Managing the Global supply Base through Purchasing Portfolio Management

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Abstract

It is generally agreed that 'how to source globally' has become a critical strategic decision for companies competing on a global basis. In contrast with an increased focus on global sourcing and supply chain management, little is known about problems and solutions to the actual integration and coordination of procurement across worldwide business units. Based on an in-depth case study, derived from a multinational Dutch chemical company, the usefulness of a portfolio approach to the management of a global supply base has been explored. The results indicate that the Kraljic’s purchasing portfolio approach allows for developing effective purchasing strategies and managing a global supply base.

Introduction and research questions

Global sourcing has been identified as a field of interest for practitioners and as a separate research topic in the late 1980’s (Kotabe and Omura, 1989). The catalyst under global sourcing has been worldwide competitive pressure which forced firms to reduce costs and to improve quality and responsiveness (Birou and Fawcett, 1993). According to many authors (e.g. Womack and Jones, 1996) the ability to move production and sourcing around the globe is a key source of real competitive advantage. However, it should be noted that for instance Mol (2002) could not find empirical evidence for a direct relation between global sourcing and economic performance.

Nevertheless, many firms are striving for higher levels of global sourcing, although different researchers (e.g. Mol, 2002; Trent and Monczka, 2003) point at the fact that the actual degree of real global sourcing is relatively low. Real global sourcing refers to the integration and coordination of procurement requirements across worldwide business units (Monczka and Trent, 1991; Rozemeijer, 2000; Faes et al., 2000) and with other functional groups, particularly R&D, manufacturing and marketing, within business units (Kotabe, 1992; Trent and Monczka, 2003). We will refer to these coordination issues as external and internal interfaces respectively.

It will not come as a surprise that especially the larger, multinational firms are engaged in global sourcing. These firms are more likely to have worldwide production facilities, design centers, and marketing and sales activities (Trent and Monczka, 2003). But the integration and coordination of procurement requirements across business units (external interfaces) is challenging and difficult to master. The same can be said about the internal interfaces within individual business units. To achieve maximum procurement benefit, firms often have to challenge entrenched systems and behaviors that work against collaborative efforts between and within business units (Ohmae, 1989; Kotabe, 1992).

This context raises a variety of questions concerning the nature, the organization and the impact of global sourcing. How to source globally and how to manage a global supply base (i.e. how to develop effective business relationships with suppliers who are located all over the world) have become critical strategic decisions that are influenced by the capabilities needed to compete (Kotabe and Murray, 2004). In addition, it is important to stretch these issues to theoretical and empirical research on global supply chain management, as is underlined by a recent special issue of Industrial Marketing Management (33:1, 2004) on the topic.

One possible way to organize global sourcing and to manage a global supply base might be through the use of a purchasing portfolio model. Research findings indicate that successful supply chain management requires the effective and efficient management of a portfolio of relationships (e.g. Bensaou, 1999; Frohlich and Westbrook, 2001). This places purchasing managers for the task of developing and
executing a set of differentiated supplier strategies. The need for such strategies requires some sort of classification (e.g. Olsen and Ellram, 1997; Lilliecreutz and Ydreskog, 1999). Therefore, in advance a portfolio model for supplier relationships appears to be a useful tool.

Kraljic (1983) introduced the first, comprehensive portfolio approach for purchasing and supply management. By categorizing products in a 2x2 matrix, sensible guidelines are given for managing supplier relationships. Some twenty years later, purchasing portfolio models have gained ground in both research and practice (e.g. Cox, 1997; Nellore and Söderquist, 2000). In a survey of Dutch manufacturing companies, Gelderman (2003) found a widespread utilisation of purchasing portfolio models. Of the larger companies some 80% are using some kind of portfolio approach. However, there remain unanswered questions with regard to the actual employment of portfolio models in practice (Gelderman and van Weele, 2003).

In line with the foregoing, the prime questions underlying our research were:

- How to find balance between global contracting and local opportunities?
- What kind of supplier strategies are applied by purchasing professionals in a global context, using a portfolio approach?
- How do experienced professionals handle measurement issues of purchasing portfolio management?

