

***Purchasing and Supply Management 17th edition
Johnson Solutions Manual***

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Chapter 2 EOC KEY

1. What are the major challenges in setting supply strategy?

The major challenges in setting supply objectives and strategy are covered on page 31. The challenges are identified: effective interpretation of corporate objectives and supply objectives, selection of the appropriate action plan or strategy to achieve the desired objectives, and the identification and feedback of supply issues to be integrated into organizational objectives and strategies. In essence, the principal challenge is understanding corporate objectives and strategies and identifying and seizing opportunities.

2. What factors have caused the current interest in, and attention to, strategic purchasing and supply planning?

This is an opportunity to bring current events, beyond the scope of the text, into the discussion. Examples might include geopolitical events, economic growth or contraction, supply shortages and disruptions, etc. The major challenges in setting supply objectives are covered on page 31, and the six categories of supply strategy are on pages 31-32.

3. How can supply sell itself more effectively internally?

The question does not specify to whom supply can sell itself. Top management? Other functions? The answers provided by the students should specify the context. For example, helping top management achieve corporate goals and strategies versus helping the V.P. of operations achieve their operational objectives for cost and quality through the timely delivery of goods and services that comply with specifications. The obvious linkages internally are with operations, finance, and marketing/sales.

4. What do you believe to be the most difficult obstacles to making a supply function strategic?

There are several possible answers, and it depends on the situation. It could be a lack of recognition by senior management of the opportunities in supply, or conversely, it could be the inability of supply to deliver value to the organization. Good answers will consider the context and possible remedies. Question 3 (selling supply internally) is also related to this question. An inability to demonstrate and communicate how and where supply can provide value can be a critical obstacle.

5. What type of data would supply need to contribute to an organization's strategic growth? How might supply obtain such data?

Figure 2-1 shows the relationship between supply objectives/strategy and organizational objectives/strategy. Figure 2-2 shows the relationship between current/future needs and markets. Both are relevant for this question. Understanding the relationship among these is critical if the supply function is to maximize its contribution to organizational success. Data from corporate strategic business plans, including sales growth and budgets, are a good starting point. These data can be supplemented with data from other functions, such as operations (e.g., production forecasts) and sales/marketing (e.g., sales forecasts and market share).

6. What role can (should) supply play in determining a firm's strategy in the area of social and environmental sustainability?

The issue of social and environmental sustainability is raised on pages 30-31 and 39. It is also covered throughout the textbook, including a section in Chapter 17. As stated in the textbook, sustainability performance must not only comply with legal obligations but also meet the values and standards of the organization's stakeholders, including employees, shareholders, government organizations, and customers. Therefore, sustainability has economic, risk management, and legal considerations. Supply can and should play a central role in this area. It has a significant impact on the sustainability performance of the supply chain through its selection and management of suppliers.

7. How can the supply manager determine which cost-reduction strategies to pursue?

Cost reduction strategies are covered on page 32. Understanding total costs of ownership, including the laid-down cost of what is acquired or the total cost of acquisition and use—life-cycle cost—is essential. Furthermore, cost reduction strategies must consider the competitive environment, such as 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.

8. Can you have a supply strategy in public procurement? Why or why not?

The question challenges the students to consider the context of public sector procurement. Clearly the answer to this question is yes. Public sector organizations spend a significant amount of money each year at the municipal, state/provincial, and federal levels. A sound supply strategy can help ensure value for funds spent. As stated on page 32, in the public sector, the term competitive edge usually may be interpreted to mean strong performance in achieving program objectives.

9. Why should a supply manager consider hiring (or obtaining internally) an employee without any supply background?

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This question requires the students to reflect on the activities and opportunities in supply. For example, the ability of someone with engineering background to discuss technical requirements of purchase with a supplier. Or a person with an accounting/finance background to analyze total the cost of ownership of a product or service. The supply strategy questions summarized in Figure 2-4 on page 36 can be used to discuss the range of activities and why a supply manager may want to hire a person without a formal supply background, presumably to leverage their skills in other areas. Notwithstanding, there is still a need to develop staff, regardless of their background, on sound supply management practices. The issue of background (e.g., supply versus non-supply) of senior supply executives, including the chief purchasing officer (CPO), is covered in Chapter 3.

10. What are the differences between operational and financial risks? How can supply managers approach these risks differently in the following areas: identification and classification; assessment and monitoring; and risk strategy?

Risk management is covered on pages 32-34. A starting point is to define operational risks (e.g., the risk of interruption of the flow of goods or services) and financial risks (e.g., the risk that the price or cost of the goods or services acquired will change significantly). While operational risks can have financial implications (e.g., lost sales from stockouts), financial risks may not impact operations (e.g., price increases of raw materials). The section, Managing Supply Risks, on page 34 addresses issues related to identification and classification of the risks, impact assessment, and a risk strategy. As stated in the text, identification and assessment can help identify high-impact, high-probability risks as organizations strive to make their supply chains both resilient and agile.

11. Reputational risk may be the most serious risk faced by most organizations. Do you agree or disagree with this statement? Why?

Reputational risk is covered on page 33. This question provides an opportunity to ask students to identify examples of companies that have experienced damages to their brand reputation from supply-related problems. While operational (e.g., raw material shortages) and financial (e.g., higher raw material costs) supply issues may represent short-term setbacks, reputational damages can affect shareholder value over the long term. As described in the textbook, firms such as Walmart and Apple dedicate significant resources to protect themselves from reputational risks by monitoring suppliers to ensure compliance with corporate codes of conduct.

12. How do changes in product and process technologies create potential supply risks?

Risk management is covered on pages 32-35. Changes in product and process technology have the potential of creating supply risks through obsoleting existing equipment, products, or services, or drastically changing the existing cost/price realities. For example, an organization 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 (e.g., financial risk). Similarly, technological innovation may result in the availability of products or services with superior quality or features, requiring changes to operations (e.g., operational risk).

