E-Commerce in the Textile and Apparel Industries

Jan Hammond and Kristin Kohler

Harvard Business School

Prepared for:

"The E-Business Transformation: Sector Developments and Policy Implications"

September 26-27, 2000

Draft: Please do not quote without permission of authors

Comments most welcome!

Corresponding Author:
Jan Hammond
Morgan T37, Harvard Business School
Boston, MA 02163
617-495-6620
jhammond@hbs.edu

The authors acknowledge the generous support of the Alfred P. Sloan Foundation.

Introduction

This paper provides an overview of e-commerce activities in the textile and apparel industries. We begin with a brief look at the current competitive landscape in the "bricks and mortar" apparel industry, highlighting the changes that have occurred over the past decade as retailers have adopted "lean-retailing" business models in response to increased product proliferation and shorter product life cycles. With the advent of the internet, apparel sales have started to move on-line. To understand how the pattern of growth of on-line apparel sales might differ from that of other products, we outline some of the critical ways in which the apparel purchase decision differs from the purchase decision for other consumer products, such as books and compact disks, which have experienced rapid growth in on-line sales. In view of these differences, we characterize some of the new technologies and business practices that are being developed to facilitate on-line apparel purchasing.

The paper then focuses on business-to-consumer (B2C) business models that have emerged to sell apparel on-line. We'll explore a range of B2C business models, from the introduction of new "pure-play" business models to the development of on-line strategies by incumbent brick and mortar retailers, catalog companies, and apparel manufacturers, highlighting some of the challenges relating to channel conflict and supply chain management that incumbent firms face as they enter into the world of apparel e-commerce.

We then turn to an analysis of business-to-business (B2B) models that are beginning to surface, concentrating on the potential benefits of these models to the operations of the textile-apparel-retail supply chain. We also discuss some of the different models that are emerging, and how they are related to differences in channel power.

The internet has already affected the world of apparel and textiles. Driven to provide consumer convenience, the majority of apparel manufacturer and retailers have created a virtual version of some aspects of their current physical environment. A few

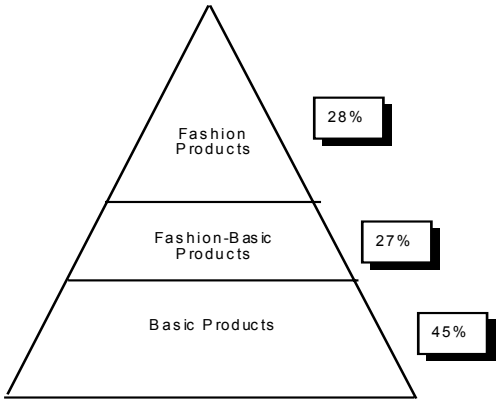
apparel manufacturers and retailers have used the internet to go beyond their existing offerings, providing the consumer with a value-added internet experience such as customized on-line apparel catalogs and custom-fit clothing. However, the potential impact of the internet on the consumer, and on the industry, lies not in what the consumer sees and does on a computer, but in how retailers and manufacturers leverage the internet to meet both expressed and latent consumer needs. The technology now exists to reinvent the textile-apparel supply chain to provide consumers with what they want, when and where they want it. The barriers to implementation lie more in the willingness of the members of the supply chain to redefine their policies and practices to take full advantage of the internet technology.

Industry Background[1]

The apparel industry can be segmented in several ways that are useful for trying to make sense of the different business models that characterize the industry. Cost is one basis for segmentation. A large segment of the apparel industry competes on cost. To achieve rock-bottom costs, manufacturers typically pursue production in low-labor cost countries and endure the long lead times that usually result from low-cost transportation. (The single-minded pursuit of low costs in general results in longer lead times, since firms try to minimize costs by manufacturing and shipping in large lot sizes). Lower cost clothing is typically sold through mass merchants (such as K-Mart and Wal-Mart). Firms in the industry choose to sustain increasing costs in order to obtain better quality (look, feel, fit and durability) or more "fashionable" goods.

The degree to which garments follow the latest trends and fashions (that is, how "fashion forward" the garment) is the basis for a second type of industry segmentation. Garments can be roughly classified as basic, fashion-basic, or fashion goods depending on the length of the product life cycle and the degree of demand unpredictability for the garment. (See Exhibit 1.)

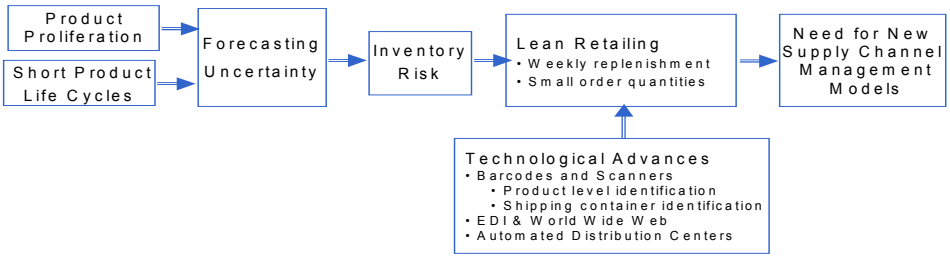
Exhibit 1: The Fashion Triangle



Source: *A Stitch in Time*, Oxford University Press, 1999.

