

An Exploratory Study of Procurement Strategies for Multi-Item RFQs in B2B Markets: Antecedents and Impact on Performance

Tobias Schoenherr

Department of Supply Chain Management, The Eli Broad Graduate School of Management, Michigan State University, East Lansing, MI 48824, USA, Schoenherr@bus.msu.edu

Vincent A. Mabert

Operations and Decision Technologies, Kelley School of Business, Indiana University, Bloomington, IN 47405, USA, mabert@indiana.edu

This research explores procurement strategies for multi-item requests for quotation (RFQs) in business-to-business (B2B) markets using responses from 825 purchasing professionals. The study first establishes procurement strategies that differ based on their level of strategic emphasis, i.e., the importance that is placed on the pursuit of four strategic objectives. Underlying objectives, which are obtained via factor analysis, include the focus on price, security of supply, internal procurement efficiencies, and bundle building. Next, cluster analysis is used to derive prototypical strategic approaches. The three cluster groups that emerge possess the same relative ranking of the four objectives, but differ based on the intensity with which these objectives are pursued. The clusters are labelled as the three strategic groups of *strategists*, *opportunists*, and *responders*. The research then explores, using an industrial buyer behavior lens, the impact of environmental antecedents in determining a particular strategy. Environmental variables include purchase importance, market uncertainty, supply base availability, buyer bargaining power, item experience, and supply base experience. Finally, the study tests the impact of procurement strategy on the buyer's perceived performance, suggesting that *strategists*, placing more emphasis on the pursuit of strategic sourcing objectives, achieve better performance than *opportunists* and *responders*.

Key words: procurement strategies; environmental conditions; purchase performance; industrial buyer behavior; survey research

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1. Introduction

The investigation of procurement strategies and mechanisms in business-to-business (B2B) markets, as well as their impact on performance, has been gaining attention, as evidenced by recent studies (e.g., Bichler and Steinberg 2007, Burke et al. 2009, Deng and Elmaghraby 2005, Elmaghraby 2007, Erhun et al. 2009, Gupta et al. 2009, Kouvelis et al. 2006, Mithas and Jones 2007). Numerous streams and sub-streams of sourcing strategy research have emerged. For example, Elmaghraby (2000) provided an overview of sourcing strategies in the fields of operations research and economics, and presented a classification of past research based on the number of opportunities present for the buyer to select a supplier (single or multiple selection period(s)), and from how many suppliers the buyer is able to source the items (single or multiple supplier(s)). In addition, Ellram and Carr (1994), who reviewed primarily empirical purchasing research, categorized past work based on three aspects of purchasing strategy: specific purchasing

strategies used, purchasing's role in supporting other firm strategies, and the utilization of purchasing as a strategic function. Despite this prolific literature, no published empirical research was found that specifically addresses the interplay of the buyer's objectives in determining procurement strategy, the antecedents that may determine this strategy, and the subsequent impact on performance. The present study examines these links with data collected from a large-scale survey conducted among procurement managers, and makes contributions to research and practice. We investigate these relationships within the context of a multi-item request for quotation (RFQ), for which the development of an appropriate strategy can be especially challenging (Bakos and Brynjolfsson 1999).

The procurement/sourcing/purchasing (these terms will be used interchangeably) strategy an industrial buyer pursues is influenced by his or her objectives for the event. Depending on the primary objectives sought, associated buying activities can be segmented into prototypical sourcing approaches. For example, prior literature suggested the segmentation into

tactical, leverage, critical, and strategic purchases/items (Carter 1999, Kraljic 1983, Monczka et al. 2005). The present research commenced with 11 goal statements that may be pursued in a particular sourcing initiative. These objectives were identified from prior literature, and related interviews and case studies with purchasing professionals. Based on an exploratory factor analysis of the survey responses, the objectives were grouped into four overriding categories to achieve parsimony. The labels chosen for the factors are anchored in prior literature, and summarize the underlying individual goal statements. The four approaches deal with the following aspects: (1) *price focus*, which encompasses the goal of getting the best price, (2) *supply security*, an approach that tries to minimize risk and assure supply continuity, (3) *purchasing efficiency*, which is associated with the goal of supply base consolidation and the creation of a streamlined purchasing environment, and (4) *bundle building*, which aims to group items into larger packages and to avoid uncompetitive bids on less attractive items.

While purchasing professionals may focus on just one of these four objectives, more likely they will pursue a combination of these goals in an integrated strategy. For example, while a buyer may focus on price in a particular sourcing event, the consideration of supply security, and thus the preference for a long-term relationship with the supplier, may also be considered as important. The present study investigates how these objectives are combined, and clusters responding buyers into like groups with similar strategic emphases. This emphasis is defined as the aggressiveness, proactiveness, or intensity with which buyers pursue certain objectives in a particular purchase situation. As will be seen, our data differentiate between three procurement strategies, which are linked to the strategic types of *strategists*, *opportunists*, and *responders*. The derivation of these prototypical procurement strategies based on the four primary objectives is a contribution in itself, supplementing prior classification schemes.

Having established the three strategic types, the study uses an industrial buyer behavior lens to examine influential antecedents that may determine procurement strategy. Central to this stream of research is the investigation of why industrial buyers behave the way they do. Six of the most relevant environmental characteristics are selected, which include purchase importance, market uncertainty, supply base availability, buyer bargaining power, item experience, and supply base experience. Investigating the impact of these conditions on the derived strategy classification scheme provides a novel perspective to study strategic sourcing decisions by the firm.

Finally, the investigation highlights the impact of procurement strategy on the buyer's perceived performance and reports which strategic stance led to the most favorable outcome. As such, the study explores what firms can do to improve performance, with the findings contributing to the practice–performance relationship literature.

The remainder of the paper is organized into six sections. Section 2 provides the theoretical background and develops our overriding proposition and the seven hypotheses. Section 3 describes the research methodology, followed by a description of the data analyses and the presentation of the results in section 4. A discussion of these results is offered in section 5, with section 6 providing an overall conclusion.

2. Theoretical Background and Hypothesis Development

Purchasing research has a long tradition of investigating, classifying, and describing procurement strategies. Most studies rely on industrial buyer behavior literature, a research stream originating in the late 1960s and the early 1970s that aimed at better understanding industrial buying decisions. Of particular importance were the models by Robinson et al. (1967), Webster and Wind (1972), and Sheth (1973), which have received much attention. These frameworks provide some of the first conceptual models to analyze procurement strategies and industrial buyer behavior. Subsequent aspects investigated in strategic sourcing include international procurement (Cunningham 1982), the impact of competition (Hahn et al. 1986), the evolution of procurement strategies (Monczka and Trent 1991), the integration of the product life cycle concept (Birou et al. 1997), green purchasing strategies (Min and Galle 2001), and the impact of power and interdependence in buyer–supplier relationships (Caniëls and Gelderman 2007). Despite this proliferation of procurement strategy research, no published studies were found that focus specifically on the multi-item or bundled RFQ, how environmental conditions within this context can influence the procurement strategy used, as well as the subsequent purchase performance. The research presented here fills this gap by empirically investigating these relationships via a large-scale survey.

The design of the appropriate order lot or bundle a supplier is asked to provide bids on (the RFQ) is one of the most challenging tasks in sourcing, with the potential to have a significant impact on purchase performance (Mabert and Schoenherr 2001, Schoenherr and Mabert 2006, 2007, 2008). Including multiple items in an RFQ, instead of just a single stock keeping unit (SKU), provides an intriguing context to investigate associated procurement strategies (cf. He and

Ioerger 2005). Previous research noted this scenario as becoming increasingly prevalent (e.g., Rosenthal et al. 1995), especially within the context of procurement auctions (Gupta et al. 2009), and several studies exist that look at the vendor selection problem within the specific context of multi-item bundles (e.g., Murthy et al. 2004, Narasimhan et al. 2006).

While it may be easy to develop a focused strategy for a single item, the inclusion of multiple items in an RFQ is more challenging (Bakos and Brynjolfsson 1999), and trade-offs may be necessary. In addition, bundling several items together can directly impact cost components, such as the purchase price and operations cost, stressing the significance of this approach (Linthorst et al. 2008). For instance, while bundling can decrease the costs associated with managing the supply base (because fewer participants need to be managed), suppliers may charge a premium for providing the bundled solution (realizing the desired internal benefits for the buyer, or compensating their internal efforts in supplying all the different bundle components). Furthermore, while significant benefits are associated with bundling, considerable challenges may also be present (Schoenherr and Mabert 2006). As such, if a bundle is not specified correctly, for example, if it is too complex, then few or no competitive bids may be placed on the RFQ. This was noted by Elmaghraby (2007, p. 414) within the context of electronic procurement auctions: “It is important to note once the buyer has defined the bundles of goods that will be auctioned, she has essentially created a zero-sum game.” Despite the criticality of this issue, little empirical research exists that examines bundling from a B2B sourcing perspective (Schoenherr and Mabert 2008); this study therefore focuses on the multi-item or bundled RFQ (the terms “multi-item” and “bundled” will be used interchangeably).

