

December 2001

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Recommended Citation

Angeles, Rebecca, "Current Lessons in Business-to-Business Systems Development Implementation: Creating a Retail Extranet" (2001). *AMCIS 2001 Proceedings*. 106.
<http://aisel.aisnet.org/amcis2001/106>

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CURRENT LESSONS IN BUSINESS-TO-BUSINESS SYSTEMS DEVELOPMENT IMPLEMENTATION: CREATING A RETAIL EXTRANET

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Abstract

The objective of this article is to understand extranet implementation guidelines and then, provide a specific case using VF Playwear Inc.'s HealthTextbto.com, a business-to-business extranet for linking VF with its small retailers. Because of the heavy pressure to create a Web presence in the digital marketplace, some firms have found it beneficial to work with e-business solution providers that can assist them through the critical points of the development life cycle. VF Playwear, Inc. manufactures children's clothing and is part of the VF Corporation umbrella that supplies such well-known clothing brands as Wrangler, Lee, Rustler, Vanity Fair, and Vassarette, among others. Lessons learned by VF Playwear, Inc., in close collaboration with MERANT Solutions (Enterprise Solutions) and Egility Solutions (Infrastructure Solutions), are featured in this case study.

Keywords: Extranets, electronic trading partnerships, systems development cycle

Introduction

This paper seeks to describe a concrete case study on business-to-business extranet implementation featuring the lessons learned by VF Playwear Inc. in putting up the HealthTextbto.com extranet. Extranets are electronic, Web-enabled interorganizational systems that bring together all participants in an extended enterprise and serving as a "neural center" of corporation business transactions (Baker 2000). An extranet has also been defined as "...a collaborative network that uses Internet technology to link businesses with their suppliers, customers, or other businesses that share common goals....An extranet can be viewed as part of a company's intranet that is made accessible to other companies or that is a collaboration with other companies...." (Riggins and Rhee 1999).

Even though the closing of the year 2000 brought disappointing developments leading to an economic downturn that directly affects expectations about return on investments from e-business online implementation projects, a survey conducted by AMR Research of the Global 1000 executives present in the Strategy 21 Executive's Conference showed that 87 percent of the survey respondents planned to sustain or even increase their e-business investments in supplier management, sales and channel management, and business-to-business marketplaces (AMR Research February 13, 2001; January 29, 2001). This research group further expects business-to-business e-commerce to be adopted at a more accelerated pace hitting about \$5.7 trillion in business volume by 2004 (AMR Research May 1, 2000). Industry leaders are expected to move 60 to 100 percent of their transactions to the Internet from 2000-2002. Furthermore, the supply chain management market is expected hit reach about \$7.8 billion by 2001 with inventory management, order fulfillment, and supply chain planning as the top three initiatives that companies will seek to implement (AMR Research February 13, 2001).

Extranets are still a key Internet implementation model for deploying three extranet-based e-business strategies: (1) channel expansion: using extranets to open new sales channels; for instance, sellers in a community procurement extranet can reach new customers; (2) channel enablement: sales and distribution channels can deploy extranets to deliver customer service or customer self-service; and (3) supply chain management: segments of the supply chain are being streamlined through extranet links; for instance, logistics companies have offered package ordering, tracking, and payment systems services to their customers through extranets (Guptill and Terhune March 1999).

Extranet Typology

The more recent deployment of interorganizational systems (IOS) is expected to result in electronic collaboration that will enhance the competition in negotiating the different points in the integrated supply chain. Riggins and Rhee (1998) classified electronic commerce applications along two dimensions: first, whether or not end users were inside or outside the firewall and second, whether Internet technology is used to enhance existing relationships such as electronic data interchange (EDI) linkages between suppliers or customers or to facilitate the initiation of new relationships as in the case of Web sites targeting online customers (i.e., technology facilitated). This framework resulted in four types of electronic commerce applications: (1) *intranet*: used to improve coordination with internal business units (applications end users are internal to the firewall and is technology enhanced); (2) *intronet*: used to improve coordination with existing trading partners (applications end users are external to the firewall and is technology enhanced); (3) *Internet*: used to create markets by reaching out to new customers (applications end users are external to the firewall and is technology facilitated); and (4) *supranets*: used to exchange information to enable interorganizational work teams (applications end users are internal to the firewall and is technology facilitated). Business-to-business extranets incorporate features of both intranets and supranets according to Riggins and Rhee (1999).