13. How is supply risk management different for public and private sector organizations?

The textbook does not make specific reference to differences or similarities between public and private sector organizations with respect to risk management. Therefore, students need to consider how public and private sector organizations differ and the implications for supply risks. Every organization is exposed to supply risks, and public sector organizations are exposed to operational, financial, and reputational risks. Using an example in class may help frame context for the students. For example, government agencies generally function at the national, state, and local (e.g., municipalities) levels. The context of municipalities may be more familiar to students who use local government services. Most municipal organizations are not involved in global sourcing, which limits currency exposure. However, construction projects will be affected by commodity prices (e.g., oil and aggregates for road paving). Outsourced services (e.g., garbage collection) may expose municipalities to operational risks (e.g., service disruptions). From a political standpoint, reputational risks may cause the most serious problems for government senior administrators and politicians, who would want to avoid the negative publicity. The non-profit orientation of public sector organizations should be highlighted. While private sector organizations may be concerned about how supply risks impact profits and shareholder value, public sector organizations are mostly cost centers concerned with delivering value to stakeholders. While the question asks for differences, discussing the similarities and differences will provide for a rich class discussion.

14. What can supply do to assist in minimizing a firm's risk of product liability lawsuits?

Risk management is covered on pages 32-35. Product liability is one of the many potential risks that an organization might face. Students should be asked to consider the type of risk product liability lawsuits represent – operational, financial, reputational, or some combination. The issues of supplier quality (pages 36-37) are also relevant for this question.

15. Why should supply be concerned about the balance sheet?

This question addresses the “how much” versus “what price” on pages 37-38. Students should be able to demonstrate an understanding of assets and liabilities (balance sheet) as distinguished from revenues, costs, and profits (income statement). Most organizations tend to worry about cost savings and the cost of supply (income statement) versus opportunities to free up working capital and generate cash (e.g., inventory reductions). The section on “how much” on page 37 describes opportunities for reducing inventories and tradeoffs between pursuing lower prices through volume discounts as opposed to purchasing smaller volumes at higher prices and keeping inventories low. Also see Chapter 10, Price and Chapter 11, Cost Management.

CHAPTER TWO

Supply Strategy

Chapter Outline

Levels of Strategic Planning	<i>Who?</i>
Major Challenges in Setting Supply Objectives and Strategies	<i>When?</i>
Strategic Planning in Supply Management	<i>What Price?</i>
Risk Management	<i>Where?</i>
<i>Operational Risk</i>	<i>How?</i>
<i>Financial Risk</i>	<i>Why?</i>
<i>Reputational Risk</i>	Conclusion
<i>Managing Supply Risk</i>	Questions for Review and Discussion
<i>The Corporate Context</i>	References
Strategic Components	Cases
<i>What?</i>	2-1. <i>Suman Corporation</i>
<i>Quality?</i>	2-2. <i>Stedmann Technologies</i>
<i>How Much?</i>	2-3. <i>Topeka Elevators</i>

Case 2-1: Suman Corporation

Teaching Note

SYNOPSIS

Mike Bradie, supply chain manager at Suman Corporation, needs to decide on what strategy he should follow to protect its future barac needs.

TEACHING OBJECTIVES

The context of the case is to determine the appropriate purchasing strategy for the acquisition of key raw materials to protect against cycles of abundance and shortages. In doing so, the case deals with topics related to risk management and purchasing strategy. A third topic that can be covered with this case is supplier development/reverse marketing (see Chapter 12). For students to do an effective job analyzing the case and developing alternatives, they are expected to perform quantitative analysis using the data provided in the case.

SUGGESTED STUDENT ASSIGNMENT

If you were in the position of Mike Bradie, what is your assessment of the barac situation and what strategy would you adopt?

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POSSIBLE DISCUSSION QUESTIONS

1. What is the price that a purchaser has to pay for procurement flexibility?
2. How can supply be guaranteed in a period of market shortages?
3. What should the criteria be for establishing long-term contracts?
4. What are the real risks of being without barac for Suman?
5. Why are the suppliers interested in obtaining long-term contracts?
6. What strategies are available to Mike Bradie in this situation?

ANALYSIS

The purpose of purchasing strategy is: 1) To be congruent internally with and supportive of corporate strategy, as well as an input into strategic threats and opportunities, and 2) To assure that future markets will meet future corporate needs. This case is a fine illustration of the strategic role supply can play on both fronts.

It appears that Suman, which traditionally has had as its core strength the provision of equipment capable of temperature control (heating and cooling), has moved into a different thrust. Its new product has received strong market acceptance. However, as shown in Table TN-1, marketing seems incapable of giving a decent forecast, and they have been too low each time. Nor is supply in any position to create a more reliable forecast.

One thing is certain, however, purchasing is responsible for providing adequate supply of raw materials to support sales, regardless of what those sales turn out to be. Thus, with respect to quantities, supply needs to worry about the extreme positions, rather than the forecast.

From a company standpoint, the very best alternative would be the most optimistic scenario shown in Table TN-1. Were that to occur, barac filters sales would outstrip total company revenues by the sixth or seventh year (actually, only three or four years from now).

It is possible to look at the financial impact on the company of barac filters (see Table TN-2) during the first three years. By the 3rd year filter sales were contributing almost \$41 million to profit and provided a total contribution of approximately \$56 million to fixed costs and profits.

Tables TN-3 and TN-4 extend the forecasts in Table TN-1 for the forecast provided by marketing and an “optimistic” forecast. The conservative marketing estimate suggests sales of \$216 million and contribution of \$140 million by year 8. The optimistic forecast predicts sales of \$1.5 billion and contribution of nearly \$1 billion. There is no profit information provided for Suman’s standard heating and air conditioning lines, but even at 10 percent of sales on \$1 billion—\$87 million, or \$913 million of non-barac filter sales, an annual profit of \$91 million would be reasonable. Therefore, barac filters potentially could be the pot of gold at the end of the rainbow for Suman.

Thus, the challenge for purchasing becomes to assure supply no matter what the sales demand turns out to be. The price of barac is below two percent of selling price (see Table TN-2) and is practically immaterial.