In recent years, fashion attributes have infused nearly all garment types: product life cycles are shortening and product proliferation is accelerating even in the most basic garments. These trends have engendered increasing demand uncertainty that has changed radically the basis of competition in the textile-apparel-retail channel. Increasing demand uncertainty has led to the advent of "lean retailing:" retailers who once purchased large quantities of each item far in advance of the selling season now avoid the risk of carrying inventory of increasingly unpredictable items by ordering smaller quantities of each product in advance and ordering, on a weekly basis, replenishment quantities of those products that have sold in the previous week. The forces driving lean retailing are summarized in Exhibit 2.

Exhibit 2: Forces Driving Lean Retailing



Lean retailing has driven changes in both information and product flow, resulting in the changes in manufacturing and logistics practices indicated in Exhibit 3 below. Exhibit 3a shows the structure and dynamics of a more traditional channel, designed primarily to minimize production and distribution costs. Exhibit 3b depicts the channel associated with lean retailers, designed to lower the risk of delivering a plethora of apparel products to retail. Lean retailing practices have in many ways paved the way for e-commerce, by requiring and exploiting the use of various critical technologies, streamlining the supply chain, promoting information exchange in the supply chain, and requiring smaller quantities of products to be manufactured and shipped in response to actual consumer preferences.

Exhibit 3a: Channel Structure: Traditional Retailer-Supplier Dynamics

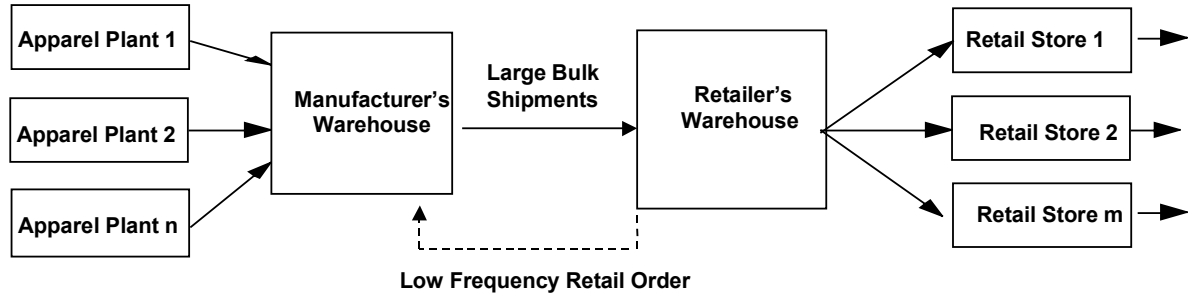
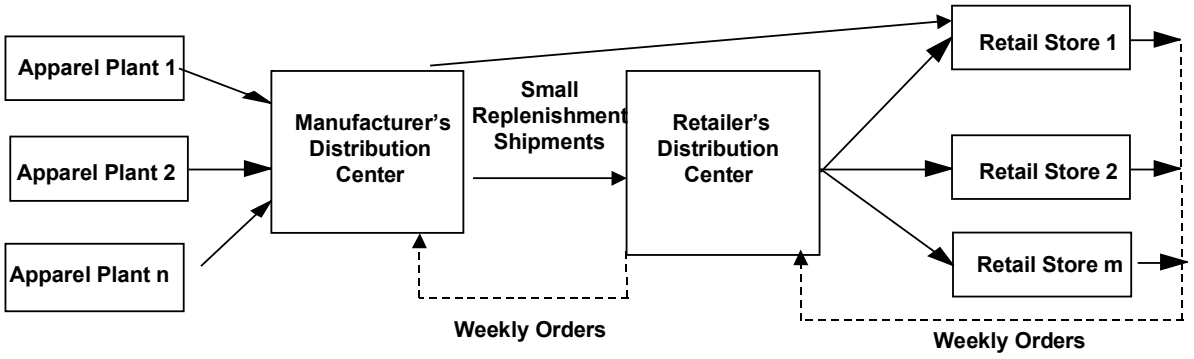


Exhibit 3b: Channel Structure: Lean Retailer-Supplier Dynamics



Source: *A Stitch in Time*, Oxford University Press, 1999.

Lean retailing has been facilitated greatly by the introduction and maturation of several key technologies:

1. Product identification using bar coding and point-of-sale scanning, used to provide immediate, accurate information on which products have sold;

2. Electronic data interchange (EDI), used by the retailer to place replenishment orders quickly and accurately; and

3. More sophisticated, often automated distribution centers, which allow manufacturers to pick and pack small replenishment quantities based on EDI orders.

As noted above, these technologies, and the business practices associated with them, form the underpinnings for many of the critical technologies and practices required for effective implementation of e-commerce strategies.

Distinctive Aspects of the Textile and Apparel Industries: Factors Affecting E-Commerce Adoption

A number of distinctive aspects of the textile and apparel industries provide challenges to the implementation of electronic commerce.

First, and perhaps most important, is the difficulty of accurately characterizing the product on-line. Many of the characteristics of a garment that are pivotal in the consumer decision-making process -- color, touch and feel, and fit -- are difficult, if not impossible, to communicate virtually. Moreover, unlike books, music, and consumer electronics, the difficulty in describing the product cannot be offset easily with customer reviews, reviews by industry experts, or comparisons based on independent performance evaluations. (Although for on-line purchases, like catalog purchases, brand names help consumers infer certain aspects of quality or fit, especially for consumers making repeat or replenishment purchases.) These obstacles likely will act more as a deterrent in the B2C segment of electronic commerce than in the B2B segment, since industry standards for

characterizing color and fabric will be more familiar forms of communication for business partners than for individual consumers.

