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Supply Chain Management: A Case Study of Issues For BioAg

ABSTRACT: Supply chain management has become an increasingly important topic to agribusiness managers during the past five years. Drivers of this trend include buyers seeking higher levels of customer service and efforts by firms to control costs, especially inventory.

This case introduces the reader to supply chain management. It would work well either as part of a capstone course, in a special topics course, or in an executive education course. The case explores some of the issues and dilemmas associated with supply chain management efforts at BioAg, a small Midwestern firm that manufactures agricultural chemicals that are environmentally sensitive.

BioAg's Company History[1]

BioAg is a small Midwestern firm manufacturing agricultural chemicals that are environmentally sensitive. Important patents help protect BioAg's 60% market share in its market segment. Although still small, the niche market for environmentally sensitive agricultural chemicals has been growing about 50% per year since 1991.

BioAg has experienced rapid growth in sales because of an increasing societal concern about environmental issues (see Table 1 for a summary of BioAg). In 1991, the company started with two products. By 1998, the BioAg product line included 36 different chemicals for use on wheat, barley, corn, soybeans, and specialty crops. BioAg has no retail outlets, but rather sells their products through farm input supply firms. As the number of products has grown, BioAg has sold its

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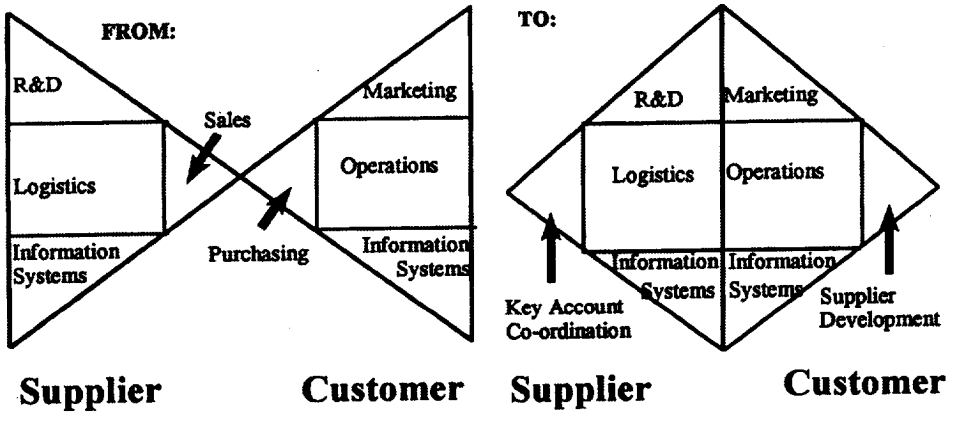
Table 1. BioAg's Sales, Product Line, Number of Sellers, Market Area, by Year

	Year							
Item	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Sales (million $)	.50	.75	1.25	2.50	3.75	7.50	12.50	18.00
Number of Products	2	4	5	7	8	12	20	36
Number of Farm Supply Sellers	8	12	22	40	70	140	280	420
Number of States Product Sold in	1	2	3	6	8	12	16	24



Source: Peck, Helen, 1998, *Partnerships in the Supply Chain: Introducting Co-Managed Inventory at Guinness GB*, Council of Logistics Management, Oak Brook, IL.

Figure 1. Changes in Procurement with Shift to SCM

products through more and more supply firms. The company now sells their products through 420 supply firms in 24 states, up from only eight supply firms in one state in 1991. They anticipate selling in international markets within three years.

The top management of BioAg consists of a microbiologist (Abe) and a cereal scientist (Ben). They are excellent research scientists and have shared leadership of the company. Abe and Ben recently attended the American Crop Protection Association (ACPA) annual meetings, which featured several sessions about supply chain management.

During one session, Farmco, a large regional input supply firm and BioAg's major reseller, announced their intentions to move aggressively with supply chain management initiatives. In a pilot project with a seed company, Farmco lowered inventory stocks by 10% and increased customer service (as measured by on-time deliveries) by 5%. Farmco feels there are three keys to building a successful supply chain relationship. First, the buyer and seller must move from an adversarial to a partnership-type relationship. Second, to manage inventory levels, the two firms must coordinate and streamline their logistics. Finally, information systems must

allow them to share key information, thereby improving communication, allowing quicker action, and better decision making.

Upon their return, Abe and Ben convene a meeting with four key BioAg managers, Cindy, Dee, Ernie, and Fred. Cindy is the sales manager, Dee runs information systems, Ernie heads R&D, and Fred leads logistics. Abe and Ben show the other four a graphic from the ACPA meeting and ask how should BioAg proceed to adopt this type of change with Farmco and other customers (see Figure 1).