It is possible to create a decision tree for the potential scenarios which Suman might face with respect to barac as is done in Figure TN-1. Therefore, the supply strategy that needs to be developed should be able to deal with the full set of scenarios.

Broadly speaking, what mistake will most likely get Mike Bradie fired? There are three potential sins that Mike could be accused of: 1) paying too much for barac, resulting in lost profit and contribution, 2) Buying too much barac—tying up working capital, increasing inventory holding costs, and exposing the company to disposal costs, and 3) Not having enough barac—resulting in stock-outs, poor customer service and lost market share. Let us examine the consequences of potential supply problems.

What Scenario is the Very Best for Supply?

Given such high uncertainty on demand and supply, it is a good question to ask: Which scenario would provide the toughest challenge for supply? As per Table TN-1 this would be the top combination of: high filter sales, barac supply market tight and barac price high. If Mike Bradie can develop a strategy that deals with this alternative, at least the worst consequences of underages would be avoided. Therefore, let us define the requirements for a high sales scenario.

As shown in Table TN-1, this would be the \$191 million sales this year, \$382 million next year, and \$688 million the year thereafter. Translating these sales dollars into quantities of barac gives the following figures assuming a sales volume of approximately \$2,700 per pound of barac (see Table TN-2). Based on the optimistic forecast (see Table TN-4), the demand for barac this year would be approximately 70,000 lbs., next year 140,000 lbs., and the following year 255,000 lbs. Comparing these figures to current market capacities in case Exhibit 1 shows the following:

	<u>Capacity</u>
Levy Chemical	80,000 lbs.
Vasey Inc.	40,000 lbs.
T.R. Specialties	20,000 lbs.
Total	140,000 lbs.

Given Suman's current volume of 32,000 lbs. (Exhibit 1 in the case) or about 23 percent of total industry capacity, the potential requirements of Suman for the coming years greatly exceed the current three suppliers' capability of supplying. Potentially, at approximately 255,000 lbs. two years from now, Suman would have to find additional capacity of about 220,000 lbs., assuming no growth in demand from any other customers and users of the current three suppliers.

Thus, the challenge changes from: Should we sign a long-term contract or not? To: How can we assure Suman will have sufficient supply? Even for the current year, what the suppliers are proposing would fall far short of Suman's barac requirements based on the optimistic forecast in Table TN-4.

The Capacity Challenge

Given the size of Suman's potential barac needs, the option of make or buy certainly deserves consideration. If T.R. Specialties can economically invest in a 20,000 lbs. plant and Vasey in 40,000 lbs. and Levy Chemical in 80,000 lbs., what are the economics of investing in a much larger facility? Given the profit margin on barac filters, it is quite possible that Suman is better off investing in increasing filter sales than making its own barac. Moreover, if the raw materials going into barac are by-products of other processes, supply of these materials might also become an issue.

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Given the reliance of Suman's profit dreams on barac supply, Mike Bradie is woefully inadequately equipped right now to deal effectively with a comprehensive barac supply strategy. Without knowledge of barac raw material markets and investments required for the make or buy question, about all Mike can do in the short term is show willingness to purchase any quantities he can get his hands on and to work in the meantime on a serious proposal to Levy Chemical.

Given that Levy Chemical holds the patent and is large and has been a good supplier, the president of Suman should probably meet with the president or an appropriate senior executive of Levy Chemical. The discussion would be as follows. "Unfortunately, we at Suman are unable to forecast with any accuracy what our barac requirements are going to be over the next three to five years. We hope they will increase significantly, but we are not sure. Let us take a look at your lead times and investments required to get additional capacity on stream in a hurry. We are willing to commit a very significant percentage of our barac requirements to you, if you can assure us that, should very high requirements materialize, you will be able to supply."

This kind of message should be music to Levy Chemicals' ears, because their patent position is really starting to pay off. Grabbing a customer like Suman with such high growth potential is a smart move.

It is worthwhile to consider Suman's bargaining power with its suppliers. Obviously, the names of the companies have been disguised in the case, two of the three barac suppliers (Levy Chemicals and Vasey Inc.) are large petrochemical companies. T.R. Specialties, although small than the other two suppliers, is still a large company. Asking students to give some examples of companies in this industry (e.g., Dow, DuPont, and BASF) helps to drive home the fact that the suppliers are much larger

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than Suman. Furthermore, barac production is likely a small part of their total business. The growth opportunities for barac, might be attractive, but the petrochemical business is complex and decisions related to investing in capacity can potentially take years. Furthermore, how does Mike Bradie, or even the president of Suman, get the attention of senior management at a large petrochemical company, such as Dow or DuPont?

RISK ANALYSIS

Mike Bradie is meeting on April 22nd with Jessie Woods and Rob Hares from Levy Chemical. What is the risk of signing the five-year agreement with Levy Chemical? The following analysis provides some context, providing the breakeven of monthly sales, based on the total contribution in the analysis provided in Tables TN-1, TN-2, TN-3, and TN-4:

- Commitment: $25,000 \text{ lbs./year} \times 5 \text{ years} \times \$80 \text{ (assumed average price)} = \10 mm
- Breakeven marketing forecast in year 4: $\$67 \text{ mm} / \$10 \text{ mm} = 1.8 \text{ months}$
(12 months / ($\$67 \text{ mm} / \10 mm))
- Breakeven optimistic forecast: $\$123 / \$10 \text{ mm} = 1 \text{ month}$ (12 months / ($\$123 \text{ mm} / \10 mm))
- Breakeven no growth: $\$56 / \$10 \text{ mm} = 2.1 \text{ months}$ (12 months / ($\$56 \text{ mm} / \10 mm))

CONCLUSION

The key points in this case are as follows:

1. The role of supply strategy is to contribute effectively to organizational goals and strategies.
2. The low cost of barac and the high contribution from filter sales place emphasis on supply assurance.
3. Mike Bradie's job is not to forecast filter sales or barac process or market conditions, but to assure supply no matter what happens.
4. Mike Bradie needs the support of other members of Suman senior management, especially marketing, and the CEO, if he is to assure supply of barac.
5. It is already very late to be addressing the availability of barac. It should have been on supply's radar screen earlier.
6. The current supply challenge clearly requires top management involvement.
7. The lack of information about barac costs, investments, raw materials, future sales, and so on, is worrisome.
8. There still is an opportunity for Mike Bradie to start doing what he should have been doing much earlier—start thinking strategically.

