

Purchasing Portfolio Models: A Critique and Update

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Purchasing portfolio models have spawned considerable discussion in the literature. Many advantages and disadvantages have been put forward, revealing considerable divergence in opinion on the merits of portfolio models. This study addresses the question of whether or not the use of purchasing portfolio

SUMMARY

models is considered as a sign of purchasing sophistication. Using data from a broad sample of industries, it was found that purchasing sophistication is a two-dimensional construct: purchasing's professionalism and purchasing's position within companies. Results revealed that the position and the professionalism of purchasing are both positively related to the greater use of purchasing portfolio models. Findings indicate that portfolio usage is definitely a sign of purchasing sophistication.

INTRODUCTION

It is generally agreed that purchasing has evolved from a clerical buying function into a strategic business function that contributes to the competitive position of companies (Ellram and Carr 1994; Carter and Narasimhan 1996). Empirical evidence indicates that firms can indeed obtain competitive advantage by managing supplier relations (e.g., Dyer 1996; Mol 2002; Chen, Paulraj and Lado 2004). Obviously, differentiation is needed in managing supplier relationships, since not all suppliers are to be dealt with in the same way. The need for differentiated supplier relationships requires some sort of classification (Lilliecreutz and Ydreskog 1999). Since portfolio models provide differentiated strategic actions for heterogeneous categories of objects or subjects (Turnbull 1990), a purchasing portfolio approach could be characteristic of a sophisticated, strategic purchasing function.

In a seminal paper, Kraljic (1983) introduced a comprehensive purchasing portfolio approach, including a matrix that classifies a firm's purchased items into four categories on the basis of their profit impact and supply risk. Some authors have introduced similar models, although there are more similarities than differences in comparison to the original Kraljic matrix (Elliott-Shircore and Steele 1985; Olsen and Ellram 1997; Lilliecreutz and Ydreskog 1999; Van Weele 2002). The Kraljic matrix has become the standard in the field of purchasing portfolio models (Lamming and Harrison 2001; Gelderman 2003). Moreover, it has become the dominant approach to what the profession regards as "operational professionalism" (Cox 1997).

However, in contrast with a growing acceptance and usage, purchasing portfolio models have become the target of severe criticism. Some argue that the complexity of business decisions does not allow for simple recommendations. How could one deduce strategies from a portfolio analysis that is based on just two basic dimensions (Heege 1981; Dubois and Pedersen 2002)? By simplifying the issue of buyer-supplier relationships, portfolio models fail to capture vital aspects, such as the context of networks (Dubois and Pedersen 2002), the interdependencies between products (Ritter 2000), and the concern for sustainable competitive advantage

through interfirm relationships (Wagner and Johnson 2004). Some find the Kraljic approach counterproductive, providing recommendations either to exploit power (Olsen and Ellram 1997), or to avoid risk associated with the supplier exercising power (Dubois and Pedersen 2002). From a completely different perspective, Cox (1997) sharply condemned purchasing portfolio approach. Its major weakness is that the methodology “does not provide us with any proactive thinking about what can or should be done to change the existing reality of power.” In addition, measurement issues have been highlighted as a key criticism of portfolio models. In general, decisions based on portfolio models are proven to be sensitive to the choice of dimensions, factors and weights (Day 1986). How is one to know whether or not the most appropriate variables are being used (Nellore and Söderquist 2000)? Homburg (1995) and Heege (1981) called attention to the demarcation problem, measuring the key variables. Any classification is rather arbitrary, if one is not clear what the exact distinction is between “a high” and “a low” supply risk. Others point to the disregard for the supplier’s side in the Kraljic matrix (Homburg 1995; Kamann 2000).

Despite all of these theoretical problems and objections, there is limited empirical evidence on the usefulness of purchasing portfolio models (e.g., Carter 1997; Lilliecreutz and Ydreskog 1999; Gelderman and Van Weele 2002; Wagner and Johnson 2004). Based on an (inductive) case study approach, Wagner and Johnson (2004) found that managers anticipated positive outcomes from planning activities related to supplier portfolios. In an explorative study, Gelderman and Van Weele (2003) concluded that experienced practitioners have found a

reply to the critique of the Kraljic approach. The main point of that study was that experienced portfolio users reflect on the results of portfolio analysis and consider in-depth discussions within cross-functional teams as the most important benefit of any purchasing portfolio analysis. These tentative conclusions, however, are based on a small number of explorative case studies. Therefore, it remains unclear whether purchasing portfolio usage should be considered as a sign of a mature and sophisticated purchasing function or as a sign of poor operational pragmatism. This contrast leads to the scope and aim of this study, which is to use survey data to test whether or not purchasing portfolio usage is positively associated with purchasing sophistication.