**Methodology**

The case study method was chosen for a number of reasons (Yin, 1994). First, because of the apparently limited research on the issues at hand. Most publications are conceptual or anecdotal by nature. Second, case study research is preferable when the research questions focus mainly on ‘how’ and ‘why’ questions. We wanted to gain insight in the organization and development of differentiated purchasing strategies by means of a portfolio approach in a global sourcing context. The questions in our research deal with exploratory issues, rather than frequencies or incidence. Akzo Nobel Coatings, the actual case company (see box), was invited to participate in the research, because of their extensive experience with global purchasing issues in general and with the portfolio approach in particular.

The quality of the methodology for an exploratory case study should be judged on the basis of construct validity, reliability and external validity (Yin, 1994). The construct validity refers to the measures for the concepts being studied. To avoid problems related to the subjectivity of data, multiple sources of evidence were being used (triangulation purposes). In line with the nature of the exploratory research objectives, data were collected primarily through the use of semi-structured interviews. Additional and contextual information was found in written documentary material, such as annual reports, purchasing plans and websites.

The case study has been based upon a key-informant method. Hence a selected, limited number of executives and purchasing professionals was interviewed. In the case study, the purchasing vice president of a business unit was used as the first key-informant. The other informants were chosen through a snowballing technique whereby the first informant nominated other key-informants. Respondents were interviewed on the basis of a semi-structured questionnaire, allowing for elucidation, elaboration and clarification. The interviews were conducted by two researchers to enhance interpretation and understanding of the gathered material. As we reported back the tentative analysis and conclusions from the interviews, respondents were provided with the opportunity to improve the match with the intended information, and to explore issues in more detail.

The reliability refers to the possibility of repeating the study with the same results. To enhance the reliability of the case study, a standard interview guide had been developed and used. The external validity refers to the domain to which a study’s findings can be generalized. Obviously, this case study does not allow for any statistical generalization.
Akzo Nobel Coatings: the case company

Akzo Nobel is made up of three business areas: Pharma, Chemicals and Coatings. This case study focuses on Decorative Coatings, a major business unit of the business area Akzo Nobel Coatings. In more than 30 countries comparable portfolio analyses are performed for the different sub-business units (area business units). These national organizations understand their own local markets almost anywhere in the world, which guarantees expert service close at hand. Akzo Nobel Coatings is among the world leaders in the development of advanced new coatings. Production is provided by 130 plants, all over the world. Akzo Nobel Coatings has a registered sales of EUR 5.3 billion, Decorative Coatings accounts for EUR 1.8 billion in 2003, which corresponds to a 35% share of total sales in Coatings. The most important product category is raw materials, the vital ingredients of coatings. The main ingredients are binders, pigments, extenders, additives and solvents. In financial terms, spending on raw materials constitute a substantial share of total sales. Other categories are more or less non-recurring investments and all kinds of services and supplies. The central purchasing department is responsible for the procurement of non-production related products. This case study is restricted to the procurement of raw materials for Decorative Coatings, because this business unit is experienced in the use of a purchasing portfolio approach.

Organization of purchasing

Akzo Nobel is a decentralized company that operates on a worldwide scale. For the procurement of raw materials, Akzo Nobel Coatings faces the challenge of finding a balance between global contracting and local opportunities. For certain ingredients the world market is very concentrated: 5 or 6 suppliers produce and sell 80% of the total world volume. For the buying of raw materials three buying systems are being used:

- lead buying (20%)
- main buying (60%), and
- local buying (20%).

The coordination issues regarding the business units (internal and external) are being managed through the interaction of these buying systems. Certain raw materials are needed in different plants, all over the world, and can be delivered by local suppliers. For all business units within Coatings, a lead buying system is being utilized, in pursuit of savings and synergy. A lead buyer has the responsibility to develop and implement the overall purchasing strategy for a certain raw material. The lead buyer draws up the central contract, negotiates prices and has control over volumes that are bought from different local suppliers. Users in other business units can be asked to switch to another supplier. The lead buyer needs to prove that the best purchasing strategy is chosen.

The main buying system operates on the business unit level. A main buyer is responsible for the procurement of a product (group), within a business unit. A business unit can appoint its own main buyer who cooperates with the main buyer(s) of other business units. Monczka and Trent (1992) recognized that global sourcing requires an information network that captures and provides material requirements data to all locations on a timely basis. Akzo Nobel’s system of lead buyers and main buyers is supported by an advanced computer system that records all purchasing requirements of all business units all over the world.

For other product categories the purchasing responsibility is assumed by local plant units. Local buyers deal with local suppliers. The computer system also supports local buyers, by giving access to purchasing information with respect to all commodities bought within Coatings.

