

Quantifying the impact of the purchasing function's sophistication on cost savings through balanced sourcing strategies

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Abstract

Do investments into the development and expansion of the purchasing function pay off for the company? This question – which a firm's management faces every year at the time of budget planning – is difficult to answer. There are two mayor problems: measurement challenges concerning the "sophistication" of purchasing and the difficulty attributing a monetary value to it. Discussing this relationship, the present paper reports the results of a major project which involved 14 comparable firms belonging to the same industrial group. Each was subject to a weeklong "procurement performance analysis", allowing for a reliable comparison of their sophistication. In parallel, 42 workshops using an identical methodology were conducted in these firms, developing sourcing strategies for commodity groups and identifying their savings potential. Matching the results of these two sets of data reveals a link between the quality of the purchasing organisation and the savings potential identified. An additional result of this research is that a single best sourcing approach did not emerge. For instance, global sourcing did not account for more than 20% of the total cost reduction. While the absolute savings potential identified may not be transferable to all industries, these findings alert supply strategist designing their supplier network to carefully balance their approaches rather than following single-sided fashions and to further invest into the professionalisation of their purchasing organisations.

Keywords: sourcing strategy, purchasing organisation, performance measurement, commodity group approach, global sourcing.

Purchasing and corporate success: Challenges in measuring

Even though touching a very central question, the issue of financial performance and purchasing sophistication has received less attention in the literature as would be expected. There are studies on particular elements of sophistication, such as demonstrating the value of purchasing's cross-functional involvement (Goh et al. 1999), underlining the performance significance of formulated sourcing strategies and a long-range sourcing plan (Carr; Smeltzer 1999), supplier evaluation systems (Carr; Pearson 1999), supplier development initiatives (Sánchez-Rodríguez et al. 2005) or a long-term collaborative supply management orientation (Shin et al. 2000).

A comprehensive view with 26 variables describing sophistication, was presented by Carter and Narasimhan. Purchasing maturity was able to explain 43% of the overall performance variation of the firms in their sample, expressed by sales related indicators (Carter; Narasimhan 1996). The importance of the purchasing function within the firm, human resource management in purchasing and the interaction with suppliers were found to be most influential.

A more recent and similarly comprehensive study got a result which at a first glance appears to be counterintuitive: only few significant differences were found between successful and less successful firms, and in addition, underperforming firms were reporting to apply more "best practices" (Ellram et al. 2002). Analysing this study, it strikes that performance had been measured in terms of stock market performance. However, stock prices may be too indirect a measurement for purchasing success. Another point made by the authors of this study themselves was that "...they [the respondents from underperforming firms, H.S.] may simply perceive that they are employing a high level of best practices due to the current effort they are directing toward best-practice activities."

The conclusion from the above is that it would be beneficial to a) use a quantitative success indicator closer to purchasing's sphere of influence and b) to have a more objective measure for sophistication than self-reported estimations, preferably carried out by third parties. Therefore, a novel approach will be applied here. For the first issue we suggest to assess the monetary value of sourcing strategies and for the second the application of a multidimensional maturity profile. Hence, this paper is organised as follows: in the next section sourcing strategies in general and those schemes used with the present study in particular will be discussed. Having explained the success measure which was used, the next section can then focus on measuring sophistication and lay out the approach used here to measure sophistication. Then, data origin and the results from the analysis will be presented, so that conclusions for management and research can be drawn in the end.