The organization of the paper is as follows. First, a brief introduction to purchasing portfolio models is presented, followed by a review of the pros and cons of such models. Next, the characteristics of purchasing sophistication are discussed. This is followed by a description of the design of a survey among purchasing professionals in Dutch manufacturing companies. Finally, the results are discussed and implications are presented.

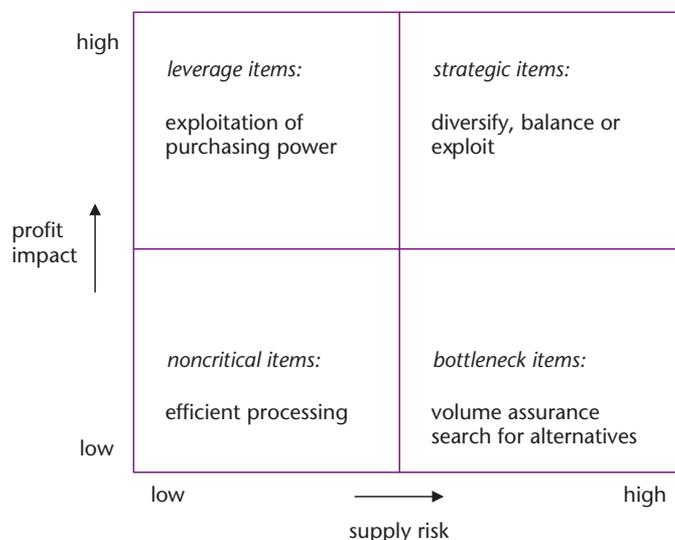
PURCHASING PORTFOLIO MODELS

Kraljic (1983) introduced the first comprehensive *portfolio approach* for the use in purchasing and supply management. Some 20 years ago, he advised managers to guard their firms against disastrous supply interruptions and to cope with changing economic and technological dynamics. His message was that “purchasing must become supply management.” In this context, Kraljic (1983) developed a convenient portfolio approach for the determination of a comprehensive strategy for supply.

Kraljic’s approach includes the construction of a portfolio matrix that classifies purchased products and services on the basis of two dimensions: profit impact and supply risk (“low” and “high”). The result is a 2 × 2 matrix and a classification into four categories: bottleneck, noncritical, leverage and strategic items; see Figure 1. Each of the four categories requires a distinctive approach toward supplier management. Leverage items allow the buying company to exploit its full purchasing power, for instance through tendering, target pricing and product substitution. Routine items are of low value, are ordered frequently and therefore cause high transaction costs. Therefore, strategies are aimed at reducing transaction costs through category management in e-procurement solutions. Bottleneck items cause significant problems and risks that should be handled by volume insurance, vendor supplier control, safety stock and backup plans. In some cases, a search for alternative suppliers or products is needed. Strategic items require a more collaborative strategy between both the buyer and the seller. The general idea of Kraljic’s model is to minimize supply risk and make the most of buying power. Each of the four

Figure 1

THE KRALJIC MATRIX: CATEGORIES AND RECOMMENDATIONS



Source: Modified from Kraljic (1983).

quadrants allows for differentiated supplier strategies based upon the position of a product in the portfolio.

Over time, portfolio models have entered many textbooks on purchasing and supply management (e.g., Van Weele 2002; Burt, Dobler and Starling 2003; Baily, Farmer, Jessop and Jones 2004; Monczka, Trent and Handfield 2005). The Kraljic matrix inspired many practitioners and researchers to gain a deeper understanding of the possibilities of a portfolio approach for purchasing purposes (e.g., Nellore and Söderquist 2000; Gelderman and Van Weele 2002, 2003; Wagner and Johnson 2004). Other scholars have introduced variations of the original Kraljic matrix (e.g., Elliott-Shircore and Steele 1985; Syson 1992; Hadelers and Evans 1994; Olsen and Ellram 1997; Van Weele 2002). However, the proposed matrices are very similar to the Kraljic matrix in that they use practically the same dimensions and categories, and suggest some of the same recommendations (Appendix A). Thus, it is fair to conclude that the Kraljic matrix has become the standard in the field of purchasing portfolio models (Lamming and Harrison 2001; Gelderman 2003).

