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Purchasing and Supply Management

Sixteenth Edition

P. Fraser Johnson, PhD

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Preface

Purchasing and supply management has become increasingly visible in a world where supply is a major determinant of corporate survival and success. Supply chain performance influences not only operational and financial risks but also reputational risk. Extending the supply chain globally into emerging regions places new responsibilities on the supplier and supply, not only to monitor environmental, social, political, and security concerns, but also to influence them. Thus, the job of the supply manager of today goes beyond the scope of supply chain efficiency and value for money spent to search for competitive advantage in the supply chain. Cost containment and improvement represent one challenge; the other is revenue enhancement. Not only must the supply group contribute directly to both the balance sheet and the income statement; it must also enhance the performance of other members of the corporate team. Superior internal relationship and knowledge management need to be matched on the exterior in the supply network to assure that the future operational and strategic needs of the organization will be met by future markets. The joy of purchasing and supply management lives in the magnitude of its challenges and the opportunities to achieve magnificent contributions.

For more than 85 years, this text and its predecessors have championed the purchasing and supply management cause. Based on the conviction that supply and suppliers have to contribute effectively to organizational goals and strategies, this and previous editions have focused on how to make that mission a reality.

A great deal has happened in the supply field since the fifteenth edition was published. Continuing advances in information technology provide new ways to improve supply efficiency and effectiveness. New risk management, sustainability, and transparency requirements, and the search for meaningful supply metrics, have further complicated the challenges faced by supply managers all over the world. As a consequence, several changes and updates have been made to the sixteenth edition. First, the new edition provides an opportunity to incorporate the latest theory and best practice in supply chain management into the text. Wherever appropriate, real-world examples and current research are used to illustrate key points. Second, the application of information technology to supply chain processes continues to change rapidly, including the evolution of cloud-based computing, digitization, and blockchain. The text has been updated accordingly. Third, there are also several important emerging issues—including sustainability, challenges of managing risk in a global supply chain, and collaboration—that are addressed in this text. Meanwhile, other supply management issues, such as global sourcing and supply chain collaboration, continue to remain at the forefront. As the world's technological and political environments continue to change and evolve, supply managers are faced with new challenges and risks managing their global supply chains. Lastly, nearly one-third of the cases have been replaced with new cases that cover topics such as risk management, cost analysis, metrics, purchasing consortiums, and acquisition of capital equipment. Thus, the examples in the text and 49 real-life supply chain cases afford the chance to apply the latest research and theoretical developments in the field to real-life issues, opportunities, decisions, and problems faced by practitioners.

In this edition, the focus on decision making in the supply chain has also been strengthened considerably. The chapter sequence reflects the chronological order of the acquisition process. Criteria for supply decisions have been identified in three categories: (1) strategic, (2) operational, and (3) additional. Criteria in the third category, including balance sheet and income statement considerations, all dimensions of risk, sustainability considerations, are growing in relevance and making sound supply decisions an even more complex challenge.

Anna E. Flynn has been a coauthor of this text since the twelfth edition of this text in 2002, after previously assisting with tenth and eleventh editions. Anna has been a committed educator in the supply management field. She is a former faculty member at Thunderbird School of Global Management and Arizona State University, where she was also director of the undergraduate program in supply chain management. Anna also served as vice president and associate professor at the Institute for Supply Management (ISM). As a research associate for CAPS Research, she was able to explore important topics relevant for supply management professionals. Her accomplishments include authorship of several books. Although Anna did not participate in this edition, her past contributions are still evident throughout this text.

A book with text and cases depends on many to contribute through their research and writing to expand the body of knowledge of the field. Thus, to my academic colleagues, I extend my thanks for pushing out the theoretical boundaries of supply management. To many practitioners, I wish to extend my gratitude for proving what works and what does not and providing their stories in the cases in this text. Also, many case writers contributed their efforts so that approximately one-third of all the cases in this edition are new. Case contributors in alphabetical order included: Carolynn Cameron, Garland Chow, Jenni Denniston, Dominque Fortier, Manish Kumar, Glen Luinenberg, Eric Silverberg, Dave Vannette, and Marsha Watson.

The production side of any text is more complicated than most authors care to admit. At McGraw-Hill Education Noelle Bathurst, Harper Christopher, Michele Janicek, Erika Jordan, Elizabeth Kelly, Tobi Philips, Charles (Chuck) Synovec, Erin Tilley, and many others contributed to turn our efforts into a presentable text.

The support of Acting Dean Mark Vandenbosch and my colleagues at the Ivey Business School has been most welcome. Professors Larry Menor and Robert Klassen have provided invaluable feedback and assistance.

The assistance of the Institute for Supply Management (ISM) and the Supply Chain Management Association in supporting the continuous improvement of supply education is also very much appreciated.

P. Fraser Johnson

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Brief Contents

Table of Contents

Indexes

Chapter **Two**

Supply Strategy

Chapter Outline

Key Questions for the Supply Decision Maker

Should we

- Become more concerned about the balance sheet?
- Develop a strategic plan for purchasing and supply management?
- Spend a major part of our time on strategic, rather than operational, issues?

How can we

- Anticipate the competitive changes we will face in the next 10 years?
- Ensure supply is included as part of the organization·s overall strategy?
- Generate the information needed to do strategic planning?

In strategic supply, the key question is: How can supply and the supply chain contribute *effectively* to organizational objectives and strategy? The accompanying question is: How can the organizational objectives and strategy properly reflect the contribution and opportunities offered in the supply chain?

A *strategy* is an *action plan* designed to achieve specific *long-term goals and objectives.* The strategy should concentrate on the *key factors necessary* for success and the *major actions* that should be taken now *to ensure the future.* It is the process of determining the relationship of the organization to its *environment,* establishing long-term *objectives,* and achieving the desired relationship(s) through efficient and effective *allocation of resources.*

LEVELS OF STRATEGIC PLANNING

To be successful, an organization must approach strategic planning on three levels:

1. *Corporate.* These are the decisions and plans that answer the questions of What business are we in? and How will we allocate our resources among these businesses? For example, is a railroad in the business of running trains? Or is its business the movement (creating time and space utility) of things and people?
2. *Business Unit.* These decisions mold the plans of a particular business unit, as necessary, to contribute to the corporate strategy.
3. *Function.* These plans concern the how of each functional area's contribution to the business strategy and involve the allocation of internal resources.