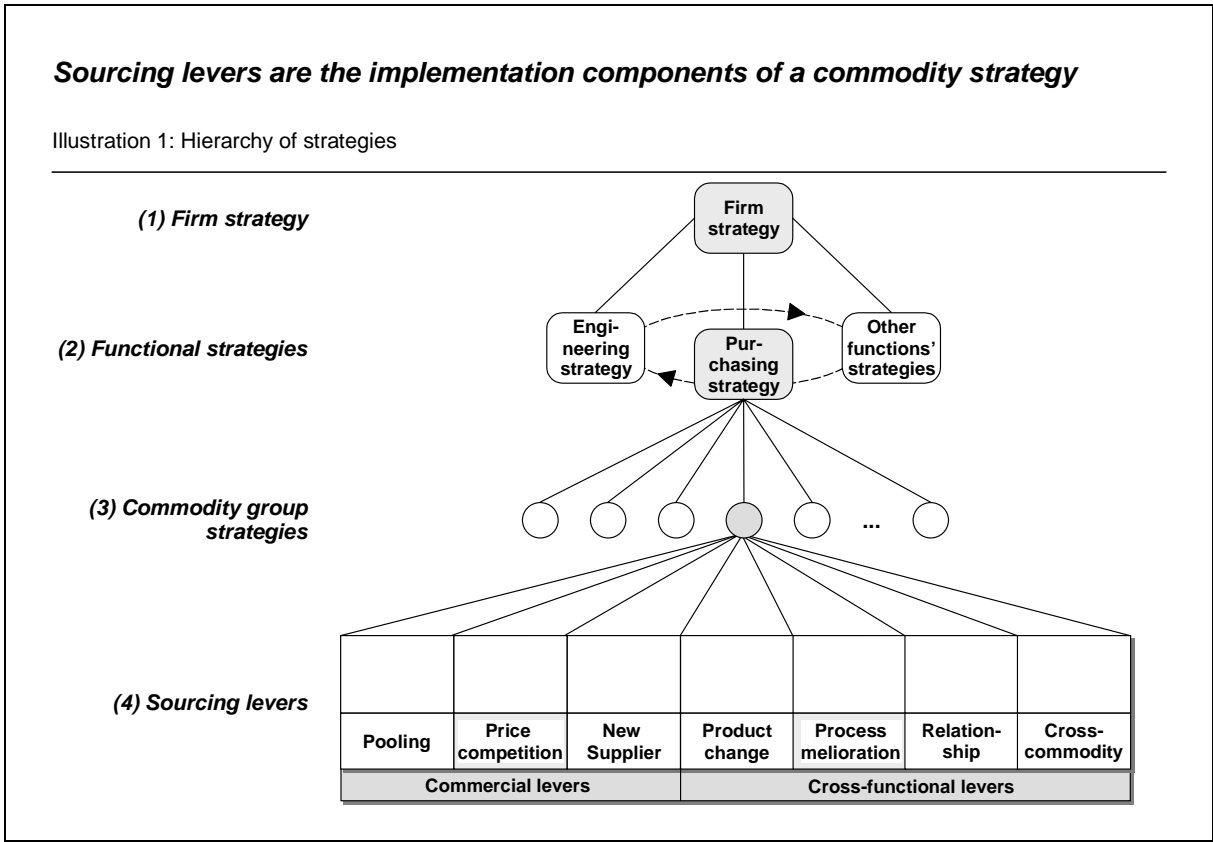
Success measure: Savings potential of sourcing strategies for commodities

Before we describe how the monetary value of sourcing strategies has been measured, we should first discuss the term "sourcing strategies". They provide general orientation on how a particular commodity is planned to be purchased. There are a multitude of definitions for sourcing strategies, while "...the most basic question that need to be addressed in designing a coherent set of sourcing strategies are what to source, and where to source." (Kaufmann 2002, p. 15). Sourcing strategies should decide on global versus local sourcing, single or multiple sourcing and partnership or competitive bidding (van Weele 2005). In addition, the scope of sourcing (unit, module or system), the timing and storage strategy and the sourcing subject (single or pooling) could be added (Arnold 1997). Literature has generated a variety of sourcing concepts, which, however, are more descriptive in nature and have rarely been subject to a comprehensive empirical test (as an overview on several models see Arnold; Eßig 2000).

In purchasing, several levels of strategies can be differentiated (Leenders; Blenkhorn 1988). Sourcing strategies in the above sense are not to be mixed up with the overall purchasing strategy of a firm, but follow on a subordinated level. The purchasing strategy unites several sourcing strategies. Such sourcing strategies are either aiming at individual suppliers or are directed towards product groups, i. e. commodities. The term should not be mixed up with traditional commodities (raw materials) or simple goods. Commodities are general categories or families of purchased items (Monczka et al. 2002, Rendon 2005). For a commodity based approach to be applied, similar materials or services purchased on one supply market need to be congregated into one group (Boutellier; Zagler 2000). For example, a commodity group "tubes" could be formed: there are different sizes, production methods,

quality requirements etc. for tubes, but there is a limited number of suppliers who produce them. Now, rather than dealing separately with each of these suppliers, possibly by different purchasers in a single firm, applying commodity-management, one purchaser would be responsible for the entire family of tubes. This paper follows the commodity group approach: For each commodity, a commodity strategy is defined, first. Only then it is checked which suppliers are more suited to fit (Monczka et al. 2002, Kalbfuß 2000, Eßig; Wagner 2003).