CRITICISM AND SUPPORT

Organizations usually have a large number of products and a variety of suppliers, which generally necessitates different treatment. For quite some time, *ABC analysis* (or Pareto-analysis) was the only tool for differentiating between important and less important purchases. However, ABC analysis concentrates on the financial value of items, ignoring the cost of poor quality, performance risk, social risk and other components (Hartmann, Ritter and Gemünden 2001). Moreover, ABC analysis does not provide strategic recommendations for the categories; it merely provides information on the concentration of purchase spend.

The introduction of the Kraljic portfolio approach has been described as “a major breakthrough in the development of professional purchasing,” representing “the most important single diagnostic and prescriptive tool available to purchasing and supply management” (Syson 1992). Kraljic (1983) made a reasonable case for the usefulness of the portfolio approach by describing the experiences of four large industrial companies. Other case studies indicated that a purchasing portfolio model is a powerful tool for:

- Coordinating the sourcing patterns of fairly autonomous strategic business units within companies, resulting in leverage and synergy (Carter 1997; Gelderman and Van Weele 2002)
- Differentiating the overall purchasing strategy, with different strategies for different supplier groups (Lilliecreutz and Ydreskog 1999)

- Discussing, visualizing and illustrating the possibilities of the development of differentiated purchasing strategies (Gelderman and Van Weele 2002)
- Configuring and managing supplier relationships, considering various interdependencies and trade-offs among relationships (Wagner and Johnson 2004)

Portfolio approaches can be used to improve the allocation of scarce resources (Olsen and Ellram 1997). A portfolio model provides a framework to understand and to focus a company's supply strategy (Hadelers and Evans 1994). Portfolio usage has been associated with the level of purchasing sophistication of companies. A portfolio approach can make the difference between an unfocused, ineffective purchasing organization and a focused, effective one (Hadelers and Evans 1994), especially for those companies that have never thought systematically about their procurement expenditure (Cox 1997). The utilization of this purchasing methodology may lift the purchasing activity out of the tactical, fire-fighting mode into a strategic role (Elliott-Shircore and Steele 1985). It convinces top management of the effective role that purchasing can play in contributing to a company's profit and success (Carter 1997).

However, purchasing portfolio models have been severely criticized too. There are doubts and questions with respect to the following measurement issues:

- The selection of variables: “How could one know whether the most appropriate variables are being used?” (Nellore and Söderquist 2000)
- The supplier's side: “Why is the supplier's side disregarded in most portfolio models?” (Homburg 1995; Kamann 2000)
- The operationalization of dimensions: “What is exactly meant by profit impact and supply risk?” (Ramsay 1996)
- The measurement of variables: “How should the weighting of factors take place?” (Olsen and Ellram 1997)
- The lines of demarcation: “What is the exact difference between a ‘high’ and a ‘low’ supply risk?” (Homburg 1995)
- The simplicity of recommendations: “How could one deduce strategies from an analysis that is based on just two dimensions?” (Dubois and Pedersen 2002)

Other criticisms relate to more fundamental issues and objections. Portfolio models have a tendency to result in strategies that are independent of each other (Coate 1983). They do not depict the *interdependencies* between two or more items in a matrix (Olsen and Ellram 1997); instead, they concentrate on separate products (Ritter

2000). Because portfolio models are limited to analyzing products in a dyadic context, they fail to capture all the aspects that are considered vital for buyer-supplier relationships from a *network perspective* (Dubois and Pedersen 2002). In line with the foregoing, some are averse to recommendations either to exploit power (Olsen and Ellram 1997), or to reduce risk associated with the interdependence of companies within an industrial network (Dubois and Pedersen 2002). From a different perspective, Cox (1997) condemned the portfolio methodology, because it does not provide any *proactive thinking* about what can be done to change the existing reality of power in the various supply chains in which companies are involved.

It should be noticed that arguments supporting portfolio models have been reported in a limited number of case studies, while the counter-arguments are to be found in conceptual studies. The critique of portfolio models, however, does not include the experience of practitioners. Gelderman and Van Weele (2003) reported that experienced users have found a reply to the critique of portfolio models, stressing that there is no simple, standardized blueprint for the application of portfolio models. It requires critical thinking and sophistication of the purchasing function. This proposition, however, is not substantiated by quantitative empirical evidence.