Purchasing and supply strategies

An important starting point for the purchasing and supply strategy with respect to raw materials, is that suppliers should guarantee low cost. Akzo Nobel Coatings does not demand the lowest prices, but prices that are lower than the ones that are paid by their competitors. Akzo Nobel Coatings operates from a ‘lower’ and ‘later’-principle:

- Akzo Nobel Coatings wants prices that are lower than the prices paid by competitors, and
- in case of price-increase Akzo Nobel wants to endure that rise at a later point in time.
Another point of interest is the dependence on suppliers (buyer’s dependence). The business unit is feeling hesitant about being dependent on suppliers. ‘Dependence costs money’, is the general conviction. Strategic partnerships are rarely an option. As a buyer of ingredients, it is felt that they are by definition too small to be engaged in strategic partnerships. The business is in this respect not comparable to the automotive, where strategic alliances with suppliers are more common. Purchasing strategies are based on the results and the conclusions of the portfolio analysis. For the development of purchasing strategies it is very important to include marketing positions and business strategies of Akzo Nobel Coatings as a supplier of goods. For the business units it is imperative to create a logical fit between purchasing strategies and marketing strategies. From the perspective of global sourcing this is a fine example of the management of internal interfaces within business units. As a supplier, Akzo Nobel Coatings faces basically two possible market situations, either a commodity market or a niche market. In a commodity market, Akzo Nobel Coatings has to deal with low margins and large quantities in aggressive, competitive markets. Specifications are general, resulting in flexibility in switching from one supplier to another. Contracts are on a short term basis, price negotiations are tough, and the logistic demands on the suppliers are high. The same holds for Akzo Nobel Coatings as a manufacturer of products.

In a niche market, Akzo Nobel Coatings operates with relatively high margins. The delivery times and high quality are important selling points. As a result, these are important criteria for suppliers too. High product quality in end markets requires high quality ingredients. In return, high margins in end markets allow for expensive raw materials. Akzo Nobel Coatings is engaged in close relationships with (preferred) suppliers. Switching costs are relatively high. Purchasing’s job is to maintain the required quality. In collaboration with suppliers, considerable savings can be gained. The R&D department will be involved in product improvement and will be guarding the distinguishing position in comparison with competing manufacturers.

If two products are located in the same quadrant of the purchasing portfolio matrix, it is not concluded beforehand that the same purchasing strategy is advised. It all depends on the situation in the corresponding end markets: is it a niche market or a commodity market? The selection of suppliers should be based on portfolio analysis. Crucial is the question: “What is the added value of this supplier to our company?” The criteria for the most important suppliers are set. These preferred suppliers should perform in the areas of product quality, reliability of delivery, price, technical capabilities, and general management. In return, Akzo Nobel Coatings enters commission agreements, based on quantity rebates. Preferred suppliers should have production facilities in several countries, near Akzo’s plants. Moreover, preferred suppliers should meet all of the criteria that are set by Akzo.

**Purchasing portfolio analysis: dimensions, measurement and use**

For every plant portfolio analyses are performed on a yearly basis. Targets can be connected to product groups within and across the quadrants of the portfolio matrix. For instance:
- a certain product should be moved from the strategic quadrant to the leverage quadrant;
- the number of items in the right quadrants (strategic and bottleneck) should be reduced by 5%;
- the value of all leverage and non-critical purchases should be at a minimum of 65%.

Akzo Nobel Coatings works with price indices for raw materials. Every year purchasing plans are developed, including specific goals for specific product categories. Targets and goals are formulated in terms of these indices. A critical benchmark concerns prices that are being paid by competitors, although it is very difficult to get a hold on that information.

The matrices of the different area/country business units are not combined to one joint purchasing portfolio matrix. An ingredient of coating A might easily be replaced by another, while the same ingredient in coating B can not be replaced by any other ingredient. There is a diversity of significance of the same ingredient for different coatings. The portfolio matrix is completed on the level of individual plants. Given the fact that local situations are incomparable with respect to the chemical composition of coatings, portfolio matrices can not be joined. Coordinated sourcing is then organized by the lead buying system and the main buying system.

