COOPERATIVE BUSINESS MANAGEMENT STRATEGIES FOR THE U.S. INTEGRATED TEXTILE COMPLEX

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Introduction — The AMTEX Partnership and the DAMA Project

The mission of the American Textile (AMTEX) Partnership is to engage the unique technical resources of the Department of Energy National Laboratories to work with the U.S. Integrated Textile Complex (US ITC) and research universities to develop and deploy technologies that will increase the competitiveness of the US ITC. The objectives of the Demand Activated Manufacturing Architecture (DAMA) project of AMTEX are:

1. To determine strategic business structure changes for the US ITC,
2. To establish a textile industry electronic marketplace,
3. To provide methods for US ITC education and implementation of an electronic marketplace.

The Enterprise Modeling and Simulation Task of DAMA is focusing on the first DAMA goal as described in another paper of this conference. The Cooperative Business Management (CBM) Task of DAMA is developing computer-based tools that will render system-wide information accessible for improved decision making. Three CBM strategies and the associated computer tools being developed to support their implementation are described in this paper. This effort is addressing the second DAMA goal to establish a textile industry electronic marketplace in concert with the Connectivity and Infrastructure Task of DAMA. As the CBM tools mature, they will be commercialized through the DAMA Education, Outreach and Commercialization Task of DAMA to achieve the third and final DAMA goal.

Cooperative Business Management Strategies and Supporting Tools

Cooperative business management is a concept built upon the assumption that improvements in US ITC competitiveness can be achieved if companies involved in the manufacture and sale of common products adopt a cooperative decision-making model. In this model decisions are mutually beneficial to all parties involved, but not necessarily optimal for any one particular company. This concept is illustrated graphically in Figure 1. Several computer tools are being developed in support of the CBM concept as depicted in this figure. An important fact to keep in mind, however, is that computer tools can only facilitate and enable CBM thinking. Success ultimately depends upon people and their willingness to conduct business according to the CBM model. Three CBM strategies and the computer tools related to each strategy are described below.

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The first CBM strategy involves establishing strategic business partners that have agreed to engage in some form of information exchange or data sharing program. This CBM strategy is enhanced by providing the partners with the ability to electronically and securely share business data. To support this strategy a data sharing computer tool, referred to as TEXNET, is being developed. An important aspect of TEXNET is its ability to electronically represent business partnerships. This feature gives TEXNET users the capability to share data securely among trading partners over the Internet. TEXNET also

provides a framework for the distributed use of computerized analysis tools. One such tool is the Supply Chain Integrated-Analysis Prototype, referred to as SCIP, that is under development in the DAMA project. SCIP builds upon the TEXNET data-sharing concept by enabling the analysis of shared data at the supply chain level. It is a dynamic production and inventory supply chain management system with the goal of meeting both forecasted and unexpected demand for a variety of types of produced goods in such a way that benefits all sectors of the supply chain. The SCIP analysis makes use of business-relevant transformations to place data obtained from business partners into an appropriate business context for the recipient. The analysis of supply chain level performance using tools like SCIP represents the second CBM strategy. The third CBM strategy involves exploring new or alternative supplier sources. The National Sourcing Database (NSDB) computer tool is being developed to support this strategy. The NSDB is intended to address a company's need to quickly identify candidate suppliers that can meet a specific set of requirements.

To summarize, the TEXNET, SCIP, and NSDB computer tools play a complementary role in supporting a company's efforts to implement the following three CBM strategies:

- Establishing business partnerships and sharing data (TEXNET)
- Analyzing shared data within a business context (SCIP)
- Exploring alternative sourcing options (NSDB)

Figure 1. Illustration of the CBM Concept
Each of these steps are examined in more detail below and in the viewgraph presentation.

**Establishing Business Partnerships and Sharing Data**

The first step toward realizing effective cooperative business management strategies is to identify and establish mutually beneficial business partnerships. Business partnerships are not new to the US ITC; partnerships have been the cornerstone of effective business practices in this industry and in other industries for a long time. The new concept that DAMA adds is the ability to capture the relevant aspects of business partnerships electronically in what are referred to as a Trading Partner Agreements (TPAs). TPAs are critically important to the computer tools that are being developed to facilitate CBM, just as informal business agreements and agreements in paper form are important to conducting business today. The TEXNET data sharing tool relies heavily upon TPAs to ensure data privacy by defining and constraining the extent of data sharing between two companies. An important security feature of TEXNET is that in a trading partner relationship, the owner of the data object is responsible for deciding what rules or provisions will govern access to that data. In more specific terms, TPAs can be viewed as active control mechanisms for defining and regulating access to data via data access methods. These control mechanisms and data access methods have been defined very generally within the TEXNET architecture so that shared data can take on a variety of forms. In their most common form they will provide access to one or more data tables from a company’s business database. It is important to note that this data sharing paradigm is compatible with existing Electronic Data Interchange (EDI) arrangements. EDI documents can be embodied in TEXNET data access methods and shared by trading partners.

