suppliers, in particular cost, time and quality. These are the traditional performance



Table 3. PPMS structure in the sample.

	Aero	Retail	Station	Pharma	Switch	Oil	Wash	Candy	Steel
Purchasing performance	Cost	Budget vs. actual and saving	Sales and margins and inventory	Budget vs. actual and saving	Saving and cash flow	Saving	Price variance and saving	Budget vs. actual	Price variance
	Time	Conformance		Internal customer satisfaction		Purchasing throughput time		On time delivery	Total throughput time
Internal processes	Quality	Suppliers variety				Customer satisfaction, qualification and standard contracts	Supplier performance	Conformance	Conformance and customer satisfaction
	Flexibility Innovation Sustainability								
Internal processes	Cost	Spending via e-auctions	Supplier reduction	Orders through e-catalogue		Cost of purchasing function, spending consolidation and use of e-procurement	Supplier number, low-cost country suppliers, use of e-procurement, self invoice and VMI	Cost of purchasing function	Inventory level and use of e-procurement
	Time	Order emission LT			Order emission LT	Order emission LT			Purchasing throughput time
Suppliers	Quality	Supplier management	Long term, collaborative relationships		Supplier management	Supplier management			Customer satisfaction
	Flexibility Innovation Sustainability							Supplier turnover	
Suppliers	Cost	Purchasing price and supplier profitability	Purchasing price	Purchasing price	Purchasing price	Purchasing price	Purchasing price		Payment terms compliance
	Time	On time delivery	On time delivery	On time delivery	On time delivery	On time delivery	On time delivery	On time delivery	Purchasing price and total cost
Suppliers	Quality	Conformance	Conformance and certification	Conformance and customer service	Conformance	Conformance	Conformance	Conformance	Supplier throughput time
	Flexibility	Reactivity to change	Customer responsiveness	Innovative proposals	Time to market				Conformance
Suppliers	Innovation	Contribution to NPD	Innovativeness	Innovative proposals			Innovativeness		
	Sustainability		Social and environmental responsibility				Social sustainability		

Table 4. PPMS process in the sample.

	Aero	Retail	Station	Pharma	Switch	Oil	Wash	Candy	Steel
Design	KPIs defined and measured by purchasing department Budget set by COO Purchasing targets set by CPO	KPIs and targets on sales and profit defined by the board KPI for buyers defined accordingly by the CPO	KPIs and targets defined by COO Buyer are measured on return on sales of their product	KPIs defined and measured by purchasing department Targets jointly set by COO and CPO	KPIs and department targets defined by the group HQ CPO sets buyers targets under the group constraint KPI measured by an accounting unit dedicated to purchasing department	KPIs defined and measured by a dedicated unit of purchasing department CPO sets targets for 31 purchasing KPIs CEO sets savings and purchasing throughput time targets	KPIs are jointly defined by CEO and CPO Category manager participate in setting targets	KPI are jointly defined by CEO and CPO Vendor KPIs are defined by the CPO	A dedicated BU proposes KPIs to the group SBU's
Role	Control and improvement	Motivation, communication and monitoring	Communication, evaluation and control	Value creation	Control and decision making PPMS became necessary after the company went public (short-term horizontal)	Control, evaluation and improvement	Monitoring, internal and external communication	Monitoring and continuous improvement	Continuous improvement

