BUSINESS-TO-BUSINESS E-BUSINESS MODELS: CLASSIFICATION AND TEXTILE INDUSTRY IMPLICATIONS

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Abstract

Since the introduction of the Internet and e-commerce in the mid-1990s, there has been a lot of hype surrounding e-business, the impact that it will have on the way that companies do business, and how it will change the global economy as a whole. Since the crash of the dotcom companies in 2001, there has been much less hype surrounding the use of the Internet for business. There seems to have been a realization that e-business may not be the answer to all of a company's problems, but can be a great asset in the struggle to increase efficiencies in daily business dealings, and that the Web is primarily a new way of relating to customers and suppliers. This paper categorizes and discusses the different types of business-to-business electronic business models currently being used by businesses and discussed in the academic literature, and shows how these business models are being implemented within the textile industry. This paper is divided into three parts. Part I gives an overview and some important definitions associated with business-to-business e-business, and discusses some characteristics that are unique to doing business on the Internet. Risks and benefits associated with doing business online are also discussed. Part II analyzes the different types of e-business models seen in the academic literature. Based on the analysis of the literature, a taxonomy of e-business models was developed. This new classification system organized e-business models into the following categories: sourcing models, ownership models, service-based models, customer relationship management models, supply chain models, interaction Models and revenue models. Part III reviews how these e-business models are currently being used within the textile industry. A preliminary analysis of 79 textile manufacturing companies was conducted to identify the applications of e-business.

Keywords

Electronic commerce, electronic business models, textiles, Internet

Introduction

Since the introduction of the Internet and e-commerce in the mid-1990s, there has been a lot of hype surrounding e-business, the impact that it will have on the way that companies do business, and how it will change the global economy as a whole. Since the crash of the dotcom companies in 2001, there has been much less hype surrounding the use of the Internet for business. There seems to have been a realization that e-business may not be the answer to all of a company's problems, but can be a great asset in the struggle to increase efficiencies in daily business dealings, and that the Web is primarily a new way of relating to customers and suppliers. Forrester Research, a technology research firm, has forecasted that business-to-business e-commerce will reach $2.7 trillion in 2004, reaching 53% of all online business trade in five years [23]. It is a mistake, however, for companies to expect huge benefits from simply implementing e-business without changing their organizational structure [7]. Companies must now decide, as with any new venture, which type of business model will best support their e-business efforts. According to the article "Why Business Models Matter" by Joan Magretta, "A business model's great strength as a planning tool is that it focuses attention on how all the elements of the system fit into a working whole." [18] This paper categorizes and discusses the different types of business-to-business electronic business models currently being used by businesses and discussed in

the academic literature, and shows how these business models are being implemented within the textile industry.

This paper is divided into three parts. Part I gives an overview and some important definitions associated with business-to-business e-business, and discusses some characteristics that are unique to doing business on the Internet. Risks and benefits associated with doing business online are also discussed. Part II analyzes the different types of e-business models seen in the academic literature. Based on the analysis of the literature, a taxonomy of e-business models was developed. This new classification system organized e-business models into the following categories:

1. sourcing models,
2. ownership models,
3. service-based models,
4. customer relationship management models,
5. supply chain models,
6. interaction models and
7. revenue models.

Part III reviews how these e-business models are currently being used within the textile industry. A preliminary analysis of 79 textile manufacturing companies was conducted to identify the applications of e-business.

Part I: Background

Part I of this paper defines the terms associated with business-to-business e-business models, the characteristics and attributes associated with using the Internet to do business, and the risks and benefits companies can face when making the decision to go online.

Definition of B2B e-Business Models

First, what is business-to-business e-commerce? Business-to-business in general is defined as commercial business between trading partners [12]. An electronic market is defined as an information system that links together buyers and sellers to exchange information, products, services and payments through computers and networks [12]. Business-to-business e-commerce is a combination of these two definitions where the information system is the Internet. The benefits of using the Internet to do business include the potential to lower costs by selecting suppliers, establishing prices, ordering goods, and paying bills electronically. Transactions can be completed regardless of location, buyers and sellers can be matched in a digital forum for pre-sale, sales transactions, and post-sale activities [12]. It is important to realize that business models and strategy are not the same thing. Business models describe how the pieces of a business fit together, but do not take into account competition. A competitive strategy explains how a company will do better than their rivals by being different. Businesses, online or not, must have both in order to be successful [18]. According to the article "Process Models and Business Models – A Unified Framework", there are two types of models in e-Commerce, a business model and a process model. Business models define the 'what' in an e-commerce system and are concerned with value exchanges among business partners, and the process model defines the 'how', focusing on the operational and procedural aspects needed to make the system work [3]. The focus of this paper will be on how business models add value to an e-commerce system.

Internet Characteristics

Some basic characteristics of the Internet must first be described in order to understand the impact that business-to-business e-commerce will have on an organization. First, the broadcasting model of the Internet is different from the traditional broadcasting models, for example those of television or radio. The Internet allows for a many-to-many communication model versus the traditional one-to-many model [22, 27]. In other words, any user of the Internet can also be an information provider. Second, consumers not only interact with humans, but also with intelligent agents. This second characteristic also leads to a third, namely consumer competence. It is important to address the skill level of the customers. The website should be user-friendly so that the company does not have to train customers on how to use the site. The Internet also allows for a wealth of information to the customer and an "unprecedented level of choice". Companies must consider how to help customers to make

correct decisions with so many choices available. Finally, the balance of power has shifted with the use of the Internet toward the consumer. With this shift, issues of online privacy and security must be addressed. This also brings into play the importance of trust, and the role of the brand name becomes even more important online [5, 19, 22]. The brand offers value to customers when purchasing online by lowering search costs, quality knowledge, and inspiring trust [11]. Some trust issues that customers may look for before doing business with a supplier online include: the generalized reputation or perception of the supplier, customer expectations for security, privacy and confidentiality, assurances provided by the supplier such as certifications or guarantees, and the reports of other customers [6]. Additional factors that may influence a customer's further transactions with an online supplier include: accuracy of order fulfillment, punctuality of order fulfillment, the nature of any interactions with customer relations, resolution of any disputes, subsequent communications from the supplier, and any communications from other suppliers with whom customer information was shared [6].