A hierarchical model emerges: (1) the firm strategy should be aligned to (2) the functional strategies such as the purchasing strategy, which in turn relates to (3) the individual sourcing strategies developed for the various commodities a firm is buying. To implement the sourcing strategies, finally, a purchaser can apply (4) sourcing “levers”. A sourcing lever comprises a coherent set of similar measures that are used to improve the firm’s sourcing performance in a commodity group. Literature often does not distinguish between commodity strategies and sourcing levers. However, since several levers can simultaneously implement one commodity strategy, there is a methodological value added to making this distinction (illustration 1).



For the present study, a selection of sourcing levers has been used as a discussion basis for identifying savings potentials with the firms in our sample. The model has evolved in consulting practice, but has been adopted for this study to match the suggestions from the above literature on sourcing strategies. We identify seven levers that can be differentiated into those aiming at benefit allocation and another group aiming at benefit creation. The so-called “commercial levers” focus at uncovering benefits, i. e. they intend to identify and lift potential for cost reduction that only has not been seized by the buyer, yet:

1. *Pooling of demand* refers to a reduction in the number of suppliers for a commodity with the consequence of an increased purchasing volume with the remaining suppliers. The expectation is to thus achieve price reductions with the latter. Pooling in the sense of reducing the number of suppliers can be done in every company. Firms belonging to larger groups have the additional opportunity of pooling with others units from their group which procure similar goods or use the same suppliers. Even if purchased goods are

different in their specification, there can be a pooling effect through joint negotiation with a single supplier.

2. *Price evaluation*: The most classical form of achieving price reductions with a supplier can be differentiated with new techniques, such as electronic auctions, analysis of the composition of the supplier's price or simply more frequent quotations.
3. *Extension of supplier base* means searching for new sources which usually translates into a global sourcing effort, investigating for international suppliers. However, other options to expand the supply base could be to build up manufacturers with similar know-how as new suppliers. Multiple sourcing rather than single sourcing can be the consequence.

The next group of levers are called "cross-functional" levers because they require a cross-functional co-operation in the firm. In theory, an isolated purchasing department could apply the commercial levers without discussion with other functions such as engineering, production or logistics. With the following levers this is not possible at all. As opposed to the previous group, they do not primarily aim at leveraging the existing potential, but create new opportunities in collaboration with suppliers. They reflect what has been called the switch from a transactional to a relational exchange (Spekman; Carraway 2006):

4. *Product and programme optimisation* aims at the modification of the material or the service provided so as to reduce the costs of its components. The techniques applied are the standardisation of materials, their modularisation and the reduction of requirements. One way to support such an exercise is the application of the design-to-cost method.
5. *Process improvement* at the interface between buyer and seller simplifies or automates the interfaces, e. g. material flow, demand planning, logistics etc. Innovative storage models such as consignment stocks also fall under process improvement.
6. *Intensification of supply relationship*: Implementing strategic partnership, early supplier inclusion into new product development and applying alternative contracts such as cost-plus contracts or gain sharing agreements are discussed here. The optimisation of the relationship intensifies the co-operation with the supplier.
7. *Commodity spanned lever*: One of the disadvantages with the formation of commodity groups is the danger of parallel optimisation of individual commodities without considering the relations between each other and their interdependencies. Commodity spanned leverage exactly analyses savings potentials at the interfaces between materials. Furthermore, it considers the option of partnering consortia, understood as a collaboration between more than two firms contributing with different commodities to a single project or product.

These seven levers do not generally exclude each other, even though some particular trade-offs have to be considered at the time of consolidating the selected levers to a commodity group strategy. For instance, the lever "extension of supplier base" may be conflicting with the application of the lever "intensification of relationship" (Schiele 2003, Füchtenbusch 2006). Typically, elements from more than one lever will be used to support the commodity strategy.