Data collection and management	Year (savings), 6 months (other measures) Ongoing SAP implementation: moving to monthly purchasing reporting	Monthly (for most indicators) – 2 years Data come from the ERP	Year for COO, Daily monitoring by CPO Source: company data base	6 months, 2 years for internal customer satisfaction and daily monitoring through ERP	Monthly Every SBU has its own ERP: data are integrated in a central warehouse	3 months Data from 17 ERP are merged through SAP	6 months, 2 years for internal customer satisfaction	Year	Monthly Data are gathered from the company ERP
Implementation	Used for 1 year, introduced by purchasing department	Used for 8 years	Used for 25 years	Used for 20 years, introduced by purchasing department	Used for 4 years, introduced by the group	Used for 2 years by the dedicated purchasing unit	A structured system exists since 2 years Consultants helped in building the system	Used for 5 years	Used for 8 years Data are integrated by the dedicated company ERP
Benefits	Timely and accurate performance evaluation E.g. spending for value creating programmes is being monitored	Formalisation, control and alignment with business strategy	The PPMS allows us to sustain the role of purchasing within the firm	Value creation through purchasing policy improvement	Effective objectives formalisation and sharing Higher transparency Easier control and target accomplishment	Performance improvement (especially saving and time)	Objectives are clear, formalised, measurable and shared	Formalised, clear and measurable indicators	Managers are allowed to monitor and improve performance
Criticalities	Database integration KPIs evaluation: different categories should have different targets	Data reconciliation across 10 SBUs	No major problems	Database integration across all the group companies	Additional resource needed	Database integration across group companies: less time for data analysis	No major problems	The purchasing process is not automated: hard to monitor internal performance	Data integration Customisation of KPIs across SBUs

Table 5. PPMS architecture in the sample.

	Aero	Retail	Station	Pharma	Switch	Oil	Wash	Candy	Steel
Organisation and category level	Business and purchasing KPIs for CPO Common purchasing KPIs for buyers (e.g. supply agreements, time, quality, etc.)	CPO is measured on purchasing contribution to sales and profit Buyers are measured on internal KPIs (e.g. purchase price, return per supplier and supply base variety) Targets changes across categories	Same indicators for buyers KPIs are adapted to categories (e.g. food vs. non-food)	Business and purchasing KPIs for CPO Specific category KPIs for buyers	The PPMS is organised in 4 areas of KPI: business, functional, personal and qualitative, personal and quantitative The higher the organisation level, the more business results count CPO is mainly measured on savings Purchasing people have their own KPIs, according to their role (e.g. strategic category vs. commodities)	Top-down PPMS structure: different KPIs for different roles	CPO reports to CEO both on business and purchasing KPIs	CPO reports to CEO on overall purchasing cost and sets targets for buyers	KPIs are customised for each SBU according to categories to be managed

indicators that can be found in any vendor rating system, in line with consolidated research in the field (Day and Lichtenstein 2006). Innovation is also measured by several firms, in particular by those firms which rely mostly on suppliers for innovation, while the others, such as oil and steel, develop innovation mostly internally, given their industry and their level of vertical integration. The remaining two KPIs are much less diffused. Suppliers' sustainability is measured only by two out of nine firms in our sample, suggesting that, despite the current emphasis and attention to this topic, it is still not yet consolidated and diffused into every PPMS. Finally, supplier flexibility also is measured by only two firms in our sample. This result seems quite surprising at first sight, since supplier flexibility is often considered a key factor. However, measuring flexibility has always been a difficult task (Beamon 1999, Krause *et al.* 2001), since flexibility is a 'potential' performance, which can be verified only when it is needed. For this reason often firms prefer to pre-negotiate supplier flexibility and include it into contracts, or consider it as a selection criterion, without measuring it in a structured way, or rather including it into time performance (on time delivery despite changes in date, volume or mix).

KPIs related to internal processes are less adopted compared to the ones applied to suppliers. The cost or efficiency of the internal processes is the most adopted measure by our cases in the sample. In some cases, this is measured in terms of actual costs of the purchasing department, in other cases it is related to inventory management (stock keeping costs). In line with literature contributions over the past decade, the adoption of e-procurement tools also is used to measure the efficiency of the purchasing process (Caniato *et al.* 2010, Ronchi *et al.* 2010). This performance appears to be consolidated and this is in line with the view of the purchasing department as a support unit, which needs to be controlled in terms of efficiency. Time performance is measured in some cases (e.g. the order cycle time and the purchasing throughput time from the request for purchase to the order placement). Again, this is in line with the view of the purchasing department as an internal service provider, which needs to be measured in terms of service level (Kumar *et al.* 2005). Quality of the purchasing process is also measured by some companies (e.g. customer satisfaction and supplier relationship) highlighting once again the purchasing department as a service provider to the rest of the company. On the contrary, flexibility of the purchasing process is not measured within our sample; this is not completely coherent with the service providing attitude observed so far. Probably, this is caused by the difficulty in defining a proper indicator.