Several studies have reinforced the notion that linking supply strategy to corporate strategy is essential, but many firms do not yet have mechanisms in place to link the two.[1]

[1] A. Tchokoguéa, Jean Nollet, and Julien Robineau, "Supply·s Strategic Contribution: An Empirical Reality," *Journal of Purchasing and Supply Management* 23, no. 1 (2017), pp. 105–122. S. D. Hunt and D. Davis, "Grounding Supply Chain Management in Resource-Advantage Theory: In Defense of a Resource-Based View of the Firm," *Journal of Supply Chain Management* 48, no. 2 (2012), pp. 14–20.

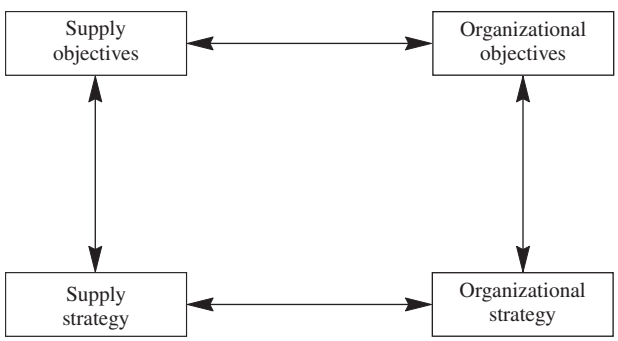

FIGURE 2–1
Supply Strategy Congruent with Organizational Strategy

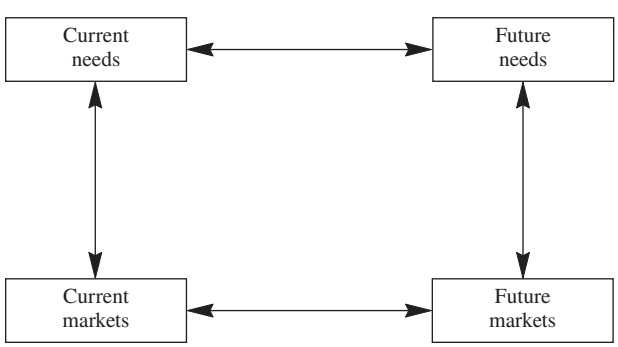

FIGURE 2–2
Supply Strategy Links Current and Future Markets to Current and Future Needs

Effective contribution connotes more than just a response to a directive from top management. It also implies inputs to the strategic planning process so that organizational objectives and strategies include supply opportunities and problems.

This is graphically shown in Figure 2–1 by the use of double arrows between supply objectives and strategy and organizational objectives and strategy.

A different look at supply strategy is given in Figure 2–2. This shows an effective supply strategy linking both current needs and current markets to future needs and future markets.

One of the significant obstacles to the development of an effective supply strategy lies in the difficulties inherent in translating organizational objectives into supply objectives. For example, Steve Kiefer, vice president of global purchasing and supply chain management at General Motors (GM), introduced the "One Cost Model" program, which dispenses with conventional bidding. Since taking on the role of chief purchasing officer at GM in 2014, Kiefer has been working to improve working relationships with suppliers. The benefits have translated into improved cost and quality performance.[2]

Normally, most organizational objectives can be summarized under four categories: survival, growth, financial, and sustainability. Survival is the most basic need of any organization. Growth can be expressed in a variety of ways. For example, growth could be in size of the organization in terms of number of employees or assets or number of operating units, or number of countries in which the organization operates, or in market share.

[2] "2017 Automotive News All Stars," *Automotive News* 92, no. 6805, November 27, 2017, p. 34.

Financial objectives could include total size of budget, surplus or profit, total revenue, return on investment, return on assets, share price, earnings per share, or increases in each of these or any combination. Sustainability objectives include both environmental and social considerations. Sustainability performance must not only comply with legal obligations but also meet the values and standards of the organization's stakeholders, including employees, shareholders, and customers. The notion of good citizenship is embodied in this fourth objective.

Unfortunately, typical supply objectives normally are expressed in a totally different language, such as quality and function, delivery, quantity, price, terms and conditions, service, and so on.

MAJOR CHALLENGES IN SETTING SUPPLY OBJECTIVES AND STRATEGIES

The first major challenge facing the supply manager is the effective interpretation of corporate objectives and supply objectives. For example, given the organization's desire to expand rapidly, is supply assurance more important than obtaining rock-bottom prices?

The second challenge deals with the choice of the appropriate action plan or strategy to achieve the desired objectives. For example, if supply assurance is vital, is it best accomplished by single or dual sourcing, or by making in-house?

The third challenge deals with the identification and feedback of supply issues to be integrated into organizational objectives and strategies. For example, because a new technology can be accessed early through supply efforts, how can this be exploited? The Spartan Heat Exchangers case at the end of this chapter provides an illustration of how supply should be integrated to corporate strategy. The changes in corporate strategy and objectives at Spartan necessitate changes in supply strategy.

The development of a supply strategy requires that the supply manager be in tune with the organization's key objectives and strategies and also be capable of recognizing and grasping opportunities. All three challenges require managerial and strategic skills of the highest order, and the difficulties in meeting these challenges should not be minimized.

STRATEGIC PLANNING IN SUPPLY MANAGEMENT

Today, firms face the challenge of prospering in the face of highly competitive world markets. The ability to relate effectively to outside environments—social, economic, political, legal, and technological—to anticipate changes, to adjust to changes, and to capitalize on opportunities by formulating and executing strategic plans is a major factor in generating future earnings and is critical to survival. Supply must be forward looking.

A supply strategy is a supply action plan designed to permit the achievement of selected goals and objectives. If well developed, the strategy will link the firm to the competitive environment as part of the long-term planning process. An overall supply strategy is made up of substrategies that can be grouped together into six major categories:

1. *Assurance-of-supply strategies.* Designed to ensure that future supply needs are met with emphasis on quality and quantity. Assurance-of-supply strategies must consider changes

in both demand and supply. (Much of the work in purchasing research [see Chapter 17] is focused on providing the relevant information.)