TEACHING PLAN

I use this in my last MBA supply chain class. It is an excellent case to review some basic course topics, but also examine the strategic role of supply and risk management, both of which are covered in Chapter 2.

I start the class by asking what students want to do at the meeting with Levy Chemical on April 22nd. I ask if they are prepared to sign the five-year contract and if they want to negotiate. Usually students argue for a shorter-term contract and want to negotiate the price. Many students cite the risk of the rumored new product that may become available. After a discussion of students' plans, I ask: "What are the three worst mistakes that Mike Bradie can make"? These are as follows:

- Not enough barac
- Too much barac
- Pay too much for barac

I then ask: Which one can get Mike Bradie fired? Not having enough barac in this situation would be a major blow to the company and thus Mike Bradie.

Next, I walk the students through the analysis, in sequence, in Tables TN-1, TN-2, TN-3, and TN-4. I conclude this part of the discussion with analysis of the breakeven to quantify the risk.

At this point the issue of supply assurance has been established. The final part of the discussion is to develop alternatives. There are several that should be identified by the students, including:

- Make versus buy
- Alliance/partnership
- Buy supplier (Note that the suppliers are likely much larger than Suman)
- Stockpile
- R&D, new product development
- Reverse marketing/supplier development

I conclude the class with a discussion of risk management and the strategic role of supply. I remind the students that supply is not just about low cost, but they need to worry about supply shortages and to protect core business operations.

WHAT HAPPENED

It is worthwhile to know what happened. Mike Bradie refused to sign the five-year contract, preferring a short-term contract and to negotiate price. Levy Chemical refused to supply barac to Suman without a long-term contract. Meantime, sales of barac filters continued to sell well, and Suman ran out of supply of barac. Mike Bradie was fired, and when his replacement was hired, he met with the president of Suman on the first day, who said: "Fix the barac problem"

Table TN-1
Barac History and Projections
(In Millions of Dollars and Percentages)

Year	1	2	3	4	5	6	7	8
Marketing's Projections (\$)	2	18	48	104	125	150	180	216
Marketing Growth Forecast (%)		28%	37%	20%	20%	20%	20%	20%
Actual Sales (\$)	13	35	87					
Growth Actual (%)	1,300%	170%	150%					
Optimistic (%)				120%	100%	80%	60%	40%
Optimistic \$				191	382	688	1,100	1,540
Pessimistic \$				96	96	77	54	32
Pessimistic %				+10%	0	-20	-30	-40

Table TN-2
Historical Performance

	Year 1	Year 2	Year 3
Filter Sales	\$13 million	\$35 million	\$87 million
Barac Purchases lbs.	5,000	13,000	32,000
Barac Purchases \$	\$235,000	\$650,000	\$1,686,000
Barac \$ as % of sales	1.81%	1.86%	1.94%
Manufacturing Cost 28% of sales (given)	\$3.64 million	\$9.80 million	\$24.36 million
\$ Sales/lbs. Barac	\$2,600	\$2,690	\$2,720
Selling and Administrative(est. 25% of sales)	\$3.25 million	\$8.75 million	\$21.75 million
Profit Before Tax	\$6.11 million	\$16.45 million	\$40.89 million
Variable overhead (est.: 30% of SG&A)	\$975,000	\$2.625 million	\$6.525 million
Contribution [sales – (mfg. + variable overhead)]	\$8.4 million	\$22.6 million	\$56.1 million

Table TN-3
Marketing Forecast

	Year 4 (F)	Year 5 (F)	Year 6 (F)	Year 7 (F)	Year 8 (F)
Marketing forecast (\$)	\$104 mm	\$125 mm	\$150 mm	\$180 mm	\$216 mm
\$ Sales/lbs. Barac (est.)	\$2,700	\$2,700	\$2,700	\$2,700	\$2,700
Barac Purchases lbs.	38,000	46,000	55,000	65,000	80,000
Barac Purchases \$*	\$2.5 mm	\$3.3 mm	\$4.3 mm	\$5.5 mm	\$7.2 mm
Manufacturing Cost (28%)	\$29 mm	\$35 mm	\$42 mm	\$50 mm	\$60 mm
Selling and Administrative	\$26.0 mm	\$31.3 mm	\$37.5 mm	\$45.0 mm	\$54.0 mm
Profit Before Tax	\$49 mm	\$59 mm	\$71 mm	\$85 mm	\$102 mm
Variable overhead	\$7.8 mm	\$9.4 mm	\$11.3 mm	\$13.5 mm	\$16.2 mm
Contribution	\$67 mm	\$81 mm	\$97 mm	\$116 mm	\$139 mm

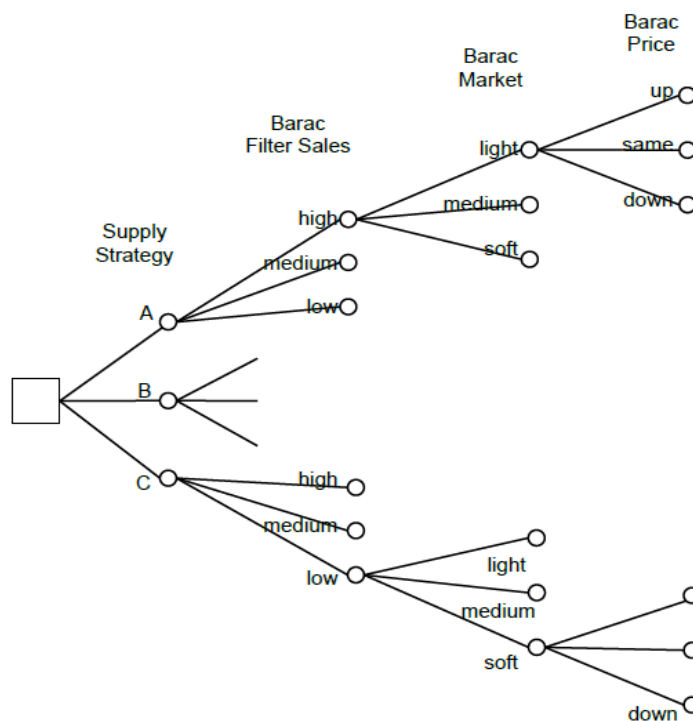
* \$65 year 4; \$72 year 5; \$78 year 6; \$84 year 7; \$90 year 8