"I think this would be a huge mistake," starts Cindy, the sales manager. "We have been aggressively expanding our supplier base. Look at how I've expanded the number of farm input supply firms in the past four years. It is the competition among the dealers that is leading to our growth. Besides, my job is to sell. Others are supposed to service accounts."

Ben replies, "I understand that, but Farmco has $500 million in sales. They account for 35% of our sales and 20% of our 420 dealers. They are among our most important customers."

"I'm also skeptical," adds Ernie. "We are a company living with proprietary technology. Your idea seems to imply that we share our R&D with our customers. How do I know that our ideas won't end up in the hands of our competitors?"

Abe says, "That is an important question Ernie. But we're looking at our relationship with Farmco as a partner. Don't we have to trust our partners?"

Dee from IT then offers, "I'm sure that we could eventually get there. However, most of our efforts are focusing on Y2K (year 2000) fix-ups. I'm sure that Farmco and our competition won't move for at least two years."

Abe responds, "I think you may be wrong. According to Farmco people they are upgrading their information technology system as part of their year 2000 remedy."

Abe and Ben then turn to Fred who has remained silent throughout the meeting. Fred frowns and says, "I don't know how I can improve service while cutting inventory levels. Our forecasting ability has already diminished because of the number of products we now offer and markets we serve. Remember that we just built two new distribution centers. And don't forget that we plan to expand to 1,000 dealers in the next two years. I guess I'm with the others. This is not a good fit for BioAg."

Ben answers, "Fred, are you suggesting that our distribution capabilities drive the future direction of the firm? I'd also like your appraisal of Farmco's pilot study. They said they would share the results with us. How did they do it?"

After the meeting Abe and Ben are silent for a few moments. Ben says, "This seemed like such a good idea at the ACPA meeting." Abe replies, "Yeah, and I overheard that Farmco plans to move forward with our competitors if we aren't interested. Can we wait?" They decide to reconvene their team, and consider the following questions.

Additional Considerations

What are the potential risks and benefits to BioAg in pursuing the supply chain management initiative with Farmco?

Farmco cites three main factors in moving toward supply chain management. Which factor will be easiest to achieve in this case? Which factor will be the greatest obstacle? Does a successful supply chain relationship require all three factors?

Assume that BioAg and Farmco move forward with their supply chain initiative. How might this effect BioAg's relationship with its other farm input supply firms?

TEACHING NOTE

Introduction

The objective of this case is to introduce the concept of supply chain management (SCM) to an agribusiness audience. In particular, the case follows the planning efforts among an interdisciplinary team of managers at BioAg. Dealing with cross-functional collaboration within the firm, the case aims to provide a wide perspective of supply chain management issues.

Teaching Hints

Although supply chain management is an important current topic facing industry, few programs in agribusiness or agricultural economics have courses that would include this as subject matter. The authors envision two alternatives to introduce SCM into the curriculum.

First, SCM could be taught as part of a capstone course. This is appealing because SCM issues are cross-functional by definition. Topics of discussion might include procurement, vertical coordination, sales forecasting, inventory management, logistics, sales management, and activity-based costing. The subject matter could be covered in two or three class periods. Under this alternative, the case could serve to introduce the students to the breadth of SCM. Instructors might wish to consider the following outside readings by Fisher (1997) or Davis (1993).

Second, an entire module or special topics course could be dedicated to SCM. With this alternative, one good text would be *Introduction to Supply Chain Management* by Handfield and Nichols (1998).

One topic of particular interest to agribusiness students is Efficient Consumer Response (ECR), a food industry supply chain strategy. Soucie (1997) has a reading that explores ECR. A more detailed report by Phumpiu and King (1997) is available through *Ag Econ Search*. A perspective on supply chain management for agricultural input supply firms is available at the web site for RAPID (www.rapidnet.org/). RAPID is a U.S. industry initiative to realize the economic and stewardship benefits of electronic commerce.

ANALYSIS

Issue 1: What are the potential risks and benefits to BioAg in pursuing the supply chain management initiative with Farmco?

By working with the readings, it is possible to identify environmental factors bringing SCM to the forefront. Thus, before moving to the risks and benefits, one might wish to identify managerial aspects of SCM for BioAg.

SCM initiatives differ in that they are dependent upon information sharing between the buyer and seller. The intent of Figure 1 is to characterize the important shift in the relationship between the parties. Forecasting improves by sharing information about customers and sales. This improves the supplier's capacity planning and is a major source for reducing inventory levels. Reducing uncertainty in the supply chain through more reliable transportation also lowers inventory requirements. Sharing cost information is important because it allows the customer and supplier to identify redundant costs.