2. *Cost-reduction strategies.* Designed to reduce the laid-down cost of what is acquired or the total cost of acquisition and use—life-cycle cost. With changes in technology, alternatives may be available to reduce an organization's overall operating costs through changes in materials, sources, methods, and buyer–supplier relationships.
3. *Supply chain support strategies.* Designed to maximize the likelihood that the considerable knowledge and capabilities of supply chain members are available to the buying organization. For example, better communication systems are needed between buyers and sellers to facilitate the timely notification of changes and to ensure that supply inventories and production goals are consistent with the needs. Supply chain members also need better relations for the communication needed to ensure higher quality and better design.
4. *Environmental-change strategies.* Designed to anticipate and recognize shifts in the competitive environment (economic, organizational, people, legal, governmental regulations and controls, and technological) so that it can turn them to the long-term advantage of the buying organization.
5. *Competitive-edge strategies.* Designed to exploit market opportunities and organizational strengths to give the buying organization a significant competitive edge. In the public sector, the term *competitive edge* usually may be interpreted to mean strong performance in achieving program objectives.
6. *Risk-management strategies.* Whereas the various aspects of the previous five types of strategies have been covered earlier in this text, the issue of risk management has not yet been discussed. Therefore, risk management will be addressed in the following section, not to imply greater importance, but to assure adequate coverage.

RISK MANAGEMENT

Every business decision involves risk, and supply is no exception. In financial investments, a higher rate of return is supposed to compensate the investor or lender for the higher risk exposure. Risks in the supply chain can be classified into three main categories: (1) operational: the risk of interruption of the flow of goods or services, (2) financial: the risk that the price or cost of the goods or services acquired will change significantly, and (3) reputational risk.

All three risks affect the survival, competitiveness, and bottom line of the organization and may occur simultaneously.

Operational Risk

Every business continuity plan recognizes that supply interruptions and delays may occur. Catastrophic events such as earthquakes, tornadoes, hurricanes, war, floods, or fire may totally disable a vital supplier. Strikes may vary in length, and even short-term interruptions related to weather, accidents on key roads, or any other short-term factor affecting the supply and/or transport of requirements may affect a buying organization's capability to provide good customer service.

A distinction can be drawn between factors beyond the purchaser's or supplier's control, such as weather, and those that deal directly with the supplier's capability of selecting its own suppliers, *managing internally, and its distribution* so as to prevent the potential of physical supply interruption. Careful supplier evaluation before committing to purchase can mitigate against the latter type of supply interruption. In situations of ongoing supply relationships, communication with key suppliers is essential. Such is the situation in the Suman case at the end of the chapter. Mike Bradie is concerned about the potential shortage of a key raw material and must come to an agreement with his suppliers to avoid possible supply disruptions.

Unfortunately, supply interruptions increase costs. If last-minute substitutions need to be made, these are likely to be expensive. Idle labor and equipment, missed customer delivery promises, and scrambling—all have increased costs associated with them.

Financial Risk

Quite different from supply interruptions are those risks directly associated with changes in the price of the good or service purchased. A simple example comes from the commodity markets. Increases in the price of oil affect prices paid for fuel, energy, and those products or services that require oil as a key ingredient or raw material.

A purchaser who has committed to a fixed-price contract may find a competitor able to compete because commodity prices have dropped. Currency exchange rate changes and the threat of shortages or supply interruption also will affect prices, as will arbitrary supplier pricing decisions. Changes in taxation, tolls, fees, duties, and tariffs also will affect cost of ownership.

Given that both supply interruption and price/cost risks directly impact any organization's ability to meet its own goals and execute its strategies, supply chain risks—whether they are on the supply side, internal to the organization, or on the customer side—need to be managed properly.

Reputational Risk

Reputational risk may be even more serious than operational or financial risks, because the loss of reputation may be catastrophic for a company. Both legal and ethical supply issues may affect the company's reputation. "You are known by the company you keep" applies not only to one's personal life, but also to corporate life. Thus, the reputation of a company's supply chain members will affect its own image. The internal and external communications decisions and behavior of supply personnel can have both negative and positive impacts. Therefore, legal and ethics issues (Chapter 15) are highly relevant to reputational risk. Adverse publicity with respect to poor supplier social performance, bribery, kickbacks, poor product quality, improper environmental practices, and so on, can be extremely expensive and damage the company's brand image. Some companies invest considerable resources monitoring suppliers as a means to manage reputational risk. For example, Walmart conducts more than 20,000 audits each year to ensure compliance with its Responsible Sourcing Program, which sets standards for suppliers located in emerging economies in areas such as labor and employment practices, employee compensation, and health and safety.[3]

[3] Walmart, 2016 Global Responsibility Report, https://corporate.walmart.com/2016grr.

Managing Supply Risk

Managing supply risks require: (1) identification and classification of the risks, (2) impact assessment, and (3) a risk strategy.

The trend of globalization of supply chains has increased the complexity of purchasing responsibilities and made identification of risk more difficult. The preceding discussion identifying supply interruption and price/cost changes as two categories has been highly simplified. Technology, social, political, and environmental factors have not even been mentioned yet. Technology has the potential of interrupting supply through the failure of systems and through obsoleting existing equipment, products, or services, or drastically changing the existing cost/price realities. A purchaser committed to a long-term, fixed-price contract for a particular requirement may find a competitor can gain a significant advantage through a technology-driven, lower-cost substitute. Regulatory changes can drastically offset a supplier's capability to deliver at the expected price or to deliver at all as demonstrated in the Russel Wisselink case in Chapter 9.

Because the well-informed supply manager is probably in the best position to identify the various supply risks his or her organization faces, such risk identification should be a standard requirement of the job, including the estimation of the probability of event occurrence.

Impact assessment requires the ability to assess the consequences of supply interruption and/or price/cost exposure. Correct impact assessment is likely to require the input of others in the organization, such as operations, marketing, accounting, and finance, to name just a few. Assessed potential impact from identified risk may be low, medium, or high.

Combining potential impact assessment with the probability of event exposure creates a table of risks with low probability and low impact on one extreme and high probability with high impact on the other. Obviously, high-impact, high-probability risks need to be addressed or, better yet, avoided, if at all possible.