Compounding the difficulty in characterizing the product is the personal, often emotional nature of an apparel purchase. Apparel purchasing decisions are closely linked to individuals' feelings about themselves, their body image, and the image they wish to project. Clothing is the "skin" a person chooses to wear to project his or her self-image to the public, and hence is intimately tied to one's sense of self. Thus the decision can be laden with emotional factors that are less important in decisions to buy books, music, food, and electronics.

Ample evidence suggests that current B2C sites are unable to characterize their products adequately to allow consumers to make effective choices. Most compelling is the high return rate in apparel products purchased on line. Return rates for apparel bought on-line mirrors the rates for catalog apparel purchases: by one estimate, returns for apparel bought from catalogs ranged from 12% to 35%, depending on the product's style and how fashion-forward it was. Specifically, for casual apparel, such as from Eddie Bauer or Lands' End, returns fell in the 12%-18% range, for more fitted fashions, returns were 20-28%, and for high fashion, they were as high as 35%.[2]

An analysis by Harris Interactive ecommercePulse computed the ratio of dollars consumers spent off-line as a result of on-line shopping to dollars spend on-line. The greater the ratio, the more likely that on-line shoppers use internet shopping sites to gather information about products, rather than to make direct purchases. It is not surprising that for this measure apparel led the list of categories studied: for every dollar spent on apparel on-line, consumers who visited on-line apparel sites spent $2.92 purchasing apparel from catalogs or brick and mortar stores. Lower on the list are products that are easier to specify: computer software (off-line to on-line ratio = $0.99); health and beauty products ($0.93); music/video products ($0.83); and books ($0.68).[3]

The accuracy of color on the web is of particular concern to consumers. A web-based survey conducted by InfoTrends Research Group, Inc. indicated that 88% of consumers would prefer to shop at an internet site that could guarantee "true and

accurate" color.[4] Most of the consumers polled in the survey already use the Web to purchase non-color-dependent products such as videos, compact discs, books, and computing equipment. However, the respondents indicated that they rarely purchase apparel on-line, "largely because of their insecurity about getting what they expect."[5] The report indicated that many consumers who purchase apparel online refer to printed catalogs for more accurate depictions of color.

The degree to which the difficulty in characterizing apparel products inhibits on-line consumer purchases differs by product type. Basic products are selling well on-line, according to Forrester research.[6] These products have a number of characteristics that make them more amenable to on-line purchasing. First, they are fairly familiar products, making their descriptions easier to understand. The touch and feel of basic garments are quite familiar and are fairly similar across brands, which makes the buyer less hesitant to purchase them "sight unseen," and produces fewer surprises when the garment arrives. (One industry observer noted that you need to "sell each consumer twice" –first when they buy the item and it's shipped, and second when they open the box and compare the color to what they saw on their screen.")[7] Similarly, for more basic items, the fit of different garment styles tends to be better understood, making it easier to purchase on-line. In some cases, the cut of a basic garment may be more forgiving in that it can fit a wide range of body types. Products like men's dress shirts and women's hosiery with consistent, known sizing are also amenable to on-line buying. Basic garments are typically lower cost than more fashionable products, which also contributes to a lower level of risk in an on-line purchase. In addition, since basic products are worn for "every day" events, their purchase often evokes less emotion than more fashion-forward items.

More fashionable items may be more risky to purchase on line: the decision to purchase online is more significant because of the increased importance of touch and feel, color and cost, and the increased emotional element associated with more fashionable clothing. However, the internet is expected to penetrate the fashion segments of the market, in part because it will provide exposure and access to unique or unusual products that are hard for consumers to find locally. The ability to customize clothing for fit,

fabric, or style should also provide an impetus to increase on-line sales of fashionable garments.

Several initiatives are underway to improve the ability of on-line sites to characterize their products, and thereby reduce both the hesitancy of consumers to purchase apparel on line and the return rates of those products.

1. Color Representation: J. Crew is testing E-Color's new "Colorific" feature designed to increase on-line color accuracy and consistency.[8] E-color offers server-based software called True Internet Color, to increase the accuracy of colors depicted on line. Recent reports suggest that Bloomingdales.com, Jcrew.com, and others plan to adopt True Internet Color on their web sites.[9]

2. Detail: HP Open Pix and Live Picture offer Zoom technology. According to Forrester, Bloomingdale's and J. Crew are starting to use these technologies on their sites. Most on-line apparel sites plan to introduce zoom technology, as shown in Exhibit 4 below.

3. Fit: A range of options is under development to help consumers identify the right size for apparel products they are considering. Some sites offer "fit calculators" to help consumers translate their measurements into sizes. Others (e.g. Public Technologies Multimedia) are offering more sophisticated software to map consumers' measurements to appropriate brands, styles, and sizes. Still others are using 2-dimensional or 3-dimensional models to help consumers predict product fit. A firm called TheRightSize recently announced technology called "The Rosetta Stone of Fit" to reduce the rate of size-related returns in the apparel industry. The company plans to offer the technology for use in internet, catalog, and in-store shopping.[10] Body scanners for taking measurements have been developed, but Forrester Research, Inc. suggests consumers may prefer to purchase products shown on an attractive model rather than

seeing it draped over the consumer's true, but imperfect body dimensions.