Bundling has been primarily examined in the economics and marketing literature. For example, Adams and Yellen (1976), looking at commodity bundling, discussed why bundling can be such a prevalent practice. Palfrei (1983) analyzed bundling decisions of a multi-product monopolist, and Avery and Hendershott (2000) investigated bundling within the context of multiple products auctions. Bakos and Brynjolfsson (1999) studied the strategy of bundling information goods, and Stremersch and Tellis (2002) provided a synthesis of strategic bundling for marketing. More recently, Gosh and Balachander (2007) considered bundling as a competitive strategy, McCardle et al. (2007) explored the impact of bundling on retail merchandising, and Wu et al. (2008) developed a customized bundle pricing model. Our contribution lies in the investigation of this issue from an operations and supply chain perspective, specifically

using the theoretical lens of industrial buyer behavior. While this study does not focus on bundling *per se*, it uses this practice as an intriguing context worthy of exploration and understanding. Moreover, prior research most often dealt with the offer of the bundled product to a customer downstream, in a business-to-consumer (B2C) setting (downstream bundling). The present study considers the case of upstream bundling, i.e., the creation of a multi-item RFQ by an industrial buyer offered to suppliers in a B2B context; this issue is examined from the buyer’s perspective.

Bundling is done for many reasons (cf. Elmaghraby 2007). For example, with multiple items the dollar spend of the RFQ can be significantly increased, generating economies of scales for the supplier (Birou et al. 1997, Kaufmann and Carter 2002) and heightened bargaining power for the buyer (Ramsay 2001a, Schoenherr and Mabert 2006). In addition, transaction costs, such as ordering costs (Looman et al. 2002), can be lowered, and benefits can be achieved via complementarities of the bundled products (Bakos and Brynjolfsson 1999). The right combination of multiple SKUs into a single RFQ can also lead to more competitive bidding (Elmaghraby 2005) and supply base optimization (Das and Narasimhan 2000). Usually, items are bundled together if they rely on similar raw materials or similar production processes, or if they have similar applications or technical requirements (Schoenherr and Mabert 2006).

The literature and our field observations suggest various objectives being pursued with multi-item RFQs. Some buyers may look for efficiency when creating multi-item RFQs, while others place a higher emphasis on creating a very competitive environment with the goal of getting the best price. Yet other buyers are more focused on obtaining complementarities between bundled products or ensuring that also fewer competitive items are successfully procured. Others lean toward supply security and assurance, by, for example, information sharing and the establishment of a collaborative and long-term relationship with the supplier. While each of these strategies may be pursued in isolation, a more realistic view suggests that buyers consider all of these aspects, but with differing levels of emphasis (cf. Hult et al. 2006, 2007, Oltra et al. 2005). We therefore propose that buying strategies can be classified according to how aggressively, proactively, or intensely the various goals are pursued. Aggressiveness/proactiveness/intensity is defined as the degree to which buyers follow certain objectives in a particular sourcing situation (cf. Monczka et al. 1993). As will be discussed in greater detail below, we presented buyers with a number of goal statements and asked them to indicate their degree of agreement with these objectives being pursued with the focal purchase. Stronger agreement indicated a heightened

importance associated with these objectives, and thus a stronger strategic emphasis.

Our *a priori* expectation is that buyers will differ in their procurement strategy, specifically according to how aggressively, proactively, or intensely it is pursued, or how much importance is placed on each of the objectives. This facilitates the identification of buyer groups that differentiate themselves based on their level of strategic emphasis, which serves as a foundation for further analysis, i.e., the testing of the hypotheses. The proposition is formally stated as follows:

P1. Procurement strategies of buyer groups differ based on the strategic emphasis with which goals of multi-item RFQs are pursued.

Prior research often used Miles and Snow's (1978) strategy typology to differentiate between behavioral groups and strategic types, and labeled them as prospectors, analyzers, defenders, and reactors (cf. Bendoly et al. 2007). Prospectors are the most proactive and aggressive in their strategy, while defenders are satisfied with the *status quo* and do not make too many adjustments in their strategic dealings. Analyzers are a hybrid between these two types. Reactors do not have a well-developed strategy; they are characterized as merely reacting to competitive pressure. Based on the application of Miles and Snow's typology in prior research (e.g., Hambrick 1983), their classification may be applicable for our study as well. However, while their typology will be used as a starting point, we are open to alternate groupings (e.g., Oltra et al. 2005). Especially helpful for our research were the taxonomy development studies by Miller and Roth (1994), Frohlich and Dixon (2001), and Boyer and Hult (2005), whose suggestions we followed for selecting the best number of clusters and the ensuing taxons.

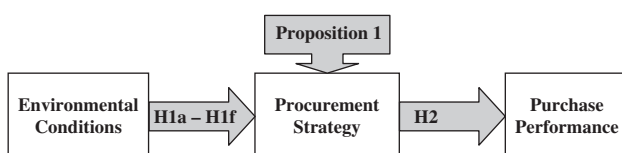
The hypotheses, described in the remainder of this section, draw on the bodies of literatures of industrial buyer behavior, bundling, procurement strategy, and the general areas of supply chain management, strategy, and procurement. The complete research model is summarized in Figure 1. Environmental conditions, which were derived based on related literature and case studies of the authors, include purchase importance, market uncertainty, supply base availability, buyer bargaining power, item experience, and supply

base experience, which are all hypothesized to influence and determine procurement strategy. Different types of procurement strategies were identified by considering 11 goal statements, grouped together into four overriding themes, and subjected to a cluster analysis to identify prototypical groups. Following the premise of the proposition above, we expect that these procurement strategy clusters differ based on the strategic emphasis with which each of the four objectives is pursued. In addition, depending on the strength or intensity with which the objectives are followed, we hypothesize purchase performance to differ. Specifically, a more aggressive pursuit of procurement strategy should lead to better performance.

2.1. The Impact of Environmental Conditions on Procurement Strategy

2.1.1. Purchase Importance. Purchase importance is a fundamental characteristic of procurement and a major variable in industrial buyer behavior (Johnston and Lewin 1996). Purchase importance can be defined as the procuring firm's perception of the strategic significance of the particular purchase (Cannon and Perreault 1999), or the perceived impact the purchased asset has on organizational effectiveness (McQuiston 1989). The importance of a purchase can be assessed by the relative spend included in the RFQ, whether the items support a core competency of the company, or whether a failure to procure the items would have significant consequences for the firm. With more SKUs included, the impact on the firm of failing to procure the desired bundle will most likely increase, warranting the inclusion of this variable in our study. Prior research established the impact of purchase importance on buyer behavior (McQuiston 1989) and on the ensuring buyer-supplier relationship (Cannon and Perreault 1999); for instance, Iyer (1996) showed that purchase importance influences the extent to which a buyer will consider and explore new alternatives. Within this context, an increase in perceived purchase importance makes the buyer less likely to exclude new vendors from the consideration set (Heide and Weiss 1995). Other articles suggesting the link between purchase importance and behavior include: Johnston and Bonoma (1981), who proposed that higher purchase importance should lead to more involved communication; McQuiston (1989, p. 66), who suggested importance as a causal determinant of "participation and influence in an industrial purchase decision"; and Bunn (1993), who showed that the use of a particular buying decision approach depends on the importance of the purchase (cf. Hunter et al. 2006). Based on this review, purchase importance should impact the procurement strategy of the buyer, as assessed by his or her emphasis placed on

Figure 1 Research Model



procurement objectives. Specifically, we expect that an increase in importance leads the buyer to pursue the objectives with more emphasis. Our first hypothesis is therefore formulated as follows:

H1a. A heightened importance of the multi-item RFQ leads to a greater strategic emphasis in the buyer's procurement strategy.

2.1.2. Market Uncertainty. Market or supply uncertainty refers to the unpredictability and variability of changes in and the general nature of a firm's supply market (Elmaghraby 2000, Tullous and Utecht 1992). This uncertainty, which has been an important variable in explaining industrial buyer behavior (Cannon and Perreault 1999), can be the result of incomplete or inaccurate information. We assess market uncertainty by whether supply market trends were easy to monitor, whether the forecasts were accurate, and whether sufficient information was consistently available for making decisions. Based on these properties, we expect market uncertainty to impact how purchasing is pursued. Specifically, we suggest that procurement strategies are pursued less aggressively with a higher level of market uncertainty.

Several prior studies provide support. For example, market uncertainty has been linked to sourcing decision making (Ülkü et al. 2005) and the selection of purchasing strategies (Cunningham 1982). Moreover, Bunn (1993, p. 45) showed that the use of a particular buying decision approach depends on task uncertainty, which is "the buyer's perceived lack of information relevant to a decision situation," and Van de Vrande et al. (2006) argued, in their study on external technology sourcing, that high market uncertainty should be responded to with a lower level of commitment. In addition, findings by Hoskisson and Busenitz (2002) suggested firms favoring joint ventures over acquisitions in the presence of high market uncertainty; the former approach can be considered as less aggressive when compared with the latter. Furthermore, Cannon and Perreault (1999) used the concept of supply market dynamism, which is similar to our market uncertainty construct, as a key determinant for the resulting buyer-supplier relationship. Tullous and Utecht (1992) suggested that market uncertainty should influence a firm's choice of whether to source from a single or multiple suppliers. In general, multi-sourcing is favored in environments with high uncertainty (Elmaghraby 2000). Along similar lines, Steensma and Corley (2000), investigating the impact of uncertainty on the resulting sourcing relationship, suggested higher uncertainty being associated with

less involved relationships. Analogous in our case, high uncertainty is related to a less involved pursuit of a buyer's procurement strategy.