Managing supply risks should be started at the supply level, but may escalate to the overall corporate level. Relatively simple actions—such as avoiding high-risk suppliers or high-risk geographical locations, dual or triple sourcing, carrying safety stock, hedging, and using longer-term and/or fixed- or declining-price contracts and protective contract clauses—have been a standard part of the procurement arsenal for a long time. If most purchasers had their way, they would like to transfer all risk to their suppliers! However, the assumption of risk carries a price tag, and a supplier should be asked to shoulder the risk if it is advantageous to both the supplier and purchaser to do so.

The Corporate Context

Supply risk is only one of the various risks to which any organization is exposed. Traditionally, financial risks have been the responsibility of finance, property insurance part of real estate, and so on. The emergence of a corporate risk management group headed by a risk manager or chief risk officer (CRO) allows companies as a whole to assess their total risk exposure and seek the best ways of managing all risks.

A supply manager's decision not to source in a politically unstable country because of his or her fear of supply interruption may also miss an opportunity to source at a highly advantageous price. A corporate perspective might show that the trade-off between a higher price elsewhere and the risk of nonsupply favors the apparently riskier option. Mergers and acquisitions as well as insourcing and outsourcing represent phenomena full of opportunities and risks in which supply input is vital to effective corporate risk resolution. The decision about

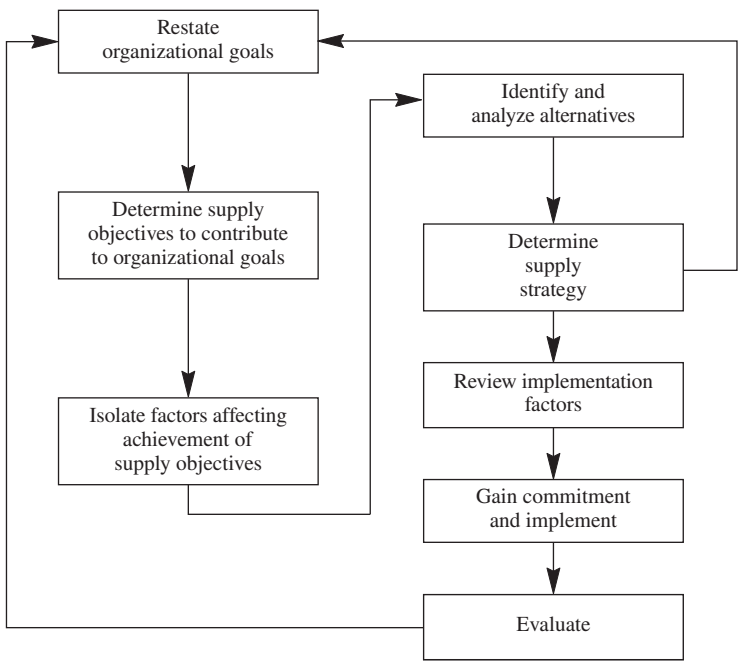

FIGURE 2–3
Strategic Supply Planning Process

how much risk any organization should be willing to bear and whether it should self-insure or seek third-party protection is well beyond the scope of this text. Nevertheless, it is clear that risk management is going to be an area of growing concern for supply managers.

Figure 2–3 is a conceptual flow diagram of the strategic supply planning process. It is important to recognize that the planning process normally focuses on *long-run opportunities* and not primarily on immediate problems.

STRATEGIC COMPONENTS

The number of specific strategic opportunities that might be addressed in formulating an overall supply strategy is limited only by the imagination of the supply manager. Any strategy chosen should include a determination of what, quality, how much, who, when, what price, where, how, and why. Each of these will be discussed further. (See Figure 2–4.)

What?

Probably the most fundamental question facing an organization under the "what" category is the issue of make or buy, insourcing, and outsourcing. Presumably, strong acquisition strengths would favor a buy strategy. (See Chapter 5: Make or Buy, Insourcing, and Outsourcing.)

Also included under the heading of what is to be acquired is the issue of whether the organization will acquire standard items and materials readily available in the market, as opposed to special, custom-specified requirements. Standard items may be readily acquired in the marketplace, but they may not afford the organization the competitive edge that special requirements might provide.

FIGURE 2–4
Supply Strategy Questions

1. What?
   - Make or buy
   - Standard versus special
2. Quality?
   - Quality versus cost
   - Supplier involvement
3. How Much?
   - Large versus small quantities (inventory)
4. Who?
   - Centralize or decentralize
   - Location of staff
   - Top management involvement
5. When?
   - Now versus later
   - Forward buy
6. What Price?
   - Premium
   - Standard
   - Lower
   - Cost-based
   - Market-based
   - Lease/make/buy
7. Where?
   - Local versus regional
   - Domestic versus international
   - Large versus small
   - Single versus multiple sourcing
   - High versus low supplier turnover
   - Supplier relations
   - Supplier certification
   - Supplier ownership
8. How?
   - Systems and procedures
   - E-commerce
   - Negotiations
   - Competitive bids
   - Fixed bids
   - Blanket orders/open orders
   - Systems contracting
   - Group buying
   - Materials requirements planning
   - Long-term contracts
   - Ethics
   - Aggressive or passive
   - Purchasing research
   - Value analysis
9. Why?
   - Objectives congruent
   - Market reasons
   - Internal reasons
     1. Outside supply
     2. Inside supply

Quality?

Part of the "what" question deals with the quality of the items or services to be acquired. Chapter 7 addresses the various trade-offs possible under quality. The intent is to achieve continuous process and product or service improvement.

Supplier Quality Assurance Programs

Many firms have concluded that a more consistent quality of end-product output is absolutely essential to the maintenance of, or growth in, market share. Suppliers must deliver consistent quality materials, parts, and components; this also will effect a marked reduction in production costs and in-house quality control administrative costs. Therefore, a strategy of developing suppliers' knowledge of quality requirements and assisting them in implementation of programs to achieve desired results may be needed. Three of the programs that might be used are:

1. *Zero defect (ZD) plans.* "Do it right the first time" is far more cost effective than making corrections after the fact.
2. *Process quality control programs.* These use statistical control charts to monitor various production processes to isolate developing problems and make needed adjustments

(corrections) before bad product is produced. The buying firm may need to assist the supplier with the introduction of the needed statistical techniques.

3. *Quality certification programs.* Here the supplier agrees to perform the agreed-upon quality tests and supply the test data, with the shipment, to the buying firm. If the seller does the requisite outgoing quality checks and can be depended on to do them correctly, the buying firm then can eliminate its incoming inspection procedures and attendant costs. This approach almost always is a key element in any just-in-time purchasing system, as discussed in the following section.