Because of the growing importance of extranets to sustain just-in-time inventory practices, improve supply chain management, obtain real-time order status information, and integrate buyers' and sellers' internal management systems, this case study focuses on the systems development issues involved in extranet implementation using a retail case study. One of the promises of the Internet-enabled trading partnerships is the democratization of the electronic playing field that will allow small- and mid-sized firms a greater level of participation than was possible with the older point-to-point, proprietary technologies such as EDI. The VF Playwear HealthTex extranet was designed primarily to allow a more active participation of the firm's small retailers in e-business by making available to them the latest clothing collection early in or even before the onset of a season. Without HealthTex, these small retailers could purchase items only towards the end of the season when most of the merchandise was sold out to VF Playwear's larger customers.

Extranet Implementation Issues

While following the same systems development life cycle phases observed for developing stand-alone intraorganizational business application systems, the implementation effort for extranets has its peculiar challenges. In the hub-and-spoke arrangement among electronic trading partners, the "hub" or the firm initiating the network connectivity usually takes on a proactive role in organizing and motivating trading partner participation in the interorganizational network. An extranet development task force with members from key corporate departments of participating firms and representatives from vendors is organized, usually under the leadership of the hub firm (Szuprowicz 1998). The team facilitates the flow of information from business executives to technical groups to upper-level management. The head of the task force ideally wears both business and marketing hats, with the support of a strong technical advisory staff to validate the proposed technical solutions. The team could look forward to intensive mutual consultations among the diverse business and technical talent at various levels. Among the main issues that need to be "refereed" by this team are the following: (1) management of the wide variety of work methodologies, business practices, and agendas of independent distributors or vendors overseeing the products or services used by the participating firms; (2) language and cultural differences among the department members of participating firms; and (3) prioritizing the periodic and regular need to change extranet content from multiple sources locally and worldwide.

Security is such a major issue so much so that all actual and perceived threats need to be clearly articulated during the project planning and analysis stages. Extranets present a layer of additional challenges because this Internet-based infrastructure traverses multiple corporate cultures and information systems (Bayles 1998).

Since end users will interact primarily with the Web browser-enabled graphical user interface, its design details are extremely key to the usability, ease of use, and effectiveness of the extranet. The extranet development team should obtain agreement from participant firms on a common interface design, its features, access conditions at different levels, guidelines for adding content, and a hierarchy for user interface usability testing and approval.

Methodology

This case study primarily used interviews with both participants in both VF Playwear and Merant, literature review search, and web site analysis to collect data about the HealthTex business-to-business extranet.

Case Study: VF Playwear Inc.'s HealthTex Extranet and Merant

Healthtextob.com was launched in February 1999 as a major foray of VF Playwear in participating in electronic commerce. Healthtextob.com mirrors the actual exchange between VF Playwear's sales representatives and apparel buyers.

Gary Simmons, President of VF Playwear, Inc. had this to say about the HealthTex site:

"The web provides a wonderful marketing venue for the HealthTex brand. We believe the ability to increase brand awareness by using the web will have a positive impact on our retail partners....VF has always had strong relationships with retailers and selling online should only enhance those relationships. This will save our customers time and money while increasing their product selection."

The VF Playwear E-Commerce Project Director at that time noted the following result of this extranet deployment:

"Ticket size is up by an average of 10%. Retailers are coming back in and replenishing stock over and over. We have extended the selling season by up to 14 weeks---at full price. As long as the goods are up, retailers are buying them. Small retailers now have access to all four seasons of merchandise. And 40% bought holiday merchandise that they did not buy last year."