In our study on the relation between cost savings and purchasing sophistication these seven levers have been used in workshops to define sourcing strategies for commodity groups. The saving potentials identified by checking the applicability of each lever in a particular material group, then, serves as the dependent variable, which should be explained by the purchasing sophistication of the respective firms. There is an assumption of a link between sourcing strategies and purchasing sophistication: "...certain strategies are used more often than others, depending on how advanced an organization is at the purchasing strategy development process." (Monczka et al. 2002, p. 184). The measurement of the sophistication will be discussed next.

Purchasing sophistication: Application of best practices

Even recent surveys showed that the use of tools in purchasing is usually confined to a rather limited selection (Cox; Watson 2004). This gives room for a differentiation in terms of sophistication, if the latter is understood as the application of a substantial set of best practices, such as, for instance, tools (Ellram et al. 2002).

There are at least two ways to measure purchasing sophistication: one way would be to name tools, methods and management approaches and ask a firm to attribute a score to each, reflecting the employment of the techniques. The other way would be to conduct a purchasing audit, executed by third parties (van Weele 2005). To ensure the reliability of an audit, it can be based on a sophistication profile. This is a multidimensional stage model describing each state of sophistication, thus making it possible to assign each observation to one of the descriptions. This means that the auditor has at disposition a description of an ideal state for each item and variations thereof. A comprehensive stage model of maturity that can be found in literature is the one by Bhote (Bhote 1989), another one is the model applied here.

Our model of procurement performance analysis has evolved in practical application during the last few years, with the latest update - reflecting best practices - being released for this study. It is built on four stages of maturity. These four stages are defined individually for each topic, but follow these guiding lines: a) to check whether a particular activity is known with the assessed organisation, b) a position or a person is assigned to do this task, c) the process is documented as well as applied and, d) at the most mature status, on top of fulfilling the basic requirements, its integration with the rest of the company is assured. An underlying principle is that a purchasing organisation that reached a mature level does not depend on the performance of sole individuals, but is structured to such an extent that it can sustain personnel turnover and continue to perform.

Six broad dimensions are analysed by a total of 111 questions:

1. *Material and technology management*: The first steps of the purchasing life-cycle, i. e. the determination of demand, pooling of demand, market analysis and innovation management. Each of these features is assessed by several questions. E. g. the first feature of this dimension, determination of demand, is analysed by asking to what extend purchasing is involved in product or project planning, how is the process of requirements planning is organised and which tools support this process.
2. *Supplier management*: The process of supplier selection, evaluation, the process of enquiry till conclusion of a contract, contract management and finally, supplier development are covered.
3. *Cross-functional process definition and purchasing integration*: Many activities in a firm can only be optimised if the functional departments collaborate with each other. This dimension analyses the interfaces of the purchasing unit with other functions, focussing on product development, sales activities, the quality management process, logistics and production and finally risk management.
4. *Personnel management*: Such as the following three dimensions, personnel management is considered to be an enabler for performance. Recruiting purchasing personnel, their integration into the work situation and further skill development lay the groundwork for performance.
5. *Purchasing controlling*: One of the most challenging activities concerns the purchasing target management process and the tools and measurements used to structure it. The link between purchasing strategy and company strategy is also part of the assessment.
6. *Purchasing organisation*: The final enabler is the way how purchasing is structurally organised. Our maturity profile does not prescribe any particular form of organisation, but asks for roles, responsibilities and interfaces to be sustainably established, comprehensively documented and well structured. The organisation and responsibilities, the organisational integration of the purchasing department into the firm as a whole and finally the communication and information policy and channels used by purchasing are part of the assessment.

A firm is said to have reached a high level of purchasing sophistication if it averages high scorings in the six dimensions. The intention of having six dimensions is to reflect a balanced and comprehensive view on a purchasing organisation covering the whole range of activities. Another advantage is the possibility of comparing the organisations thus assessed in detail.

Having explained the concept used to measure the firms' sophistication and their performance, as indicated by the savings potential of the commodity strategies, we can now present the concrete procedure applied for this study.

Data and method: Parallel purchasing audits and commodity workshops

In a larger project, procurement performance data was collected from 14 firms belonging to a single group. For this purpose, the sophistication profile described above was used, in which the six assessed dimensions were subdivided in and analysed by a total of 111 questions. For each of these questions four stages of maturity were verbally formulated, so that the auditors could assign the responses to the respective level. Applying this extensive, 10.000 words strong instrument, a possible interviewer bias can be limited. The evaluation is further detailed by assigning a score between 1 and 20 to each question.