Our focus on multi-item RFQs makes this investigation particularly intriguing, because prior research usually did not use this characteristic as a differentiator. An exception provides Palfrei (1983), who showed the impact of uncertainty in downstream bundling. Overall, one may expect market uncertainty to be higher for bundled purchases than for single-item transactions, as more items need to be considered, potentially increasing the uncertainty in an exponential fashion. Within this context, market uncertainty will have an impact on the strategic emphasis in the procurement strategy of the buyer, i.e., how much importance is placed on strategic objectives in sourcing multi-item RFQs. With heightened market uncertainty causing less confidence, we suggest that buyers are inclined to pursue their associated objectives with less emphasis, yielding the following hypothesis:

H1b. Increased market uncertainty present for the multi-item RFQ leads to lower strategic emphasis in the buyer's procurement strategy.

2.1.3. Supply Base Availability. Supply base availability characterizes the environment the buyer operates within, as it relates to the number of capable alternate supply sources available for a particular multi-item RFQ. Past research has shown that the availability of competent supply sources determines how buyers treat these suppliers and approach negotiations (Bunn 1993, Cannon and Perreault 1999). The present study assesses supply base availability by noting whether multiple companies could have supplied the buyer with the bundled RFQ, and whether suppliers had the necessary capabilities and capacities. We suggest that the number of suppliers affects the strategic emphasis in the procurement strategy of the buyer, i.e., the aggressiveness or intensity with which strategic objectives are pursued, in a positive way. As bundling items together into a single RFQ can restrict the supply base availability significantly (Schoenherr and Mabert 2007), we argue that the multi-item aspect is particularly interesting to explore.

Prior research provides support. For instance, Kotabe et al. (1998) suggested that the availability of alternative suppliers influences the internal or external sourcing choices of firms, and Choi and Krause (2006) discussed the concept as influencing supply base complexity. Kekre et al. (1995) established the link between supplier availability and quality, as well as the performance of the finished product.

Supply base availability was also a key concern in Spekman's (1988) study on buyers' perceptions of strategic vulnerability, and was one of the four determinants of buyer-supplier relationships in Cannon and Perreault's (1999) research. It has been used in Bunn's (1993) taxonomy of buying decision approaches, and was a moderating variable influencing the buyer's strategic decisions in Rutherford et al. (2008). Within the context of downstream bundling, i.e., the bundling of products to customers, it has also been shown that the number of buyers can influence the strategy of the seller (Palfrei 1983). Based on this discussion, we suggest that when the choice set within the supply base is large, buyers experience more freedom in executing their strategies. A larger available supply base provides purchasers with more leeway and the opportunity for a stronger strategic emphasis. The next hypothesis is therefore formulated as follows:

H1c. Better supply base availability present for the multi-item RFQ leads to greater strategic emphasis in the buyer's procurement strategy.

2.1.4. Buyer Bargaining Power. Buyer bargaining power, central to many business relationships (Porter 1980), refers to the clout or influence buyers have over suppliers, and the degree to which favorable outcomes or concessions can be demanded. Power, or the ability to control decision variables in relationships (El-Ansary and Stern 1972), can, for example, be assessed by how important it was for the suppliers, or how eager they were, to get the business. Bargaining power has been an important variable in industrial buyer behavior (Hunter et al. 2006) and in the investigation of buyer-supplier relationships (Johnston and Lewin 1996). As such, power has been shown to impact behavior and the ultimate outcome of sourcing negotiations (Schoenherr and Mabert 2007), with the less powerful member in a relationship usually providing responses that the more powerful party desires (Leonidou 2005). In addition, the entity with heightened bargaining power has more control and influence over which strategy to pursue (El-Ansary and Stern 1972). Associated is the liberty to follow desired objectives more rigorously or with greater emphasis. The more powerful party has fewer limitations in what they can do, or in how strongly they can push preferred agendas. Therefore, procurement strategies should be reflective of and directly account for the level of bargaining power available (He and Ioerger 2005). Possessing bargaining power for bundled purchases can be especially crucial when the SKUs in the bundle are very dissimilar from each other, potentially making it difficult for suppliers to provide all the

items bundled together (Schoenherr and Mabert 2006). Instead of the supplier foregoing the business opportunity and not bidding on the RFQ due to unfavorable item combinations, the buyer's bargaining power can entice the supplier to participate. Heightened bargaining power should thus be particularly useful in our context of multi-item RFQs, enabling the buyer to pursue strategic objectives more meticulously. Additionally, bundling items together usually increases the spend volume of the RFQ, providing the buyer with a better bargaining position (Schoenherr and Mabert 2006, cf. Linthorst et al. 2008). Because of the potential for greater profit with the increased bundle volume, suppliers should be more motivated to bid for the business. Overall, the power in a multi-item RFQ setting provides the buyer with more freedom and leverage, which can enable a more rigorous pursuit of their procurement strategies. We therefore hypothesize the following:

H1d. Heightened buyer bargaining power present for the multi-item RFQ leads to greater strategic emphasis in the buyer's procurement strategy.

2.1.5. Item and Supply Base Experience. This study considers two types of experience, item experience and supply base experience, as impacting the strategic emphasis of the buyer. Both factors have been main variables in industrial buying behavior research. Item experience refers to the degree of knowledge an industrial buyer possesses about the individual SKUs included in the multi-item RFQ. Low item experience exists when items are relatively new or a purchaser possesses little experience with the items. In either case, minimal information has been internalized and little is known about the items, for example, how and from whom to purchase the bundle. Supply base experience measures how knowledgeable the buyer is about the marketplace, including the suppliers' capabilities, capacities, product spectrums, and availabilities.

The concept of the buyer's experience, which can certainly impact decision making and strategic choices (Tyler and Steensma 1998), has been used in numerous prior studies. For example, a heightened experience was associated with a less extensive search for information (Weiss and Heide 1993). Johnson et al. (2007) assessed experience as impacting the selection of supply initiatives, and Claycomb and Frankwick (2004) considered a buyer's prior experience as a moderating variable to various buyer behaviors in industrial purchasing. Furthermore, Johnston and Lewin (1996), who synthesized 25 years of research on industrial buyer behavior, following the seminal works of Robinson et al. (1967), Webster and Wind (1972), and Sheth (1973),

identified experience as one key variable that has been investigated in related research. In fact, it was already a component of the above-cited three first models of industrial buyer behavior. While experience influences buyer behavior directly, it also indirectly impacts conflict resolution and negotiation behavior, the buying group characteristics, and the amount of additional information needed (Johnston and Lewin 1996). Moreover, Sheth and Sharma (1997), investigating supplier relationships, stressed the importance of considering experience and learning that takes place over time, and Cho and Kang (2001) suggested that firms with more experience are faced with fewer obstacles in executing their procurement strategies. Experience with suppliers was also a key concern in Spekman's (1988) study on buyers' perceptions of strategic vulnerability, and has been shown as influencing an agency's procedural choice in Greenstein (1995). Further, experience was a major variable in Åkesson et al.'s (2007) assessment of sourcing strategies in the Swedish apparel industry, and in Johnson et al.'s (1998) survey of Chief Purchasing Officers.

These arguments provide support for our postulation that experience influences the procurement strategy of the buyer, i.e., the level of engagement with which objectives are pursued. This should be true especially for bundled purchases, which possess a greater complexity due to several SKUs being combined in a single RFQ. The multi-item context places more emphasis on item and supply base experience, because the inclusion of several items, as well as their combination in an RFQ, most likely requires additional experience. In the present study, we differentiate between item and supply base experience, as defined above, and present the following hypotheses:

H1e. *Better item experience/knowledge present for the multi-item RFQ leads to greater strategic emphasis in the buyer's procurement strategy.*

H1f. *Better supply base experience/knowledge present for the multi-item RFQ leads to greater strategic emphasis in the buyer's procurement strategy.*

2.2. The Impact of Procurement Strategy on Purchase Performance

This study defines purchase performance as the buyer's perceived success of the multi-item RFQ and the associated negotiations. Performance is measured by whether the bundle received competitive bids, whether bundling created internal synergies and savings, and whether purchase price savings were higher than expected. In addition, we assess the general satisfaction of the buyer by asking whether the goals

for the focal RFQ were achieved, and whether the bundled RFQ with the same item combination would be sourced again. The performance measure is subjective, as perceived by the buyer. While we could have chosen a more objective performance measure, we felt that a subjective one captures the totality of the RFQ event better. Our unit of analysis is the multi-item RFQ, so traditional success measures, such as return on investment or inventory turns, would not be useful. A common success measure in purchasing has also been the percent of savings achieved; however, with this measure we would only focus on the price aspect of the sourcing event, neglecting some of the other objectives that may have been pursued, and which may have actually led to a higher price (e.g., for the benefit of a reduction in risk). The performance measure specifically relates to the multi-item context.