PURCHASING SOPHISTICATION

Purchasing sophistication (or maturity) can be viewed as a key characteristic of the purchasing function. The sophistication level of the function determines the extent to which the purchasing function will be included in the strategic management decision-making process (Pearson and Gritzmacher 1990). In this study, *purchasing sophistication* is defined as the level of professionalism of the purchasing function (Rozemeijer, Van Weele and Weggeman 2003). The concept has been derived from different purchasing stage or development models (e.g., Reck and Long 1988; Keough 1993; Van Weele 2002). Various characteristics of the purchasing function can be expected to determine its level of sophistication and maturity. In this study, the following characteristics have been used for the development of a purchasing sophistication construct: (1) reporting level of the purchasing function, (2) the contribution to the competitive position of the company, (3) an orientation on collaborative supplier relationships, (4) the skills to participate in cross-functional teams, (5) skills for developing purchasing and supplier strategies, and (6) a focus on clerical and administrative duties. As shown later in this study, these characteristics can provide an indication of the level of sophistication of the purchasing function. Appendix B includes the list of questions relating to purchasing sophistication.

Reporting Level

Purchasing's position within the organizational structure can be assessed through the organization chart that indicates the reporting level of the purchasing function. Stage or development models for the purchasing function most commonly point out that in the early stages of development, purchasing reports rather low in the organizational hierarchy (Rozemeijer 2000). The relative power position of the purchasing position will be indicated by independent reporting to top management (Pearson and Gritzmacher 1990). Thus, a highly sophisticated purchasing function would report directly to top management, whereas a firm with a low level of sophistication would have a lengthy reporting chain.

Contribution to Competitive Position

The purchasing function can vary in its contribution to the firm (Reck and Long 1988). A nonstrategic purchasing function's contribution to the long-term or strategic goals of the firm may be insignificant, which implies that purchasing is not an important activity in the firm (Carr and Pearson 2002). However, purchasing can assume a pivotal strategic position, evolving from an obscure buying function into a strategic business partner (Ellram and Carr 1994). Chen et al. (2004) found empirical evidence that purchasing can engender sustainable competitive advantage by enabling firms to foster close working relationships with suppliers, to promote open communication among supply chain partners and to develop a long-term strategic relationship orientation to achieve mutual gains. Therefore, a sophisticated purchasing function, in contrast to an immature function, will be considered as an important resource for the firm (Keough 1993).

Orientation on Collaboration

In the 1990s, there was support for the idea of shifting from a traditional antagonistic approach toward a more collaborative approach to suppliers (Matthyssens and Van den Bulte 1994). Partnership sourcing is heralded as superior to adversarial competition, because it leads to long-term collaboration based on trust (MacBeth and Ferguson 1994). Adversarial relationships between buyers and suppliers is common in unsophisticated purchasing functions (Pearson and Gritzmacher 1990). A sophisticated purchasing function should have an orientation toward collaborative relationships with suppliers.

Cross-Functional Teams

In a highly sophisticated purchasing function, purchasing professionals have the skills to effectively participate in cross-functional teams. Trent and Monczka (1994) stipulated that a cross-functional sourcing team consists of personnel from at least three functions brought together to complete a purchasing or materials

management assignment. They argued that cross-functional teams offer many opportunities to achieve competitive advantage in key performance areas. Ellram and Pearson (1993) confirmed the notion of increased emphasis on team responsibility for the purchasing function. Team participation should foster improved communication, awareness and integration of the purchasing function with other functional groups in the firm. Giuniperio and Vogt (1997) found higher levels of team participation in purchasing when the function had a strategic orientation. Johnson, Klassen, Leenders and Fearon (2002) also found that purchasing's strategic role was positively related to the greater usage of (internal) cross-functional team usage. Thus, the skills to participate in cross-functional teams are likely to be associated with the purchasing sophistication of companies.

Developing Strategies

Purchasers need different skills depending on whether the function is task-oriented or strategic (Freeman and Cavinato 1990). There is a broad consensus that companies need a variety of relationships, each providing its different benefits, where no general "best" type of relationship exists (Young and Wilkinson 1997; Gadde and Snehota 2000). Professional purchasers must have a variety of skills for making effective decisions (Pearson and Gritzmacher 1990). They are expected to possess the skills necessary to plan, evaluate, implement and control purchasing and supplier strategies (Carr and Smeltzer 1997). More specifically, purchasing personnel in companies with a more sophisticated approach to purchasing will have the skills to develop differentiated purchasing and supplier strategies.