The portfolio analysis is considered as an indispensable tool for the development of purchasing strategies, differentiated to products and suppliers. The portfolio analysis is being used to indicate the importance of a raw material and its suppliers, and to order the purchasing value. This results in a clear picture of the own strengths and weaknesses in purchasing markets. The main purpose of the portfolio
approach is to detect products or product groups that cause problems and risks of dependence: bottleneck and strategic items. Considering the vast number of items that are being bought, it is imperative to use a portfolio-tool. Otherwise, it would be impossible to gain a clear insight into the problems and possibilities of the product portfolio.

The results of the portfolio analysis point at the problems and products that need to be tackled, and to what priority. It focuses on the goals and directions of purchasing strategies, and the efforts of R&D-departments in their search for alternative solutions.

In addition, the purchasing portfolio provides valuable insights in the balance of power. It is of critical importance to recognize and formulate questions with respect to negotiation possibilities. Which party dominates the relationship? Is there a problem, facing a dominant supplier? If so, what is the problem? Do we want to deal with one or more suppliers? What goals would be in reach? Obviously, there is the question "what are the possibilities of purchasing for influencing the balance of power?"

Akzo Nobel Coatings uses a customized version of the Kraljic portfolio approach. All raw materials are categorized into four cells, based on:
- the number of suppliers, and
- the value of purchases.

The number of suppliers is defined as "the number of suppliers that are actually used in the last year for the same item". There is an important difference with the size of the supply base, the potential number of suppliers, which is per definition larger than the number of actual suppliers. A scale is used that runs from 'large' to 'small'. More specific, the demarcation line between 'large' and 'small' is drawn by assessing the dependence on the supplier at hand. In general, the number of one or two suppliers is considered to be 'small'. Apart from that, a larger number of suppliers could create dependence too, in case of mutual agreement and collusion. The number of suppliers is seen as an operationalization of the original Kraljic-dimension 'supply risk'.

The value of purchases is measured in money, reflecting the price and the volume (use) of a raw material. The demarcation line between 'high' and 'low' is based on a 80-20 rule. This means that the upper half of the matrix contains all purchases that add up to 80% of the total purchase value, while the lower half of the matrix holds the remaining 20%. Any portfolio is to be used from the perspective of the individual users. The implication is that the demarcation line is drawn from the user's perspective. The value of purchases is a relative concept, to be considered from the individual perspective of the local plant concerned. The reason is that the portfolio matrix should be relevant to the users. This means for instance that the procurement of 5,000 tons for a small plant A might be positioned as a 'high value of purchases', while 30,000 tons of the same commodity for a larger plant B is to be seen as a 'low value of purchases'. Otherwise, plant A would only have positions in the lower regions of the matrix.

The completion of the matrix can not be carried out by the purchasing department (internal coordination). This should be done in close concert with the technical and chemical experts (R&D). In addition, users have information regarding annual use figures, whereas the financial management could provide information regarding the total value. It is critical that the portfolio analysis is understood, accepted and supported by all employees of the plant.

Figure 1 shows an example of a portfolio matrix, as might be found in a local organization of Decorative Coatings. What can we learn and conclude from the information in the portfolio matrix?

- Apparently, the strategic category contains 60% of the value of all purchases. This can be interpreted as a very high dependence on suppliers, which can only be justified in case of niche markets for the end products. In a niche markets, products are characterized by much added value, a high quality and price level, and a drive for new products. For commodity markets, there would be a misfit of the actual and expected segmentation in the portfolio matrix. In case of end products for commodity markets, the strategic quadrant would have to be much smaller.

- In addition, the figure shows a large number of items with a relatively low value. This implies much administrative work for purchasers. A possible objective could be to lower the number of bottleneck and non-critical items.
value of purchases ↑

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<tr>
<th></th>
<th>High</th>
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<td>5%</td>
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<th>Strategic</th>
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<td>percentage</td>
<td>60%</td>
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<table>
<thead>
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<th>Non-critical</th>
<th>Bottleneck</th>
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<tbody>
<tr>
<td>no. of items</td>
<td>240</td>
</tr>
<tr>
<td>percentage</td>
<td>15%</td>
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number of suppliers →