In each unit, two auditors conducted about 10 interviews. The interview partners were several people from the purchasing organisation and their cross-functional partners, i. e. the heads of the other relevant departments (research and development, production, logistics, quality, marketing) as well as the management of the unit (technical and financial director). On top, the IT-systems in place, process documentations and other material was viewed by the auditors. Thus, the accuracy of identified sophistication levels can be considered high. The problems discussed in the introduction, namely a possible overestimation bias by self-analysis, can be avoided by using third parties as auditors.

In these same 14 firms a total of 42 cross-functional commodity workshops discussing the sourcing strategies were conducted. In principle, the commodity workshops can be – and usually are – conducted independently of the performance analysis. In this particular project, however, the exceptional opportunity arose to apply the two instruments simultaneously. The reason for this coincidence was rooted in the collaborative company culture in that corporation: since an audit induced by headquarters may or may not be pleasant for the visited unit (depending on the result), sponsoring commodity workshops which support the operative units' daily work usually is appreciated by these firms. The practical advantage of this procedure is that in this way the whole project found greater acceptance. The academic advantage out of this constellation is that the results of the two instruments can be compared.

In each firm that was audited two to four commodity workshops were conducted. These workshops aimed at identifying savings potentials and develop project ideas on how to seize it, relying on the discussion of the seven levers (figure 1). The commodity workshops were prepared by the strategic purchaser responsible for that particular commodity with the help of an expert on the method. Each of the workshops had one distinct category as topic. The half-day workshops were typically attended by about half a dozen experts from different functions plus the moderator. Normally, apart from the purchaser, one or two people from the engineering department were present, in addition to a delegate from production logistics and a quality engineer. These experts sequentially discussed saving opportunities concerning the seven different levers. In a second round the size of savings that could derive from these ideas was estimated and their potential discussed. For each idea a range between an optimistic and a pessimistic savings potential was agreed during the lever-workshop. Afterwards, the responsible purchaser co-ordinated a cross-check of the potential, which in many cases would serve as an indication for purchasing's next year planning.

All firms analysed are rather homogeneous, medium-sized first-tier suppliers producing metal-made parts and components. Due to the similarity of the firms and the same industry, also the commodities dealt with in the workshops were similar. As a consequence, the results both of the performance analysis as well as the sourcing strategies workshops offer a chance for comparison, in the sense of a multiple case study with literal replication (as opposed to theoretical replication) where each case is purposefully different in order to draw conclusions from the difference (Yin 2003). In such a similar

environment a limited number of interfering variables disturbing the comparison can be expected. In particular, the success measure (savings potential identified in cross-functional workshops) would possibly not have been comparable if completely different commodities had been the subject of the analysis. Such a homogeneous constellation can be considered as a very rare opportunity.

Analysis: Identification of a positive relationship between purchasing sophistication and savings potential

The procurement sophistication of the 14 analysed firms was summarised on a scoring model where the maximum value is 20. The average values encountered in practice were ranging from 7.2 points to 11 points, i. e. no visited firm was simultaneously hitting the best score in all analysed dimensions.

With regard to the savings potential identified in the parallel cross-functional lever-workshops, it ranged between 2.7% and 12.2%. This value refers to the total purchasing volume of the commodity groups analysed and also controls for the number of lever workshops conducted in each firm by displaying their average results. For statistical analysis the means of an optimistic and the pessimistic scenarios were used. In theory, the saving potential could reach 100%, if the material was made superfluous.