In addition to the characteristics discussed above, according to an article in Integrated Manufacturing Systems, "Internet technology is changing the way of product development, ranging from information gathering, product managing and commerce to product development and maintenance" [25]. It is important to understand how using e-business can change the entire organizational structure. Using the Internet to do business takes away many of the restraints that are present in traditional business. For example, the range of content on a website encompasses anything that can be digitized; information is more easily accessed and readily available, and digital copies are essentially free [22]. These new attributes lead to new customer consequences. Customers can more easily compare prices and product offerings; search costs are lower, and they have a wealth of information at their fingertips [20]. These customer consequences can be used either in favor of or against the organization [22]. The lower search costs and the ability to easily compare prices and product offerings can lead to more competition for the firm, and the large amount of information available can be overwhelming to the customer, along with the possibility of a large amount of alternatives to consider. Companies can turn these consequences around, however, by providing customers with decision-making aids and by making all the information that a customer may need available on the website. They can also customize the website for individual customers, so that they only see products and services that are of interest to them, thus cutting down on the overload of information and alternatives.

Risks Associated with B2B e-Business

In order to understand why a company would or would not decide to implement B2B e-business, some of the perceived risks and benefits should be discussed. Some of the prevailing reasons for not entering into the e-business arena are listed below:

- Could lead to uncontrolled growth
- Fear of alienating intermediaries
- Satisfaction with current business arrangements
- Concern about levels of understanding the technology
- Time and expense of the reengineering process
- Fear that their products are not suited for the Internet [26].

These are reasonable fears that need to be addressed, especially in small firms where the cost of implementing an e-business solution would have a huge impact on the business, and the failure of such an endeavor could cause serious damage and could potentially drive the company out of business. Firms must also take into account the retaliatory power of existing intermediaries. It is important that they are able to avoid, or at least contain, channel conflict, and thus the alienation of their existing business partners [4, 5].

They must also consider whether their suppliers and customers are ready for the transition. If the customers and suppliers will not participate, then there is not much point in proceeding. There is also debate as to whether the Internet enhances relationship marketing. On the one hand, with the use of the Internet, companies can custom tailor information about products and services to individual preferences, but on the other hand, it is argued that a lack of human interaction will damage the customer relationship [9].

The implemented e-commerce system must also be 100% error-free. Unlike a salesperson working for the company who knows where the flaws in a system may be, an online shopper expects the

information presented on the website to be completely accurate. One misunderstanding or mistake can ruin an important business relationship [13].

Benefits Associated with B2B e-Business

Once a company has taken into account all of the risks involved when committing to an e-business solution, they must also take into account the benefits that can be gained by going online. One of the main reasons that a company would opt to go online is the potential opportunity to reduce costs. There are potential cost reductions in transaction costs, error reduction, and reduced lead-time, all of which lead to lower costs of services and products and improved efficiency [17, 19, 20]. There is also the potential to manage inventory more efficiently, adjust more quickly to customer demand, get products to market faster, and cut down on the cost of paperwork [17]. According to an article in Integrated Manufacturing Systems, "with the Internet a firm can offer a fully integrated, tightly linked system, with a searchable catalog, improved ordering and delivery options, back-office record keeping and billing, real-time inventory management, and constantly updated advertising and customer preference data gathering; often times at substantial cost reduction" [12]. Manufacturing Execution Systems (MES) can be integrated with a company's Enterprise Resource Planning (ERP) system and their website, so that the company's plant floor operations are linked directly to the company's website, and customers can track orders on the plant floor [2].

Information is more easily accessed and readily available to customers who may be in different time zones [22]. According to a survey conducted by the Norwegian Statistical office, companies involved in e-commerce wanted to achieve improved flexibility first, and gain new customers second [12]. Another huge advantage for companies conducting business through the Internet is the fact that interactions with customers can be easily monitored and logged. If this information is collected and used properly, it can provide a company with a wealth of marketing information [7]. The fact that the Internet is an open standard is also a great benefit [23]. The Internet is open and freely available. All that is needed is a computer and a web browser to use the Internet.

Companies can also use the Internet to differentiate their company from other similar companies. They can offer more customization; they can provide a lower price due to the cost savings that they achieved by using the Internet to do business, and they can offer premium customer service [24].

Companies seem to see the benefits of e-business overriding the risks. According to a report by NAPM/Forrester Research on e-business, US organizations have increased their participation in online marketplaces from 19.1 % in January 2001 to 22.7% in April 2002 [12].

Website Attributes and Services

Before discussing the various types of business models currently used on the Internet, some of the possible services available through the use of the Internet that can be incorporated into the e-business model will be discussed. Some of the most popular services offered by business to business websites are: information exchange, digital catalogs, online auctions, logistics services, supply chain planning, and design collaboration [16]. According to a survey conducted by Strategy+Competition, information exchange, digital catalogs, and online auctions were the attributes most frequently integrated into the companies' websites, with 65%, 63%, and 55% respectively of the companies surveyed reported as either already offering or planning to offer these services. Logistics services, supply chain planning and design collaboration were reported to be used or planning to be used by 21%, 8%, and 4% respectively of the companies surveyed [15].

The easiest and most readily used function of the Internet is for information exchange. This is generally where most companies start with their Internet presence. Using a website as an information exchange costs relatively little and helps to build a sense of community [15]. Communication capability is increasing rapidly every year. Based on how quickly these capabilities have increased in the past, the implications are that over the next ten-year period, there will be a 3^{10} increase in communication capabilities. This infers that there will be an ability to move enormous amounts of data around the globe at little cost [23]. The advantages of using information exchange to facilitate an online community with customers and suppliers is to create and maintain a closer relationship, to increase loyalty, and to help the company to react more quickly and accurately to customers demands [7, 19]. Feedback via the Internet can be very valuable to optimize products for important clients, and to

optimize production planning in relation to customer orders [7]. Some of the disadvantages of the online community are that the customers have more power, as they can potentially find more good and bad information about products from each other. Also, the members of the online community may expect more and more up-to-date information about products, orders, etc. [7]. This means that the company must be willing and able to keep up with the increased expectations of their customers and suppliers.

Another option that can be offered on a company's website is a digital catalog. With the use of a digital catalog, suppliers can gain access to a broader customer base without the incremental production and distribution costs of paper catalogs. Both suppliers and customers will save in transaction costs [15]. A digital catalog is most easily used for standardized products, i.e. products where a customer can accurately specify the product he wants to purchase by indicating a combination of values for all parameters [7]. Another benefit of the digital catalog is the ease of customization afforded by the Internet. A catalog can be customized for big customers so that they only see the products that are of interest to them [7, 20]. It can also be used to create a customer profile that automatically shows the customer products that they have previously shown interest in, and may also suggest alternatives or other products based on customers with similar profiles [7, 20]. Companies can also use digital catalogs internally as a way to integrate the products of all of their suppliers in order to offer a uniform format to all of the internal customers [7]. Ideally, the catalog would be integrated with the company's inventory, and the customer could check the availability of the desired items before they are actually ordered [7]. One of the potential difficulties of having an online catalog is that the catalog is available online 24 hours a day, seven days a week. This may often mean that organizational changes have to be made in order to secure orders and customer service requests that may come in any time of the day or week [1, 7].

