AN ANALYSIS OF E-COMMERCE INTEGRATION IN THE TEXTILE INDUSTRY

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INTRODUCTION

“What is most important is to learn faster than competitors about just where the heart of future demand actually lies. [Some would] call it prospecting. We call it expeditionary marketing.” ¹

Markets have been an important characteristic of human civilization for centuries. However, each generation has expanded the power to exchange by increasing outreach across time and space with the adaptation to new technologies brought about by the development of highways, railroads, telephones, and computer networks². Each new work practice brings with it new wealth and new means of commerce that serve to shrink the segments of the world economy until it ultimately becomes a global marketplace. (This is exemplified by the fact that business can be transacted anywhere on Earth in relatively short timeframes.)

In the past, it was difficult to obtain accurate information about the values of companies actively engaged in emerging markets (e.g., e-commerce). Now, electronic trading systems are becoming widespread, providing real-time information and thereby increasing volume and liquidity. Employment patterns are being transformed, with tasks of increasing sophistication and complexity being demonstrated in the emerging markets first. Paradoxically, with regard to the adoption of electronic commerce, some U.S. industries might as well be part of the Third World.

Textile mills in the United States are one such “Third World” industry with regard to e-commerce. From a factory floor, machinery and production standpoint, the textile industry has successfully integrated new technology in machining and production methods throughout its history. Surprisingly, its supply chain management, inventory control, and sales processes have seen very little innovation in the last hundred years. Perhaps this can be explained by the dire situation of the textile industry as evidenced by the very real threat of U.S. textile mills being shut down and relocated to Mexico and other developing countries with low cost labor and materials. Textile mill managers have had to work intensely at simply surviving in the global economy from day to day, and attempting to integrate new technological processes and related systems is nearly impossible.

Meanwhile, like a rapidly flowing stream, electronic commerce (or “e-commerce” as it will be referred to throughout this paper) is flooding the global marketplace, bringing some industries with it and leaving others behind.

The purpose of this study is to examine the current environment in the U.S. textile industry, particularly with respect to supply chain management, inventory control, sales

¹ “Competing for the Future,” p. 261, Gary Hamel and C.K. Prahalad
² “The Future of the Electronic Marketplace,” edited by Derek Leebaert
and marketing processes, to determine whether business-to-business (B2B) e-commerce provides benefits leading to competitive advantage for its businesses. Relevant e-commerce trends are described, and the integration of e-commerce in the business of two textile companies are compared. Finally, the study concludes with a general analysis of the various strategies for integrating e-commerce in the textile industry.

**Overview of E-commerce**

Electronic commerce is generally defined as the marketing, buying, and trading of goods and services through the Internet or other communications networks. It is typically classified into business-to-consumer (B2C) and business-to-business (B2B) transactions. This study focuses on the B2B aspect of e-commerce, which is defined as systems of two or more business partners who exchange, aggregate, distribute and track information, conduct many types of transactions, and complete a number of other vital transactions with real-time visibility of those processes. Electronic commerce between businesses is not new. Businesses began sending and receiving purchase orders, invoices and shipping notifications electronically via electronic data interchange (EDI) in the late 1970s. EDI is operated over private value-added networks and has high upfront capital costs, as well as intensive installation and training requirements. For these reasons, it is out of the reach of many small and medium-sized businesses.

E-commerce over public networks makes these processes possible for even the smallest home office. Companies of all sizes can communicate with each other electronically, through a web of interconnected networks including the public Internet, intranets, and extranets.

![B2B Commerce Growth in U.S.](image)

**Source:** Jupiter Internet BtOB Commerce Model

The rapid growth of B2B e-commerce is due to:

- lower purchasing costs: buying materials or services for a corporation can be an expensive, multi-step process. E-commerce lowers costs by consolidating

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3 U.S. Dept. of Commerce report, May 1999
purchasing and facilitating relationships with key suppliers to yield volume
discounts and tighter integration with the manufacturing process.

- reduction in inventories: having more accurate forecasts of what sells and what
does not can increase inventory turns and keep the right products in stock. E-
commerce enables the necessary information to get to those who need to use it, in
a real-time fashion.

- more efficient logistics: matching an order with the products and then getting
them to customers in the timeframe promised at as low a cost as possible is the
goal of a firm's logistics operation. E-commerce can make these processes more
efficient by tracking products each step of the way from the factory to the end
user and makes this information available to all who need it, when they need it, at
very low cost.