Finally, candy is the only company measuring the innovation of the purchasing process in terms of suppliers' turnover, and steel is the only case in which the timeliness of payments is measured. This last performance is intended as a sustainability measure, in terms of correct behaviour towards suppliers. We can observe that in general internal KPIs are much less common compared to suppliers' ones, and only cost, time and quality are partially diffused. All the other performance dimensions are seldom or never considered in our sample, suggesting a very limited attention by firms. We have observed that existing KPIs measure the purchasing department as a service provider to the rest of the company, but service is generally limited to a traditional transactional perspective (cost, time and quality). There is very limited attention to the contribution provided by the internal processes in terms of flexibility, innovation and sustainability.

Finally, considering the overall purchasing performance, the dominant KPI is cost. In all our cases, there is a strong commitment to measuring the purchasing department by means of the saving obtained from suppliers. This is of course the result of the efforts of the purchasing people and the suppliers together, and is generally the first purchasing target set by the company. Often it is measured in terms of difference between the budget and the actual price paid, and in some cases (such as aero), it is the saving achieved through e-auctions. In the case of retail firms (retail and station), the measure is slightly different since the margin (price – cost) is considered. This is due to the fact that in this industry purchasing is directly related to sales and the category managers are directly evaluated on the profit generated.

The second most frequently measured performance (seven out of nine cases) is quality, which is measured in different ways in our cases. Pharma and oil measure the internal customer satisfaction, which is an overall measure of the performance of both the purchasing department and the supplier. Retail, given the characteristics of the industry, also evaluates the variety of the supply base, in comparison to competitors.

Time is measured only by candy, oil and steel, mostly in terms of total process time from request for purchase to delivery, which includes both internal and external lead times. Since time is almost always measured separately for internal processes and suppliers, in order to better evaluate the two contributions, it is understandable that it is not often considered at the aggregated level.

The other dimensions are not considered as overall purchasing performance in our sample. We can conclude that the overall performance is measured always on cost, often on quality and sometimes on time; while

the other dimensions are not considered at this level. This is a good indicator of the fact that so far the purchasing department is mainly considered as a source of savings and a service provider, but still there is no clear evaluation of the strategic contribution in terms of flexibility, innovation and sustainability. There are several possible reasons for this: first of all such performance dimensions are more recent in their definition (Neely 1999) and therefore they are less consolidated and more difficult to measure. Furthermore, there is probably a sort of organisational inertia, driven by the fear for the proliferation of KPIs, which could lead to problems in managing them.

## 6.2. PPMS process

In order to answer the second research question, we analysed the PPMS process in our cases. A synthesis of the nine cases is reported in Table 4.

First of all we can observe that the main KPIs, in particular those referring to the overall purchasing performance, and in general, the ones used to evaluate the CPO, are usually defined directly by the CEO, the COO or the board. This means that in our cases purchasing is considered as a first level unit, responding directly to the top management and therefore has a relevant role within the organisation. Once the top management has defined the main KPIs and the overall guidelines and targets, the CPO is generally autonomous in articulating them towards the purchasing staff, defining more specific KPIs and targets for the lower levels within the purchasing department.

The main goals of setting up a PPMS can be summarised in two main ones. The first is generally control and monitoring of the overall spending process, which is of course quite straightforward. This confirms the great efforts devoted to bringing the entire purchasing domain within a unique responsibility, or at least consolidating information and data in order to gain a comprehensive picture of the overall spending. This is in line with the literature (Franco-Santos *et al.* 2007) that suggests to develop a structured and formal PPMS in order to move from a sporadic analysis to a systematic control, in order to foster continuous improvement and more informed decision making. The case of switch is emblematic: the PPMS became necessary when the company decided to go public, in order to get better control on short-term performance. The second main goal is of a different nature: many firms in our sample stated that the development of the PPMS was aimed at internal communication goals, in order to better demonstrate the service level provided by the purchasing

department and the value created to the rest of the company and thus foster the 'internal customer' logic even further in the organisation. In some cases, this was extended also outside the company: a PPMS can support communication to suppliers, customers and stakeholders in general also. This appears to be coherent with the 'communication' role of PMS proposed by Franco-Santos *et al.* (2007) and further supports this perspective.