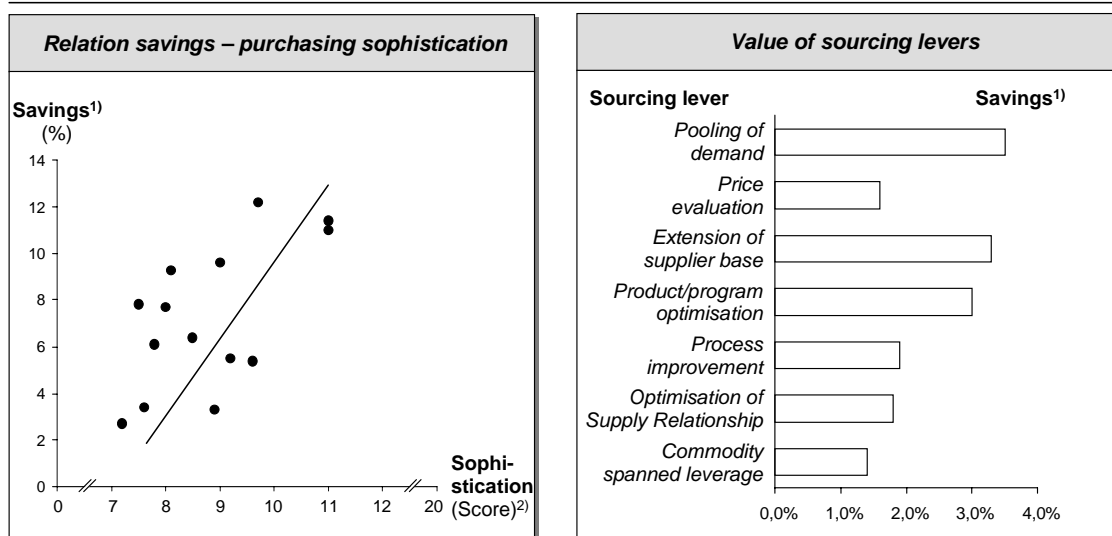
In principle, for the data at hand, the Bravais-Pearson correlation coefficient can be calculated, only that such small samples usually are not very practical and merely powerful relations can be detected (Cohen 1992, Mayer 2004, Alreck; Settle 2004). Here, a regression line has been calculated, which can visually be inspected in illustration 2, left hand side. The two variables (purchasing sophistication and savings potential) display a significant and positive correlation (0.62, $p=0.018$). This means that in our sample firms with a higher purchasing sophistication tended to identify a higher saving potential in analysing their commodity groups. Regarding the sample size, these results, of course, only give a first indication for the relation. However, the positive correlation between sophistication and savings can be considered to be strong enough to deserve further discussion.

At first glance this result may be counterintuitive. One may expect to find a higher savings potentials with firms that have an unsophisticated purchasing function. However, an explanation for the positive correlation between sophistication and savings could be that in the absence of systems, tools, methods, skills and other resources, i. e. low sophistication, no organisation can realistically commit itself to savings it cannot deliver afterwards. The illustrative case would be that without language skills, commodity teams may be more reluctant in starting international sourcing initiatives, i. e. applying the supply base expansion lever. They may also lack the necessary market knowledge to estimate the potential. Here, the approach in the workshops asking for the local team to rate the value of their chosen sourcing levers themselves, rather than leaving this task to be done by third parties, could have had an influence. The savings potential identified thus has a subjective component, because it includes a reflection of the judgement by the people involved on what they can deliver in their situation.

Of course, objectively, a higher potential for realising savings may exist. But from the firm's perspective it is out of reach or cannot be recognised. The problem, of course, is that other firms from the same industry with a more sophisticated purchasing function could possibly identify the commodity's savings potential to a higher degree.

Higher developed purchasing organisations identified higher saving potential, relying on balanced sourcing strategies

Illustration 2 – Results



- 1) Savings expressed as percentage of the total analysed purchasing volume. The graph to the left shows the cumulated average savings of the analysed commodity groups per firm. The graph to the right shows the values per sourcing lever, as an average of the values achieved for this particular sourcing strategy in the different firms. In every firm several sourcing levers per category were applied simultaneously.
- 2) Sophistication of the purchasing function in a firm expressed in a scoring model ranging from 1 to 20 points. No firm in the sample was exceeding 11 points.

With the data available, a more detailed analysis is possible: we can better understand which levers have contributed to what extent to the savings identified. Illustration 2 (right hand side) summarises the average results of the 42 workshops, desegregated for each lever and regardless of the firm. The average potential per lever varied between 1.4% and 3.5%. This percentage refers to the identified potential in relation to the total purchasing volume of a commodity.