Table TN-4
Optimistic Forecast

	Year 4 (F)	Year 5 (F)	Year 6 (F)	Year 7 (F)	Year 8 (F)
Market forecast (\$)	\$191 mm	\$382 mm	\$688 mm	\$1,100 mm	\$1,540 mm
\$ Sales/lbs. Barac (est.)	\$2,700	\$2,700	\$2,700	\$2,700	\$2,700
Barac Purchases lbs.	70,000	140,000	255,000	410,000	570,000
Barac Purchases \$*	\$4.6 mm	\$10.2 mm	\$20.0 mm	\$34.2 mm	\$51.3 mm
Manufacturing Cost (28%)	\$54 mm	\$107 mm	\$193 mm	\$308 mm	\$431 mm
Selling and Administrative	\$48 mm	\$96 mm	\$172 mm	\$275 mm	\$385 mm
Profit Before Tax	\$90 mm	\$180 mm	\$323 mm	\$517 mm	\$724 mm
Variable overhead	\$14.3 mm	\$28.7 mm	\$51.6 mm	\$82.5 mm	\$115.5 mm
Contribution	\$123 mm	\$246 mm	\$ 444 mm	\$710 mm	\$993 mm

* \$65 year 4; \$72 year 5; \$78 year 6; \$84 year 7; \$90 year 8

Figure TN-1
Barac Purchasing Strategy Decision Tree



Case 2-2: Stedmann Technologies

Teaching Note

SYNOPSIS

On Tuesday, January 9th, Cynthia Clark, manufacturing engineering specialist at Stedmann Technologies (Stedmann), in Jacksonville, Florida, and Jonathan Anderson, senior buyer, were preparing for an important meeting in one week when they would report their recommendations for the manufacturing of a new product, the DC1000, to the senior executive team. Cynthia and Jonathan were evaluating whether Stedmann should depart from its current operations and supply chain strategy of outsourcing in favor of insourcing product manufacturing.

TEACHING OBJECTIVES

Most cases on purchasing and supply chain management deal with issues related to outsourcing, such as supplier selection and coordination. This case presents students with a situation where they must assess the merits of making as opposed to buying. In doing so, it provides the opportunity to evaluate the financial and strategic trade-offs when formulating operations and supply chain strategies. Decisions to make versus buy should not be taken lightly. What a firm makes versus what it outsources directly impacts the organization's operational competencies and influences corporate strategy.

SUGGESTED STUDENT ASSIGNMENT

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1. As Cynthia Clark, what recommendations would you make to the executive committee regarding the manufacturing of the DC1000 and why?
2. What are the risks of insourcing production? What are the potential benefits? Besides cost, what other factors should Cynthia Clark and Jonathan Anderson take into consideration?

POSSIBLE DISCUSSION QUESTIONS

1. What is the payback of insourcing the DC1000?
2. What factors might Stedmann's customers consider besides cost when purchasing a cooling system?
3. How are the custom and hybrid cooling systems markets different? What are the key success factors? What are the margins?
4. What are the risks of insourcing? What are the benefits?
5. Why has Stedmann adopted a strategy of outsourcing for its products? Do you think that there are similar financial benefits available for insourcing other products?
6. How long do you think it will take to setup the facility to produce the DC1000? How long will it take before the plant achieves a reasonable operational efficiency rate?

ANALYSIS

The case refers to “insourcing”; however, the DC1000 is a new product. Therefore, a more accurate description of the decision, as described in Chapter 5 of this textbook, is make versus buy. Technically, insourcing is the decision to reverse a past decision to buy.

Financial analysis offers a convincing case in favor of insourcing production of the DC1000. Exhibit TN-1 provides a summary of the analysis, using the data from case Exhibits 1 and 2. The savings per unit is \$21,925, or approximately 50 percent of the cost of outsourcing (\$41,250). The payback on the \$9.5 million in capital equipment (case Exhibit 2) is approximately 10 months at 500 units per year and five months at 1,000 units per year.

The case indicates that the production rate is two units per shift representing 500 units per year. Two shifts are required to meet the forecast of 1,000 units per year. Labor costs provided in case Exhibit 1 are \$2,700 per unit, which represents \$5,400 per shift. Based on 15 production workers producing two units per shift, this represents an average cost of \$45 per hour, including wages, benefits and other associated employee costs, assuming an 8-hour shift. Positions such as CNC and milling machine operators and welders are skilled jobs, likely commanding wages of \$50,000 to \$70,000 per year (not including benefits). The \$45 per hour cost looks reasonable.

As shown in Exhibit TN-1, the estimates for variable overhead costs for the insource option range from approximately \$1.6 million to \$3.2 million per year, depending on volumes (e.g., 500 units versus 1,000 units per year). The major costs will be for the facility (e.g., rent, power, and taxes) and indirect labor. Lease costs in Jacksonville, Florida for industrial property at the time of the case were about \$6 to \$7 per square foot per year, representing approximately \$500,000 per year. Assuming an average cost of \$75,000 per year for the 10 indirect labor staff, the annual cost would be \$750,000. It would appear that the budget would cover these expenses.