How the Healthtextob.com Extranet Site Works

The main concept behind the design of the frontend interface of the web site was to offer VF Playwear's strategic partners, its retailer-buyers a convenient and extremely familiar medium for selecting products, very close to the actual physical buying experience they used to know. The marketing manager of E-Commerce at VF Playwear explained at some point, "It's [the retailer buying process] based on a grid principle....When you work with a live salesperson, [he or she] will put up a recommended buy. The site will do this for you. We want it to be like a virtual salesperson that will guide the retailer through the buying process." (Rabon and Abend 1999).

Authorized trading partner-retailers are issued a password in order to enter the web site. Retailers order seasonal items and replenishment goods or check the status of their on-line orders. Upon entry into the web site, retailers pick a specific size range or season. There are two ways to shop: (1) by the collection where products are presented according to delivery time periods within which they are offered and (2) by classification---for instance, if a retailer would like to buy pants and tops separately, they could do so by indicating the classification of the piece of clothing. Retailers are also given a "peek feature" which previews forthcoming collections and an area for "recommended purchases." A "recommended buy" will be presented to the retailer and associated with this is a "details" feature that gives a blown-up version of selected items. A "related style" feature will show complementary garment items to those originally recommended. A "swap" button also enables the retailer to mix and match tops and bottoms within a group and by clicking a box beside the phrase "I Like This," the retailer builds in their preferred product choice.

Another product page also shows information on pricing, delivery options, fabric contents, and size ranges. First-time clients can avail of a "help" feature in the form of a "product glossary" containing silhouette information and fabric construction information to familiarize themselves with VF Playwear's lines.

A running calculator keeps track of all retailer purchases and an order worksheet presents all choices made. The retailer can, then, choose to alter product choices or quantities and add/delete items. Once all final product choices are made, the order worksheet will summarize a total order cost and a delivery schedule.

Retailers who have not yet signed up for online accounts could experience a multimedia tour of the site's functionalities and may download printable forms they could use in applying for credit. Authorized retailers receive a username and password via offline confirmation.

E-Business Systems Development Methodology and the Merant Business Solution

VF Playwear had very specific objectives it was committed to that fueled the extranet project: (1) their clients started to demand Web access to the firm's systems; (2) at that time, VF Playwear thought it was an appropriate competitive move to match the

business-to-business online deployment of its nearest competitors by servicing its smaller retailers; and (3) the marketplace, as a whole, expected major firms like VF Corporation to mount their own responsive business-to-business initiative to “tune in with the Internet times.” A major challenge for this extranet implementation was the ambitious schedule that pushed for delivery within three months. In order to meet this goal, newer rapid application development approaches, primarily emphasizing iterative, functional prototyping as opposed to the time-consuming development of design specifications, turned out to be most appropriate for an application that mainly revolves around the graphical user interface. To ease the transition of small retailers to an online presence, VF Playwear saw to it that the interface experience was as close as possible to the physical experience of buying they were already familiar with as opposed to introducing an approach that was radically different.

The business solution mounted by Merant, at that time, consisted of a production platform using Microsoft NT Server and Microsoft Internet Information Server (IIS 4.0), which supported Active Server Pages (ASP). Use of the Microsoft SQL Server 7.0 and ActiveX Data Objects (ADO) was also made. The choice of this combination of elements was natural since it was already in use by the development staffs of both Merant and VF Playwear. The “virtual buying” experience was intended to emulate, if not surpass the physical interaction with the physical clothing goods and the occasional visit from the area sales rep. One way of “surpassing” the realities of physical buying would be to present the entire line of merchandise for the current and forthcoming seasons using a “grid” framework that shows the entire line of clothing and allows the retail store buyer to experiment with “mix and matching” items. What happens with most small retailers is that they are last to be informed about the latest items in the clothing line and the physical samples made available to them may not have all items in a line.