Exhibit 4 shows some of the capabilities on-line apparel sites offered, or planned to offer, in 1999.

Exhibit 4: Site Features Offered by On-Line Apparel Retailers, 1999[11]

	% of companies offering	% of companies planning to offer	Total
Sizing information	80%	15%	95%
Fashion advice	43%	13%	56%
Lifestyle/entertainment content	38%	10%	48%
Outfit cross-sales	25%	18%	43%
Zoom technology	23%	55%	78%
Virtual model	13%	15%	28%
View items together	8%	10%	18%
Recommendations based on prior purchase	5%	28%	33%
Custom fit service	5%	5%	10%
Webcasting	3%	13%	16%

Apparel Distribution Channels: Industry Trends and Current Status of On-Line Sales

During the past decade, apparel sales through discount and specially stores have grown at the expense of department store sales. For example, in 1990, apparel sales through department sales represented 22% of all apparel sales,[12] compared to 19% in 1998, as shown below.

Exhibit 5 shows the volume of apparel distributed through major types of distribution channels in 1998 and 1999. Although still the lowest volume channel, on-

line sales of apparel totaled $1.1 billion in 1999, up nearly a factor of three from the previous year.

Exhibit 5: Apparel/Accessories Sales By Channel[13]

	1998 ($ billion)	1998 %	1999 ($ billion)	1999 %
Discounters	$34.7	20.1%	$36.9	20.5%
Specialty stores	$38.4	22.2%	$40.4	22.4%
Department store	$32.9	19.0%	$34.4	19.1%
Major chains	$29.4	17.0%	$29.2	16.2%
Off-price retailers	$11.2	6.5%	$11.4	6.3%
Factory outlets	$6.6	3.8%	$6.7	3.7%
Catalog	$17.0	9.8%	$17.2	9.6%
Online	$0.4	0.2%	$1.1	0.6%
Unreported	$2.4	1.4%	$2.5	1.4%
Total	$173.0	100%	$179.8	100%

Estimates for future on-line sales of apparel suggest great optimism. One estimate puts on-line sales at over 7% of sales in 2003.[14] A more aggressive projection estimates that on-line apparel sales will account for 9% of apparel sales in 2000, and 18% of sales in 2010.[15] What rate of growth prevails will rely heavily on the implementation of some of the technologies discussed above.

Emerging B2C Business Models in the Apparel Industry

Apparel web sites have been launched by established apparel retailers and manufacturers as well as by new entrants. Forrester breaks the B2C firms into five categories:

1. **Catalog companies** (retailers that derive the majority of their revenues from catalog sales);

2. **Brick and mortar retailers** (retailers that derive the majority of their revenues from physical stores);

3. **Pure manufacturers** (apparel manufacturers that sell products only through stores owned by others);

4. **Hybrid manufacturers** (manufacturers that sell both in their own stores as well as stores owned by others); and

5. **Pure play firms** (retailers that sell apparel only on-line).

Entry of Incumbents

Catalog companies have experienced the easiest transition to B2C apparel retailing, since their "back-end" systems for inventory management and order fulfillment are better tailored for selling and delivering products to individual consumers. The most successful of these have realized, however, that they must make significant changes to the consumer interface. They must exploit the internet's capabilities to add value beyond simply putting their catalog on-line. (For example, Lands' End provides customized fashion models the customer can use to "try on" products virtually.)

Brick and mortar retailers have varying levels of functionality on their sites. Most offer store locators and product displays and product news, and some offer on-line ordering. Apparel manufacturers have been the slowest to sell products on line: most have sites displaying merchandise or referring consumers to retail stores or on-line sites that sell their products. Many have been hesitant to sell due to fears about channel conflict, problems with setting prices for products, and lack of infrastructure to support direct sales. The experiences of Levi Strauss offer insight into some of the challenges manufacturers experience with on-line selling.

Levi Strauss Case Study

In November 1998, Levi Strauss launched on-line sales of Levi and Dockers brands. According to a former Dockers marketing director, the top consumer request at dockers.com was for direct on-line sales of Dockers products.[16] Levi had delayed on-line product sales due to "legal issues that forbade the manufacturer from setting prices for its products in the US."[17] Potential channel conflict was foreseen at the time of launch: Advertising Age noted that Levi was treading "into the potentially treacherous waters of channel conflict with this week's launch of its first major on-line selling effort."[18]

Within a few months of launch, Levi declared exclusive rights to sell Dockers and Levi on-line, thereby prohibiting on-line retailers from selling Levi and Dockers brands. By June 1999, Levi discontinued online advertising for its web site, and shifted money into traditional media in order to drive traffic to the site. Levi claimed that the typical customer order of $56- $120 per customer was not sufficiently high to make its online advertising pay off.[19]

In November 1999, Levi's announced that it would discontinue selling Dockers and Levis from its web site, noting "Right now the cost of running a world-class e-commerce business is unaffordable considering our competing priorities."[20] Industry observers cited channel conflict as a key reason for the change. Currently, Levi uses its site as a merchandising vehicle, with links to key retail partners' sites, JCPenney.com and Macys.com, for consumers wishing to purchase on-line.