The case indicates that Jonathan Anderson was able to secure cost reductions from suppliers of 25 percent based on the projected volumes for the DC1000 components. Lower prices make sense given the steady volume of standard components. The \$37,500 cost suggests that the variable costs for the outsource option were about \$50,000 per unit for existing products. Including variable overhead, the cost would be about \$55,000. The case indicates that the company sold approximately 1,600 units, ranging from \$50,000 to \$250,000 per system. Annual revenues were \$150 million, which likely includes service parts sales. Based on \$125 million of revenues from the sale of new systems, the average price would be approximately \$78,000, which represents a 30 percent margin (e.g., \$23,000/\$78,000). Using a 30 percent margin based on the outsource cost of \$41,250, the selling price for the DC1000 would be \$58,000. At 1,000 units per year, the DC100 represents a \$58 million business, which is about 40 percent of Stedmann’s current revenues.

Operations and Supply Chain Strategy

There are two strategic issues to consider. The first issue is the decision to enter the market for dry cooling technology. Stedmann has previously focused on custom products, which is a make-to-order market. Capabilities to design custom products for individual customer needs is an important key success factor. Stedmann, therefore, currently competes on flexibility and service. In contrast, the DC1000 is a standard product in a make-to-stock environment. Deliver (or availability) and cost are

the main key success factors. Presumably Stedmann's competitors have similar products available with respect to capacity, performance, and cost. Keeping costs in line is critical, which makes the insourcing option particularly attractive provided they can perform as expected operationally. This would also suggest that a 30percent gross margin for a standard product might not be realistic and the price for the DC1000 is likely less than the \$58,000 estimate provided in the analysis above.

The second strategic consideration is the change in operations and supply chain strategy to "make" versus "buy." This is a significant change that necessitates the development of a new set of capabilities—which represents the principal learning objective of the case. Exhibit TN-2 provides a framework of operations and supply chain decisions that include three categories: structural, infrastructural, and integration. The structural and infrastructural categories are operational, and the integration category is related to supply chain capabilities. Starting a new plant from scratch will mean developing capabilities in each of the three areas. At this point, Cynthia and Jonathan have a concept, including a preliminary facility and capital plan, but do not have the organization, systems, and equipment in place. As the saying goes: "Strategy is easy, execution is hard." Stedmann's current operations and supply chain strategy are to rely on suppliers for manufacturing and perform final assembly in-house. This allows the company to focus on what it considers its core competencies of product design and marketing. Manufacturing the components for the DC1000 is much different from performing final assembly. Potential operational and supply chain risks include:

- No experience with manufacturing technology, including CNC, plasma cutting, and milling equipment.
- Systems for manufacturing planning, scheduling, and inventory control will need to be developed. It is not clear from the case that Stedmann's ERP system has modules that will support these activities. TBEXAM.COM
- New raw material suppliers will need to be identified and contracts negotiated. Does Jonathan want to single or dual source? Systems will need to be put in place for forecasting, scheduling and delivery. Contracts with transportation service providers will need to be negotiated.
- Quality assurance processes will need to be developed and implemented.
- Employees will need to be hired and trained.
- Continuous improvement initiatives and employee involvement in quality and process improvements will need to be setup.

Perhaps the biggest risk is that operational and supply chain problems prevent Stedmann from meeting customer demand at this critical time. Late deliveries, quality problems and capacity constraints could frustrate customers, and Stedmann could damage its reputation, which could represent long-term consequences. The cost advantages of insourcing are worthless if Stedmann is unable to satisfy customer requirements for cost, delivery, and quality.

Notwithstanding the risks, there are a number of potential advantages of insourcing, some of which are identified in Cynthia's quote in the case: greater control of product quality, shorter lead times and lower total costs. These benefits can be achieved, in part, through collaboration between the product and process engineers, which is made possible through insourcing and local manufacturing. Manufacturing and assembling the product in-house will provide insights regarding opportunities for product and process improvement that are often elusive when production is outsourced to several different suppliers.

TEACHING STRATEGY

As part of the class introduction, I start off by recognizing that the decision has been made to launch the DC1000 and we need to get ready. I then ask for a class vote: How many people favor continued outsourcing versus insourcing? I tell the students that there are no hybrid options—they need to pick one of the two options. It is important to emphasize that this is a critical period for Stedmann. Success or failure will have important consequences for its expansion plans and financial performance. Is this a first step, and does the company want to expand into other segments in the future?

Next, getting the financial analysis (Exhibit TN-1) helps establish the financial viability of insourcing. Obviously, if the numbers do not make sense, then there is no reason to pursue this option. Class discussion can then transition to the pros and cons (e.g., risks) of insourcing. The framework in Exhibit TN-2 can be used to structure the class discussion. Probing questions will need to be asked, such as: What are the company's core capabilities? Do they include product manufacturing?

It is worthwhile to pause at this point in the discussion and explore the differences between the markets for custom-designed hybrid industrial cooling systems and standard products, such as the DC1000. Students should recognize the differences in competitive priorities—competing on flexibility versus cost—and the implications for the operations and supply chain decision areas in Exhibit TN-2. The implication is that there are two issues impacting Stedmann's operations and supply chain strategy: insourcing versus outsourcing and custom versus standard products. This can be illustrated in the matrix in Exhibit TN-3. The operational and supply chain capabilities required to compete in these quadrants are different.

I conclude class with a comment that despite the potential financial advantages, insourcing has considerable risks. One other possible alternative would be to dig deeper into the differences between the insourcing and outsourcing options. Jonathan attributes the gap, which is more than 50 percent, to “transportation costs and supplier overhead, inefficiencies and profit margins.” However, a more thorough understanding of the reasons for a difference will help validate the analysis provided by Cynthia and Jonathan.