- lower sales and marketing costs: E-commerce allows a company to market to
additional customers with little, if any, incremental cost. Because its sales
function is housed in a computer server rather than physical store locations or
sales people, its reach is bounded only by the capacity of the servers to respond to
inquiries and orders.

- new sales opportunities: E-commerce provides the opportunity for companies to
market their products and services to the global marketplace; again, at little or no
incremental expense.

Overview of the Textile Industry

The textile industry has a long history in the United States, dating back to the onset of the
Industrial Revolution in the 1790s. Despite strong competition from lower-wage, non-
domestic textile producers, the industry remains one of the largest, most diverse, and
most dynamic segments of the U.S. manufacturing sector. The industry has maintained a
competitive position by specializing in high-value luxury items, launching successful
campaigns to encourage consumers to buy domestically made products, modernizing old
mills with the newest technology, and adopting quick-response and "just in time"
manufacturing strategies that permit the industry to respond rapidly to changing demands,
particularly in the apparel and home furnishings markets.

<table>
<thead>
<tr>
<th>U.S. Textile Industry Profile</th>
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<tbody>
<tr>
<td>Companies</td>
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<tr>
<td>Plants</td>
</tr>
<tr>
<td>Capital Investment in 1996</td>
</tr>
<tr>
<td>Annual Sales in 1999</td>
</tr>
<tr>
<td># of Employees in 1999</td>
</tr>
</tbody>
</table>

Source: Census of Manufacturers, 1999

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4 Paraphrased from information found on the American Textile Manufacturing Institute website
Textile companies prepare and transform fibers into yarn, thread, or webbing, convert the yarn into fabric or related products, and dye and finish these materials at various stages of production. Many textile facilities also produce final products for consumption (e.g., thread, yarn, bolt fabric, towels, and sheets), whereas the rest produce transitional products for use by other textile establishments and by establishments classified in the apparel or other industries. The facilities fall into the following major categories, in order of most numerous to least numerous:

- Knitting mills
- Miscellaneous textile products
- Broadloom mills (for cotton, wool, and man-made fibers, including silk)
- Textile finishing (including dyeing)
- Yarn and thread mills
- Carpet and rug mills
- Narrow fabric mills

In the United States, it is uncommon for apparel customers to purchase a "package" of finished goods from a single supplier or source. Rather, the customer may buy fabric from one source, order trim from a second source, and contract with a third source to have garments cut and sewn. U.S. customers find it most cost-effective to do business in this manner, which is reflected in the historically fragmented nature of the textile industry (defined by Michael E. Porter as one in which no firm has a significant market share and can strongly influence the industry outcome) ⁵.

Source: American Textile Manufacturers Institute

Textile End Uses 1998 (% by pounds)

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Apparel</td>
<td>36%</td>
</tr>
<tr>
<td>Home Furnishings</td>
<td>25%</td>
</tr>
<tr>
<td>Floor Coverings</td>
<td>23%</td>
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<tr>
<td>Industrial/ Other</td>
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</table>

Supply chain management
Recent trends show that most B2B commerce is likely to flow through supply chains rather than neutral exchanges. E-commerce is the enabler because it breaks down the barriers to information sharing that proprietary information systems create. As a result, it paves the way for cooperating groups to share previously locked up information on inventory levels, in-transit stock, purchasing history, etc. Underpinning the supply chain is a flow of information including sales data, production schedule, demand forecasts, inventory status, promotion plans and new product introduction plans. At the beginning and end of each flow are buyers and sellers. Efficient management of this flow enables companies to get products to volume and market faster and more efficiently, while reducing inventories. Industries that have successfully integrated E-commerce into their supply chain have applied the principle of viewing the supply chain as an ecosystem of value creation through which players within and outside the supply chain are able to create options, forecast the value of their options and exercise them in a timely, economical fashion. This trend has yet to touch the textile industry.

Inventory control
Using B2B technologies, companies can better utilize their inventory and raw materials. In addition, online transactions allow even more time to be shaved off for companies that use JIT (just in time) manufacturing. Ultimately, it allows firms to use less working capital to do the same amount of work, freeing these funds to be invested elsewhere. The purchase, storage, and management of raw materials is a critical process for the textile industry. Even more so is the management of the inventory of finished goods. A good share of textile firms’ fiscal difficulties can be blamed on inability to quickly and efficiently move finished goods from inventory to the end users. B2B technologies could provide a critical boost in an area for which any improvement could yield dramatic long-term results.