Past research suggested a link between procurement strategy and performance. For example, Monczka et al. (1993), who studied supply base strategies to maximize supplier performance, concluded that the ability to compete depends on the development of aggressive strategies. Janda and Seshadri (2001) explored the link between purchasing strategies and efficiency and effectiveness, and found that especially cooperative negotiation and long-term oriented relationship strategies lead to increased purchase performance. Cousins and Lawson's (2007) research provided additional evidence for the association of procurement strategy with relationship and business outcomes. The authors' study highlighted the importance of aligning sourcing strategies to particular supplier relationship approaches in order to improve firm performance. In addition, Murray and Kotabe (1999) focused on location and ownership factors of service sourcing strategies and investigated their impact on performance. The link between sourcing strategy and performance was also studied by Murray et al. (2005) within the context of China. The authors found that strategic alliance-based sourcing is associated with better market performance, given low levels of product innovativeness and technological uncertainty. Overall, findings from these studies suggest that a more involved sourcing approach can result in better performance. Therefore, we expect that a greater emphasis on strategic goals will positively impact performance. Investigating the link between strategic emphasis associated with a multi-item RFQ and performance should be of particular interest, providing insight in this more constrained sourcing environment (Schoenherr and Mabert 2008). We hypothesize the following:

H2. *A stronger strategic emphasis in the buyer's procurement strategy is associated with better perceived performance of the multi-item RFQ.*

3. Methodology

3.1. Sample and Data Collection

Data were collected via a large-scale online survey created and administered according to Dillman’s (2000) tailored design method. A random address set of purchasing professionals employed in manufacturing industries was kindly provided by the Institute for Supply Management (ISM), the major procurement and supply management association in the United States. We focused on the manufacturing industry (standard industrial classification [SIC] codes 2000 through 3900) to make the study more manageable and to diminish confounding effects. Questionnaire recipients were asked to focus on the most recent multi-item RFQ they were involved with, and about which they had sufficient knowledge. Subsequent questions then referred to this focal multi-item purchase (cf. Choi and Hartley 1996).

A total of 825 useable and complete responses were received, yielding an effective response rate of 17.8%. When looking at the respondents’ SIC codes, most firms came from miscellaneous manufacturing industries (23.8%), followed by electronic/electric equipment (16.0%), fabricated metal products (8.9%), and chemicals and allied products (8.7%). All remaining manufacturing SIC codes had a representation of <8%. A wide range of different-sized companies was represented in the sample, with an average number of 8800 employees. A breakdown is provided in Table 1. A one-way analysis of variance (ANOVA) was conducted to assess the relationship between organization size and procurement strategy, whose derivation will be described in the next section. No significant differences were detected.

The average focal multi-item RFQ was comprised of 249 individual items, with over three-quarters of the bundles containing fewer than 100 items. An ANOVA evaluating the relationship between number of items and procurement strategy yielded no significant results. Over half of the RFQs contained primarily direct materials (58.7%), followed by indirect materials/MRO (maintenance, repair, and operating) items

(24.8%) and services (7.5%). The average spend of an RFQ was US\$7.26 million, with the median being US\$500,000.

To assess non-response bias, the first (early) and last (late) 200 respondents to the survey were compared (Armstrong and Overton 1977) with late respondents being approximated as non-respondents (Pace 1939). The comparison between the two groups across the final dependent variable, performance, as well as other variables such as spend and number of employees, turned out to be not statistically significant. Non-response bias was thus regarded as not a serious concern.

3.2. Measurement Items and Scales

Summated rating scales (Spector 1992) were used to measure the constructs in our hypotheses. Individual measurement items were developed based on established scales and/or case studies and interviews with sourcing managers conducted by the authors. Respondents to the survey were asked to indicate their agreement or disagreement with these statements on a seven-point Likert scale, with higher values indicating stronger agreement.

The central variables in our research are the *strategic purchasing goals* and the associated procurement strategies the company pursues when using a multi-item RFQ. In order to capture the most current and relevant goals within this context, we conducted a series of case studies, interviewing procurement professionals about their strategies and goals followed when creating multi-item RFQs. Simultaneously these efforts were complemented with a review of related literature and the identification of most common purchasing goals used to describe strategy; the prior section summarized some of these works. This approach ensured the relevancy and applicability to both industry practice and prior research, leading to the identification of a comprehensive list of 11 key goals. Respondents were asked to indicate their degree of agreement with the particular goal being pursued in the specific multi-item purchase situation.

Measures for *purchase importance* were developed based on scales used in McQuiston (1989) and Heide and Weiss (1995), adapting them to the multi-item RFQ context. Higher aggregate values indicate an increased importance of the purchase. *Market uncertainty* is measured with a combination of items adapted from Heide and John (1988) and Cannon and Perreault (1999). High market uncertainty is present with a higher aggregate value on the scale. Measurement items for *supply base availability* draw on extensiveness of choice scales by Bunn (1993) and Cannon and Perreault (1999). Higher aggregate scores are indicative of increased supplier availability. Scales by Doney and Cannon (1997) and Bunn (1993) were utilized to develop the *buyer bargaining*

Table 1 Organization Size

Employment	Frequency	Percent	Cumulative percent
≤ 150	114	14.71	14.71
151–300	104	13.42	28.13
301–500	101	13.03	41.16
501–1000	97	12.52	53.68
1001–1500	113	14.58	68.26
1501–8000	108	13.94	82.19
8001–50,000	99	12.77	94.97
> 50,000	39	5.03	100.00

power construct. Higher aggregate scores signify a heightened degree of buyer bargaining power. We developed our own measures for the *item experience* and *supply base experience* constructs, because no suitable related scales were available. Insight from our case studies and interviews with purchasing professionals aided in this process. Higher aggregate scores on these constructs signify heightened experience. *Purchase performance* measures how successful the multi-item RFQ is perceived to have been, with higher values being indicative of better performance. Drawing from case study insights, as well as satisfaction and performance scales by Cannon and Perreault (1999), 12 items were developed that serve as the measure for a successful multi-item RFQ.

4. Data Analysis and Results

A four-step methodology was used for the analysis of the data. First, key procurement strategies were identified via exploratory factor analysis, followed by cluster analyses. An exploratory approach was chosen because the measures for our strategy dimensions were newly developed for the multi-item context. Second, we purified the measurement items for the environmental constructs, as well as for performance. Because these measures were mostly developed based on prior scales, confirmatory factor analysis (CFA) was used to assess their psychometric properties. Third, the linkage between environmental conditions and procurement strategy (H1a–H1f) was evaluated via multinomial logistic regression analysis. And fourth, the relationship between procurement strategy (strategic emphasis) and performance (H2) was tested via univariate analysis of covariance (ANCOVA).

4.1. Step 1: Identification of Procurement Strategies

In order to succeed in today's competitive environment, firms should not and cannot treat all purchased items in the same way. Rather, items need to be segmented into categories, and specific supply strategies must be developed for each (Carter 1999). While ABC or Pareto analysis has proven useful, its main criticism is the primary focus on cost. To overcome this limitation, a portfolio approach is often used to segment supply along various criteria, usually resulting in a 2×2 matrix. The seminal work of Kraljic (1983) provided an early framework to distinguish purchases based on the importance of the sourced items and the complexity of the supply market. Other dimensions for classifying purchased items into groups included risk/exposure and cost/value/spend considerations (Carter 1999, Monczka et al. 2005). However, rather than relying on established labels, we followed a grounded theory approach (Glaser and Strauss 1967) to identify a set of goals most commonly pursued with multi-item purchases. A set of 11 goals was de-

rived via case study research by the authors. We also drew on prior studies mentioning bundling goals, such as the achievement of complementarities (e.g., Bakos and Brynjolfsson 1999) among multiple items and the reduction of transaction costs (e.g., Adams and Yellen 1976).

To derive a parsimonious set of overriding procurement objectives, a two-phase approach was utilized (cf. Craighead et al. 2004) using both factor and cluster analyses. In the first phase, the 11 strategic goal statements were subjected to factor analysis (Principal Components, Varimax Rotation with Kaiser Normalization) to identify common overriding strategic emphases. The results were four one-dimensional constructs explaining 68.2% of the variance (Table 2). The factors were labeled according to the common theme they described. Guidance in the labeling was provided by prior sourcing strategy segmentations and their properties in Kraljic (1983), Carter (1999), and Monczka et al. (2005). The dimension labeled *purchasing efficiency* includes goals that aim to create a simpler and more streamlined purchasing environment, as well as the minimization of effort. The factor labeled *price focus* is concerned with the goal of getting the best price in a competitive environment. The *bundle building* approach deals with the goal of finding new suppliers that can offer a large portfolio of products, and the associated avoidance of cherry-picking (suppliers only submitting bids on the most attractive items and avoiding less desirable ones). The final dimension of *supply security* includes goal statements related to risk reduction, collaboration, and securing of supply.