Take a typical project derived from the analysis of the lever “product optimisation” as an example: changing the specification and replacing one material with another may reduce the costs in this particular case for 10%. Assuming that the value of the material to be replaced was amounting to 20% of the total commodity purchasing volume, the savings thus derived from the application of this lever, in this case, would score at 2%. All measures recorded here refer to their impact on the total purchasing volume of the commodity, not the individual project. Note that in this way, many small projects with a high impact can each display the same cumulated potential as one large project with a low impact. Measuring savings with reference to the total purchasing volume does have the advantage of making the results of the application of each sourcing lever comparable with each other.

In all commodity groups measures incidental to more than one lever were identified. On average, half of the seven levers applied during the workshops. It is worth noticing the absence of any clear “champion” among the sourcing levers. On average, in the sample, each of them proved to be valuable. Only applying selected levers at the time of defining the commodity strategy would result in lost opportunities.

Of course, there are some limitations to this study. For instance, the absolute amount of savings could have been influenced by the contemporary situation in the metals industry. Transferring the absolute values identified in this sample over time and into other completely different industries, say media, may pose serious challenges. Furthermore, the values achieved for pooling are likely due to the fact that the analysed group of companies comprised 14 units and could be lower for solitary firms.

A possible bias with the lever-workshops is that primarily those commodities were selected, which do have a cross-functional impact. Ideally, the total purchasing volume of the firms would have been analysed following the same method. On the other hand, in an industrial firm cross-functional

commodities are by far the most important materials. However, this limits the expressiveness from our findings concerning the value of sourcing levers to a similar industrial environment and restricts it, for instance, for service firms. In future research, a particular set of levers for service firms may be developed. Still, the conclusion that a balanced sourcing approach seems to be more promising than focussing on single levers, only, is likely to be sustainable.

Restricting the analysis to a limited number of similar firms improves the quality of data and its internal comparability, but limits its generalisability, for example extending to other industries. The number of firms analysed gives this study an explorative character. On the other hand, identifying a correlation in a sample of 14 units nurtures the expectation for the relation to be confirmed with larger samples. Unfortunately, identifying a relation does not yet explain the cause and effect. Here, a longitudinal analysis could help.

Conclusion: The need for a sophisticated purchasing function to apply balanced sourcing strategies

The study at hand discussed the relationship between purchasing sophistication and its financial effects. Sophistication was measured by audits based on a maturity profile, whilst the financial effect was indicated by the results of a series of commodity workshops which were run in parallel to the audits in the same firms and defined commodity strategies and estimated their monetary value. From this discussion it may be concluded that:

- 1) Sourcing strategies for commodity groups should preferably be balanced rather than single sided in terms of levers applied. Campaigns focussing on any single sourcing lever can only be complementary to applying a mix of the remaining levers as well. For instance, in our sample the lever concerning global sourcing was worth less than 20% of the total saving potential identified. Had there been a campaign only focussing on this single lever, the vast majority of savings would not have been identified. Further, with such a single-sided analysis the risk of not considering trade-offs with other levers is difficult to control. Systematic “balanced sourcing”, analysing all levers simultaneously, identifies the entire accessible potential and makes possible trade-offs transparent.
- 2) The differentiation between commodity group strategy and sourcing levers may appear to be a semantic detail. However, mixing up the two levels can result in underperformance: sometimes the application of a lever is called “the sourcing strategy”, but actually it is only one single lever out of at least seven. As a result, the consideration of the other six levers may be neglected. Asking the question of “which levers do comprise the sourcing strategy” helps to avoid unbalanced sourcing.
- 3) The link between purchasing sophistication and savings may encourage firms to set up more sophisticated purchasing functions. Our results indicate that resources dedicated to this purpose have the character of investments and have an arguable chance to pay off. Note that our measure of sophistication did also include the quality of cross-functional co-operation within a firm. Internal collaboration is something that may be improved even without any monetary investment.

Fruitful future research could be dedicated to more “extreme” firms. This study had only a narrow perspective of “normal” firms, which achieved a sophistication score ranging between 7 and 11 out of 20 points. Our sample did not include any really basic purchasing organisations. All firms had already achieved at least standard sophistication. On the other hand, no firm was accumulating best practices in all of the six dimensions assessed. In the extremes of the spectrum, a different relation between sophistication and savings could possibly appear. One expectation would be that very highly sophisticated firms from a peak onwards run into an area of decreasing returns on sophistication. It would be of considerable practical value to understand where this turning point is.

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