How Much?

Another major component of any supply strategy deals with the question of how much is to be acquired in total and per delivery. Chapter 8 discusses a number of trade-offs possible under quantity. In JIT and MRP, the trend has been toward smaller quantities to be delivered as needed, as opposed to the former stance of buying large quantities at a time to ensure better prices. Ideally, buyers and suppliers try to identify and eliminate the causes of uncertainty in the supply chain that drive the need for inventory, thus reducing the amount of inventory in the total system. One option available under the how much question may involve the shifting of inventory ownership.

The supplier maintains finished goods inventory because the supplier may be supplying a common item to several customers. The safety stock required to service a group of customers is often much less than the combined total of the safety stocks if the several customers were to manage their own inventories separately. This concept is integral to the successful implementation of systems contracting (discussed in Chapter 4).

From a strategic standpoint, supply may wish to analyze its inventory position on all of its major items, with a view to working out an arrangement with key suppliers whereby they agree to maintain the inventory, physically and financially, with delivery as required. Ideally, of course, the intent of both buyer and supplier should be to take inventory out of the system. An area in the buyer's facility may even be placed under the supplier's control.

Walmart and Zara are examples of two companies that have tailored their supply chains to create competitive advantage. Both companies, albeit in different industries, are able to keep inventories low, while maintaining customer services levels that match or exceed their competitors.

Other options are to switch to JIT purchasing or to consignment buying. If a supplier can be depended on to deliver needed purchased items, of the agreed-upon quality, in small quantities, and at the specified time, the buying firm can substantially reduce its investment in purchased inventories, enjoy needed continuity of supply, and reduce its receiving and incoming inspection costs. To accomplish this requires a long-term plan and substantial cooperation and understanding between buyer and seller.

In consignment buying, a supplier owns inventory in the buyer's facility under the buyer's control. The buyer assumes responsibility for accounting for withdrawals of stock from that consignment inventory, payment for quantities used, and notification to the supplier of the need to replenish inventory. Verification of quantities remaining in inventory then would be done jointly, at periodic intervals. This strategy has advantages for both supplier (assured volume) and buyer (reduced inventory investment) and is often used in the distribution industry.

Who?

The whole question of who should do the buying and how to organize the supply function is addressed in Chapter 3. The key decisions are whether the supply function should be centralized or not, where staff should be located geographically, and to what extent top management and other functions will be involved in the total acquisition process. To what extent will teams be used to arrive at supply strategies?

When?

The question of when to buy is tied very closely to the one of how much. The obvious choices are now versus later. The key strategy issue really lies with the question of forward buying and inventory policy. In the area of commodities, the opportunity exists to go into the futures market and use hedging. The organized commodity exchanges present an opportunity to offset transactions in the spot and future markets to avoid some of the risk of substantial price fluctuation as discussed in Chapter 10.

What Price?

It is possible for any organization to follow some specific price strategies. This topic is extensively discussed in Chapter 11. Key trade-offs may be whether the organization intends to pursue paying a premium price in return for exceptional service and other commitments from the supplier, a standard price target in line with the rest of the market, or a low price intended to give a cost advantage. Furthermore, the pursuit of a cost-based strategy as opposed to a market-based strategy may require extensive use of tools such as value analysis, cost analysis, and negotiation. For capital assets, the choice of lease or own presents strategic alternatives, as discussed in Chapter 16.

Where?

Several possibilities present themselves under the question of where to buy. Many of these are discussed in Chapter 12. Obvious trade-offs include local, regional, domestic, or international sourcing; buying from small versus large suppliers; single versus multiple sourcing; and low versus high supplier turnover, as well as supplier certification and supplier ownership. Lastly, through reverse marketing or supplier development, the purchaser may create rather than select suppliers.

How?

A large array of options exists under the heading of "how to buy." These include, but certainly are not limited to, supply chain integration of systems and procedures; choice of technology; e-commerce applications; use of various types of teams; use of negotiations, reverse auctions, competitive bids, blanket orders, and open order systems; systems contracting; group buying; long-term contracts; the ethics of acquisition; aggressive or passive buying; the use of purchasing research and value analysis; quality assurance programs; and reduction of the supply base. Most of these will be discussed in Chapters 3 through 12 in this text.

Why?

Every strategy needs to be examined not only for its various optional components, but also for the reason why it should be pursued. The normal reason for a strategy in supply is to make supply objectives congruent with overall organizational objectives and strategies at

both an operational and strategic level. Other reasons may include market conditions, both current and future. Furthermore, there may be reasons internal to the organization, both outside of supply and inside supply, to pursue certain strategies. For example, a strong engineering department may afford an opportunity to pursue a strategy based on specially engineered requirements. The availability of excess funds may afford an opportunity to acquire a supplier through backward/vertical integration. The reasons inside supply may be related to the capability and availability of supply personnel. A highly trained and effective supply group can pursue much more aggressive strategies than one less qualified. Other reasons may include the competitive environment. For example, government regulations and controls in product liability and social and environmental sustainability performance may require the pursuit of certain strategies.

What makes supply strategy such an exciting area for exploration is the combination of the multitude of strategic options coupled with the size of potential impact on organizational success. These opportunities are as vast for service firms as they are for manufacturing, private, and public sector organizations. The combination of sound supply expertise with creative thinking and full understanding of corporate objectives and strategies can uncover strategic opportunities of a size and impact not available elsewhere in the organization.

Conclusion

The increasing interest in supply strategies and their potential contribution to organizational objectives and strategies is one of the exciting developments in the whole field of supply. Fortunately, as this chapter indicates, the number of strategic options open to any supply manager is almost endless. A significant difficulty may exist in making these strategies congruent with those of the organization as a whole. The long-term perspective required for effective supply strategy development will force supply managers to concentrate more on the future. The coming decade should be a highly rewarding one for those supply managers willing to accept the challenge of realizing the full potential of supply's contribution to organizational success.