Sales and marketing
Virtual marketplaces, also referred to as industry exchanges or B2B discounting sites, provide real-time auctions and negotiated sales for immediate delivery of inventory that might otherwise be difficult or slow to move. Both sellers and buyers have access to a larger market than they could ever hope to attract by using traditional methods, and at considerably less expense. As mentioned above, inventory management is a critical process for textile firms, which may explain why this trend in E-commerce is one that textile firms adopted relatively quickly. Upon exploration, however, it seems that most of the textile-related marketplaces on the Internet today are provided by third party entities rather than the textile firms themselves, who simply use the marketplaces created by others. Some of these existing textile marketplace sites include:

- Apparelbids.com
- Buytextiles.com
- Clicktex.com
- Etexx.com
They work very much like a traditional auction (perhaps this is also a factor in its relatively quick adoption by the textile firms), where buyers offer goods for sale – generally excess inventory and irregulars – and interested buyers make bids during a predetermined timespan. The host site facilitates the process, but it is up to the buyer and seller to close the deal and arrange payment and delivery. The host site charges a fee to both buyers and sellers who use the marketplace mechanism.

Customer service
Many industries are currently struggling with how to best leverage new information technologies for added value in customer service. Access to information via an internet browser is the most common form of customer service activity by industries today. Future trends in customer service will be driven by the customers as opposed to the suppliers as customers progress along the learning and experience curves and begin to understand the types of service applications that truly add value from their perspective.

COMPARISON OF THE INTEGRATION OF E-COMMERCE BY TWO TEXTILE FIRMS

To aid in understanding the integration of e-commerce by the textile industry, two textile-related companies are sampled in terms of the following:

1. Communications infrastructure
2. Technical expertise
3. Enterprise systems
4. Current e-commerce activities
5. Planned e-commerce activities
6. Perceived barriers to e-commerce adoption
7. Lessons learned

The information contained in the numbered items below was provided by the Vice President for Information Systems at Company "A", and by the Manager for e-Business at Company "B". The information reflects their individual opinions and should not be construed as expert analysis. The purpose of using this approach was to emphasize the varying perspectives of ‘real-world’ company executives at this point in time and to contrast the views held by two textile companies attempting to understand the emerging technology that has already taken hold in many other industries.
Company "A"

Company "A" is a leading manufacturer and marketer of textile products for the home fashions and apparel fabrics markets. The company designs, manufactures and markets a coordinated line of value-added home fashions products consisting of packaged bedroom furnishings such as comforters, sheets, pillowcases, shams, bed skirts, decorative pillows and draperies. Company "A" also manufactures and markets a broad range of high quality woven cotton and cotton blend fabrics for apparel and is the leading supplier of men's dress shirt fabrics in North America. It has approximately 8,000 employees with operations in Virginia; North Carolina; Tennessee; South Carolina; and Georgia. The company makes apparel fabrics such as material for men's shirts, and home fashion items such as comforters, sheets, and pillowcases. Home fashion products are sold through high-volume retailers such as Wal-Mart (11% of sales). The company's woven cotton and yarn-dyed fabrics, such as oxford cloth, are used in products sold under the Liz Claiborne and Van Heusen brands.

Company "A" E-Commerce Integration

1. Communications infrastructure
   Their facilities are connected via a frame relay wide area network using TCP/IP Ethernet with multiple T-1's. (see Glossary for definition of terms.)

2. Technical expertise
   Its Information Technology division currently has about 100 employees; all of whom are actively engaged in implementing technology solutions throughout the company’s facilities.

3. Enterprise systems
   SAP (see sidebar)

4. Current e-commerce activities
   The company is currently evaluating a number of e-commerce applications. Their primary focus is in determining the nature of business value that various e-commerce solutions provide on two fronts: procurement, and the end user interface. They are evaluating e-procurement solutions, comprising of software that improves ordering and enables exchange of information with supplier trading partners. A second area of procurement focus is evaluating a number of marketplaces or exchanges due to the potential for volume purchasing advantages these initiatives create.

   The company's technical staff is exploring the possibility of offering a procurement mechanism or marketplace portal for customers, but have not yet made a decision.