**Portfolio-based strategies**

Based on the situations and conditions on the marketing and sales side, purchasing strategies are focused on handling costs and strategic vulnerability (dependence on suppliers). Targets are determined for each product category in each quadrant, dealing with these issues. Purchasing strategies in general are aimed at adapting and improving conditions, not so much at changing positions in the portfolio matrix. However, sometimes movements are possible and desirable in the matrix. The main movement in the matrix is from strategic to leverage; other switches are rare. The point of action is the number of suppliers. Sometimes it is possible to enlarge the number of suppliers, in particular by means of an active strategy of supplier development. The value of purchases is usually not compliant to intervention, because of the fixed prescribed composition of coatings. The method allows identifying to what extent products can shift to another quadrant. For instance, suppose product A is a raw material that is only available from one mine in the world, owned by one supplier. Suppose product B is a raw material of which the buying company requires its specifications to meet extremely high quality elements. Obviously, products A and B will be positioned in the strategic quadrant. While product A can hardly be shifted, product B could be moved towards the leverage quadrant, provided that its specification would be defined less strict, which opens the market to more suppliers. In other words, additional background information is needed on products, markets and suppliers, in order to avoid that opportunities or threats might be neglected. In practice, there are practically no chosen movements from the left half to the right half of the matrix. In other words, purchasing strategies are generally not aimed at reducing the number of suppliers. For raw materials a general rule holds that it is always better to deal with two or three suppliers, then to deal with a single supplier. The reason is that any supplier reduction increases dependence which lead to a vulnerability for price raises. For reasons of flexibility, Akzo Nobel Coatings stresses the importance of maintaining good relationships with potential suppliers that are not currently contracted. They can provide useful information to be used in negotiation processes. Moreover, these suppliers may provide alternative arrangements in cases of emergency or problems with the current suppliers. Working with a limited number of suppliers is preferably combined with the possibility to fall back on alternative suppliers.
It is recognized that there is a huge difference between having a sole supplier of choice and a sole supplier of necessity.

There is an area of tension between purchasing and marketing departments. Product and marketing managers are always looking for possibilities to differentiate products, whereas purchasing managers are always looking for possibilities to simplify and standardize products. The demands of marketing and customers limit the number of possibilities for purchasing in their natural propensity for controlling and reducing cost.

**Bottleneck items**

For bottleneck items there are concerns and questions with respect to the assurance of supply. After all, there is just one available supplier for a certain ingredient. The buying strategy is a forced single sourcing. Generally speaking, negotiating for lower and the lowest prices is not the main focus of purchasing. Because of the company's vulnerability, suppliers of bottleneck items must have contingency plans and emergency stocks. In the contract there is a clause inserted that compels the supplier to report an intended termination of production. Otherwise, costly safety stocks would be inevitable. A search for alternatives only takes place in exceptional cases, because the costs of testing are several times higher than the expected results. This means that high levels of risk and dependency have to be accepted to a certain degree.

A consignment system is a practical solution for some bottleneck items. The supplier is responsible for the continuous availability of certain raw materials that are stocked at the sites of Akzo Nobel Coatings. Payments are based on actual use, not based on deliveries, which means that financial risks are taken by the supplier, not by the buyer. It is the supplier’s responsibility to replenish the stock when and if necessary.

**Non-critical items**

Non-critical items represent a low value of purchases. The added value is low and the supply risk is small, because of the large number of suppliers and/or alternative products. The strategy here is aimed at minimizing the cost of preparing and placing purchase orders. Possible options are standardization of procedures, combining of orders and invoices, and e-procurement. These measures reduce administrative costs and the time-consuming handling of orders to a minimum. On another decision level, possibilities of outsourcing are to be considered, meaning that parts of the purchasing process might be outsourced. A possibility would be the contracting of a large international distributor.

Another option to consider is to ask a supplier of a leverage or a strategic product to supply a certain non-critical item as well. The same holds for bottleneck items.

**Leverage items**

Suppliers in the leverage quadrant manufacture ingredients for which alternative products exist, or for which alternative solutions can be found through a simple adaptation of the method of preparation. In many cases there is an added value to the products, for instance just-in-time delivery, consignment stocks, or the delivery in a special format or packaging. These special features should save production costs. Supplier selection is often based on the added value in these areas.

Obviously, purchasing is an interesting ‘partner’ for suppliers. The purchasing department is alert, looking for suppliers that offer more added value and/or that charge lower prices. Purchasing is continuously monitoring the supplier performance and is taking action when a supplier deviates from the agreement. A leverage position however, does not mean that the buyer is the dominant party. The value of purchases is relatively high from the perspective of the buying company, not from the supplier’s perspective. Units are usually too small to dominate even leverage relationships.