Online auctions are another popular feature offered by B2B websites. Auctions allow for a one-to-many buying or selling of goods or services [12]. One reason for the popularity of this feature is the relatively low cost of the software. Online auction software can be purchased for as little as $50,000 [15]. This feature is good for buyers who can use this to their advantage to get an optimal price for goods, but many suppliers have experienced significant margin squeeze when forced to compete in this way [15]. Intermediaries use online auctions to reduce the information asymmetry that exists in normal business transactions. For example, if there are several potential suppliers competing for an industrial bid, if they are bidding in real time online, there is potential for there to be a reduction in the final bid [19].

The most common use of Web-based technology in industrial application is currently in collaborative product design, supply chain management and training [25]. Supply chain management tools "help companies to share sales and production forecasts over the Internet" [15]. By fully integrating the supply chain via the Internet, companies can expect reduced supplier integration costs, minimized investment expenses, and optimized industry-wide capacity [27]. Design collaboration helps manufacturers to share product development tasks with their contractors via the Internet [15]. Integrated product development occurs when assemblers, customers, and suppliers are all involved in the product development process. This is facilitated by the Internet and can lead to improved designs, reduced product development times, and reduced costs. It can provide a mechanism through which design teams are able to exchange data quickly and accurately [23].

One of the challenges associated with using the Internet to smooth the progress of the product development chain is the issue of dividing a design task into smaller, but independent, design objects, so that their design can be performed separately and simultaneously by different parts of the product development chain, and in this way all the separate elements are brought together into the assembled end product that meets the given design requirements [23]. Another product development challenge that can be addressed via e-commerce is collecting and compiling design requirements that may come from customer requirements, or from the technical or economical requirements introduced by manufacturing [23]. E-commerce can also be used to convert complicated numerical results into a visual form that can be more easily understood by the design team [23]. E-commerce can also allow for the inclusion of a wider variety of factors associated with the product, such as manufacturing and assembly restraints, taking into account factors that affect the integrity of product components in parallel development, and the greater ability to include customer requirement [23].

Logistics services involve "facilitating the physical flow of goods within a firm or between a firm and its suppliers and customers" [15]. Providing this service is valuable to many customers, but managing the physical movement of goods is much more difficult than some of the other services that can be offered on the Internet. This may explain why this service is not used as often as some of the others [15].

Some other attributes that a company can use to enhance the effectiveness of their website are affiliate programs, entertainment features, community features, customer control options, communication features, relevant news and information, search features, and incentive programs [20, 22]. A company can use an affiliate program to increase traffic to their website. They offer affiliates who place links to their website a referral fee if a customer clicks on their link and purchases goods at their site. Entertainment, community and other relevant news and information can be added to a site to keep customers coming back. The site can include community features that allow customers to share information about products. This can also generate more sales if reviews are good. Placing relevant news articles, providing an online magazine or providing product information on a site are other ways to keep customers coming back to the site regularly. Customer control, communication features and search features are some ways to increase customer satisfaction at the website. One customer control feature is to allow customers to choose between finding the information they need on the web, chatting with web line advisors, or speaking to someone at a call center. Some communication features are using webcams to communicate with customers, chat features, or computer-to-phone calls. Business can even increase the effectiveness of their search feature by including not just the location of the product but also recommendations for substitution or complementary products.

Internet Market Structures

According to Mahadevan, all business on the Internet falls into one of three broad market structures: portals, market makers, and product/service providers. B2B portals primarily provide members of an industry with a sense of community by providing them with information about products, services, and general industry information. They are also used as focal points to channel traffic into the websites of product/service providers in the designated industry [19].

Market makers also offer customers a sense of community and industry information, but they differ from portals in that they participate in the facilitation of business transactions between the buyer and supplier. This market structure can provide an industry with cost reductions by reducing product search costs and transaction costs [19].

Product/service providers are suppliers that sell to their customers directly via the Internet [19].

Once a company has weighed the pros and cons of taking their business online, they must then decide which direction would be best for their company in terms of implementing an e-business model. Unfortunately, there is no unique, successful business model for companies that perform electronic business. Just as in traditional business, the model depends on the products and services that the company offers, the market structure, etc. [7]. It is also important to understand exactly what a business model is and what the company hopes to accomplish with the model. A good business model is essential to every successful organization, whether it is a new venture or an established player [18]. Success online, just as in traditional business, involves adding value to the firm as well as adding value to the customer [22]. A good business model should tell who the customer is, what the customer values, how the business makes money, and how value is delivered to the customer at an appropriate cost [18]. All new business models are variations on the generic value chain which underlies all businesses. They consist of two parts; activities associated with making something, and activities associated with selling something. A new business model involves either the design of a new product or a process innovation, a better way of making, selling, or distributing an already proven product or service [18]. In terms of business-to-business e-business models, the process innovation models are the way that companies will more commonly use the Internet. It is important for companies to understand that their business model does not have to be set in stone. According to the article, "Business Models Matter" in Harvard Business Review, "business modeling is… the managerial equivalent of the scientific method – you start with a hypothesis, which you then test in action and revise when necessary" [18]. An eLab Position Paper from the Owen School of Management at Vanderbilt University states that "for many firms… the greatest consequence of the Web for their business is that business models are seen as a challenge" [22].

Part II: E-Business Models

The literature available on the subject of B2B e-commerce business models varies greatly. According to the article, "Examining E-Business Models: Applying a Holistic Approach in the Mobile Environment", "…the business literature defines business models from different viewpoints, each focusing on different components. This leads to a fragmented and confusing picture regarding the shape and role of e-business models and the factors that distinguish successful business models." [28] Most journal articles on the subject focus on a specific category of e-business model. This section categorizes the business models represented in the literature. Based on the e-business models found in literature, a taxonomy was developed containing the following seven categories:

1. sourcing models,
2. ownership models,
3. service-based models,
4. customer relationship management models,
5. supply chain models
6. interaction models, and
7. revenue models.

It is important to note, however, that many companies will have e-business solutions that fall into more than one of these categories.