About SAP

Founded in 1972 and headquartered in Waldorf, Germany, SAP is the world's largest inter-enterprise software company, and the world's third-largest independent software supplier overall. SAP employs over 21,700 people in more than 50 countries and is listed on several exchanges including the Frankfurt stock exchange and NYSE under the symbol "SAP."  Source: SAP website
5. Planned e-commerce activities

Company "A" intends to build or purchase a portal that allows customers to gain access to information through SAP and access order status and delivery information.

6. Perceived barriers to e-commerce integration

- Diversity of retailers’ systems: The retailers in the textile industry have thousands of suppliers. If all of their suppliers create portals they will all be unique and it is difficult to envision retailers being interested in learning to use a thousand different supplier-produced portals. The perception is that in the short term it may provide competitive advantage for suppliers to build portals serving retail customers; however, in the long-term this is not feasible from a customer value perspective. Retail customers are building their own, internal portals that provide a common interface among all their suppliers enabling information exchange system-to-system. If a supplier’s data systems are not able to integrate with those retail portal systems, the retailers will obtain their materials from suppliers that do.

- Lack of global standard: There are many ‘flavors’ of XML mark-up language, but a standard has not been established. Rosetta Net is the closest to having an industrial-strength standard for the e-commerce industry (see sidebar). Standards would facilitate the development of products from multiple manufacturers without extensive modification, while allowing them to keep intact their existing product numbers and pricing schemes. As a result, distributors would gain a better handle on inventory management. Manufacturers would gain tools for creating a standard catalog that could be used to gain access to ordering activity across the supply chain. Additional information on XML as a standard for e-commerce is found in the Appendix.

7. Lessons learned

- The current structure of e-commerce in the textile industry consists of supplier-driven ‘solutions’ that require downstream channel partners to view their data through the supplier’s portal on the internet. This requires a conscious action by the customer and limits the customer’s buy-in to the interface because it was created with supplier needs and interests in mind. A significantly more valuable approach is to apply the power of e-commerce to the development of system-to-system data exchanges that take place automatically, in real-time, without any action on the part of the supplier or

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**Rosetta Net to Help Standardize On Supply-Chain Activities**

The IT industry is coming together to define a set of Internet trading standards aimed at reducing costs in all corners of the sector's supply chain. Rosetta Net was formed to hammer out standard Web data formats and schema for use and reuse among manufacturers, distributors, retailers and users of corporate IT products. Just as efforts in the automotive, retail and financial services sectors have shown, core pieces of the Rosetta Net project could be applied to other industries where standard definitions are needed for swapping purchasing and trading data over the Internet.

*Source: Rosettanet.org*
customer. For example, if a manufacturer encounters a situation that results in a production delay, this information would propagate automatically throughout the suppliers’ and customers’ systems such that all orders impacted by the delay would show revised delivery dates instantaneously, without manual entry on either end.
Company "B"
This company is the largest producer and processor of textured yarns in the world. The company’s primary business is the texturing, dyeing, twisting, covering, and beaming of multi-filament polyester and nylon yarns. Its textured yarns are found in home furnishings, apparel, and industrial fabrics, automotive, upholstery, hosiery, and sewing thread. Over the years the company has transitioned itself from a domestic manufacturer and supplier to a participant in the world marketplace. Today, the company maintains manufacturing plants in the United States and internationally. The U.S. plants are concentrated in North Carolina and Virginia, and the international plants are in Brazil, Colombia, Ireland and the UK.

In addition to textile yarns, the company also produces a portion of its textured polyester raw material and participates in non-core related businesses. These businesses include the manufacture of nonwoven fabrics through its wholly-owned subsidiary Technical Fabrics; cleaning and processing through investment in Micell Technologies; and manufacturing systems consulting and integration through their majority-owned subsidiary Technology Group.

Company "B" E-Commerce Integration

1. Communications infrastructure
   Like Company "A", Company "B" has a T-1 connection to the Internet.

2. Technical expertise
   Company "B" has a subsidiary, Technology Group, that assists the manufacturing operation with the integration of new technology.

3. Enterprise System
   All of the yarn manufacturing-related facilities in North America use Oracle 10.7 which allows Company "B" to aggregate data from the plant floor to a single view enterprise-wide and distribute it to customers.