The frequency of measuring and reporting can be very different according to the nature of the various KPIs considered. Economic measures, which are related to the accounting cycle, are often analysed on a yearly basis (or twice a year), despite information gathered much more frequently. Public companies require a more frequent measure, i.e. at least once every quarter, but often on a monthly basis. Suppliers' performance are generally measured on a monthly basis, when the information system allows it. Generally speaking, information systems are considered the most relevant constraint to the frequency of measuring, and dedicated projects were ongoing in some of the cases during this study. Other measures that require an *ad hoc* evaluation can be much less frequent. For example, internal customer satisfaction is measured only once every 2 years in wash and pharma. We can conclude that the frequency is strictly related to the goals of the various KPIs and to data availability, sometimes leading to sub-optimal frequencies.

Despite all the investigated cases had a PPMS in place at the time of this study, some of them have been in place for many years (station and pharma for 20 or more) and are now quite consolidated, while others are very recent and still in their development phase (e.g. aero, oil and wash). Interestingly, in the retail industry they are quite consolidated, since purchasing has always been part of the core business, while in other cases only recently the need for such a tool was recognised. In some cases, the group headquarters have driven the adoption, while in other cases the purchasing department itself has been the promoter of the initiative, in line with the communication goal previously discussed.

The benefits recognised are generally in line with the goals, i.e. control, improvement and communication. In particular, transparency and objective measures are perceived as beneficial in both internal (with the top management and internal customers) and external (with suppliers) relationships. Also formalisation is considered as a positive effect, in terms of both performance measures, targets and procedures.

The main criticality or barrier encountered during the implementation phase has been the information system: most companies had problems in gathering

data, consolidating them into a single system, integrating the various databases and ERPs within the company or the group. This is a major problem in terms of time, effort and money needed to set up the PMS, and can result also in problems in using it, if manual work is required due to the lack of integration/automation. This is particularly true in large groups, in particular if grown by mergers and acquisitions, since they often have several different information systems and databases scattered across the world.

### **6.3. PPMS architecture**

Finally, in order to answer the third research question, we analysed if and how the KPIs change according to the organisation level and the purchasing category. Results are summarised in Table 5.

Adopting the definition of Marchand and Raymond (2008), these two dimensions can be considered as the vertical (organisation level) and horizontal (purchasing category) of the PPMS architecture.

The main result is that the two dimensions, organisation level and purchasing category, are generally correlated as far as the PPMS is concerned. Indeed, at the top level within the purchasing department (i.e. the CPO), there is no KPI differentiation by category. At the lower level (i.e. single buyers), there is generally some differentiation according to the category, which is actually related to the various roles, since buyers are generally dedicated to one or few categories. Therefore, we have found differences in the PPMS according to these two dimensions, but they are not independent.

At the top level, the CPO is generally evaluated on both overall purchasing KPIs and more general business performance, since she is generally considered as part of the top management of the whole company. This is particularly true in the retail industry, in which purchasing directly contributes to profit. At the lower level, there is less and less emphasis on overall business results, but more and more attention to purchasing KPIs, which are generally specific for the role and the responsibility of each buyer. On the vertical dimension, therefore, the main difference is in the weight given to the various KPIs.

On the horizontal dimension in some cases KPIs are actually different among buyers, while in other cases they are the same, and only the specific targets are differentiated according to the category. This is driven by the decision to keep the PPMS as simple and standard as possible, thus leading to the use of the same KPIs with different targets. The main differences are generally related to the category being strategic or

commoditised, or direct versus indirect. In the case of groups with different business units, category and KPI/target definition can be different for each of them.

Concluding, there is definitely an articulation of the PPMS according to both the organisation level and the category managed, and these two dimensions are strongly correlated. However, in many cases KPIs are not totally different, rather their weight changes, as well as the specific targets to be reached. We can argue that firms tend to balance the trade-off between the accuracy and the standardisation of the PPMS by using a rather stable mix of KPIs and differentiating weights and targets according to both the vertical and the horizontal dimension.