Sourcing Models

The first category of B2B e-business models is the sourcing model. The type of sourcing that is typical for a particular product or industry will often influence the choice of e-business model adopted by the organization. An article in Harvard Business Review defines two sourcing methods that will influence the e-business model. The first is systematic sourcing. Systematic sourcing occurs in industries where contracts are typically negotiated with qualified suppliers. The relationships are generally close, long-term relationships. The second type of sourcing is spot sourcing. This generally occurs with commodity or standardized products. The customer wants to fulfill an immediate need at the lowest possible cost [14]. The type of product being sold also makes a difference to the sourcing type. Manufacturing inputs are raw materials and components that go directly into a product and are usually purchased from an industry-specific, or vertical, supplier or distributor [14]. These products are generally sourced through the systematic sourcing method. The second type of product is an operating input. These are not parts of the finished products. Operating inputs consist of maintenance, repair, and operating goods. They are non-industry specific, or horizontal, suppliers [14]. They are generally sourced through the spot sourcing method. For the purposes of this paper, we will focus mainly on e-business models that support the systematic sourcing method, since this is the type of sourcing method most important in the textile industry.

In the article "E-Hubs: The New B2B Marketplaces" by Steven Kaplan and Mohanbir Sawhney, the e-business models are categorized according to the type of product produced and the sourcing method. The four types of e-business models generated from this matrix of goods verses sourcing options are:
- MRO hubs – non-industry specific markets that enable systematic sourcing of operating inputs (maintenance, repair, and operating goods),
- Yield managers – non-industry specific markets that enable spot sourcing of operating inputs,
- Exchanges – industry-specific markets that enable spot sourcing of manufacturing inputs, and
- Catalog hubs – industry-specific markets that enable systematic sourcing of manufacturing inputs [14].

These four types of models, which the article calls E-Hubs, are third-party-owned exchanges, and can be either neutral or biased. Neutral e-Hubs provide a marketplace for buyers and sellers without favoring one over the other. They are equally attractive to buyers and sellers, but are more difficult to get started since buyers do not want to participate unless there are many sellers, and vice versa. They must also overcome the sellers' channel conflict. Biased e-Hubs, which favor either the buyer or the seller, do not have this problem, and thus can grow more quickly [14].

The main benefit of MRO hubs is the reduction in logistics and search costs when purchasing low-value operating goods with high transaction costs. They are owned by third parties that offer buyers access to consolidated catalogs from a wide array of suppliers. At first, it was forecast that the Internet would get rid of intermediaries, with customers and suppliers dealing directly. However, this is still not common in B2B [7]. A MRO hub is actually just a new type of middleman that uses the Internet to bypass the traditional middleman. MRO hubs are generally used to order operating supplies, and do not have a direct impact on manufacturing.

Yield Managers focus on the selling of operation inputs. This type of business model usually works best with the buying and selling of operation inputs with high fixed costs that cannot be liquidated or acquired quickly [14]. This type of website would be used by manufacturers to find new employees or to purchase manufacturing equipment.

Of the types of e-business models discussed in the article by Kaplan, catalog hubs and exchanges are the models most likely to be used by textile companies to buy and sell their goods. According to this article, the exchange model "allows purchasing managers to smooth out the peaks and valleys in demand and supply by rapidly exchanging the commodities or near-commodities needed for production". With this type of e-business model, the third-party provider of the exchange maintains relationships with the buyer and seller and manages these relationships so that the buyer and seller do not have to struggle to establish them on their own. Logistics and fulfillment are conducted by third parties, and in many cases the two parties do not even know with whom they are doing business. With the exchange model, companies can be both buyers and sellers. Therefore, any additional member of the exchange is a benefit to the entire market [14].

Catalog hubs are essentially the same as MRO hubs, except that the exchanges are industry-specific. Catalog hubs bring together many suppliers at one website. The websites can be either buyer-focused or seller-focused. The main benefit of this type of website is the reduction in transaction costs by providing the customer with one-stop shopping. The customer can issue one purchase order for goods from many different suppliers. With this type of model, the roles of buyers and sellers are fixed. Therefore, the addition of additional sellers to this type of hub benefits only the buyers, and the addition of additional buyers benefits only the seller [14].

Ownership Models

The basic e-market types can also be grouped in terms of the ownership of the website. The article "Online Distribution: A Taxonomy of Channel Structures, Determinants of Outcome, And Determinants of Strategy" states that online channel structures can be owned by one or more manufacturers or primary producers individually or in cooperation, or they can be owned by a new entrant third party [4]. Similarly, according to the article "B2B Benchmark: The State of Electronic Exchanges" in Strategy+Business, e-commerce sites can be categorized as independent, consortia, or private networks, depending on their ownership [15]. Independently-owned websites are "pure-play dotcoms financed by venture capital", industry consortia-owned websites are those backed by pooled funds, and private networks are websites that are created by individual companies [15].

Independent B2B e-business models are seen as the riskiest venture since the end of the dotcom mania. Websites that are independently owned make up the majority of ownership models currently on the web, but are now risking extinction as few companies are finding clear ways to create value for the buyer or seller. They also have to deal with the greatest amount of competition and survive without the venture capital investments that were so plentiful prior to 2001 [15]. Independent models are most at risk of extinction, and must therefore look for ways to conserve cash while adding value to the customer. In order to do this, they must find a niche market where they can develop a sustainable customer base whose business they can measurably benefit [15].

Consortia-owned e-business models make up the smallest group of ownership models on the Internet today. Although this group may have the most potential impact on an industry, they must first overcome the problems caused by conflicting agendas among founding companies [15]. There is a 45% failure rate of e-businesses according to the article "E-marketplace Survival Strategies" [16]. In order for companies to stay competitive online, they must add value to the consumer. The article "B2B Benchmark: The State of Electronic Exchanges" predicted that three groups will have the most at

stake in the coming years – consortium participants, independently-owned models, and mid-sized corporate buyers and sellers [15].

The success of the consortium model depends on the creation of an integrated suite of services that will become the industry standard. This is the best way to add value to the industry and encourage participation in the e-marketplace. Second, a small group of companies must be committed to the survival of the consortium. Too many owners could lead to the downfall of the consortium if insufficient companies have invested, and those that have lose the desire to keep the consortium alive [15].

Privately-owned e-business websites are those developed and used by a private company to source goods and sell goods to their customers [15]. These Internet ventures seek revenue growth and/or efficiency rather than IPO riches [16]. This type of ownership model may consume resources that may otherwise support the consortia and independent models [15]. This type of model is probably more resilient than the other two since it does not depend entirely on new business to survive. Companies can just transfer their existing business to the Internet, while cutting down on transaction costs and possibly attracting new customers.