Information sharing can only be achieved if both parties make commitments (and often investments) with information technology. Firms should anticipate greater demands upon their information systems with SCM. From a technological perspective, great strides have been made in recent years. Specific information developments include electronic data interchange, bar coding and scanning, data warehousing, and the Internet. Information requirements are problematic to some firms because year 2000 projects are consuming information resources. Other firms are using Y2K as a rationale for updating their computer and software capabilities.

Perhaps the greatest benefit, but most overlooked, is the change that arises from working closely with customers. Close (and trusting) relationships can lead to fewer product defects, improved forecasting accuracy, and improved product design. However, these benefits are often difficult to achieve because change might be limited to the supply chain team. That is, even if the key account coordinator at BioAg and Farmco's supplier development team can agree on new SCM initiatives, there must be buy in from all the other parts of both firms.

An important risk to consider is the potential shift in power as information is shared. Assuming that Farmco is a sophisticated firm in terms of information technology and logistics, it opens itself to any weaknesses that BioAg might have. Some firms report situations where buyers demand improved information and inventory management, yet want price schedules as if the product continues to be a commodity. It will be important for BioAg to determine Farmco's corporate philosophy in their supply chain dealings.

Issue 2: Farmco cites three main factors in moving toward supply chain management. Which factor will be easiest to achieve in this case? Which factor will be the greatest obstacle? Does a successful supply chain relationship require all three factors?

Table 2. Supply Chain Management Internet Sources

Internet Sources and Comments
The *Supply Chain Council* (http://www.supply-chain.org/) was formed in 1996–1997 as a grass roots initiative by forward thinking individuals representing companies.
The *Council of Logistics Management* (http://www.clm1.org/) is a trade organization with a long history of support for education. They also have a bibliography search tool.
The *Grocers Manufactures Association* (http://www.gmabrands.com/homepage.htm) includes several pages related to ECR initiatives. Of particular interest are papers on Information Technology and a list of GMA publications.
The chief features of *ECR Central* (http://www.ecrcentral.com/Default.htm) at this point are the ECR scorecards and web links to important associations and firms.
The *Food Marketing Institute* (http://www.fmi.org/) has over 30 papers available, many report on best practices.
The *National Association of Convenience Stores* (http://www.cstorecentral.com/) is one trade association participating in ECR. You must register with their homepage, but once registered, you can gain access to information giving their perspective on ECR.
Food Distributors International (http://www.fdi.org/) has also sponsored conferences and research about ECR (which they call EFR or Efficient Foodservice Response).
Uniform Code Council (http://www.uc-council.org/ucchp.htm) is a page with important sites related to electronic commerce for the grocery industry.
RAPID (http://www.rapidnet.org/) is an industry initiative similar to ECR for the agricultural input side. To promote the adoption of electronic commerce, RAPID develops and promotes commonly supported standdards, processes, databases, and electronic connectivity.

The answer to this set of questions can vary, but should be supported by some logic. As a general proposition, common information systems are the easiest to establish. However, staff from information technology should be involved at the initial planning meetings because they will determine what information can be shared given information systems. Frustrations can arise if the parties are later unable to share information because of incompatible information technology systems.

Logistical improvements are commonly observed in SCM. Numerous firms report lowered inventory levels, improved customer service, and better forecasting. Yet logistical improvements are heavily dependent upon shared information. In the most advanced supply chains, suppliers manage inventory for their buyers, often controlling inventory within the buyer's plants. Firms at this level of SCM use activity-based costing to evaluate total supply chain costs.

The Achilles heel for many SCM relationships is the willingness to closely partner with a customer or supplier. This requires a fundamental change in the organizational behavior, which many firms are unable to achieve. In addition, there tends

to be more centralized decision-making as key account managers and supplier development teams funnel information through fewer hands.

Experts argue that a successful SCM relationship requires all three initiatives. One reason that some supply chain relationships fail is that the commitment between the firms does not extend beyond the key account managers or supplier development teams.

Issue 3: Assume that BioAg and Farmco move forward with the supply chain initiative. How might this effect BioAg's relationship with its other farm input supply firms?

Many successful SCM relationships lead to an increase in business between the partners. In some cases, they jointly plan new production plants or distribution centers. If the SCM initiative is successful, BioAg might be inclined to seek similar relationships with other suppliers. As sales grow to their partners, they would probably prune the number of farm input supply firms. Thus, Cindy's job will evolve from finding new suppliers to servicing existing customers.

Closing Comments

While aspects of SCM are quantitative or analytical in nature (inventory management, forecasting, production scheduling), a successful SCM relationship relies heavily on the human element. SCM is a great subject matter for the classroom because it reflects a current management issue in agribusiness firms. Management from local firms might be invited into the classroom to share war stories on their experiences with SCM. Instructors might also look to the Internet for other resources (Table 2).

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NOTE

1. The data for BioAg and its market are hypothetical.