Order Fulfillment

Third party fulfillment companies offer "back end" fulfillment services to both incumbents and new entrants. For example, Fingerhut Business Services Inc. (FBSI) offers inventory management and order fulfillment services to companies like Wal-Mart, Kmart, Levi Strauss, and EToys. In 1999, Federated Department Stores, which owns Bloomingdale's and Macys, purchased Fingerhut. Federated's chairman supported the purchase, noting Fingerhut's "state-of-the-art infrastructure for catalog and Internet order

fulfillment." [21] Fingerhut now has Macys.com, Bloomingdale's by Mail, and Macy's by Mail on its customer list.

Whereas Fingerhut manages inventory for its customers, some third party companies have emerged that actually purchase the manufacturer's stock for on-line fulfillment. For example, SureSource buys and stocks a manufacturer's entire product line, including replacement parts and accessories and takes delivery from manufacturers in full cases, like traditional wholesale customers. The company sets up open case inventory of the manufacturer's products in its distribution center, and asserts that it will ship to any consumer in North America within 24-hours of receipt of orders. Orders can be placed through a toll-free number, or through a manufacturer-specific web site. No apparel companies are currently using SureSource.

New Entrants

Pure-play e-tailers face relatively few barriers to entry in setting up a shop on-line. By focusing on brand names, the pure e-tailer can instill customer confidence in the product offering. Examples of pure plays in the apparel industry are

- Bluefly.com, an on-line outlet for men, women, teens and kids featuring names brands such as Prada, BCBG, and DKNY. Bluefly offers products at discount, typically 40-75% off suggested retail.

- Styleclick.com, an e-department store featuring top brand men's, women's, and children's footwear and apparel in addition to specialty accessories and bath and body products.

- Fashionmall.com, an on-line mall that houses such e-stores as Banana Republic and Brooks Brothers, creates a "mall environment" around existing brands' web pages. Thus, for example, clicking on "Jantzen products" within Fashionmall.com brings up the same screen as just clicking on jantzen.com, but it brings it up within the Fashionmall.com frame. Fashionmall also creates an on-line store presence for brands or product lines that do not have physical stores, such as a BCBG eyewear "e-store."

All of these firms essentially offer limited selections of multiple brands of products.

New business models continue to be developed in how the consumer interfaces with a brand. However, in order to truly maximize and take advantage of what the internet medium can offer, retailers and manufacturers have to look more carefully at how their back-end systems support their front-end consumer interaction.

Distribution

To date, most B2C players have not made significant changes in their distribution strategies to meet the needs of on-line consumer orders. As Levi Strauss learned during its foray into on-line selling, distributing product through channels designed for larger volumes, manufacturers incur excessive distribution costs. Catalog firms have an advantage in distribution, as their existing systems are suited more closely to e-commerce requirements.

In general, many B2C firms are turning to third-party logistics firms to give them the level of order fulfillment and delivery capability that consumers have come to expect. Third party providers include: JCP Logistics, Keystone Fulfillment Inc, founded in 1998 as subsidiary of Hanover direct, SubmitOrder.com, and UPS logistics.

Mass Customization

Today's consumers have increasingly high expectations that their individual needs and preferences will be met – they are offered a nearly endless variety of apparel options. Customers are product savvy, price savvy, and information savvy – and they have many choices to have their needs fulfilled. To date, the major impediment to getting what you want is simply searching for and finding the product. The internet has streamlined the search process, which further heightens customers' expectations that they will find exactly the product they want. Increasingly, that expectation has come to include customized fit, and customized design.

In recent years, companies like Levi Strauss have started to use mass customization techniques to offer custom-fit products at a relatively low premium over

off-the-rack prices. Mass customization, a combination of "mass production" and "custom-made" production, is rapidly becoming a guiding business principle for the 21st century. Although customized, tailor-made apparel products have existed since the advent of the industry, in recent times, only an elite few can afford to pay the significant price premium to hire a seamstress or tailor to make customized clothes.

In the mid-1990s, Levi's began to offer custom-fit blue jeans for women. Women were required to go into a store, be measured by store personnel, and then try on a sample pair of jeans whose measurements were "close to" their own. Orders were then sent to a Levi plant where the individually sized jeans were cut and sewn and shipped to the customer. Similarly, Brooks Brothers customers can be measured in a store for a custom-made shirt. The measurements are sent to a Brooks Brothers' factory where the product is made up and shipped to the customer within days.

Today, the internet provides a more convenient vehicle for mass customization. Brooks Brothers new custom suit program is called the "e-measure" initiative. The new programs will use body-scanning techniques to take customers' measurements, and then transfer the data electronically to a suit manufacturer. The manufacturer (Pietrafeso) will be able to transmit those data directly to its internal systems to develop, cut, and sew the product, with heavy reliance on automation. Pietrafeso plans to get its deliver down to two weeks.[22]

Levi Strauss is also exploiting internet technology. It recently expanded its custom-jean program: Customers in a Levi's store are measured using a tape measure, and then can go to an in-store interactive kiosk to select preferences such as color and fly styles.[23] Both Brooks Brothers and Levi Strauss are using the internet as a back-end tool to facilitate end-to-end, web-based collaboration and coordination throughout the supply chain.