Clerical Activities

A purchasing department of low sophistication will be viewed primarily as a clerical function with little decision-making power (Pearson and Gritzmacher 1990). In an immature purchasing function, purchasing will be evaluated on the clerical tasks it performs such as number of orders processed (Reck and Long 1988). Within manufacturing companies, the purchasing function is typically part of materials management. In these settings, generally it is not the responsibility of purchasing to question materials needs, forge long-term relationships with suppliers, or understand the needs of the end customer (Ellram 1998). Many companies have progressed from a clerical function back in the 1960s to a strategic function currently, while others have not made such moves (Quayle 2002). Buyers in a nonsophisticated purchasing function solve day-to-day problems with suppliers and spend their time mainly on clerical and administrative tasks.

DATA COLLECTION

The survey procedures included a pilot study aimed at enhancing the reliability and validity of the questionnaire. Pilots were conducted in 2001, whereas the actual survey was conducted in 2002. The final questionnaire has been administered to 1,153 members of the Dutch Association of Purchasing Management (NEVI). All members are employed by manufacturing companies. These purchasing professionals were targeted because of their insights into the development of the purchasing function and the possible usage of a portfolio approach in their companies. A total of 248 responses were received, of which 10 were invalid. The effective response rate was 20.6 percent (238/1,153).

Table I presents the respondent profile. Based on their job titles, the respondents can be considered as well informed about the purchasing operation in their companies. Industries represented included metal products (21 percent), electro-technical (19 percent), chemical (14 percent), machine (13 percent), wood, furniture or paper (7 percent), metal basic (4 percent), transportation (4 percent) and a small number of other industries. The distribution of the sample with respect to sales is provided in Table II. The average ratio of purchases to sales was 54.2 percent.

The potential for nonresponse bias was tested using the procedure recommended by Armstrong and Overton (1977) in which the data are classified into a first category of returned questionnaires (first-wave, early respondents) and a second category of returned questionnaires (second-wave, late respondents). To establish the presence of nonresponse bias, first-wave respondents were compared with second-wave respondents on relevant variables. All tests indicated that no statistically significant differences were found between the first wave and the second wave of respondents. Based upon the assumption that late respondents are similar to nonrespondents, it is concluded that the study does not suffer from nonresponse bias.

Table I

JOB TITLE OF RESPONDENTS		
Job Title	Frequency	Percent
Director Purchasing	70	29
Purchasing Manager	79	33
Senior Buyer	23	10
Purchasing Assistant	37	16
Manager of Logistics	10	4
Supply Chain Manager	4	2
Other	15	6
Total	238	100

Table II

RESPONDENTS' ANNUAL SALES VOLUME*		
Annual Sales (Euros)	Frequency	Percentage
Under 5 Million	8	3.4
5–10 Million	30	12.8
10–25 Million	57	24.3
25–100 Million	71	30.2
100–500 Million	48	20.4
Over 500 Million	21	8.9
Total	235	100

*Based on currency exchange rate of 1.3 euros to the USD.

PURCHASING SOPHISTICATION CONSTRUCT

To determine the level of purchasing sophistication, respondents were asked to rate the purchasing function in their company on six different characteristics, using a 5-point Likert scale (1=completely disagree to 5=completely agree). The results indicate that on average, portfolio users score higher on the purchasing sophistication items (Appendix C).

Explanatory factor analysis was used to identify a possible underlying factor structure. The results of the factor analysis (principal-components analysis with varimax rotation) are provided in Table III. The analysis indicates that purchasing sophistication is a two-dimensional construct. The first factor can be named *purchasing position*, referring to the internal position and status of the purchasing function in companies. The position of purchasing can be deduced from its contribution to the company's competitive position and its direct relationship with top management. The second factor is labeled *purchasing professionalism*, since the professionalism of purchasing is reflected by the skills of purchasers and their (negative) orientation toward and engagement in clerical activities. With the exception of "orientation on colla-

Table III

RESULTS OF PURCHASING SOPHISTICATION FACTOR ANALYSIS (FACTOR LOADINGS)		
Items	Factor 1: "Purchasing Position"	Factor 2: "Purchasing Professionalism"
Reporting to Top Management	0.848	0.078
Contribution to Competitive position	0.807	0.163
Orientation on Collaboration	0.368	0.257
Skills for Cross-Functional Teams	0.203	0.833
Skills for Developing Strategies	0.106	0.841
Orientation on Clerical Duties	- 0.018	- 0.656

aboration," all items had at least one factor loading that exceeded the recommended level of 0.50 (Hair, Anderson, Tatha and Black 1998). Only "orientation on collaboration" cross loaded on both factors. Therefore, this characteristic has been removed from further analysis.