Exhibit TN-1 Financial Analysis

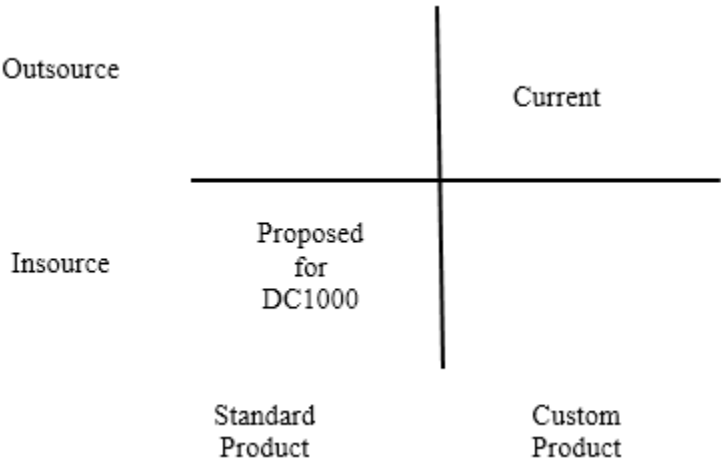
	Outsource	Insource
Material	\$ 37,500	\$ 10,756
Labor		2,700
Consumables		1,523
Outside processing		1,125
Subtotal	\$ 37,500	\$ 16,104
Variable overhead	3,750	3,221
Total	\$ 41,250	\$ 19,325
Difference		\$ 21,925
Total variable overhead @ 500 units	\$ 1,874,993	\$ 1,610,415
Total variable overhead @ 1,000 units	\$ 3,749,985	\$ 3,220,830
Annual savings @ 500 units		\$ 10,962,428
Annual savings @ 1000 units		\$ 21,924,855
Payback @ 500 units (months)		10.4
Payback @ 1,000 units (months)		5.2

Exhibit TN-2 Operations and Supply Chain Strategy Decision Areas

Structural Decisions	Infrastructural Decisions	Integration Decisions
Capacity - Amount - Type Facilities - Size - Location - Focus/specialization Scope - Process technology - Information technology	Workforce Organization Production planning and control Quality New product and process development	Supply chain - Make versus buy - Supplier relationships - Customer relationships Distribution - Channel choices

Source: Adapted from: Robert H. Hayes and Steven C. Wheelwright, *Restoring Our Competitive Edge: Competing through Manufacturing* (New York, NY: John Wiley, 1984); T.J. Hill, *Manufacturing Strategy: The Strategic Management of the Manufacturing Function* (London, UK: Macmillan, 1993); Steven C. Wheelwright, "Japan—Where Operations Really are Strategic," *Harvard Business Review* 59, no. 4, 1981: 67–74. A.V. Roth and H. Schneider, "Customer Driven Manufacturing Strategy: A Paradigm Shift," Duke University, 1990.

Exhibit TN-3
Strategic Positioning of Stedmann



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Case 2-3: Topeka Elevators

Teaching Note

SYNOPSIS

Christie Lyons, director of purchasing at Topeka Elevators, had been asked by Ameet Advani, Topeka Elevator's CEO, to present a five-year plan for the purchasing department at a meeting with the executive management team scheduled for Monday, May 6. In preparation for the meeting, Christie asked her analyst to prepare a report analyzing all expenditures made by the company with outside suppliers over the previous year. It was now April 25, and Christie was reviewing the information on the company's spend and preparing her analysis and recommendations in preparation for the meeting.

TEACHING OBJECTIVES

This case touches on several important issues, including supply strategy, organizational issues in supply, turnaround management, inventory control, and budgeting and planning. The following learning outcomes are addressed in the case:

- Analyze company spending data and identify opportunities to reduce costs.
- Analyze inventory data and understand the cost implications.
- Understand the implications of moving from a decentralized to centralized organization structure for the supply function.
- Demonstrate the ability to develop a five-year plan, including a budget and development of organizational resources.
- Assess and evaluate potential trade-offs regarding improvements to supply chain performance and develop suitable implementation plans.

SUGGESTED STUDENT ASSIGNMENT

If you were in the position of Christie Lyons, what would be your analysis of the situation at Topeka Elevators, and what would you present at the executive management team meeting on May 6? Include your annual cost savings estimates, departmental budget, and specific action that you would take to achieve your objectives.

POSSIBLE DISCUSSION QUESTIONS

1. Where would you start? With which of the purchase categories?
2. How much money do you think you can save in each of the next five years?
3. What are the inventory turns for farm supplies? What kind of improvements can be made in inventory management and how?
4. What changes would you make to the organization?
5. What are the risks to achieving your objectives?
6. Why do you think that Christie Lyons has not proposed a cost reduction plan in the past?

ANALYSIS

This is a rare opportunity for Christie Lyons to redefine the role of the supply function at Topeka Elevators. The company's poor financial performance has provided the impetus for a change, and the new CEO appears to be open to suggestions for solid opportunities to improve the bottom line.

A couple of points need to be made here. First, Topeka Elevators is a service organization and you can reinforce to your students that supply can play an important role in firms in the service sector, as well as in firms from the manufacturing sector.

Second, Christie's meeting with the executive management group could be a win/lose scenario for supply and for Christie. It is possible that if Ameet Advani, Ryan Bauer, and the other members of the executive management team do not like what Christie has to say, they may want to downsize the supply group and focus resources in more productive areas. It is conceivable that Christie could find herself in a diminished role, or even worse, out of a job. Ameet wants to establish a turnaround plan and set organizational priorities. Christie needs to make sure that supply will be a major component of his plan.

A Look at the Numbers

Christie and Sunny Dhillon have already had some work done to analyze the company's spend and inventories (case Exhibits 2 and 3). It is worth noting that the spend numbers for farm supplies in case Exhibit 2 (\$305,287) do not match the total in case Exhibit 3 (\$372,940). These are the actual figures from the company, and the differences are a result of poor information systems that created problems for the analyst (Sunny Dhillon).

Based on a spend of \$874 million, various cost savings percentages are as follows:

Percent Savings per Year	\$ Savings per Year
3%	\$26 million
5%	\$44 million
8%	\$70 million
10%	\$87 million

Inventory reductions represent another opportunity. The following is an analysis of inventory turns:

Category	Average Inventory (\$000)	Annual Purchases (\$000)	Inventory Turns
Crop protection products	\$78,118	\$ 149,635	1.9 times
Equipment and supplies	26,866	16,492	.6 times
Fertilizer	25,126	156,688	6.2 times
Seed	12,467	50,144	4.0 times
Total	\$ 142,576	\$372,940	2.6 times

Assuming a carrying cost of 25 percent per year, annual inventory carrying costs are approximately \$36 million per year. If annual purchases remain constant, improving turns could provide the following benefits:

Inventory Turns	Average Inventory	Inventory Reduction	Carrying Costs Savings
3 times	\$124 million	\$19 million	\$4.75 million
4 times	\$93 million	\$50 million	\$12.5 million
5 times	\$75 million	\$68 million	\$17 million
6 times	\$62 million	\$81 million	\$20.25 million

Compared to what the MIS director is proposing, there are substantial opportunities in the supply area. A key question is how much to promise and when.