The internet is also being used as a front-end tool for mass customization. Firms such as IC3D (Interactive Custom Clothes Company Design), Express Custom Tailors, and mytailor.com provide customers with instructions on how to take their own

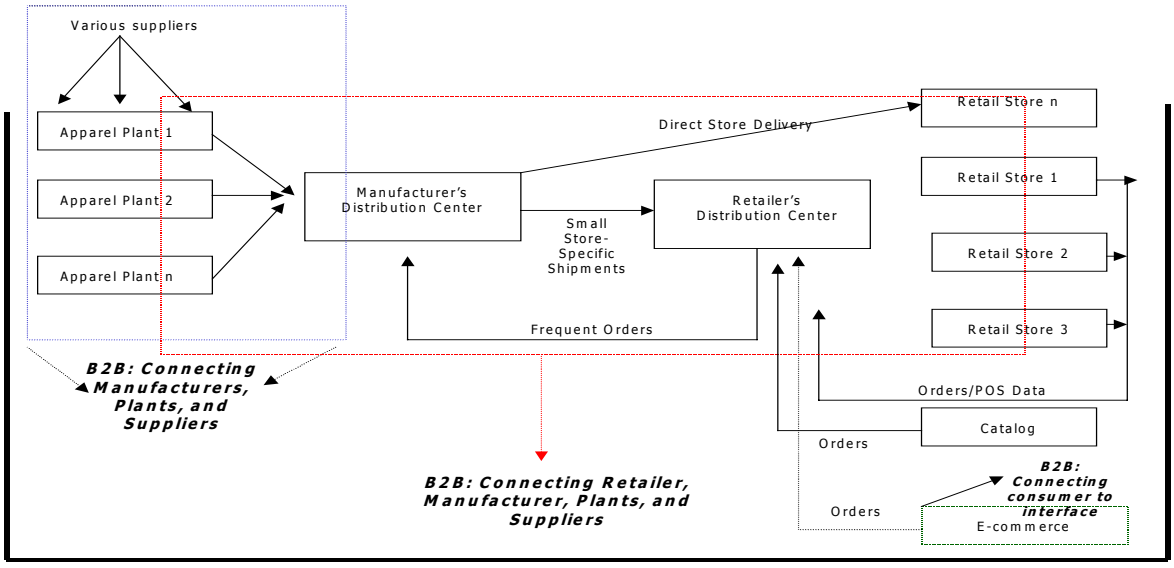
measurements, and give a menu of options for each garment. The customer interface allows consumers to "design" and designate their specific style needs.

Although the use of the internet as a front-end tool for B2C apparel sales has great potential, most agree that the real power of e-commerce in the apparel industry is in the opportunities for significant improvements in supply channel management through B2B initiatives.

Business-to-Business E-Commerce Models in the Textile-Apparel-Retail Channel

The potential benefits from successfully leveraging web-based B2B models in the textile and apparel industries are tremendous. With increasing product proliferation and shorter product life cycles, these industries incur significant excess costs in the form of inventory carrying costs, stockout costs, and markdown costs. As suggested in Exhibit 2, the very factors that led to the implementation of lean retailing also compel the industry to adopt B2B models that facilitate supply channel integration. Indeed, we can interpret many aspects of certain web-based B2B models as extensions of supply channel management practices brought about by lean retailing. Exhibit 6 shows the general structure of the textile-apparel-retail supply channel, indicating where some of the B2B opportunities lie.

Exhibit 6: Apparel Supply Chain-B2B Opportunities



B2B Exchanges in the Textile-Apparel-Retail Channel

We believe that the first link in the channel to be exploited by B2B firms will be the link between manufacturers and retailers, mirroring the implementation of EDI and other technologies required by lean retailing. Indeed, a number of B2B exchanges that focus on apparel manufacturer-retailer interface have been launched. Leading retailers have founded two major exchanges in the last 2 months.

WorldWide Retail Exchange, announced in April 2000, includes 16 powerful worldwide retailers, representing 42,000 stores with total 1999 sales of nearly $400 billion. The founding members of the exchange are: Albertson's (USA), Auchan (France), Best Buy (USA), Casino (France), CVS (USA), Delhaize (Belgium), J.C. Penney (USA), Jusco (Japan), Kingfisher (UK), Kmart (USA), Marks & Spencer (UK), Royal Ahold (The Netherlands), Safeway, Inc. (USA), Target (USA), Tesco (UK) and Walgreens (USA).[24]

Global netXchange: In late February 2000, Sears Roebuck and the French hypermarket Carrefour launched Global netXchange. The partnership now includes Kroger Co. (US), Metro AG (Germany) and J. Sainsbury (UK). The exchange has chosen Oracle as its software partner. At this point, GlobalNetXchange is leading the implementation race: Sears and Carrefour are conducting some transactions through GlobalNetXchang, whereas WorldWide Retail Exchange has yet to name a software partner.[25] All eyes are on Wal-Mart, of course, who has yet to join either partnership. Wal-Mart has its own internet-based purchasing system that it uses with its vendors.

SoftgoodsMatix.com: A couple of exchanges have been launched in collaboration with apparel manufacturers. For example, SoftgoodsMatix.com was launched the same day as Global netXchange. Its first "tenant" was VF Corporation, the world's largest apparel manufacturer. A second tenant, Warnaco, was added shortly after launch. SoftgoodsMatrix.com is one of I2's TradeMatrix marketplaces, which also includes HiTechMatrix, FreightMatrix, HomeElectronics, iStarExchange, MyAircraft and others. SoftgoodsMatrix.com will support linkages between retailer and apparel

manufacturer, but also between apparel manufacturers and their suppliers, offering planning, procurement, product development and order fulfillment support.