ASP was a good tool in presenting the HealthTex product line since it allowed the easy integration of complex hypertext markup language (HTML) pages produced by the creative team with the logic needed to drive the functional areas of these pages. ASP made the process of integrating complex creative content far simpler than using other alternatives like Common Gateway Interface (CGI), Java Server Pages (JSP), and Hypertext Preprocessor (PHP), which would have meant sacrificing performance. The HealthTex site was frequently updated to ensure retail buyers that the new product lines were available fairly early each season. Working with ASP allowed frequent updates while avoiding excessive costs. For one thing, ASP does not require the deployment of expensive technical talent and therefore, considerable savings in the use of specialized skills for site maintenance were realized. The use of administrative tools that had a reasonable rather than exhaustive range of functionality to handle all anticipated maintenance also helped cut down costs.

Lessons in Designing Electronic Partnerships and Implementing E-Business Solutions

Building an online presence has its unique systems development and implementation issues affecting the quality of the electronic trading partnership being created between the initiating company and its strategic partners. Working with an e-business solution provider like MERANT, though, presents its unique advantages especially nowadays when firms compete on “Internet time” and project development time has shrunk significantly in the digital marketplace. MERANT's execution style has been to guide the client very closely and carefully through all steps from the concept stage through to implementation.

The following are the lessons learned in pursuing a project with the assistance of a consulting firm taking the lead in the design and implementation of an extranet.

- ***Very carefully select the right trading partners in the early stages of the B2B site design and implementation, and then, slowly bring in other partners at the later stages of the system.***

Healthtex narrowed their selection of potential participating retailers based on certain criteria:

“Trading partners were first determined by their overall retail size and whether or not a B2B environment would provide better service for them. Smaller accounts are those defined as purchasing less than \$20,000 at cost on an annual basis. Healthtex also was interested in ‘prospecting’ for new accounts in a manner that was more cost effective for the company and the retailer alike. Often times, smaller accounts have to travel in order to see the line in some parts of the country. Using the Internet, travel is reduced for the retailer and Healthtex alike.”

According to VF Playwear's E-Commerce Project Director, Healthtex has provided for future enhancements to the system:

"We will be adding additional functionality that will accommodate ALL accounts no matter what their size or volume may be so that they can purchase directly using the Web. Additionally, we will be adding a feature that will allow for all off-price products to be sold in season."

- ***Creatively involve selected electronic trading partners in "test running" the pilot B2B site.***

"Retailers were first involved in the process after a beta site was developed. Since Healthtex employs several key people who have had extensive retail as well as wholesale experience the initial site was developed utilizing a functionality model that best serves the "selling in" of a manufacturer's line. Initial partners were those who purchase multi seasonal product a minimum of 3 seasons per year or more. These were representative of small mom and pop, mid size local retailers and larger size regional ones. They were not directly involved in the planning stage per se. Their involvement came in helping to beta test the functionality of the site."

Using end user input is especially important in addressing web interface design issues which are key in establishing an online virtual presence. Healthtex had to make sure that the electronic equivalent of the buying process makes all informational resources transparent to the retailer.

"Usability tests showed that buyers need to have HIGH quality images of products that show the materials details (prints, embroidery, etc)...."

The existing purchase process required tremendous human interaction in helping buyers make the right product selection. We had to capture that process and create a virtual salesman.

The data for the site was never used for marketing purposes and needed to be filtered and mapped to customer facing information. For instance, ' Cn. Grn' needs to be represented as 'Cancun Green'."

"The site was designed to emulate the buying process of a real sales person and Healthtex Internet reps fill any gaps in addressing customer needs. With this approach, many customers actually get better service. They can rely on the Internet site for basic product information and purchase recommendations while reaching a Sales/Service Representative more rapidly when needed." (VF Playwear E-Commerce Project Director)

- ***Proactively "sell" electronic trading partners on the importance of conducting necessary changes to key business processes related to the B2B site.***

Healthtex negotiated business process changes with trading partners through the combined use of one-on-one demonstrations, trade shows, personal phone calls, and informational materials.