Once these constructs were derived, cluster analysis was performed in the second phase to identify prototypical strategic approaches. Since determining the number of clusters can be a challenge, accommodating both parsimony and accuracy, the two-stage procedure outlined by Ketchen and Shook (1996) was followed. The authors suggested using hierarchical cluster analysis to determine the number of clusters, followed by non-hierarchical cluster analysis. The hierarchical cluster analysis using Ward's minimum variance cluster method was used and the agglomeration coefficients were calculated. The incremental changes in the coefficients were then computed to detect any large increase in the coefficient. According to Ketchen and Shook (1996, p. 446), "a large increase implies that dissimilar clusters have been merged; thus the number of clusters prior to the merger is most appropriate." The largest relative change occurred when moving from the four- to the three-cluster solutions (41.09%), suggesting that a three-cluster solution fits the data best. In contrast, the next two largest relative changes were experienced when moving from a five- to a four-cluster

Table 2 Factor Analysis Results

Strategic goal	Mean	Standard deviation	Purchasing efficiency	Price focus	Bundle building	Supply security
Supply base consolidation	4.648	1.870	0.787	0.043	0.176	0.078
A resulting simpler purchasing environment	4.626	1.622	0.750	0.011	0.188	0.272
More efficient purchasing	5.542	1.356	0.635	0.446	0.007	0.286
Achieving the best price possible	5.961	1.213	0.098	0.837	0.010	0.137
Making the bidding as competitive as possible	5.624	1.341	0.050	0.802	0.210	0.198
Combining attractive and unattractive items in the bundle	4.130	1.764	0.278	0.124	0.805	−0.035
Avoiding “cherry-picking”	4.623	1.704	0.388	0.322	0.659	−0.037
Finding new supplier(s)	3.775	1.670	−0.224	−0.148	0.602	0.460
Securing of supply	5.168	1.469	0.112	0.117	0.024	0.795
Having the least possible risk in sourcing the bundle	4.996	1.484	0.175	0.258	0.045	0.702
Having a collaborative buyer–supplier relationship	5.202	1.474	0.451	0.145	0.032	0.693

*Factor loadings on the corresponding underlying constructs are printed in bold.

solution (19.24%), and from a six- to a five-cluster solution (11.95%).

We proceeded with non-hierarchical or *k*-means cluster analysis, which is similar to the approach taken by Craighead et al. (2004). The three-cluster model, derived above, formed our baseline, against which we compared competing models ranging from two to seven clusters. Following the methodology described in Boyer and Frohlich (2006), we examined each solution in terms of whether the derived clusters differ from each other on the input variable (the four strategic goal dimensions) and on *post hoc* criteria (the environmental dimensions). These criteria, as well as the managerial interpretability, were utilized to identify the best solution (cf. Boyer and Frohlich 2006). Although a four-cluster solution would have been consistent with prior strategy research and the typology by Miles and Snow (1978), its managerial interpretability was lacking. The additional fourth cluster created was ambiguous, also in terms of distinguishability based on the mean values received compared with other clusters, and did not add value to our interpretation. The three-cluster solution, as suggested by the results of the hierarchical cluster analysis, was thus used. Table 3 displays the overall mean for each goal dimension, in addition to the means for each cluster. A Scheffé *post hoc* test was conducted to examine all possible 24 pairwise comparisons of cluster means (six comparisons for each strategic construct). Differences between the means were significant in all cases, confirming a good cluster analysis result.

The interpretation of the three procurement strategy groups was guided by “(a) whether there are significant differences on the cluster means of the [strategic constructs] ... at the 0.05 level or less, and (b) the relative ranking of the importance of a [strategic construct] ... within a cluster” (Miller and Roth 1994, p. 290). The latter was considered because a high mean

value may be associated with a low rank. In Table 3, the *relative rank of the constructs within each cluster* is denoted by the first number in the parentheses. The second number in the parentheses represents the *relative rank of the cluster within each strategic construct*. While firms in the three clusters do not differ in their relative rank ordering of the four strategic dimensions, companies do differ in the absolute importance they place on the four objectives. In other words, respondents did not differ based on which dimension they regard as first, second, third, and fourth most important, but based on how much emphasis is placed on each of the objectives. Therefore, we labeled our three clusters as *strategists*, *opportunists*, and *responders*, respectively (cf. Freeman and Cavusgil 2007), believing that these labels represent the characteristics of each cluster (this is at least partially in line with Miles and Snow 1978). The three clusters are described in further detail below.

When looking at the overall means, the most prominent strategic component was the focus on price and the creation of competition (mean = 5.31). This is not surprising, given the significant potential of multi-item bundles to create economies of scope resulting in a competitive advantage (cf. Gosh and Balachander 2007). *Price focus* was not only the highest ranked strategic component overall; in each of the three clusters it was also judged to be pursued with the highest emphasis. Second, in the overall ranking came the emphasis on the securing of supply (mean = 5.12), which has been labeled as a crucial responsibility for the purchasing function (Kersten et al. 2004, Quayle 2002). This objective was also consistently in second position within each cluster. Third, in overall rank came the focus on efficiency in sourcing, which included supply base consolidation and the creation of a simpler purchasing environment (mean = 4.94). In terms of relative position within each cluster, it was also consistently ranked third. While not being the

Table 3 Cluster Analysis Results*

Strategic construct	Overall mean	Cluster 1: Strategists	Cluster 2: Opportunists	Cluster 3: Responders	F-value
Purchasing efficiency	4.94 (3)	5.95 (3/1)	4.55 (3/2)	3.06 (3/3)	385.46***
Price focus	5.31 (1)	6.07 (1/1)	5.12 (1/2)	3.36 (1/3)	381.24***
Bundle building	4.18 (4)	4.88 (4/1)	3.91 (4/2)	2.84 (4/3)	149.01***
Supply security	5.12 (2)	6.02 (2/1)	4.85 (2/2)	3.07 (2/3)	490.13***
N		317	411	85	

*Cluster means are displayed across the constructs. The numbers in the parentheses represent the relative rank of the constructs within each cluster and the relative rank of the cluster within each strategic construct, respectively.

*** $p < 0.001$

most important factor, it is still of concern for purchasing professionals when sourcing bundled RFQs. After all, this is one of the drivers for creating bundles (e.g., Bakos and Brynjolfsson 1999). The *bundle building* strategy construct was ranked fourth (mean = 4.18), which is also consistent across each of the three clusters. This strategy component attempts to ensure that less attractive items are bid on by bundling them together with more attractive ones. Our finding of this aspect being the least emphasized across the groups is consistent with past research (e.g., Schoenherr and Mabert 2006). Nevertheless, bundling can be a valuable strategy in sourcing (Elmaghraby 2007, Ramsay 2001b). How the bundle is structured can have an effect on its value (Linthorst et al. 2008) and impact purchase performance (Schoenherr and Mabert 2008). This is especially critical for the *strategists* and *responders* who both have values above the midpoint of the scale assessing bundle building; this factor was a real concern for these groups, and should therefore not be neglected.

Examining the three clusters individually, the clear distinction between them is not the relative importance they place on each of the four strategy components (as discussed above, their relative internal ranking was consistent) but the strategic emphasis, the intensity, or the aggressiveness with which they are pursued. Buyers in Cluster 1, labeled as the *strategists*, place the highest emphasis on the four strategic factors. Purchasers in Cluster 2, encompassing the *opportunists*, are characterized by exhibiting an intermediate or average strategic emphasis. While objectives are still pursued with importance and intensity, values across the four constructs are consistently lower than the ones from their higher-aiming counterparts. *Strategists* pursue all of their goals in a consistent fashion on high levels, whereas *opportunists* follow a less aggressive approach. Purchasing professionals in Cluster 3, which we labeled the *responders*, are characterized by the lowest values across the constructs. In fact, the means for Cluster 3 are all below the midpoint of the seven-point scale. While this group pursues strategic objec-

tives, the emphasis or intensity with which the strategy components are pursued is rather low compared with the prior two groups. The *responders* are thus characterized as the least aggressive in pursuing strategic objectives in their sourcing decisions.

Subtle differences can be observed within each cluster when looking at the relative magnitude of the strategy component means. Individuals in Cluster 1, the *strategists*, place similar emphasis of about equal magnitude on the three highest ranked aspects (price focus, supply security, and purchasing efficiency), whereas the jump in magnitude to the fourth factor, bundle building, is significantly larger. This was confirmed via paired-samples *t*-tests. The change from price focus to supply security, and the change from supply security to purchasing efficiency, were not significant, whereas the last change, from purchasing efficiency to bundle building was ($t(316) = 13.983$, $p < 0.001$). This observation suggests that *strategists* (Cluster 1) place about equal emphasis on the first three strategy components, whereas the intensity with which bundle building is pursued is significantly lower.

For the *opportunists*, mean changes in magnitude between the four strategic dimensions were statistically significant for all three instances. As such, price focus had a significantly higher emphasis than supply security ($t(410) = 5.780$, $p < 0.001$), supply security had a significantly higher emphasis than purchasing efficiency ($t(410) = 4.239$, $p < 0.001$), and purchasing efficiency had a significantly higher emphasis than bundle building ($t(410) = 9.079$, $p < 0.001$). *Opportunists* thus have a clear rank order of their strategic priorities, each being significantly different than the others.