Apparelbuy.com was launched in December 1999 in collaboration with Guess?, using Commerce One MarketSite and PeopleSoft e-Procurement.

Several B2Bs focus on selling excess apparel inventory and overruns. These typically require a lower level of capability, since they tend to focus on one-time buys rather than on-going replenishment. Thus, the length and accuracy of lead times tends to be a bit less important than in a standing relationship in which smaller, more frequent orders are placed. Firms focusing on apparel overruns include:

- **Virtualrags.com,** whose site says it competes on ease of search, quality of image, and accuracy of information. The site offers 1000 items, and asserts that it has 4700 registered buyers.
- **Tradeweave**, working with QRS, Dillards, Donna Karan, Leslie Fay, offers apparel overruns, providing "retail intelligence, authenticated trading, staged exchanges, trading tools, and integration with backend purchase orders and invoicing.
- **Apparelbids.com** competes by offering large, one-of-a-kind purchases

Two noteworthy B2B firms have been launched in Hong Kong.

Texwatch.com offers products for the entire textile-apparel-retail supply chain. It has a marketplace for quota; garments; fabric; yarn; fiber; machinery and accessories. Hong Kong-based apparel sourcing giant Li and Fung has set up an e-commerce subsidiary, **Lifung.com**, to open up a new market segment of overseas small and medium-size enterprises.[26] After announcing the new subsidiary, Li & Fung's stock price jumped 14%. "It's a empire-strikes-back story," said Goldman Sachs head of investment banking Timothy Dattels, adding Li & Fung is another example of an old economy stock moving its core business online."[27]

Performance Impact of B2Bs

Both vertical exchanges and horizontal B2B are expected to extend and improve performance aspects of supply channels that have been critical to meet lean retailers' requirements. Enhancement of these exchanges will allow companies to more closely collaborate on product design, inventory planning, and other value add activities. Some of the positive effects of B2Bs in the textile-apparel-retail channel include:

1. Decreasing the cost of communication in the channel. Electronic data interchange (EDI) has been used to improve the speed, accuracy, and cost of transferring data between channel partners. B2B models rely on web-based data exchange, which has significant advantages, such as

    a. Using a hub-and-spoke type of system rather than pair-wise connections. Having a centralized exchange means that only one additional link needs to be added when a new firm is added to a network, rather than having to add one link between the new firm and each of the established firms in the network.

    b. By keeping the software, protocols, etc. centralized, changes or improvements can be made to processes in one centralized location, rather than requiring each link in the network to be upgraded. This can be a significant advantage, since maintenance and upgrading costs can be considerable for EDI systems.

    c. The use of centralized systems also improves standardization, which decreases costs by reducing or eliminating proprietary standards or requirements.

    The magnitude of these savings can be huge. For example, the COO of Sears estimates that the cost to place an average purchase order will drop from $100 (its current cost using its current EDI system) to $10 per using the Web-based retail exchange. As Sears handles about 100 million purchasing orders annually, savings should total roughly $9 billion per year.[28]

2. Improving visibility in the supply chain, thereby improving order fulfillment, inventory management, forecasting, and customer service.

The use of EDI has allowed rapid transfer of information among channel partners. The information currently provided, including point-of-sale data, orders, forecasts, and information about inventory levels, has improved visibility in the supply chain considerably. However, using web-based B2B models will improve this visibility substantially. Instead of having to adhere to a set schedule (e.g., transmit POS data and inventory levels weekly) or having to request the transmission of data, web-based models will allow continuous visibility among channel partners. A retailer can access a manufacturer's inventory data when and how often it wishes to, rather than having to negotiate for each transfer of data.

Morgan Stanley describes an example of the "win-win" nature of having order status on the internet: Prior to placing the data on the internet, Dell Corporation received an average of three order-status calls or questions from each customer who had placed an order. By putting this information on the web, Dell decreased its own costs (eliminating the need to answer emails or phone calls about order status) and improved customer service. Specifically, after the information was put on the web, Dell received eight inquiries per customer, suggesting that previously the customer had been underserved in terms of information. Indeed, order cancellations decreased after the web-based implementation. Thus, Dell was able to cut costs and improve customer service at the same time.[29]

One apparel B2B firm, Fasturn.com, describes its on-line tracking system as a "glass pipeline." Fasturn plans to be the ASP host for 1,500 apparel factories in 25 countries and mid- to high-end fashion-labels and retailers. Using Fasturn.com, buyers can specify what they want in terms of color, style, size, or country of origin, and then negotiate prices, order sample shipments, and close transactions. Fasturn's I2 marketplace software then tracks inventory, shipping and delivery. In addition, Fasturn will have on-line "showrooms", an auction site, and an off-price market for liquidated goods.[30] One apparel B2B firm, Fasturn.com, describes its on-line tracking system as a "glass pipeline."

3. Improving Forecasting Capability

One of the greatest benefits of B2Bs in this industry will be the increased forecasting capability, which in turn will allow the firms in the industry to better match supply and demand. Few industries are as notorious as the apparel industry for having such difficult predicting demand, and thereby incurring costs of stockouts, markdowns, and inventory carrying costs. Channel visibility, in concert with good collaboration between channel partners, will allow a much more streamlined supply chain.

4. Reducing Channel Inventories

The high cost of carrying inventory in this industry will make reduced inventory a significant benefit.