4. Current e-commerce activities
   A public launch of the company's e-commerce application, Fyberserv, was announced on March 6, 2001. Fyberserv was designed and initiatied by Mr. Company "B"s Manager for eBusiness. The application was developed through a vendor relationship with the subsidiary technology company Technology Group. It is the first online business tool of its kind in the textile industry providing access to comprehensive, real-time information that can be customized by the end-user. The new Fyberserv system allows customers to enter and adjust orders and forecasts; track order status, purchase orders,
shipping history, bills of lading, and invoices; view product catalogs and product specifications; and conduct product searches – all online.

5. Planned e-commerce activities
Access to Fyberserv will be open to all North American customers by July of this year and all European customers having access by December. It is expected that a significant number of first-time international customers will emerge as a result of Fyberserv’s online presence.

6. Perceived barriers to e-commerce integration
• Lack of precedents: The Manager of eBusiness stated that the biggest barrier to e-commerce in the textile industry is that it has never been done before. Fyberserv began as an idea to improve customer relations. With that objective in mind, the Manager and his staff set about to identify a few models to use as a basis for their customer service and marketing application; but they found none. So they asked their customers to help them determine exactly what they are looking for from Company "B" to make their interactions with Company "B" easier and more efficient. They got the customers to rank specific things they would like to be able to do electronically via the Internet or other network infrastructure. Fyberserv, in its current iteration, is solely the result of customer input – nothing in the design is there simply because someone at Company "B" thought it would be a good idea – it was all designed to fulfill customer needs and interest.

• Condition of existing data systems: One of the first issues Company "B" encountered upon implementing their e-commerce application was the condition of existing data systems. The integration of an e-commerce application serves to shine a spotlight on all the processes in the firm and, inevitably, errors are found in those processes that have the potential to compromise the integrity of the data being provided to customers via the e-commerce interface. As a result, those processes require some degree of re-design or updating, and in some cases, new processes must be established in place of the existing processes. It is a daunting challenge; possibly more so for an industry as established and traditional as the textile industry.

• Education of customers: Although the e-commerce application was developed using customer input, Company "B" struggled with finding ways to educate the customers about the benefits of using the application. The biggest benefit to using Fyberserv is its speed. Company "B" found that when customers make an inquiry via Fyberserv, it is five times faster than if they had made the same inquiry by telephone. The objective was for the customer to learn how to leverage the information available on Fyberserv as if they owned the information. To do that, some education of the customer is necessary. The buying patterns for most of the company's
customers indicates that they are not forecasting for future purchases. By using Fyberserv, customers can view their shipping history and see literally every order that Company "B" has ever shipped to them. This information can then be used for forecasting, volume orders, etc.

7. Lessons learned

- The challenge of developing an e-commerce interface for customers to use was not the technology; the expertise is always available. The challenge is to design a tool that not only meets customer needs for information and attracts their interest, but that can also be applied as a marketing tool in the global economy.

- Any form of e-commerce presents a significant change in business practice for an ‘old-school industry’. The key is to get a quick win, dominate the space first even if it means using a less than perfect implementation to start with. Change in this industry is inevitable for those who expect to survive and prosper in today’s global marketplace.

- E-commerce is a popular buzzword in business right now, and there is an infinite number of people and companies that claim to know THE best way to integrate it into a company’s business model. However, the fact is that they are all new at this. Each company knows their customers best and from that perspective are best qualified to develop an online interface that meets their needs.

- The textile industry is struggling; working capital is at a premium and our customers are taking serious measures to reduce costs. E-commerce helps customers save money because they spend less time on the phone checking on orders, and they are able to implement very efficient and effective inventory control techniques to save on inventory costs. Company "B" looks for every opportunity to help customers reduce their costs.

- Make vs. buy: textile companies are going to have to make their own e-commerce applications; you can’t buy out of the box and be able to meet the needs of the customer. It’s very expensive to buy the so-called ‘solutions’ that are available today. Company "B" has been approached by several companies offering $5-6 million systems; but unless the customers demand it, they’re not interested in those systems.

- The textile industry is slow to adopt commercial technology applications. If customers would be willing to spend a small amount of time to learn the benefits that Fyberserv offers, they would realize dramatic cost savings – particularly in the case of the smaller customers (less than 10,000 pounds of textile production per year). Fyberserv supplies all the information these small companies need to run their small business.
CONCLUSION

What can be drawn from the insights of these IT executives with regard to the integration of e-commerce in their industry? One cannot make direct parallels between the two textile companies because they are in different positions on the supply chain and therefore have disparate customer/supplier experiences and objectives. However, some general issues are identified below based on the strategies of companies such as those described above and possibilities for new strategies are offered.