A reliability analysis was performed in order to ensure the internal consistency of the indicators that constitute each construct. Cronbach's alpha was 0.60 and 0.71 for the first and second factors, respectively, indicating acceptable internal consistency and reliability of the constructs.

CONTROL FOR SIZE

Previous studies indicated that larger firms recognized the strategic importance of purchasing more so than smaller firms (Carr and Pearson 1999). Mudambi, Schründer and Mongar (2004) reported that most SMEs do not engage in cooperative purchasing arrangements, while the few that do experience marginal success. Quayle (2002) found a lack of awareness by SMEs that effective purchasing may positively affect the profitability of organizations. Larger companies are more likely to deal with more products, more suppliers and more complex purchasing situations and therefore need more advanced analytical tools to develop effective supplier strategies. Under these circumstances, the employment of sophisticated tools will probably have more effect. Since this study included firms of various sizes, an attempt was made to control for firm size. The variable "firm size" was included as a control variable, measured on an ordinal scale. Companies are either "large companies" with more than 100 employees or "small- or medium-sized enterprises" (SMEs), in accordance with the definition of the Dutch Central Commission of Statistics (CBS). By sorting the sample according to firm size, the sample consists of 170 larger firms and 68 SMEs.

EMPIRICAL RESULTS

Since the dependent variable (portfolio usage) is measured as a dichotomous variable, logistic regression analysis has been used to explore the relationship between portfolio usage and the two purchasing sophistication factors: purchasing position and purchasing professionalism.¹

The main results of logistic regression are shown in Table IV. The overall fit of the model can be assessed using chi-square. In this case, the χ^2 is statistically significant at

¹Logistic regression allows prediction of which of two categories (here: users and nonusers) a respondent is likely to belong to, given certain other information (here: data on purchasing position, purchasing professionalism and company size). The analysis can be used to establish which variables are influential in predicting the correct category. Answers can be found to the question: Which variables are appropriate for predicting whether a respondent will use a portfolio approach or not?

$p < 0.001$. In other words, overall the model is predicting usage and nonusage significantly better than a model with only the constant included. The Nagelkerke R^2 was found to be 19.7 percent. The overall accuracy of the model is indicated by the predicted group membership, which predicts to which of the two categories (users and nonusers) a respondent is most likely to belong, based on the model. The correctly predicted group membership was 76.8 percent.

The empirical results indicate that, after controlling for firm size, the position of the purchasing function is to be positively associated with portfolio usage. In cases where purchasing has a better position within the company, a portfolio approach is more likely to be used. The same conclusion holds for the professionalism of the purchasing function. Purchasing portfolio methods are used more often by more professional purchasers than by their less professional colleagues. In other words, the usage of portfolio models increases significantly as purchasing's professionalism increases. In addition to the interpretation, the values of the coefficients Exp (B) indicate the contribution of the independent variables to the prediction of the outcome variable. The outcomes of the logistic regression indicate that the association with portfolio usage is stronger with purchasing professionalism than it is with purchasing position. As expected, firm size has a significant impact on portfolio usage. The likelihood that a larger company uses a portfolio model is nearly 2.6 times higher than those of an SME.

CONCLUSIONS AND IMPLICATIONS

The purchasing portfolio is often considered a valuable tool for developing differentiated purchasing and supplier strategies. However, portfolio models have been criticized, pointing at measurement problems, more fundamental issues and objections. It appears that arguments supporting portfolio models are derived from qualitative case studies, while counter-arguments are based on theoretical and conceptual studies. Based on a survey of purchasing professionals, this study provides evidence that purchasing portfolio usage is associated with purchasing sophistication. Users contrast in a positive way with nonusers of the portfolio, especially on their professionalism (skills) and their position within their companies.