5. Improving Design

As technology improves in representing products and components online, and as designers become more accustomed to "virtual" collaboration, the ability to design new products quickly should improve. In addition, access to a global supply network should increase apparel firms' ability to locate the right fabric and components.

Impact of E-Commerce on Competitive Landscape of the Industry

In some ways, B2B businesses are a natural progression of EDI and automated ordering systems, so some of the impact of B2B business will simply be an extension of current trends: shorter lead times, more reliable lead times, smaller, more frequent orders. Internet technology has opened the door for the restructuring of some aspects of the textile-apparel-retail channel.

Some functions – especially those related to information -- currently performed by agents and other intermediaries can be transferred to the web, although the difficulty of specifying the qualities of apparel, textile, and other components will make the web a less-than-perfect substitution.

Expected Evolution of B2Bs in the Apparel Industry

The apparel industry has a number of characteristics that make it a prime candidate for the rapid adoption of B2Bs:

- Demand unpredictability is high: the need for improved channel information is considerable.
- The high fragmentation of plants and global dispersion of plants make the need for transparency high: there are many local players who benefit from lack of good market information.
- In short, the "pain" in the industry is high; there is great room for improvement.

The industry has other factors that will slow the rate of adoption:

- Products, capabilities and quality of products and components are difficult to specify.
- Apparel plants are small, with relatively low levels of sophistication. Implementation will be challenging.
- The complexity of interaction among channel partners is relatively high. Communicating about product design, product quality, plant capabilities, involves significant subjectivity. This type of communication will be harder to put on line. Intermediaries provide domain expertise and local knowledge that will be hard to automate.

In general, we expect the strong suppliers to get stronger, and the weak weaker, as B2Bs transparency in the global supply chain increases. Firms with relatively high prices or lower quality that were existed primarily due to buyers' lack of market information will lose ground as market transparency improves. The rate of adoption in the industry should fall in the middle of the range: it will not be as swift as in some due to the complexity of interactions in the channel, but the motivation for improvement is high.

Endnotes

[1] This section draws heavily from research described in *A Stitch in Time: Lean Retailing and the future of Manufacturing: Lessons from the Textile and Apparel Industries*, by F. Abernathy, J. Dunlop, J. Hammond and D. Weil, Oxford University Press, 1999.

[2] "Getting Less in Return", Catalog Age, March 15, 1999, p. 1,18.

[3] "Clicks and Bricks," Wall Street Journal, April 17, 2000, page R8.

[4] "Holiday Shoppers Wary of Color On-line; Web-Based Survey Reveals Shoppers Wary about Purchasing Color-Sensitive Items On-line," Business Wire, December 23, 1999.

[5] "Holiday Shoppers Wary of Color On-line; Web-Based Survey Reveals Shoppers Wary about Purchasing Color-Sensitive Items On-line," Business Wire, December 23, 1999.

[6] "Apparel's On-line Makeover," Forrester Research, Inc., May 1999.

[7] "Apparel's On-line Makeover," Forrester Research, Inc., May 1999.

[8] "Apparel's On-line Makeover," Forrester Research, Inc., May 1999.

[9] "Holiday Shoppers Wary of Color On-line; Web-Based Survey Reveals Shoppers Wary about Purchasing Color-Sensitive Items On-line," Business Wire, December 23, 1999.

[10] "TheRightSize Will Shrink the High Cost of Size-Related Merchandise Returns; New Business-to-Business to Focus on Fit," Business Wire, 4/11/2000.

[11] "Apparel's On-line Makeover," Forrester Research, Inc., May 1999.

[12] NPD America Shoppers Panel.

[13] NPD Reports, *Women's Wear Daily, 2/22/00*

[14] "Apparel's On-line Makeover," Forrester Research, Inc., May 1999.

[15] KSA Soft Goods Survey 2000.

[16] "Commerce in Store for Levi's," Adweek, November 9, 1998.

[17] Ibid.

[18] "Levi Strauss begins First On-Line Sales Effort," Advertising Age, November 23, 1998.

[19] "Levi's Goes Offline to Plug Web Stores," Advertising Age, June 14, 1999.

[20] The Dallas Morning News, 10/30/1999.

[21] "Federated dips into Fingerhut," Chain Store Age; New York; Mar 1999; Anonymous;

[22] "Brooks Brothers 2000: Repositioned for Success," Apparel Industry Magazine, December 1999, pages AS 16 – AS 24,

[23] "Clothing that fits - concept of the future? Body scanners could make it profitable enough to be practical," The Kansas City Star, 05/30/1999

[24] "Jusco and Best Buy Join WorldWide Retail Exchange," PR Newswire, 04/26/2000.

[25] "Sears Recruiting Another Retailer For GlobalNetXchange," Dow Jones News Service, 04/19/2000.

[26] "Castling Group and Li & Fung Limited To Form Internet-Based Global Sourcing Play; Castling Group and Li & Fung Trading Announce Online B-to-B Play in Global Sourcing," Business Wire, 04/01/2000.

[27] "HK Shares End Lower; Li & Fung Placement Boosts Volume," Dow Jones International News, 03/29/2000.

[28] "Sears, French giant in online venture," Chicago Sun-Times, 02/29/2000.

[29] Philips, Charles, and Mary Meeker, "The B2B Internet Report," Morgan Stanley Dean Witter Equity Research Report, April 2000, p. 55.

[30] "Fasturn fashions $10 million funding," Vanessa Richardson, Redherring.com, March 01, 2000