The article "E-marketplace Survival Strategies" is a follow up to the study performed and outlined in the article "B2B Benchmark: The State of Electronic Exchanges", which examined 1,802 B2B sites in 2001. The results of this follow-up study showed the average failure rate of the exchanges surveyed to be 45% upon re-examination in 2002. Of the consortium-backed models, 21% failed. Over 45% of the privately owned sites failed. The textile industry e-marketplaces had failure rates in excess of 60 percent. When categorized by service offering, the total procurement model had the highest failure rate, and the full service and catalog models had the lowest failure rates [16]. Service-based models are discussed next.

Service-based Models

Another way to classify business-to-business e-business models is to group them according to the services that the site offers. These attributes and services include information exchange, digital catalogs, online auctions, logistics services, supply chain planning, and design collaboration. A description of each of these attributes is given in the introduction to this paper. The article "B2B Benchmark: The State of Electronic Exchanges" by Tim Laseter, Brian Long, and Chris Capers classifies this type of model into total procurement models, catalog buying models, auction houses, collaboration facilitators, full-service models, and specialty service models [15].

Total procurement models include those companies that have websites featuring digital catalogs and online auctions. Strategy+Business found that 32% of the companies surveyed were using this type of B2B e-business model. [15]

Catalog buying models feature only the digital catalogs as the main attribute of their website. A majority of privately owned websites use this model [15].

Auction houses focus primarily on matching buyers and sellers through online auctions, but do not offer digital catalogs. Strategy+Business found that 27% of the companies surveyed were using this type of B2B e-business model. Auctions have been around since the beginning of the Internet boom, and thus are a familiar and well-practiced way of doing business on the Internet, but with auction software becoming so inexpensive, these types of sites must find creative ways to add value to the customer to endure the competition [15]. Auctions are a good way to make the price discovery process more efficient [20].

Collaboration facilitators focus their website primarily on supply chain planning and design collaboration, to aid collaboration between buyers and sellers in a way that adds value equally for the buyer and seller, thus attracting participation from both. This type of model is used by only 3% of the companies surveyed, but they seem to represent an emerging trend [15].

The full-service model offers all the services mentioned above on their website. This model accounts for only 5% of the companies surveyed, and is generally owned by a consortium, due to the large amount of revenue required to offer all of these services.

The specialty services model offers information exchange and logistics services as its main features. Of the companies surveyed by <u>Strategy+Business</u>, 14% belonged to the specialty services model category. Most companies using this model provide information or other specialty services to a single industry [15]. Certain markets are characterized by a fragmented supply chain leading to high vendor search costs, high information search costs, high product comparison costs, large market size and huge work flow costs. Logistics providers will add value to buyers, sellers and intermediaries in these markets [19].

Customer Relationship Management Models

The article by Frank Dignum, "E-commerce in production: some experiences", categorizes e-business models according to the services offered to the customer. The categories consist of customer and supplier management models, and sales support and online catalog models.

The customer and supplier management model relies on using information collected from the customer to improve their experiences with the company. Companies can use the Internet to get information from their customers on their products and the transaction performance. This information, in turn, allows the company to better serve the customer, and helps to build a closer relationship with the customer [7]. In B2B transactions, this type of model can be used to form closer relationships with important clients by optimizing products and production planning in relation to customer orders [7]. This article identifies two different types of relationships that can be generated between the supplier and the customer based on this type of model. The first type of relationship involves forming tight relationships with a few big customers/suppliers. This type of relationship usually occurs in markets with only a few companies or a few very dominant companies. The second type is a looser relationship between customer and supplier. This type of relationship usually occurs in markets with standardized products and many global suppliers, where suppliers are chosen on an order-by-order basis. The Internet can help these companies to attract customers by making information about products easily available online and by making order processing easy by means of online ordering [7].

Sales support and online catalog models use the Internet to sell their products to customers. Companies selling products that can be described in a standardized format benefit the most from this type of model. This allows customers to accurately determine the product he wants by indicating a combination of values for all parameters. More customized products can also be sold via the Internet, but the selection process may not be so straightforward. Companies using this type of e-business model must decide how their catalog ordering will be supported. There are several options, such as publishing a catalog online but taking orders via email, fax, or phone, taking orders through a value-added network (VAN), or taking orders via the Internet. Companies may start out by publishing their catalog on the web and not taking electronic orders, and then may decide to take electronic orders via the Internet or through a VAN. The advantages of using a VAN to process orders are security of data and the reliability of the network, but these networks are closed and would only be available for existing customers [7]. It is also important when developing an online catalog to determine what information to provide to the customer and how to set up the catalog so that it is easiest for the customer to find what they are looking for. Catalogs can also be customized for big customers so that they only see products that are of interest to them.

A Tanning Technology white paper emphasizes four parts of customer/relationship management; customer interactions, operational customer relationship management, analytical customer relationship management, and personalization. An efficient customer relationship e-business model will include all of these parts in order to differentiate itself, stay competitive, and maximize customer relations. Sales, marketing and customer service should be integrated between the front and back office. Information obtained from customers should be analyzed in order to better serve the customer, and the web should facilitate greater communication between the customer and supplier [1].

Supply Chain Management Models

Supply chain management e-business models are not discussed in the literature as much as might be expected. Most e-business models spoke primarily about the management of parts of the supply chain and not the system as a whole. Supply chain management, however, is the ultimate in e-business models, and it may be difficult for many companies to obtain complete control of their supply chain via the Internet. The Tanning white paper views three processes as instrumental in the development of an

effective supply chain management model: demand management, supply management, and inbound/outbound logistics [1]. They see the goal for supply chain management e-business models to be "creat[ing] an end-to-end system that automates all the processes with suppliers, distribution partners and trading partners involved in ordering and paying for goods and services" [1]. Companies who are able to use the Internet to manage their supply chain will be able to communicate easily and share knowledge with their suppliers and customers, which will lead to strengthening and facilitating long-term relationships between these companies [5]. Also, because the Internet is an affordable option for companies of all sizes, it allows for a more complete link along the supply chain, encouraging greater collaboration and sharing of data between customers and suppliers [5].

Interaction Models

Business-to-business e-business models can also be characterized by the way that the website facilitates interactions between buyers and sellers. The article "E-commerce in production: Some experiences" by Frank Dignum classified these models as websites, sales portals, procurement portals, and exchanges [7]. Websites connect one supplier with one customer, sales portals connect many suppliers with one customer, procurement portals connect many customers with one supplier, and exchanges connect many suppliers with many customers [4, 7].
Websites connect suppliers and customers on a one-to-one basis. Sales portals connect many suppliers with one customer and are organized by the procurement department of the customer. Only large companies with enough buying power to oblige suppliers to trade through its portal usually do this. Companies using this type of model can standardize supply information and have centralized control over procurement [7]. Procurement portals connect many customers to one supplier. Several customers can use this type of model to bundle their procurement and establish leverage against suppliers. Exchanges connect many suppliers with many customers and are usually not organized by the customer or the supplier, but by an independent third party [7].