The mean changes in magnitude between the strategy components for the *responders* were less pronounced. When comparing the mean values of the dimensions in their rank order, the only statistically significant difference was the mean change from price focus to supply security ($t(84) = 2.064$, $p < 0.05$). This suggests that *responders* primarily focus on price, with the remaining three goal dimensions being of lesser,

but equal importance among themselves. Nevertheless, it must be noted that this test was only significant at the 0.05 level, and not at the 0.001 level, which was the significance level for the other two strategy groups (*strategists* and *opportunists*).

Overall, these results confirm our *a priori* expectation that buyer groups differ based on the strategic emphasis placed on their procurement strategy, i.e., the aggressiveness or intensity with which goals of multi-item RFQs are pursued (P1). *Strategists* pursue their strategic objectives on a broad level, and place equal high emphasis on price focus, supply security, and purchasing efficiency, the magnitudes of which are all significantly different compared with bundle building. *Opportunists* are more selective and differentiate more in their emphasis on strategy dimensions; *opportunists* are characterized as taking advantage of situations that arise, and following a more focused approach. As such, when going down the objectives in their rank order, each is significantly less intensely pursued than the former. *Opportunists* thus exhibit a clear hierarchy of strategic priorities. For *responders* the focus on price is significantly stronger than the focus on the remaining three objectives, suggesting that price is truly the main determining factor in their sourcing decisions; supply security, purchasing efficiency, and bundle building are pursued as well, but with lower and about equal intensity.

At this point we should stress that the label *responders* does not imply that firms falling into this group do not act strategically; they may very well do so, either consciously or implicitly, but the emphasis with which they pursue their strategic goals is less pronounced compared with the prior two categories. This is comparable to the typology developed in Freeman and Cavusgil (2007). When moving from *strategists* to *opportunists* to *responders* the authors described the respective strategy as becoming less proactive, less forward-looking, more risk averse, more cautious, and less bold.

4.2. Step 2: Construct Purification

To assess the psychometric properties of the seven multi-item constructs describing environmental aspects and performance, CFA was conducted using LISREL 8.80. Several measurement items were removed, one at a time, based on weak item loadings, high modification indices, small *t*-values of estimates, and low multiple squared correlations. Items were, however, only deleted if this move could also be substantiated theoretically. The resulting final measurement structure of the seven factors exhibited favorable fit statistics. The comparative fit index (CFI), the incremental fit index (IFI), the normed fit index (NFI), and the non-normed fit index (NNFI) obtained values of 0.98, suggesting a good model fit (Bollen 1989, Hair

et al. 1998). The root mean square error of approximation (RMSEA) of 0.04 ($\chi^2 = 833.09$, $df = 329$) is also below the threshold value of 0.05 (Byrne 1998), confirming the above evaluation. Based on these assessments, the fit of the proposed measurement model was judged to be good. Table 4 summarizes the final measurement items for each construct (means, standard deviations, and Cronbach α s), as well as the sources that were used to derive the items.

Recommendations by Anderson and Gerbing (1988) were followed to assess reliability and validity. *Convergent validity* was assessed by examining whether each estimated coefficient loads significantly on its suggested underlying construct, whereas *discriminant validity* was tested by examining whether the confidence interval around the correlation estimate includes 1.0. These requirements are fulfilled in all instances. Results of the CFA assured *unidimensionality* of the constructs, with all measurement item loadings being above the suggested threshold value of 0.30 (O'Leary-Kelly and Vokurka 1998). *Reliability* was assessed via Cronbach's α , which should have values of above 0.7 for established scales, and values of above 0.6 for newly developed scales (Hair et al. 1998). *Construct validity* was confirmed by assessing the psychometric properties of content validity, unidimensionality, reliability, convergent, and discriminant validity (O'Leary-Kelly and Vokurka 1998). The development and design of the final survey instrument and its measurement items assured *content validity*. Overall, based on these validity and reliability assessments of the constructs, their measurements were judged to be sound.

Potential common method bias was assessed via CFA and the Harman's single-factor test (Boyer and Hult 2005). If substantial common method bias is present, then either a single or a general factor will emerge accounting for most, if not all, of the variables (Podsakoff and Organ 1986). The unidimensional model resulted in a $\chi^2 = 6779.47$ with $df = 350$, indicating that the one-factor model has a considerably worse fit. Thus common method bias is not considered a serious concern.

4.3. Step 3: The Impact of Environmental Dimensions on Procurement Strategy

To test the first set of hypotheses, the relationships between environmental dimensions and procurement strategy, multinomial logistic regression was conducted. An alternate statistical technique could have been discriminant analysis, but logistic regression was selected because it has been suggested as the preferred technique (Hair et al. 1998, Press and Wilson 1978), offering more straightforward statistical tests (Boyer and Hult 2005).

Table 4 Final Construct Measurement Items

Construct	Measurement item/survey question*	Mean	Standard deviation	Sources
Purchase importance $\alpha = 0.76$	As a portion of our total spend, this bundle's dollar volume was high	3.50	1.81	McQuiston (1989), Heide and Weiss (1995)
	The items supported a core competency of our company	4.86	1.73	
	Compared with other purchases, the bundled items were important	4.81	1.52	
	An unsuccessful outcome of the request for quotation would have had only minor consequences (R)	4.33	1.78	
Market uncertainty $\alpha = 0.74$	Supply market trends were easy to monitor (R)	3.53	1.35	Heide and John (1988), Cannon and Perreault (1999)
	Forecasts were accurate (R)	3.86	1.41	
	Sufficient information was consistently available for making decisions (R)	3.47	1.36	
Supply base availability $\alpha = 0.89$	Many companies could have supplied us with all the items in the bundle	4.32	1.81	Bunn (1993), Cannon and Perreault (1999)
	Many suppliers had the necessary capabilities to produce all items in the bundle	4.73	1.69	
	Many suppliers possessed the required capacities	4.85	1.59	
Buyer bargaining power $\alpha = 0.89$	We had bargaining power	5.37	1.28	Doney and Cannon (1997), Bunn (1993)
	Getting our business was important for suppliers	5.72	1.12	
	The suppliers paid a great deal of attention to our company	5.62	1.15	
	Suppliers were eager to get the business	5.78	1.04	
Item experience $\alpha = 0.84$	Having us as a customer brought intangible benefits to suppliers (e.g., prestige)	5.05	1.37	Own developed
	We did not have much experience buying the items in the bundle (R)	5.91	1.41	
	The bundle contained items that were relatively new to us (R)	5.95	1.38	
Supply experience $\alpha = 0.83$	We had limited knowledge about how and from whom to purchase the items in the bundle (R)	6.02	1.25	Own developed
	We had a good knowledge of suppliers' capabilities	5.73	1.08	
	We were familiar with suppliers' product spectrums	5.45	1.13	
Purchase performance $\alpha = 0.86$	We possessed good knowledge about the items' availability	5.48	1.12	Cannon and Perreault (1999)
	The bundle received competitive bids	5.85	1.23	
	Bundling created internal synergies and savings, e.g., lower administrative costs	5.20	1.46	
	We would repeat the bundling again for the same items in the future	5.68	1.40	
	We achieved our goals	5.81	1.26	
	Having several items bundled together increased our bargaining power with suppliers	5.81	1.29	
Purchase performance $\alpha = 0.86$	The final purchase price we had to pay for the entire bundle was lower than expected	4.91	1.45	Cannon and Perreault (1999)
	We regret the decision to bundle the items together (R)	6.09	1.28	

*Items were measured on a seven-point Likert scale ranging from "strongly disagree" (value = 1) to "strongly agree" (value = 7). Reverse coded items are denoted by (R).

To validate our model a split-sample approach was used; the dataset was randomly divided into two groups of approximate equal size, sample I ($N = 428$) and sample II ($N = 397$), which is similar to the approach used by Bardhan et al. (2007). Our large initial sample size enabled us to do so without losing statistical predictability. Following the procedure outlined in Schwab (2008), we used sample I to calculate the multinomial logistic regression equations. From this result we took the B coefficients to compute the log estimates of the odds of belonging to each group for sample II and then converted each score into a probability, which was used to estimate group

membership (Schwab 2008). A last step involved computing the group membership for sample II directly. Now we had the group membership for sample II (a) predicted by using the B coefficients from sample I, and (b) directly from the data in sample II. The estimated model, based on sample I, was able to classify 69.3% of the cases correctly in sample II. This is greater than the 50.4% that would be classified correctly by guessing; with no additional information we would guess that each buyer pursues their goals with medium strategic emphasis, assigning them to the *opportunists* (Cluster 2). For sample II, 194 of the 397 randomly selected records fell into that group, which

Table 5 Multinomial Logistic Regression Results

	Strategists [†]		Opportunists [†]	
	Coefficient	Wald statistic	Coefficient	Wald statistic
<i>Intercept</i>	−6.385	24.853***	0.003	0.000
<i>Continuous variables</i>				
Purchase importance	0.562	26.906***	0.331	1.921***
Market uncertainty	−0.124	1.007	−0.162	2.224
Supply base availability	0.283	9.763***	0.126	0.651
Buyer bargaining power	0.636	16.671***	0.112	2.038
Item experience	−0.163	1.488	−0.175	0.872
Supply base experience	0.351	4.419**	0.141	10.826
<i>Model fit statistics</i>				
Nagelkerke pseudo R^2	0.18			
Cox and Snell pseudo R^2	0.15			
χ^2	131.24***			

[†]The reference category is *responders*.