- ***One of the toughest challenges of electronic trading partnerships is cultivating long-term "trust." One way to approach trust is to jointly co-determine fair and achievable performance metrics that all parties will honor as a true measure of success of the partnership. This is sometimes referred to as the "soft" component of trust.***

"Initial ROI on the B2B front is still something that has yet to be absolutely determined. For many reasons, the process of buying and selling product[s] as trading partners is still being defined. We can say that from a productivity standpoint on both parts, it has definitely been a win-win scenario. We look at the increase in seasonal orders placed on an account-by-account basis -- have they placed additional re-orderable product[s] at higher levels and more frequently than before? Have they purchased a particular season's products that they traditionally passed on because of timing or travel issues?"

"The biggest determination for performance success was the ability to scale rapidly as traffic requirements grew. The DELL eCommerce center was used for stress testing only. The initial site could support thousands of concurrent users and therefore has met defined performance metrics to date." (Gary Simmons, VF Playwear, Inc. President)

- ***Another critical element of the trust-building process is placing robust "security" measures in place to protect the informational assets of all participating trading partners. All players must be confident that the transaction systems are fully protected as they go on full production mode. This, in turn, is the "hard" component of trust.***

VF Corporation has its own eBusiness staff and Infrastructure group that oversees connectivity and network issues.

"We conducted a full assessment of the site and its security procedures/architecture prior to launching it. Arthur Andersen consulting group was hired to help in this process. VF was proclaimed to be tighter than Fort Knox! Additionally, all retailers are assigned a specific user code to gain entrance into the site and we expire their pass code after every seasonal purchase. We notify and verify their status prior to the next seasonal offering."

"[Security issues have been handled] very carefully [by] using encrypted protocols to [encrypt] sensitive data [and by] leveraging a secure network infrastructure. Arthur Andersen provided a security review of the site." (VF Playwear E-Commerce Project Director)

- ***Manage change carefully and "hold the hand" of end users of trading partners directly affected by the new system to lower resistance if not generate positive enthusiasm.***

Healthtex anticipated the changes required through all different phases by providing constant support during the transition periods. To begin with, the design stage adopted an intuitive approach that required little or no training of system end users. The design was also intended to be a near-perfect virtual equivalent of the physical buying process that retailers were already used to. Actively engaging retailers in the "pilot stage" also ensured their acceptance of the system once it went on production.

"The Internet places demands on web interfaces so that they are usable with 'no' training. To support this, the site was put through independent usability testing and includes comprehensive online help. We also produced training materials that could be distributed using traditional means (CDs and brochures). For partners that want customer service support we have dedicated resources assigned to help partners with online issues. Healthtex has handled the training of employees directly." (MERANT Systems Developer)

"We experienced very little resistance. One thing that Healthtex did was to employ a dedicated staff of people to the project as well as have them available to help and assist the customer. We communicated with them throughout the transitional stage." (VF Playwear E-Commerce Project Director)

- ***The effectiveness of the Healthtex web site is only as good as the quality of the flow of information through, to, and from the firm's backend systems. That portion of the supply chain has to be clarified and managed.***

In the early developmental stages of the project, there was a common ground between the IT resources of VF Playwear and the Merant group in the form of the relational database. This greatly simplified the integration process since the data models for the extranet borrowed heavily from the existing data models already present in the backend application systems. Both groups learned extensively from each other: The Merant group understood the codes used to denote products, product groups, and seasons, whereas the VF Playwear developers learned more about the intricacies of front-end applications. A purchase order from a retail buyer had a life cycle that took months to fulfill. For this reason, order creation and updates to the status of existing orders could be handled via daily batch updates from the mainframe.

The IT group of VF Playwear has created the bridge between the Healthtex extranet frontend and the business applications at the backend like manufacturing, inventory, pricing, shipping, tracking, and delivery. The extranet is internally hosted at VF Corp. Very positive results have been observed about the consequences of keeping the information flow running smoothly between the extranet frontend and the supply chain backend systems.