, Electronic Marketplaces, according to an Industrial Management and Data Systems article, are similar to the eHubs discussed in the Harvard Business Review article. The former article states that an electronic marketplace is an "inter-organizational information system through which multiple buyers and sellers interact to accomplish one or more of the following market-making activities:

- identifying potential trading partners;
- selecting a specific partner; and
- executing the transaction" [12].

They then go on to say that an electronic market, or eMarket, is "an information system that links together buyers and sellers to exchange information, products, services, and payments" [12]. The author of this article sees these types of B2B exchanges as a type of electronic middleman. The benefits of an eMarket are the potential reduction of transaction costs such as selecting suppliers, establishing prices, ordering goods, and paying bills [12]. The types of eMarket models that they see emerging in the Norwegian market are procurement networks, service networks, supply networks and delivery networks.

Revenue Models

The paper "Profitability on the Web: Business Models and Revenue Streams" characterizes e-business models according to how they generate value for the customer, and how they generate revenue for the company. They characterize the value models as brokerage models, content models, search models, incentive models, freeware models, communication models, control models, outsourcing models, entertainment models, transaction models, affiliate models and community models [22]. All of these have been discussed in the introduction to this paper as Internet attributes, with the exception of the brokerage model. The article describes the brokerage model as a type of market-marker that brings together buyers & sellers and facilitates transactions [17]. This type of model is third-party owned, and generates revenue by collecting a transaction fee from participants, selling advertising, charging subscriptions, or through sponsorship [22]. The benefits of this type of model for buyers are that they have direct access to broader supply sources, and procurement costs, intermediary transaction costs and markups are reduced [22]. The benefits for sellers are direct access to broader markets, reduced transaction and selling costs, improved operating efficiencies, and reduced working capital costs through better inventory and receivables management [22]. The

article "Emerging B2B Ecommerce Relational Models in Italy: An Empirical Analysis" further categorized brokerage models as brokers, auctioneers, dealers, and exchanges. These categories differ from each other as to the way that the broker uses to fix the price [17].

Based on these attributes that add value to the customer, websites can generate revenue in a variety of ways. Some of the revenue models that are currently being used on the Internet are transaction fees, hosting fees, referral fees, subscription fees, license fees, pay-per-view, pay-per-performance, micro-payment, advertising, sponsorships, ransom model, margin on sale of goods/services, sale of customer data, offline customer response, efficiency and effectiveness gains, value-added services, and virtual real estate [19, 22]. For an explanation of each of these revenue models, see the article "Profitability on the Web. Business Models and Revenue Streams" by Thomas P. Novak and Donna L. Hoffman [22]. Websites may use one or many of these revenue models [24].

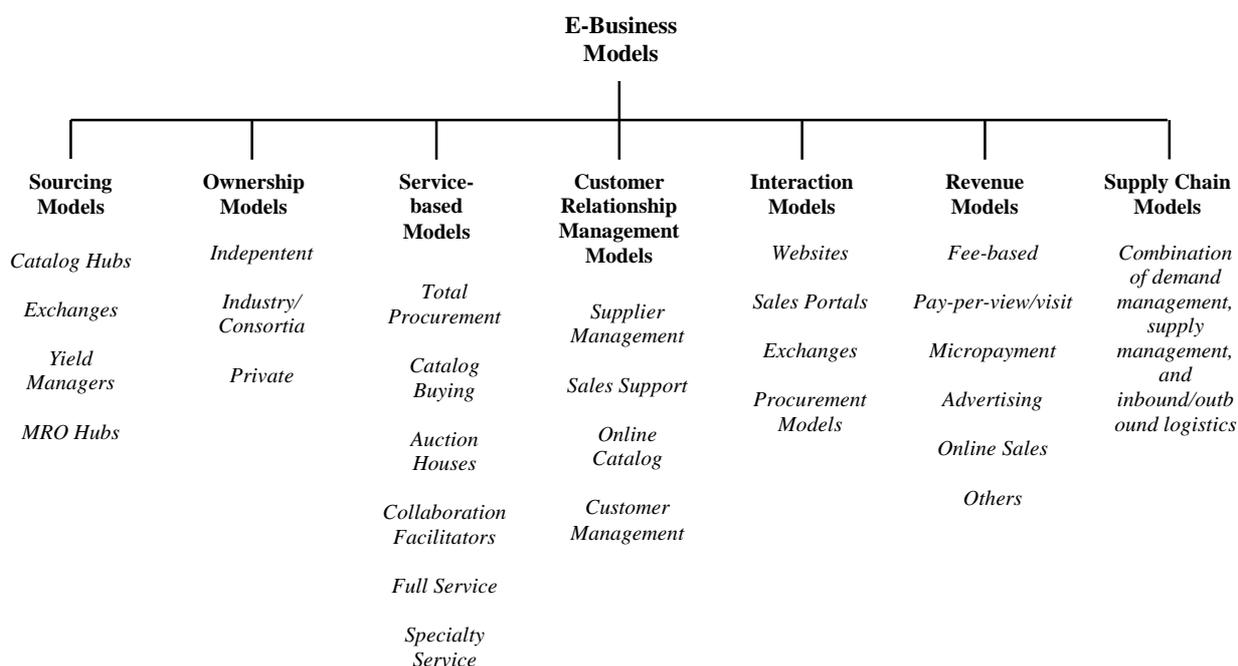The overall taxonomy of e-business models is shown in Figure 1.

Figure 1. Taxonomy of E-business Models

Part III: E-business Models and Textiles

As in most other industries, the textile industry uses a combination of the e-business models discussed above. This section discusses some of the textile companies whose e-business ventures have been discussed in the literature, and relates them to the categories of e-business models discussed in Part II of this paper. In addition to the companies covered in the literature, companies listed as textile companies in the Thomas Register were visited and categorized. First, the companies written about in the literature will be discussed.

BASF was one of the first firms to offer an e-commerce option to the textile industry, specifically carpet manufacturers and designers, in 2001. Their site offers sales, customer support, and technical support. The web application gives customers accurate and secure order placement and information 24 hours a day. It also offers order tracking, including manufacturing status, shipping status, shipping carrier and expected arrival date. Information services are also available on any BASF carpet product, including material safety data sheets [29].