Questions for Review and Discussion

1. What role can (should) supply play in determining a firm's strategy in the area of social and environmental issues and trends?
2. How can the supply manager determine which cost-reduction strategies to pursue?
3. Can you have a supply strategy in public procurement? Why or why not?
4. Why should a supply manager consider hiring (or obtaining internally) an employee without any supply background?
5. What can supply do to assist in minimizing a firm's risk of product liability lawsuits?
6. What factors have caused the current interest in, and attention to, strategic purchasing and supply planning?
7. What type of data would supply need to contribute to an organization's strategic growth? How might supply obtain such data?

8. How can supply sell itself more effectively internally?
9. What do you believe to be the most difficult obstacles to making a supply function strategic?
10. Why should supply be concerned about the balance sheet?

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Case 2–1

Spartan Heat Exchangers Inc.

On June 10, Rick Coyne, materials manager at Spartan Heat Exchangers Inc. (Spartan), in Springfield, Missouri, received a call from Max Brisco, vice president of manufacturing: "What can the materials department do to facilitate Spartan's new business strategy? I'll need your plan next week."

SPARTAN HEAT EXCHANGERS

Spartan was a leading designer and manufacturer of specialized industrial heat transfer equipment. Its customers operated in a number of industries, such as steel, aluminum smelting, hydroelectricity generation, pulp and paper,

refining, and petrochemical. The company's primary products included transformer coolers, motor and generator coolers, hydro generator coolers, air-cooled heat exchangers, and transformer oil coolers. Spartan's combination of fin-tube and time-proven heat exchanger designs had gained wide recognition both in North America and internationally.

Sales revenues were $25 million and Spartan operated in a 125,000-square-foot plant. Spartan was owned by Krimmer Industries, a large privately held corporation with more than 10,000 employees worldwide, headquartered in Denver.

Rick Coyne summarized the business strategy of Spartan during the past 10 years: "We were willing to do anything for every customer with respect to their heat transfer requirements. We were willing to do trial and error on the shop floor and provide a customer with his or her own unique heat transfer products." He added, "Our design and manufacturing people derived greatest satisfaction making new customized heat transfer products. Designing and research capabilities gave us the edge in developing and manufacturing any kind of heat transfer product required by the customer. Ten years ago, we were one of the very few companies in our industry offering customized services in design and manufacturing and this strategy made business sense, as the customers were willing to pay a premium for customized products."

MANUFACTURING PROCESS

The customized nature of Spartan's product line was supported by a job shop manufacturing operation with several departments, each of which produced particular component parts, feeding a final assembly area. Each job moved from work center to work center, accompanied by a bill of material and engineering drawing. The first process involved fitting a liner tube (in which the fluid to be cooled passed) into a base tube. This base tube, made of aluminum, was then pressure bonded to the inner liner tube through a rotary extrusion process that formed spiral fins on the base tube. The depth of the fins and the distance between them determined the amount of airflow across the tubes, and thus the cooling efficiency and power of the unit.

After the tubes were formed, cabinet and end plate fabrication began. The tubes were welded to the cabinet and the end plates. Flanges were then welded to pairs of tubes on the other side of the end plates to create a looped system. The unit was then painted and fans and motors were installed. Finally, the unit was tested for leaks and performance, crated, and shipped to the job site for installation.

MATERIALS DEPARTMENT

Spartan's buyers sourced all raw material and components required by manufacturing and were responsible for planning, procurement, and management of inventories.

Rick managed an in-house warehouse used for housing the raw material inventories, maintained adequate buffer inventories, and executed purchase contracts with vendors, ensuring specifications were met while achieving the best possible price. Rick's department included two buyers, a material control clerk, an expediter, and two shippers-receivers.

It was common for Spartan to have multiple vendors for raw material supply, and the materials group used more than 350 vendors for its raw materials, with current lead times ranging from a few days to six weeks. This wide supplier base was necessitated by the customization strategy adopted by the company. Rick noted that approximately 35 percent of Spartan's purchases were for aluminum products, mainly tubes and sheets. On average, the plant had $3.5 million worth of inventory in the form of both raw and work in process. Raw material inventory constituted approximately 40 percent of the total. Rick estimated that Spartan had inventory turns of four times per year, which he believed was comparable to the competition.

Manufacturing operations regularly complained about material shortages and stockouts, and regular inventory audits indicated significant discrepancies with inventory records on the company's computer system. Furthermore, a significant amount of stock was written off each year due to obsolescence. Rick suspected that production staff regularly removed stock without proper documentation and that workers frequently deviated from established bills of material.

NEW BUSINESS STRATEGY

Competition in the heat exchanger industry had increased dramatically over the past decade, with much of the new competition coming from Korea and Europe. Korean firms, with their low cost base, competed primarily on price, while European firms focused on standardizing their product lines to a few high-volume products and competed on delivery lead time and price. Spartan's competitors in Europe used assembly-line manufacturing processes, rather than batch or job shop operations.

Senior management viewed the competition from Europe and Korea as an imminent threat. Many of Spartan's customers had recently developed aggressive

expectations regarding pricing and delivery lead times, and some key customers had decided to opt for standard product design, sacrificing custom design for lower cost and faster delivery.

The changing nature of the industry forced senior management to reexamine their business strategy. As a result, in January, a multidiscipline task force representing engineering, manufacturing, and sales was formed with the mandate to formulate a new five-year business strategy.

The new corporate strategy was finalized in May and reviewed with the management group on June 1 in an all-day staff meeting. The central theme of the new strategy was standardization of all product lines, in terms of both design and manufacturing, reducing variety to three or four basic lines for each product category. The sales department would no longer accept orders for specialized designs. The aim of the new strategy was to reduce the delivery lead time from 14 weeks to 6 weeks and to lower production costs dramatically.

NEW CHALLENGES FOR THE MATERIALS DEPARTMENT

Max Brisco indicated that he expected the materials group to play a major role in support of the new corporate strategy and needed to know by next week the specifics of Rick's plan. The task force had set a number of ambitious targets. First, customer lead times for finished products were to be reduced to six weeks from the current average of 14 weeks. Second, the new objective for inventory turns was 20 times. Meanwhile, raw material stockouts were to be eliminated. Third, Max believed that product standardization also would provide opportunities to reduce costs for purchased goods. He expected that costs for raw materials and components could be cut by 10 percent over the next 12 months.

Rick fully supported the new direction that the company was taking and saw this as an opportunity to make major changes. He knew that Max would want the specifics of his plan during the meeting in a week's time.