*** $p < 0.01$; ** $p < 0.05$.

would yield a correct classification in 50.4% of the cases (194/397) (cf. Boyer and Hult 2005).

Table 5 provides the result of the overall analysis, regressing the environmental constructs on the categorical dependent variable (*Procurement Strategy*). Because the dependent variable has three levels, two regression models are estimated with the *responders* as the reference category. The coefficient estimates in Table 5 then indicate the probability that the observation falls in one of the two remaining categories (*strategists* and *opportunists*), relative to the probability of falling in the *responders* category. Significant positive (negative) coefficients indicate whether a unit increase in the predictor variable will increase (decrease) the probability of being in that category, relative to the *responders* category, given that the other variables in the model are held constant. Overall, the relationship between the dependent variable (*Procurement Strategy*) and the six proposed influential antecedents is highly significant, as indicated by the χ^2 statistic. Specifically, Table 5 shows that *purchase importance*, *supply base availability*, *buyer bargaining power*, and *supply base experience* are all significant determinants of procurement strategy. These results demonstrate that buyers are able to pursue their strategy with greater emphasis as the importance of the item increases, as more suppliers become available, as the power of the buyer increases, and as the experience with the supply base increases.

The results also show that the independent variables provide good predictive power for the buyer's strategic emphasis. As a follow-up test, individual logistic regression analyses were conducted to assess the individual hypotheses (Boyer and Hult 2005). The results, presented in Table 6, provide good support,

confirming five of our six hypotheses. Specifically, it showed that an increased purchase importance (H1a), better supply base availability (H1c), heightened bargaining power (H1d), and better item (H1e) and supply base experience (H1f) lead to greater strategic emphasis. This confirms that favorable environmental conditions present for multi-item RFQs enable an accentuated execution of strategy. This is especially true when comparing *strategists* and *responders*. More subtle are the differences when comparing the *opportunists* with the *responders*; these lower-emphasis groups seem to be somewhat similar, although significant differences exist as well, as can be seen in Table 6. There was no support for market uncertainty influencing the strategic emphasis of the buyer (H1b).

4.4. Step 4: The Impact of Procurement Strategy on Performance

Whether procurement strategy is associated with the buyer's perceived purchase performance, stipulated in H2, was assessed with univariate ANCOVA. This approach allows for the test between a categorical independent and a continuous dependent variable, controlling for other continuous variables which may covary with the dependent. The independent variable was the strategy type with its three levels, and the dependent variable was the aggregate score of the performance variables. As environmental conditions may not only determine procurement strategy, but also the success of the purchase directly, we included the six environmental variables as controls. The test of the overall model was significant, $F(8, 792) = 55.553$, $p < 0.001$; the model explained 35% of the variance in the dependent variable, as indicated by the adjusted R^2 and η^2 . These results suggest a strong relationship between the independent variables and performance. Table 7 presents the results. As can be seen, *strategists* record a performance score that is 0.320 higher than *opportunists*, after having controlled for environmental conditions. Similarly, *responders* record a performance score that is 0.768 lower than *opportunists*, again after having controlled for environmental conditions. Overall, the link between sourcing strategy and performance is significant, and the level of emphasis used in procurement strategy explains a large amount of variation in performance. In addition, some environmental variables, which were included as controls, exhibited a significant relationship with performance. As such, buyer bargaining power, item experience, and supply base availability positively correlated with purchase performance. However, even with these control variables included, the hypothesized link between sourcing strategy and purchase performance remained significant, accounting for the largest amount of variance explained in the dependent variable.

Table 6 Individual Regression Analyses

	Comparison A: Strategists vs. responders [†]		Comparison B: Opportunists vs. responders [†]	
	Coefficient	Wald statistic	Coefficient	Wald statistic
H1a: Purchase importance	0.290	22.551***	−0.304	10.887***
H1b: Market uncertainty	−0.106	2.391	0.188	3.248*
H1c: Supply base availability	0.144	8.130***	−0.096	1.630
H1d: Buyer bargaining power	0.675	54.729***	−0.269	5.823**
H1e: Item experience	0.223	10.388***	0.006	0.004
H1f: Supply base experience	0.477	29.244***	−0.204	3.078*

[†]The reference category is *responders*.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Follow-up tests investigating pairwise differences among the sourcing strategy means were conducted, adjusting for multiple comparisons using the Bonferroni approach. Significant differences existed in all of the six pairwise comparisons. Overall, these results support the hypothesized relationship, suggesting that a greater strategic emphasis in sourcing strategy is associated with higher performance. Table 8 presents the means and standard deviations for the three strategy groups.

5. Discussion

This research focused on procurement strategies for multi-item RFQs in B2B markets, with the contention that there are diverse groups of industrial buyers who pursue sourcing with different strategic emphases. Commencing with 11 goal statements developed from field and case study experience, as well as prior literature, four overarching objective groups were derived. These consisted of the focus on purchasing efficiencies, price, supply security, and bundle building. Recognizing that singularity of objective pursuit is unlikely, one would expect to see buyers reaching

for multiple goals, but with differing intensity levels and emphases. Our data supported this *a priori* expectation and suggested a three-cluster solution. According to their strategic emphasis, we labeled individuals as *strategists*, *opportunists*, or *responders*. Particularly intriguing was the same relative ranking of the four objectives across the three strategy groups. All three clusters regarded the focus on price as most important, followed by the desire for supply security, purchasing efficiency, and bundle building. Price or competition-related objectives receiving the highest ranking is consistent with studies in international sourcing (e.g., Monczka and Giunipero 1984), but is contradictory to others that showed non-price factors as being most important (e.g., Min and Galle 1991) (cf. Kaufmann and Carter 2002). It should be noted that while the focus on price received the highest rank, the emphasis on supply security follows very closely considering the magnitude of the means (Table 3). Buyers not only focus on price, which has been the practice in the past (Grittner 1996), but also on other objectives of almost equal importance. New facets of competitiveness, such as just-in-time and other suppliers capabilities, can explain this development.

Table 7 Analysis of Covariance Results

Variable	Coefficient	Standard error	t-value	Significance	Partial η^2
<i>Independent variables</i>					
Strategists*	0.320	0.063	5.083	0.000	0.032
Responders*	−0.768	0.096	−7.964	0.000	0.074
<i>Control variables</i>					
Purchase importance	0.023	0.023	1.006	0.315	0.001
Market uncertainty	−0.038	0.027	−1.428	0.154	0.003
Supply base availability	0.051	0.019	2.654	0.008	0.009
Buyer bargaining power	0.279	0.034	8.102	0.000	0.077
Item experience	0.126	0.028	4.574	0.000	0.026
Supply base experience	0.058	0.037	1.550	0.122	0.003
<i>Intercept</i>	2.768	0.277	9.990	0.000	0.112

*Results are presented relative to the *opportunists* category.

Table 8 Means and Standard Deviations of Performance Across Strategies

Procurement strategy	Mean	Standard deviation
Strategists	6.058	0.736
Opportunists	5.502	0.822
Responders	4.600	1.491

The test of our proposition confirmed that buyers differ in their emphases with which strategic procurement objectives are pursued. Antecedents impacting this emphasis were explored with the first six hypotheses, linking environmental conditions to procurement strategy. The results indicate that a heightened purchase importance (H1a), a better supply base availability (H1c), and increased buyer bargaining power (H1d) all lead to greater strategic emphasis. Hypotheses H1e and H1f were also supported, confirming the influence of item and supply base experience on the level of strategic intensity used in procurement. More experience enables the buyer to place greater emphasis on their strategic objectives. This result brings further insight to findings by Johnson et al. (2007), whose data suggested that more experienced sourcing executives are less likely to pursue strategic initiatives.