The BASF website fits into several of the e-business categories, including the ownership model, the service-based model, the customer relationship management model and the interaction model. All

websites will fall into one of the categories discussed in the ownership model category. BASF's site is a privately-owned model used to source and sell goods to customers. The site is also a catalog model, selling to customers through an online catalog. It is a customer relationship management model because it allows customers to gather information on goods and to track orders once they have purchased goods. The interaction that the site provides is between one supplier, BASF, and many of their customers.

Another textile company engaging in a privately owned e-commerce venture is Unifi. Founded in 1971, Unifi is one of the world's largest producers and processors of textured polyester and nylon yarn found in apparel, home furnishings, automotive fabrics, upholstery and legwear. Unifi owns and operates manufacturing facilities in seven countries on four continents. They also use a customer relationship management model, offering customers information on previous purchases, ability to check the inventory for an item, order online and get a delivery time and track samples [21]. Unifi's website also includes a service-based model, but unlike BASF, they use the total procurement model, which features both digital catalogs and online auctions. Unifi uses online auctions to sell their second-quality yarn [21].

E-marketplaces are probably the most plentiful type of business model currently available to textile companies. According to eMarket Services, 41 e-marketplaces are active in the leather and textile sectors, with 23 focusing on textiles only, 9 on leather only, and 9 focusing on both leather and textiles [10]. The ownership model is typically independent or consortia-owned, and works to facilitate transactions between many buyers and many suppliers. The service-based models typically used are auction houses, catalog buying or a combination of the two, total procurement. The sourcing model is an exchange, industry-specific model that enables systematic sourcing of manufacturing inputs. Participants in leather and textiles e-marketplace transactions tend to be final resellers, representatives, producers of raw materials, final product manufacturers, and wholesalers [10]. They also use a variety of revenue models, including (but not limited to) transaction fees and membership fees [10].

The Thomas Register has a listing of 165,000 U.S. and Canadian manufacturers that can be searched by product or service, company name, or brand name. As an initial indicator of how textile companies are using the Internet to do business, a search for "textiles" on Thomasregister.com was performed. Of the 590 listings in the chosen product headings relating to textile manufacturing, 94 websites were listed, but 9 sites were not found, three sites did not appear to be textile manufacturing sites, one site was located outside the US, and two sites were under construction. This left 79 websites under the product headings listed in Table 1. It is important to note that some companies fall under more than one product heading.

Table 1. Product headings of companies from Thomas Register related to Textile Manufacturing

Product Headings	Total companies listed	Number of companies with websites listed
Textiles	135	23
Textiles: Aluminized	3	1
Textile Slitting	5	4
Textile/Fabric Converters	67	15
Textiles: Electron	2	1
Textiles: Fiberglass	51	17
Textiles: Graphite	1	1
Textiles: High Temperature	51	21
Textiles: Hydrophilic	2	1
Textiles: Industrial	208	44
Textiles: Marine	34	12
Textiles: Medical	6	3
Textiles: Ceramic	25	14

The websites for the 79 companies were reviewed with respect to the taxonomy of e-business models described in Part II of this paper. Of the 79 textile company websites reviewed, only 12 of them actually offered a feature that allowed for online sales as a revenue model. Of these 12, all were catalog buying service based models, using only catalogs and not auctions to sell their goods. Ten of the 12 companies that included a sourcing model for their website were classified as exchanges – industry-specific markets that enable spot sourcing of manufacturing inputs. All the websites have some type of ownership model. Of the websites visited, all 79 websites were privately-owned. Of the service-based models used, all the companies used information exchange to varying degrees. Most included some company information, contact information and product information. The customer relationship models include 64 online catalogs that give customers information on the products offered, 9 sales support models, 1 supplier management model, and 10 customer management models. Most of the interaction models were procurement models, connecting many customers to one supplier. None of the websites visited used supply chain management models. Figure 2 shows the breakdown of the models used by the sample of 79 textile websites visited.
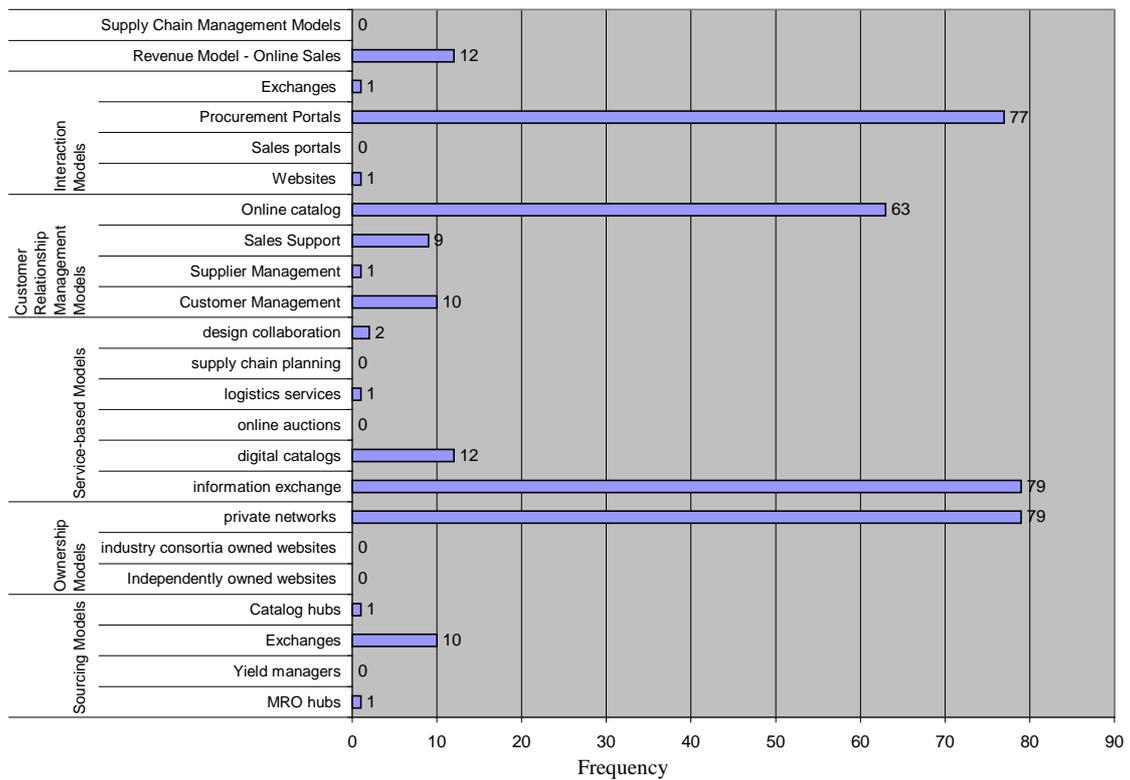