"The process of tying in our legacy systems was one of the easier things we had to accomplish in order to start to conduct business in this environment. There were a few minor tweaks that had to be done, however the entire IT team was on hand to do so, not to mention the expertise that came with the developers from MERANT." (VF Playwear E-Commerce Project Director)

"Healthtex is leveraging its existing applications to leverage backward into the supply chain. The eCommerce Application is tightly integrated to leverage these applications. Integration with the forward chain is through a tight coupling of the new eCommerce process with existing traditional sales processes providing the eCommerce capability to compliment the traditional forward selling processes." (VF Playwear E-Commerce Business Analyst)

"We can give immediate vision to the stock on-hand. The site has real-time inventory levels, so a retailer is not going to see something that doesn't exist. Plus our inventory planners can use this information to better prepare for their jobs and forecast more accurately." (VF Playwear E-Commerce Project Director)

"We are able to get data about future seasons much more quickly and efficiently. This transfer of information is then channeled throughout the company and certainly has positively impacted the production cycles." (VF Playwear E-Commerce Project Director)

"The major leverage point of MERANT's E-Solutions has been to provide high speed, reliable data access and efficient management of the digital and software assets." (MERANT Systems Developer)

- ***Finally, the hub firm, in this case, VF Playwear, Inc., needs to exercise "custodianship" over the extranet itself.***

The Healthtex extranet is managed by a director of E-Commerce who heads a separate business unit to administer the site.

Future Research Directions

Prospects for much more intensive extranet implementation in the near future are still positive despite the onset of electronic marketplaces or business-to-business exchanges. A business-to-business exchange is a virtual electronic marketplace that brings multiple buyers and sellers together in one central space where they are able to buy and sell at dynamic prices determined by the rules of the exchange (Kalakota, Oliva, and Donath 1999; Sculley and Woods 1999). Gartner Group noted that this new business model started to insinuate itself in the marketplace in the early part of 2001, even as its impact remains uncertain (Hope-Ross 2001). In a similar vein, the results of an AMR research survey on trading exchanges is finding that while the use of exchanges has not gone mainstream, U.S. corporations are starting to embrace it as 52 percent of their respondents considered them critical to business success, 43 percent plans to join or build one, and 16 percent were actually already conducting business through exchanges (AMR Research 2001).

Until business-to-business exchanges become an established and tested business model, strategic collaborative relationships among trading partners (i.e., customers and suppliers) will largely be supported by point-to-point relationships such as extranets, private marketplaces, and application-to-application and swivel-chair integration (Hope-Ross 2001). The private exchanges are closed-circuit systems that link only a few trading partners that have the advantages of control, security, privacy, and scalability (Ulfelder 2000). Moving to the private exchange from exclusive point-to-point electronic linkages may prove to be a more logical transitional strategy---if the host firm or consortium of firms can afford the high upfront costs of such a migration.

Still the approach firms will be taking will most likely be cautionary---Dell marketplaces, Chevron's Silicon Valley Oil Co., and Burlington's FreightWise closed down their exchanges in the first quarter of the year 2001 due to the lack of liquidity and the high costs of maintaining the exchange infrastructure (Gilbert 2001). The novelty of the business model, high cost of the supporting technology infrastructure, and uncertainty over the organizational and cultural issues involved in implementation makes the trading exchange a high-risk proposition at this time, especially for firms that refuse to run critical supply chain business processes through third parties. A number of firms are still conservative and would like to keep their supply chain integration closer to home and well-contained within private supply chain projects such as extranets. For the near future, then, a clear understanding of extranet implementation will continue to be important to firms that do not yet want to take the "plunge" in electronic marketplaces. Until further research advises academics and practitioner firms of the optimal conditions under which business-to-business exchanges are best undertaken, it is suggested that a "portfolio" of electronic relationships be kept. It appears safe to continue time-tested exclusive point-to-point relationships via extranets, for instance, and participate in a few marketplaces while in an "experimental" mode.

In the meantime, the interesting research questions at this transitional stage are: what would motivate firms to participate in the marketplace model versus their ongoing exclusive point-to-point relationships via extranets? Is it beneficial to keep a "portfolio of relationships"---some exclusive and point-to-point and others, open and subject to marketplace forces? For what types of

interfirm relationships? For what types of goods and services being purchased? What are comparative costs and benefits of participating in either platform?

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