## **7. Conclusions, limitations and future developments**

This article is strongly rooted in the concept of strategic alignment of purchasing with the firm's competitive priorities. When companies are able to accomplish this, their purchasing departments contribute to value creation in their business. If this is true, it is crucial to set PPMS accordingly, in order to evaluate purchasing performance, purchasing improvements and their contribution to the business.

In this article, we refer to PPMS considering the overall performance measurement process (Marchand and Raymond 2008) supporting this perspective with an empirical evidence. Assuming this approach, our research questions aimed at studying what companies are actually measuring, what are the key elements of the measurement process and what are the differences among different organisational levels and categories.

Empirical evidence shows that purchasing performance management systems has been developed in the past years, but there is still big space for improvement. Most companies are measuring suppliers' performance, while still not many of them are focusing their attention on monitoring internal processes. Most used indicators are referred to cost, time and quality; while flexibility, innovation and sustainability measures are less adopted. Generally speaking, the purchasing department is still measured mostly on cost savings rather than on the other performance indicators.

However, evidence also shows that there is a clear trend towards a further development of PPMS in the future. As illustrated, in most companies KPIs of the purchasing department are defined directly by the CEO, the COO or the Board. In some companies also the attention to internal processes, flexibility, innovation and sustainability is arising, thus pushing forward measurement systems. It is also interesting to note that

more and more companies are adopting PPMS for communication purposes, in order to show the purchasing department as a service provider and eventually a value creator to both internal customers and suppliers.

Finally, benefits and barriers have been considered, providing a realistic picture of PPMS implementation on the field.

The contribution of this article to research is twofold: on the one hand, we have provided a synthetic framework for classifying purchasing KPIs, according to six performance dimensions and three levels, bringing together several consolidated contributions from the literature (among others: Gunasekaran *et al.* 2001, Axelsson *et al.* 2002, van Weele 2004, Carter *et al.* 2005). This framework has proved to be useful to analyse and compare PPMS in our case studies. On the other hand, we have analysed how PPMS are actually put in place by firms, investigating them from the broad process perspective, thus integrating some contributions of previous studies (among others: Neely *et al.* 2005, Franco-Santos *et al.* 2007, Marchand and Raymond 2008).

We claim our results to be interesting for practitioners also, since our evidence supports the assumption that purchasing activities are becoming more and more relevant for companies. As a matter of fact, the purchasing department is the interface with the supply network and acts as a service provider to internal customers within the company. According to this perspective, purchasing activities are becoming more and more similar to sales and marketing activities, being the former ones the interface with actors upstream in the supply chain and the latter ones the interface with customers downstream in the supply chain. Those companies managing purchasing activities, and thus their performance management systems, with this perspective are the most mature ones. As a matter of fact, within the sample, the most consolidated PPMS are those adopted by companies in the retail and distribution industry, in which purchasing activities are directly related to commercial ones, thus managed according to a commercial perspective and directly impacting on profit and value created by the company. Ultimately, practitioners might find in this research study two relevant contributions for their business: first, this article provides an exhaustive and comprehensive framework useful to design the PPMS of their companies coherently with the corporate strategic priorities; second, it suggests the importance of using such a framework in order to communicate the value created by the purchasing department both internally and externally to their company.

Results described in this article are affected by some limitations which might open space for future research. The case-based methodology and the selected sample, for example, might limit the generalisability of the discussion. Moreover, the adopted research framework is a selection and integration of existing concepts and literature contributions, which might evolve over time. Therefore, future developments of the research might be based on a more structured data collection through a survey methodology using the presented research framework or an evolution of that. This will allow us to identify possible existing PPMS configurations in terms of structure, process and architecture. Survey data might be also used to understand when and why each configuration is adopted in relation with some contingent factors (e.g. industry and size). Another possible development would be the investigation of how companies are using the actual measures collected through the PPMS in order to improve their business. Finally, once purchasing performance measures are identified, it would be interesting to test the impact of those purchasing performance dimensions on the overall business performance, thus contributing to the long-lasting debate in the literature on purchasing relevance and its contribution to the overall value creation.



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