Figure 2. Textile Applications of E-Business

Product/Industry Factors That Affect the Efficiency of Electronic Business

As hinted at earlier in the paper when describing the different types of business models, the industry and the type of product being offered play a huge role in how successful an online venture will ultimately be. The article "Making Sense of Emerging Market Structures in B2B E-Commerce" does an excellent job of classifying and describing these market and product attributes. The categories are degree of fragmentation, asset specificity, complexity of product description, and complexity of value assessment [20]. The degree of fragmentation refers to how fragmented the industry is. If the market is very fragmented, for example, the Internet will be used entirely differently for doing business than if the market is made up of a few big companies [20]. The textile industry is highly fragmented, and participates in both vertically and horizontally integrated activities. For example, a textile company can be vertically integrated by engaging in such activities as Enterprise Resource Planning, Customer Relationship Management or Supplier Relationship Management. Textile companies also often engage in horizontally-oriented activities by outsourcing part of their operation to a sub-contractor [8]. Figure 3 shows this interaction.
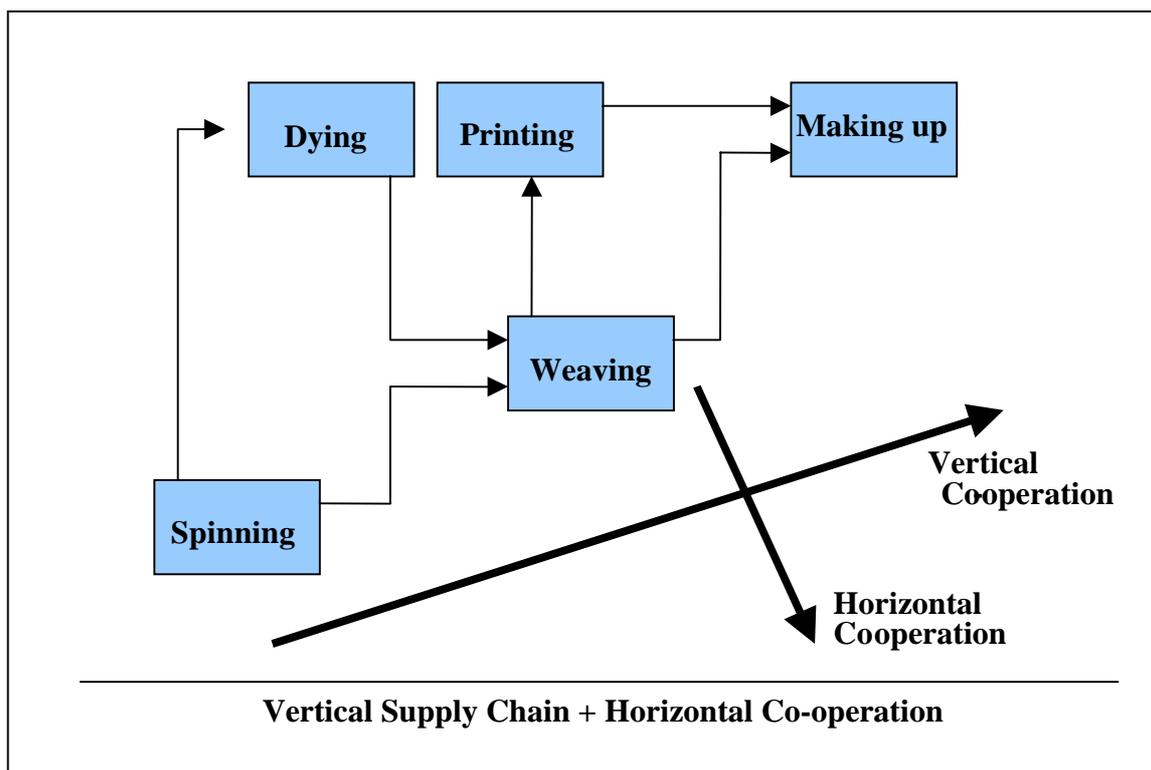
Figure 3. Textile supply network – topology: Vertical supply chain and horizontal co-operation.
Source: Fischer, T (2002). Textile Online: A Critical Overview. *International Textile Bulletin*

Asset Specificity refers to the relationships that exist between trading partners. For example, a much tighter, well-defined relationship is needed when the transactions involve high-cost items, but are less important when purchasing office supplies [20].

Complexity of product description refers to how difficult it is to describe the product to the customer so that they can understand the functional and technical specifications of the product or service [20]. Standardized products are generally thought of as more appropriate for Internet sales. In terms of the textile industry, this problem can be seen with the filtration industry. The sale of filtration products often requires expert support in choosing and servicing these complex industrial products. They often require "detailed configuration, in-depth product and application knowledge and extensive after-sale support" [13]. This makes these products especially unsuitable for certain e-business models such as portals and online exchanges where a third party mediates the sale.

The complexity of value assessment "refers to the amount of information needed to estimate accurately the worth of an item and to either arrive at a price or select items offered at a price". For example, it is easier to access the value of a new item than a used item [20].

Part IV: Conclusions

This paper presents a taxonomy of the e-business models that classifies the models into the following categories:

1. sourcing models,
2. ownership models,
3. service-based models,
4. customer relationship management models,
5. supply chain models,
6. interaction models and
7. revenue models.

An initial review of the textile manufacturing related companies revealed that of the 590 listings from the chosen product headings, 26.6% of the listings had a website. Of the 79 companies that did have websites, only 15% of the companies actually sold goods via the Internet. However, all of the websites provided information on their company and contact information, and 79.7% of the websites provided a catalog with information on the company's products. All of the websites reviewed were privately owned. This does not mean, however, that they did not also do business through exchanges or other third-party websites, or even through a separate private website.

The literature available on the subject of e-business models is extremely diverse. There does not seem to be any general consensus on the best way to meaningfully group these models so that they are of some benefit to companies who are looking for a way to integrate an e-business solution. There are several papers that have made attempts to classify these models so that they will apply to all businesses, but they are all lacking in one way or another. Research needs to be done in order to establish which areas are most important to business, and so develop meaningful e-business models.

Research is also needed to determine the current status of e-business within the textile industry, to identify what the supply chain needs are and how e-business can be used to tie the supply chain together, and to identify new opportunities to add value to the firm.

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