Case 2–2

Suman Corporation

In mid-April, Mike Bradie, vice president of supply chain management at Suman Corporation (Suman), had become increasingly concerned about the potential shortage of supply of barac, a new high-tech raw material for air filtration. During the last two weeks, Suman's three suppliers had advised Mike Bradie to sign long-term contracts and he was trying to assess the advisability of such commitments.

SUMAN

Suman Corporation of Pittsburg, Pennsylvania, produced high-quality consumer and industrial air conditioning and heating units. An extensive network of independent and company-owned installation and sales centers serviced customers throughout the North American market. Company sales last year totaled $1 billion.

AIR FILTRATION AND BARAC

For decades, Suman had sold air humidification and air filtration units along with its prime units in air heating and cooling. Until three years ago, air filtration had accounted for about 7 percent of total corporate sales and had been sold primarily as add-ons to a new air cooling and heating systems. However, with the advent of barac, air filtration had started to increase significantly as a percentage of total sales. Barac, a new high-tech product developed as part of the U.S. space effort had a range of unique properties of high interest to a variety of industries. In the case of air filtration, Suman developed and patented a process where barac could be transformed into a thin, very light, and extremely fine, mesh-like sponge material capable of filtering extremely small particles. The manufacturing cost of a barac filter amounted to about 28 percent of its selling price.

Given the population's sensitivity to air quality and the increasing number of people with asthma and allergies, the new Suman filters became popular, not only with new Suman air system installations but also as retrofits in older air conditioning and heating systems. Moreover, compared to electronic air cleaners, which cost about three times as much to install and required monthly cleaning, barac filters had to be replaced every six months, guaranteeing a continued sales volume of filters for years to come. When combined with an ultraviolet light unit, which killed airborne bacteria, a barac air cleaning system was considered a huge leap forward in air treatment.

AIR FILTRATION SALES

Along with the barac filtration system introduction three years ago, Suman's marketing department had initiated a significant promotional campaign directed at both the industrial and consumer sectors. Marketing's ability to forecast sales accurately had not been impressive, according to Mike Bradie. For the first year, marketing had forecasted barac filter sales at $2 million when in reality they sold $13 million. In the second year, the forecast was for $18 million and actual sales were $35 million. In the third year, a forecast of $48 million turned into actual sales of $87 million. The marketing department expected sales growth to level off over the next three years to a rate of 20 percent per year.

BARAC SUPPLY

Suman's first barac supplier was Levy Chemical, a longtime supplier of paints and adhesives to Suman and a large, diversified innovative chemical producer that held the patent on barac. Mike did not like the idea of single sourcing and, therefore, when barac requirements rose significantly in the second year, he brought in a second supplier, Vasey Inc., which not only produced the barac raw materials (under licence from Levy Chemical), but also manufactured a variety of barac products in the textile and automotive fields. In the third year, Mike had secured a third supplier, T.R. Specialties, a much smaller company than Levy Chemical and Vasey Inc., which also produced barac under license for its own applications in aerospace and the military, but had some excess capacity that it sold on the open market.

All three suppliers sold barac at identical prices, which had increased over the past three years. Actual volumes purchased by Suman from each of the three suppliers were as shown in Exhibit 1. The current price of barac from all three suppliers was $60.00.

SUPPLIER PROPOSALS FOR LONG-TERM CONTRACTS

During the first two weeks of April, Mike Bradie was visited by each of his current three barac suppliers with Levy Chemical first. Each warned that a shortage of barac supply was looming and that unless Mike was willing to sign a long-term contract, they would not be in a position to guarantee supply. However, each proposal was different.

Levy Chemical proposed a five-year contract with take-or-pay commitments of 25,000 pounds for the current year and 20 percent annual increases in volume for each of the following years. Prices were subject to escalation for energy, raw material, and labor every quarter based on the current $60.00 price per pound.

Vasey Inc. proposed a two-year contract for 10,000 pounds each year with similar price provisions to those of Levy Chemical.

T.R. Specialties suggested an agreement for 12.5 percent of Suman's annual requirements, which could be dropped at any time by either party, and proposed a price of $68.00 for the current year, to be adjusted semiannually thereafter, based on inflation, energy, labor, and material.

Although Mike did not know much about the actual manufacturing process for barac, he had heard that increases in capacity were expensive. He also understood that two of the three component raw materials for barac were by-products from industrial processes that were reasonably stable.

Since Mike Bradie had been able to buy almost all of Suman's needs on quarterly, semiannual, or annual contracts, he was not particularly keen on departing from his current supply practice. He had heard some rumors that a much lower cost substitute for barac might be developed in a few years. He suspected that his current suppliers were therefore anxious to tie Suman to a long-term commitment.

EXHIBIT 1
Suman Barac Purchases and Prices

Company	Capacity (in pounds)	Purchases (in pounds)		
		Year 1	Year 2	Year 3
Levy Chemical	80,000	5,000	10,000	20,000
Vasey Inc.	40,000	0	3,000	8,000
T.R. Specialties	20,000	0	0	4,000
Prices		$47.00	$50.00	$53.00

APRIL 15

On April 15, Jessie Woods, the Levy Chemical sales representative, sent an email to Mike Bradie requesting a meeting on April 22. The email concluded, "I would like to bring my sales manager, Rob Hares, so that we may discuss our proposal for the barac with you. We will not be able to guarantee you supply after August 1, if you are unable to commit."

Case 2–3

Stedmann Technologies

As Cynthia Clark, manufacturing engineering specialist at Stedmann Technologies (Stedmann), in Jacksonville, Florida, connected her computer to the conference room projector, she commented to Jonathan Anderson, senior buyer, who was sitting across the table: "Our presentation to the senior executive team is next Tuesday morning. I think we have all the financial data, but I want to make sure we can address any questions about our ability to effectively insource production if that is the way we decide to go."

It was Tuesday, January 9, and Cynthia and Jonathan were preparing for an important meeting on January 16, when they would report their recommendations regarding manufacturing of a new product. Stedmann was a leading manufacturer of custom-designed hybrid industrial cooling systems. The company was planning to launch a new product the following year, and Cynthia and Jonathan had been asked to evaluate the company's current strategy of outsourcing in favor of insourcing manufacturing.

STEDMANN TECHNOLOGIES

For more than 50 years, Stedman had specialized in custom-designed hybrid industrial cooling systems. It had annual sales of approximately $150 million and employed more than 300 people.