**Analyzing Shared Data Within a Business Context**

The second CBM strategy involves supply chain level data analysis that places shared data into a business context and that properly honors relevant supply chain constraints. This strategy is focused on analyzing production schedule information and related data in concert with the data obtained from business partners, including suppliers and customers. The Supply Chain Integrated-Analysis Prototype (SCIP) tool is being developed to enable this type of cooperative data analysis. Forecasting provides an indication of projected consumer demand for products. Inventory management provides cost-effective constraints on the manner in which the forecasted demand is met. The two processes interact through the planned production and flow of goods through the supply chain. The purpose of SCIP is to help decision makers manage this interaction. Data analyses in support of important business decisions is not a new concept to the textile industry. Numerous computer tools are available that perform production scheduling, retail demand forecasts, and other business-relevant data manipulations. The new aspect of this strategy is the supply-chain-level analysis and the fact that data from strategic business partners is included in the analysis. Therefore, this strategy builds upon the data sharing strategy discussed above. In fact this extension to traditional manufacturing data analysis is only possible because TEXNET provides the capability to access data from strategic business partners on demand.
The best way to illustrate the cooperative data analysis concept and the supporting SCIP tool is through a simple example. Consider the simple hypothetical manufacturing supply chain shown in Figure 2, where the arrows depict the direction of product flow.

![Supply Chain Diagram]

Figure 2. Example Supply Chain Illustrating the SCIP Concept

Suppose that Company A is at full capacity and producing items 1 and 2 for Company B and C, respectively. Now suppose Company A receives an order for item 3 from another strategic business partner, Company D. Unfortunately it cannot fill this order without making some production schedule change. All three orders are important to Retailer E so a resolution of this problem is desired. A supply chain level analysis enabled by SCIP is performed to see what change can be made that will be beneficial to all five companies. Let's assume that Company A has TPAs with companies B, C, and D that provides them with access to finished goods inventory data via TEXNET. Let's also assume that Company A has a TPA with Retailer E to obtain data regarding promotion plans and sales forecasts. Using the SCIP tool, Company A determines that the current production of items 1 and 2 can be delayed without negatively impacting Companies B, C, and E's ability to meet demand. TEXNET handles the secure data transfer, and SCIP handles the propagation of relevant constraints through the supply chain including the complexities associated with bill of material conversions, desired safety stocks, apparel production capacities, shipment times, and other relevant supply chain constraints. Companies B and C may still desire their orders as originally planned for local business reasons, but the SCIP analysis shows that this is a non-optimal solution for all parties taken as a whole. They can reach this conclusion by viewing the results of Company A's SCIP analysis or by using SCIP to analyze the supply chain from their point of view. As a result of the SCIP analyses, Company A can now meet the order of item 3 from Company D by adjusting the production schedule. This example clearly illustrates both the technical and social aspects of the CBM concept.

Exploring Alternative Sourcing Options

The third CBM strategy involves exploring alternative sourcing options. The SCIP-enabled solution to the sample problem presented above is only one of many possible solutions. Another approach would have been for Company D to explore alternative sources for its order. The National Sourcing Database (NSDB) addresses this need by providing a computer tool that can be used to quickly identify new or alternative sourcing options. Any company with access to the Internet and the World Wide Web can use
the NSDB to explore sourcing options. To use the NSDB a company enters the criteria by which it wishes to search the NSDB databases using the intuitive NSDB Web-based graphical user interface. The NSDB can be searched by product category, product name, or company name. Search results include the names and characteristics of the companies that meet the search criteria. Data sources in the NSDB at the time of this writing include: Auburn University Apparel Manufacturers Database, Cotton Incorporated Manufacturers Lists, American Apparel Manufacturers Association Electronic Catalog 1994 (EC '94), Garment Contractors Association, and Southeastern Apparel Manufacturers and Suppliers Association. Several new data sources and dynamic links to other data suppliers are under investigation for future inclusion in the NSDB, including replacement of EC ‘94 with EC ’96 when it becomes available.

Summary

This paper has described the Cooperative Business Management concept, three key CBM strategies, and the computer tools that are being developed in the DAMA project in support of the CBM concept and strategies. The first strategy is to enable data sharing among strategic business partners. The TEXNET computer tool is being developed to support this strategy by providing a secure mechanism to share business relevant data with strategic business partners over the Internet. The second strategy is to perform data analysis at the supply chain level in support of business decisions that are mutually beneficial to all companies involved in the manufacture and sale of a product. The SCIP tool is being developed to support this strategy by adding business context to TEXNET data sharing capabilities. Finally, the third strategy is to explore alternative sourcing options. The NSDB tool is being developed to support this strategy by providing an easy-to-use tool for accessing sourcing information over the Internet.

The CBM tools under development are described in more detail in the presentation, including a summary of the status of their development. Future CBM tool development plans include a forecasting and consumer demand analysis tool and a new product decision support tool. All computer tools developed in support of CBM strategies will make use of a data analysis and modeling effort that has recently been initiated. An update of the status of this effort will be given in the presentation. The CBM strategies described in this paper are an important aspect of the DAMA project’s goal to establish a textile industry electronic marketplace. The computer tools that are under development in the DAMA project will help the US ITC implement these strategies, and they will ultimately result in US ITC increased competitiveness in the global marketplace.