Preparing the Plan

Targeting costs savings of three to five percent per year and inventory turns of four to five times per year are realistic long-term objectives. Such performance would provide savings (value improvements and total cost of ownership reductions) of \$26 to \$44 million per year on purchases and another \$12.5 million to \$17 million in inventory carrying costs, representing a total in the range of \$50 million. It would also free up approximately \$50 to \$68 million in cash through inventory and working capital reductions.

However, achieving this level of savings performance is going to require the following:

- Corporate willingness to depart from its centralized philosophy.
- Appropriate expertise in-house to manage ongoing commitment to value improvement.
- Additional specialized external expertise to augment internal resources as required.
- The ability to dig deep into the details and slug it out at the ground level.
- Commitment of sufficient funds.
- Cross-functional support and involvement.
- Significant top management involvement and commitment at the corporate and business unit levels.

The old phrase, “spend money to make money,” certainly applies here.

What Can be Achieved and When?

Christie might consider a five-year timeline. Ramp up to achieving full potential of savings may take a couple of years as she builds talent in the organization, prioritizes initiatives, and develops business processes. The following is one possible set of objectives:

	Value Improvement Targets
Year 1	- Value improvements and total cost of ownership reductions of \$5 million - Inventory and working capital reductions of \$5 million
Year 2	- Value improvements and total cost of ownership reductions of \$12 million - Inventory and working capital reductions of \$10 million
Year 3	- Value improvements and total cost of ownership reductions of \$20 million - Inventory and working capital reductions of \$10 million
Year 4	- Value improvements and total cost of ownership reductions of \$25 million - Inventory and working capital reductions of \$15 million
Year 5	- Value improvements and total cost of ownership reductions of \$28 million - Inventory and working capital reductions of \$15 million
Total	- Value improvements and total cost of ownership reductions of \$90 million - Inventory and working capital reductions of \$55 million

It is important to point out the cumulative effects of the savings. For example, assuming that the \$5 million saving from year 1 declines at a ~~rate of 50 percent~~ each year, the ongoing savings is:

- Year 1: \$5 million
- Year 2: \$2.5 million
- Year 3: \$1.25 million
- Year 4: \$625,000
- Year 5: \$313,000
- Total: \$9.88 million

Although the initial savings is \$5 million (year 1), the ongoing savings are double that amount. If the savings can be maintained and are not clawed back by suppliers, the total sum would come to \$25 million.

Budget and Resources Required

Christie needs to specify what she will need to accomplish her objectives in the following areas:

- Staffing
- Consulting
- Other (e.g., technology, travel, and supplier conferences)

Staffing will most certainly be the most costly category. The organization structure for the current supply group is provided in case Exhibit 1. Exhibit TN-1 provides an example of the new organization structure with five new commodity managers (assuming two commodity managers for farm supplies).

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Of course, students may develop very reasonable structures that deviate from Exhibit TN-1. The point is to consider how the organization will have to change to accomplish its objectives.

Using Exhibit TN-1 as a benchmark, the supply organization increased from 11 to 15 people. In addition to the five commodity managers, there are also two buyers and four administrative and support staff (clerk, administrative support, and expeditor). The buyers can handle small value purchases and purchases that fall outside the scope of the commodity managers.

Overall, the talent level of the new group in Exhibit TN-1 has been improved, and the salary levels will reflect the abilities of the individuals involved. Consequently, Christie's total budget might be:

• Staffing	\$ 1,500,000
• Consulting	150,000
• Other	<u>250,000</u>
• Total	\$ 1,900,000

Note that by year 5, for every dollar proposed in the budget, the return is \$15 in value improvements and cost reductions and an additional \$8 in inventory and working capital reductions. This represents a 23:1 payback ratio. This obviously represents a much better opportunity compared to the proposal by the MIS group.

How to Achieve the Objectives

To give the executive management team some confidence that he can achieve the cost reduction targets, Christie should identify some immediate opportunities as part of a short-term plan. Obviously, planning specific cost reduction activities three or four years out is not realistic at this point. Examples of some short-term projects are telecommunications, energy, fleet, and MRO. Christie might want to focus on areas, such as these, where outside experts can be used as she recruits her team. With 20 suppliers accounting for 45 percent of the total spend and the top five representing 35 percent, Christie may want to personally focus on this group to explore opportunities for quick savings.

As Christie builds her organization, she can take on more large projects. Investments in technology, or even p-cards, might be one area to focus on reducing the transaction costs of small value purchases.

Final Comments

The key to this case is to link the various pieces together. Christie cannot be expected to deliver more results without appropriate resources. Perhaps the biggest risk is lack of top management support. The CEO will need to send a clear message to the organization regarding his support for the new supply initiative and be prepared to backup his words with action. Christie and her group will not be able to deliver results without the support of others in the company, and the larger the improvement target, the greater the organizational support required.

One interesting question is Christie's long-term role. To pull this off, she will need to change her role and management focus and establish organizational credibility. If Christie's orientation is toward a tactical, trouble avoidance role, it is unlikely he will be successful. The chief purchasing officer (CPO) for Topeka elevators will need to be aggressive, be able to work effectively with others in the organization, understand where to look for the big wins early, be an effective negotiator, and have the

confidence of others in the organization. It is entirely possible that someone more senior and experienced will be needed to run the supply function at Topeka Elevators. If this is the case, Christie will have to decide what role she wants to play in the new organization.

Exhibit TN-1
Example of Proposed Organizational Structure