Stedmann was owned by Geist Corporation (Geist), a global multi-industry science and technology company with more than 30,000 employees and sales of approximately $8 billion. Management used the Geist Business System (GBS) of continuous improvement to guide company culture and business improvement activities. Developed in the mid-1980s the GBS was used to drive improvement in all parts of the company, including manufacturing operations and business processes such as new product development and global sourcing.

Industrial cooling systems were used in a wide variety of applications, such as refrigeration of food and pharmaceuticals and dissipating heat from machinery. These systems used either air or liquids to absorb and dispel the heat. There were four general types of industrial cooling systems: once-through, evaporative, dry, and hybrid. Once-though systems, commonly used in mills and power generation stations, pumped water from an adjoining river or lake through a system of tubes as means of controlling the temperature of the equipment. While evaporative systems worked by spraying water on tubes carrying coolants to reduce the temperature, dry systems used fans to channel cold air over the tubes. Most manufacturers of once-through, evaporative, and dry systems offered standard product lines that differed mainly in size (e.g., capacity) and industry application (e.g., oil and gas versus manufacturing). In contrast, hybrid systems were used when operating conditions required some combination of the three technologies and were typically custom designed. The global market for industrial cooling systems was estimated at $17 billion.

Stedmann specialized in the designed, engineering, and manufacturing of hybrid cooling systems for remote, arid locations for mining, oil, and gas and military applications. Its systems offered a compact design with a small footprint, easy installation and maintenance, and energy efficiency. In the most recent fiscal year, the company sold approximately 1,600 units, ranging from $50,000 to $250,000 per system.

THE INSOURCING ALTERNATIVE

In recent years, the company had increasingly received requests from customers regarding availability of Stedmann systems in the once-through, evaporative, and dry market segments. Denis Belanger, Stedmann's president, believed this represented an opportunity: "For more than half a century, we have designed solutions for our customers that leveraged our engineering capabilities

and experience with multiple technologies. Stedmann has a reputation in the market for quality and an excellent brand image. Although we have experience with once-through, evaporative, and dry technologies, we have chosen not to compete in these markets, which tend to be characterized by standard products. However, we have reconsidered this strategy. Our plans are to expand our product line, starting with the launch of a new system that uses dry cooling technology—the Stedmann DC1000. The DC1000 would be a standard product, not custom designed like our hybrid systems. We feel there is a strong market for this product with our established customer base."

In anticipation of launch of the DC1000, Denis Belanger asked Cynthia and Jonathan in July to evaluate manufacturing and sourcing alternatives. Cynthia described the situation: "Stedmann's traditional approach has been to outsource manufacturing and handle final product assembly in-house at our Jacksonville plant. Our expertise is in product design and engineering, marketing, and global sourcing. However, with the potential to access a large market for dry cooling systems, it made sense to consider in-house manufacturing and assembly. We felt this could provide a number of advantages, including greater control of product quality, shorter lead times, and lower total costs."

As a first step, sales estimates were provided by the marketing department. This forecast estimated sales of 500 units in the first year, increasing to 1,000 units per year thereafter. Cynthia and Jonathan used the forecast provided by marketing to establish costs for outsourcing and insourcing production. Exhibit 1 provides differences in production costs between the two options and Exhibit 2 provides an estimate of the capital costs for insourcing. No additional capital costs would be required if Stedmann continued under the current outsourcing arrangement.

The company currently sourced most of the components for its hybrid systems from suppliers in China. Jonathan negotiated pricing with suppliers based on the expected volumes provided by marketing for the DC1000. Since purchases represented consistent volumes of standard components over several years, he was able to negotiate price reductions of approximately 25 percent compared to similar components for hybrid systems. The estimates provided in Exhibit 1 show costs per unit, including assembly labor, FOB Stedmann's plant.

Working with equipment and raw material suppliers, Cynthia and Jonathan developed a manufacturing cell configuration and facility plan for the DC1000. Cell design was based on a capacity of 500 units per year, or two units per day, based on a one shift operation. Two shifts would double capacity, and additional capital would be required to increase capacity beyond 1,000 units per year. Cynthia estimated insourcing would require an 80,000-square-foot facility, including space for the cell, inventory storage, and an office. Since the existing Stedmann plant was at full capacity, additional space would need to be leased in another building. The cost estimates for insourcing provided in Exhibit 1 included an estimate of variable manufacturing costs to cover expenses such as building lease, power, energy, and indirect labor costs.

New employees would be hired under the insourcing option. Each shift would be staffed with 15 production workers, including CNC operators, welders, and assemblers. Indirect labor would consist of a total of 10 people: three engineers, two production leaders, buyer, production planner, material handler, quality assurance technician, and shipper/receiver. Indirect labor costs were estimated at $650,000 per year, including benefits.

FINALIZING RECOMMENDATIONS

As Cynthia and Jonathan reviewed the information they had collected and began preparing for the meeting the following week, the two discussed the reasons for the difference between the outsourcing and insourcing cost estimates. Jonathan stated, "I believe the savings are coming from four areas: transportation costs and supplier overhead, inefficiencies, and profit margins. Although the payback looks pretty convincing, the capital costs are significant. We need to make sure to address any potential risks if we are going to recommend a change from our current operations strategy."

EXHIBIT 1 **DC 1000 Production Costs ($ per unit)**

	Outsource	Insource
Material	$ 37,500	$ 10,756
Labor		2,700
Consumables		1,523
Outside processing		1,125
Subtotal	37,500	16,104
Variable overhead*	3,750	3,221
Total	**$ 41,250**	**$ 19,325**

* Variable overhead rates were 10% for outsource and 20% for insource.

EXHIBIT 2
Capital Costs

Equipment	Cost ($)
Plasma cutter	$ 704,000
Laser cutter	605,000
Welding equipment	814,000
Press brake	311,300
CNC lathe 1	1,423,400
CNC lathe 2	990,000
Horizontal mill	1,448,700
Vertical mill 1	543,400
Vertical mill 2	543,400
Bead blaster	330,000
Material handling equipment	462,000
Building infrastructure and electrical	588,500
Inspection and testing equipment	302,500
Tooling and fixtures	220,000
Miscellaneous equipment	170,500
Total	**$ 9,456,700**