The results of this study imply that top managers discovering that portfolio management methods have not been endorsed by their purchasing organizations should question the relative sophistication of the purchasing function. These companies are probably lagging behind both in terms of professionalism and position of the purchasing organization in the overall company hierarchy. The application of purchasing portfolio management seems to have prerequisites both in terms of

Table IV

LOGISTIC REGRESSION FOR "PORTFOLIO USAGE" (N=236)			
	B-Coefficient	Standard Error	Exp (B)
Purchasing Position	0.358*	0.178	1.430
Purchasing Professionalism	0.662*	0.189	1.938
Firm Size	0.947*	0.388	2.584
Constant	0.591*	0.316	1.806
Nagelkerke R^2		19.7%	
Overall χ^2		23.7*	
Correctly Predicted Group Memberships		76.8%	

*Significant at $p < 0.05$.

professionalism that needs to be present and the exposure, i.e., locus that the purchasing domain has within the overall company organization. The application of purchasing portfolio techniques requires skills extending beyond traditional administrative competences. In addition, the purchasing purchasing needs to have a clear presence and position within the organizational hierarchy.

Future research should include an empirical study on the impact of portfolio usage, in terms of performance measures that are valued by top management. Longitudinal studies in companies could provide information about the long-term impact and usefulness of a purchasing portfolio approach. Such research requires a complex design. The researcher should overcome the difficulties of attributing results to portfolio usage and of comparing the results from different companies, because several company-specific factors are likely to influence the impact of portfolio usage. In addition, the personality of individual purchasers could be included as well, describing and explaining the use and effectiveness of the portfolio approach.

This study attempted to provide new insights into the relationship between purchasing sophistication and the usage of purchasing portfolio models. In this study, portfolio usage has been explained by purchasing sophistication (professionalism and position). However, it is also possible that the introduction of the purchasing portfolio in companies drives purchasing sophistication. Adopting a portfolio approach could work as a *catalyst for change* within the company. Portfolio models provide a practical framework for nonpurchasing specialists, analyzing and discussing purchasing issues within cross-functional teams. A portfolio project could put purchasing higher on the company's strategic agenda, clarifying the problems and possibilities of purchasing and supplier management. Further research should focus

on the *impact* of portfolio usage on the sophistication of the purchasing function.

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Appendix A

OVERVIEW AND COMPARISON OF PURCHASING PORTFOLIO MODELS

	Elliott-Shircore and Steele (1985)	Hadeler and Evans (1994)	Lilliecreutz and Ydreskog (1999)	Olsen and Ellram (1997)	Van Weele (2002)
Name of the Model	Procurement positioning overview	Supply strategy square	Classification model	Portfolio model	Purchasing portfolio
Matrix Dimensions	Profit/value potential	Product's value potential	Economic profile	Strategic importance	Profit impact
	Supply vulnerability	Complexity	Complexity and risk profile	Difficulty of managing	Supply risk
Categories	Strategic critical Tactical profit Strategic security Tactical acquisition	(Not specified)	Strategic Leverage Bottleneck Noncritical	Strategic Leverage Bottleneck Noncritical	Strategic Leverage Bottleneck Noncritical
Recommendations for					
Strategic Items	Manage suppliers	Strategic partnerships	(Not specified, depending on the desired cooperation with the supplier)	Close relationship	Partnership
Leverage Items	Drive profit	Global trading		Leverage volume	Exploitation of power
Bottleneck Items	Ensure supply	Close relationship		Standardize and find substitutes	Assurance of supply
Noncritical Items	Minimize attention	Simple contracts		Standardize and consolidate	Systems contracting

Appendix B

PURCHASING SOPHISTICATION (1=STRONGLY DISAGREE, 5=STRONGLY AGREE)

1. Purchasing reports directly to top management.
2. Top management recognizes that purchasing contributes significantly to the competitive position of the company.
3. Purchasing is mainly aimed at collaboration with suppliers.
4. The skills of purchasing personnel are adequate for working in cross-functional teams.
5. The skills of purchasing personnel are adequate for developing purchasing and supplier strategies.
6. Purchasers are mainly engaged in clerical work and operational duties, dealing with day-to-day supplier problems.

Appendix C

MEANS OF THE PURCHASING SOPHISTICATION ITEMS (ON A 5-POINT SCALE)

	Overall Sample Means	User's Mean Score	Nonuser's Mean Score
Reporting to Top Management	3.94	4.03	3.66
Contribution to Competitive Position	3.72	3.83	3.42
Orientation on Collaboration	3.60	3.63	3.48
Skills for Cross-Functional Teams	3.53	3.64	3.18
Skills for Developing Strategies	3.47	3.57	3.19
Orientation on Clerical Duties*	3.13	2.89	2.69
<i>n</i> =	236	174	62

*Recoded.