1. An issue that comes immediately to mind after hearing the perspectives of the two companies is that of supplier-provided value added services versus customer-demanded or required services. Each approach has its advocates with their own associated motivations or strategies. An initiative that is supplier-driven has the advantage of allowing the supplier to take a first mover position and participate in defining the rules in an environment where there are currently none (as mentioned in the lack of standards barrier mentioned earlier). Whereas, compliance to customer requirements puts a company at a disadvantage in terms of being able to control the direction and degree of investment throughout the development cycle of the new process. A larger, industry-scale disadvantage occurs in this situation also, because the supplier that is adjusting to the whims and vagaries of its customers will always be playing catch up and will never be in a position to take control or change the direction of a new industry standard. In that case, both the company and the industry suffer negative effects.

2. A second issue is that of technological leadership - the degree to which a company seeks technological leadership versus following or imitation. Porter's observation that "a firm could be a technological leader but deliberately not produce the highest quality product in the market," 6 is relevant to the differing approaches of Company "B" and Company "A" as articulated by the two executives.

3. An issue that is always associated with emerging markets and new technologies is whether companies choose to adopt the new technology because it presents an opportunity they wish to pursue, or that it is a problem to be solved. Although there are still problems to be solved when adopting the first approach, the lure of a resulting reward (such as increased market share, profitability or brand equity) creates momentum within the company to 'get there first', rather than wait for others to solve the problems and then piggy back from there. The question confronting these textile company executives is "Does e-commerce represent purely an element of production that must be provided because customers are beginning to

6 Michael E. Porter

"Dealing with uncertainty requires that we adopt a 'learning' rather than a 'knowing' attitude toward the future."

expect it? or is E-commerce an opportunity to build new market share in geographic and demographic markets otherwise unexplored by traditional marketing methods?"

4. **Assuming that the current customer structure is fixed** is an issue often confronted by companies considering the integration of a new customer interface. Particularly in a traditional, established industry such as textiles, it is easy to expect that customer processes and systems will remain static and therefore, new technologies must adapt to legacy third-party systems. The mistake in this approach lies in the fact that it allows old technology to drive the development of new processes simply because those old technologies are a known quantity.

**A Few Strategies to Consider:**

- Prior to committing to any particular e-commerce mechanism, preliminary planning is necessary to **determine the overall function** of the e-commerce operation. For example, is it for information only, or will it manage inquiries and transactions? Companies should estimate the amount of traffic it may receive under the most optimistic scenario in order to ensure that the IT infrastructure is scalable and usable under the most demanding conditions.

- **Avoid viewing E-commerce in isolation:** it should be integrated into the main corporate system as well as with the Information Technology strategy. Most importantly, it should be complementary to the overall business strategy. The objective isn't to introduce electronic commerce, it's to improve the business.

- Integration with the overall business strategy should occur in a **multi-phased approach** that results in a gradual transformation of business processes from old economy methods to new economy experiments. Keep in mind that any initial forays into e-commerce are indeed experiments and thus should not be the mechanism for valuable information or transactions until the technology and system integration have been proven for a particular implementation.

- When developing an integration strategy, focus attention on designs that **enable business processes to cross enterprise boundaries** and thereby eradicate problems with duplicate processes, ineffective transfer and communication disconnects.

- **Avoid** development projects that require **long gestation periods**. The results may be obsolete before they ever get established. In some cases, it may be better to be a 'fast follower' than 'first mover' - it's a matter of strategy and overall objectives.

- When initiating designs for new e-commerce processes, ask the question, "**How can we use technology to allow us to do things we are not already doing?**" A company that tries to simply automate current processes will not be driven to innovate but, instead, will only reinforce and speed up the status quo.
• E-commerce integration can evolve from initial use of business-to-business electronic data interchange transactions; to an eventual portfolio of implementations including electronic catalogs, direct online sales and customer service, and fax-on-demand service (addresses the issue of supply chain incongruity in technology advancements), to something as complex as a distributor offering thousands of customers company-specific pricing and content.

And finally, things to consider for those interested in the bottom line:

<table>
<thead>
<tr>
<th>Estimated Development Costs</th>
<th>Gobal and U.S. Textile &amp; Apparel E-commerce Market Sales Forecast</th>
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<tbody>
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<td>Basic website</td>
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Source: Forrester Research Inc.
Source: EcomTextile.com