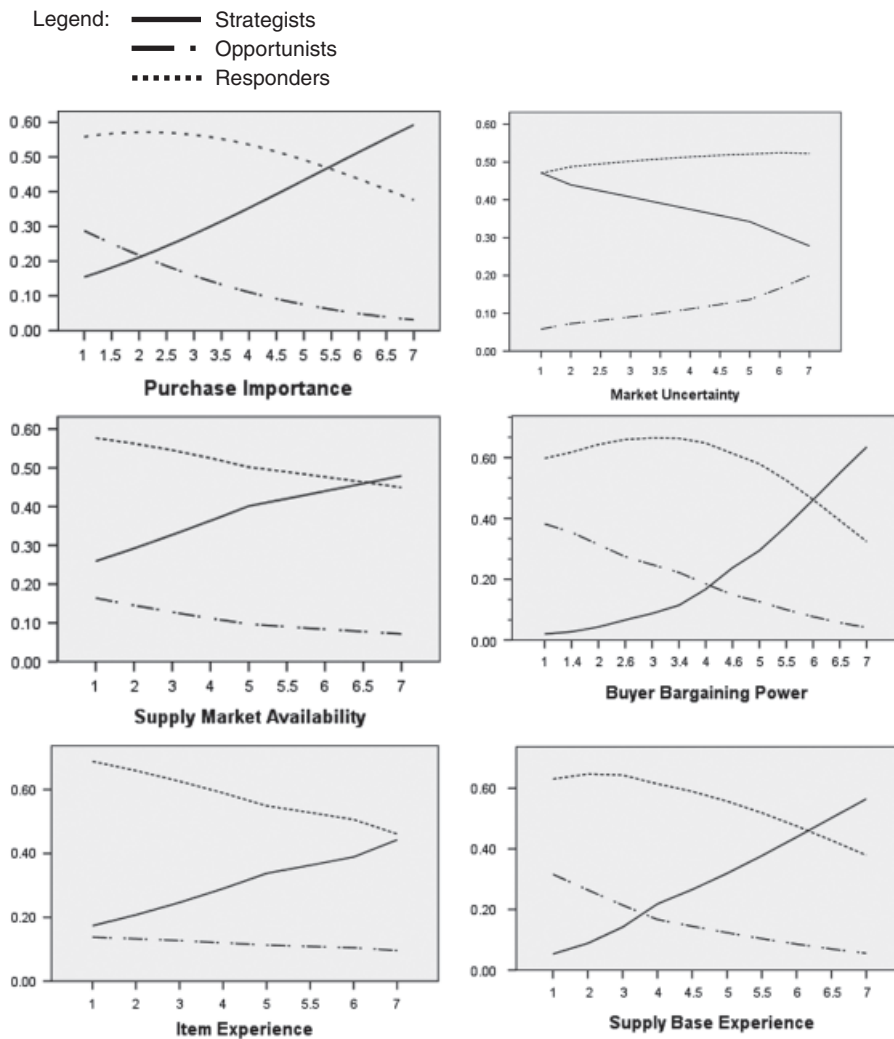
Hypothesis H1b, linking market uncertainty to strategic emphasis, was not supported. An uncertain market with incomplete information does not make purchasers less confident in executing their strategy; in other words, the emphasis with which strategic goals are pursued is not affected by the uncertainty present. This result, although counter to our expectation, is consistent with findings in Tullous and Utecht (1992). While these authors argued for a link between market uncertainty and the choice between single or multiple sourcing, their data did not support the relationship. The explanation offered was that buyers may not have associated how market uncertainty could have influenced strategy, and vice versa, i.e., how strategy could have been a response to higher uncertainty with the related aim to reduce it. A similar explanation can serve in our instance to explicate this counterintuitive result. Alternatively, market uncertainty could have been perceived as a given and inherent within the system. While the buyer may have realized the presence or absence of uncertainty, it may have been seen as “too external,” with the buyer’s strategy unable to reduce it. A further aspect that could have resulted in this unsupported relationship is the measurement of market uncertainty. While our measures were developed based on established scales and the psychometric assessment was satisfactory, alternate measures should be explored. We encourage future research to bring clarity to this issue.

These results are insightful for industrial buyers who, depending on the environmental conditions, are provided with a framework determining procurement strategy. The results are also useful for suppliers who, if able to estimate the environmental conditions that the buyer faces, can tailor their marketing strategies and offers accordingly. For example, suppliers are likely to have a better chance of achieving more of their objectives when selling to buyers with lower strategic emphasis.

While some of these results may seem intuitive, our unique contribution lies in the examination of these relationships for the multi-item RFQ and a confirmation of anecdotal evidence. We are not aware of any published studies that investigate this environment specifically; the potential existence of differences between the multi-item and single-item RFQ was illustrated in the development of the hypotheses above. To our knowledge, the present study is the first to look at the impact of environmental parameters on procurement strategy, and its subsequent influence on performance, within the context of multi-item RFQs. We propose a unique way of examining sourcing strategy, namely by looking at it as a composite of the pursuit of several goals, with the main differentiating factor being the emphasis with which the strategies are pursued.

As an additional aid for practicing managers, interaction graphs are presented in Figure 2 for the six environmental variables determining procurement strategy. The graphs map the predicted response probabilities for choosing the respective sourcing strategy (*y* axis) to increasing values on the independent environmental variable (*x* axis). For example, the first chart in Figure 2, presenting purchase importance, illustrates that as the importance of the purchase increases, the likelihood of pursuing the sourcing strategy with greater strategic emphasis increases as well. Similarly, the second chart in Figure 2 indicates that, as market uncertainty increases, the chances of following a strategy with greater strategic emphasis decreases. Overall, the chances of being a *strategist*, i.e., pursuing a strategy with a greater emphasis or intensity, increases as (i) purchase importance increases, (ii) market uncertainty decreases, (iii) supply base availability increases, (iv) buyer bargaining power increases, (v) item experience increases, and (vi) supply base experience increases. As these environmental conditions change in the direction indicated, the graphs suggest that respondents in our sample were more likely to fall in one strategy category vs. the others. Overall, the charts represent a cohesive summary of best practices exhibited by the companies in our sample and provide insight into what the average respondent would do. Practitioners can use these plots and re-

Figure 2 Estimated Probability Plots of Environmental Variables Determining Procurement Strategy



relationships to benchmark their sourcing strategy, compared with the average response of purchasing professionals in our sample.

The hypothesized link between procurement strategy and performance (H2) was supported, after having controlled for the direct impact of our environmental conditions on performance. The result confirms that buyers possessing greater strategic emphasis experience better performance. It should be noted that performance is measured as a qualitative assessment of how successful the multi-item RFQ negotiations and their outcome were perceived by the buyer. We consciously did not use a hard quantitative measure, such as percent saved compared with the prior purchase of the products, because this would only focus on one of the four dimensions of strategic orientation.

Three of the six environmental variables, included as controls, also positively correlated with purchase performance. Specifically, buyer bargaining power,

item experience, and supply base availability exhibited significant coefficients influencing performance. These findings are consistent with prior literature. First, bargaining power, or the power imbalance between buyer and supplier, has been noted as a crucial variable influencing buyer-supplier relationships, sourcing strategy, and outcome (e.g., Paulraj and Chen 2007). Our study confirmed that bargaining power has a direct relationship with performance. Second, the link between experience and purchase performance seems logical, although very few studies exist that investigate this relationship (Gao et al. 2008). However, related research on the impact of knowledge on performance provides support (Edmondson et al. 2003). In particular tacit knowledge, or experience that represents a resource under the resource-based view of the firm (Barney 1991), should be able to influence performance. Future research is encouraged to investigate this relationship specifically in sourcing. And third, our data suggest that a larger

supply base does not only influence procurement strategy, but also the performance achieved. This is consistent with prior findings, which associated a larger supply base availability with potential lower cost and better quality in favor of the buyer (Kekre et al. 1995). Our study confirmed this relationship.

The supported relationship between procurement strategy and performance suggests that buyers receive best results with more aggressive strategies. However, not all purchasing professionals are able to pursue strategies in this fashion, primarily due to the constraints placed on them by the environment. If individuals are able to alter the environmental conditions in their favor, for example, by obtaining additional market knowledge and thus increasing supply base experience, a more aggressive procurement strategy becomes feasible. Nevertheless, the effort expended in such tasks may not be worth the rewards reaped in the end, and such investments should be considered carefully.

6. Conclusion

This research investigated procurement strategies for multi-item RFQs in B2B markets, making several contributions. First, it established important sourcing strategies and objectives that differ based on the emphasis, intensity, or aggressiveness with which they are pursued. Overriding sourcing objectives, which were derived based on factor analysis, included the focus on price, supply security, purchasing efficiency, and bundle building. Cluster analysis was used to identify comprehensive sourcing strategies. A three-cluster solution fit the data best, indicating that buyers can be differentiated by the level of strategic emphasis. The clusters were labeled *strategists*, *opportunists*, and *responders* to reflect their orientation. While the relative ranking of the four sourcing objectives across the three clusters remained the same, their relative importance within each cluster differed. Second, environmental antecedents impacting sourcing strategy were explored, detecting significant relationships. Specifically, greater strategic emphasis is present with an increase in purchase importance, supply base availability, buyer bargaining power, item experience, and supply base experience. And third, the impact of sourcing strategy on performance was confirmed, with a more goal oriented or aggressive strategy leading to better performance. The unique contribution lies in the examination of these relationships for the multi-item RFQ. Furthermore, we developed estimated response curves that illustrate the three procurement strategies being predictably and significantly different from each other across the environmental variables. Additionally, the investigation

confirmed with a large-scale survey what was primarily anecdotal evidence. It contributes to the growing body of academic research by grounding the formation and selection of sourcing strategies in prior research and theory, and to industry practice by providing insight and guidance informing facets of procurement strategy.

Further research extensions exist. First, from an industrial buyer behavior perspective, it will be insightful to examine the three strategy types further in greater detail, for instance, in terms of what specific activities are conducted with each. Industrial buying behavior research has suggested variables such as extent of analysis, information search, and procedural guidance (Hunter et al. 2006). To what extent these activities are pursued with each sourcing strategy should be attractive avenues.

And second, an investigation of how each strategy is executed should be of interest. For example, will companies with greater strategic emphasis rely primarily on face-to-face negotiations, or will they experiment with more transactional negotiation modes, such as competitive bidding or online reverse auctions? Whichever strategy and mode of execution is applied, the impact on performance needs to be assessed. It is hoped that the present study serves as a motivation to pursue this area of research further.

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