On an occasional basis, the relationship with a supplier can be transformed from leverage to strategic. This is only an option if a partnership is expected to add to the competitive advantages of the firm in end markets. A chosen strategy of increasing the dependence on a supplier is limited to special circumstances, that is, if the cooperation with a supplier will result in a new or better product, providing a competitive advantage to the business unit. A partnership is always on a temporary basis, because after a couple of years the innovation is diffused and the search for alternatives recommences.

**Strategic items**

Too often, the supplier is the dominant party in the buyer-supplier relationship. In practice it is very hard to come to an agreement on the needed requirements. In those cases, Akzo Nobel Coatings has no choice
but to accept that a supplier does not add the required value. The supplier has a strong position when negotiating the quality, the size of packaging, the moment of delivery, and so on. However, exceptions do exist. For instance, if Akzo Nobel Coatings is the major account for a supplier, then there is naturally room for negotiating a better deal. Another possibility would be that Akzo Nobel Coatings is considered an important customer for reasons of image and charisma. A position in the strategic quadrant is not preferred, because of the risks and disadvantages of being dependent on a single supplier. Sometimes the number of suppliers can be enlarged by means of supplier development. Strategic partnerships are rarely an option, because the business unit is too small and the risks are too high. Strategic partnerships are only pursued if there is a competitive advantage in end markets to be gained in a buyer-supplier relationship. These partnerships are always on a temporary basis.

Conclusions

Real global sourcing refers to the integration and coordination of procurement requirements across worldwide business units (managing external interfaces) and within these business units (managing internal interfaces). For both the external as the internal coordination issues the case company combines three buying systems: lead buying, main buying and global buying. These systems are all aimed at exploiting and finding balance between global contracting and local opportunities. All systems are supported by an advanced computer system that records all purchasing requirements on a timely basis of the business units all over the world.

For Akzo Nobel Coatings, the case company under study, raw materials is the most important product category, from a financial, marketing, quality and purchasing perspective. The procurement of all raw materials is supported by purchasing portfolio analysis, performed on a yearly basis. In more than 30 countries comparable portfolio analyses are performed for the sub-business units (area business units). Measurement is usually considered as the Achilles’ heel for all portfolio models (e.g. Day, 1986). In the case company, the measurement issues are dealt with in a remarkable way. The number of suppliers and the value of purchases are selected as basic dimensions. This choice has a main advantage over many other operationalizations of the Kraljic-dimensions. The value of each variable is made measurable in an objective manner. The values are not measured in terms of perceptions or other proximities of variables. Portfolio matrices are therefore better comparable, both in time as in comparison to other plants. In addition, the demarcation problem too is handled in a very practical way. On the basis of a set of clear rules, it is decided in which category a product is to be placed. As a result of the measurement method, positions in the matrix can be determined in a rather quick and unambiguous way. A related benefit is that it allows for the comparison of different matrices that use the same variables. In addition, the method allows identifying to what extent products can shift to another quadrant.

For the evaluation of a completed portfolio matrix, it is imperative to have information on the marketing positions in the connected end markets. For instance, in case of a commodity end market, it is not acceptable to have a filled-in strategic quadrant. This means that there is a clear relationship between the purchasing strategy and the marketing strategy, catalyzed by the use of the portfolio model. On the level of individual plants, the strategic recommendations are aimed at reducing risk and dependence on suppliers. Strategic partnerships with suppliers are rare and always temporary. In special cases, whenever possible, it is recommended to increase the number of suppliers, for instance by means of supplier development. In more usual cases, the dependence on suppliers is handled by means of contingency plans and by keeping safety stocks.

The case study revealed some new insights in the possibilities of a purchasing portfolio approach in a global context. We have probably found a rare example of a multinational business unit where the portfolio technique is fully integrated in the daily practice of purchasing and supply management. Purchasing goals and purchasing strategies are clearly connected to the results of the different portfolio matrices. Every plant completes a portfolio matrix in a similar way, providing an overview of the purchasing operations at a business unit level and providing insights in local plant situations.

Obviously, the authors are aware of the limitations of this study. Most of all, the findings are based on a single case study. Generalization of findings is therefore not possible. The case study is concentrated on the level of a major business unit, whereas a study on the corporate level could provide a more comprehensive view on the coordination of procurement across (relative autonomous) business units. To conclude however, we feel that the study, albeit limited, has contributed to a better understanding of the possibilities of a portfolio approach for the management of a global supply base.
References


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