# E-AGRIBUSINESS

**By**

**Shelley J Thompson**
Director Strategy, Farm Credit Corporation
Regina, Saskatchewan, Canada

**Marvin Hayenga**
Professor, Department of Economics, Iowa State University
Ames, Iowa, USA

**Dermot Hayes**
Professor, Department of Economics, Iowa State University
Ames, Iowa, USA

July 4, 2000

**Introduction:**

E-commerce may be a disruptive technological innovation with profound implications for the agri-food sector. Louis V. Gerstner Jr., the Chairman and CEO of IBM, certainly believes that it will transform business, " "It really does present CEO's with an extraordinary opportunity to transform their companies' competitiveness, to change the industries in which they operate, to fuel innovation, to open up alternate distribution channels, and to create entirely new cost structures. It is a fundamental change, one that occurs at the molecular level of business, making possible a transformation of the basic building blocks of economics, market, and work."

This paper explores the world of business-to-business (B2B) e-commerce. It provides estimates of the size of the B2B marketplace and suggests which components of the agri-food sector will benefit the most from adopting an e-commerce platform. We discuss what business models are being pursued in the agri-food sector and which ones are likely to succeed. We also discuss the implications of e-commerce for the agri-food sector and how it may evolve.

Electronic commerce is not new. Electronic data interchange (EDI) has been used for two decades. Nor is the Internet new. The Internet was developed around 1965 to link selected universities with US military research laboratories. Although the World Wide Web was established in 1989, most people commonly date the origin of the Internet as 1993 when new technology made it much more accessible. (Karjaiainen) What is new is the opportunities provided by e-commerce and the potential for profound change because of the differences between Internet based e-commerce and EDI. Internet based e-commerce is interactive, allows for spontaneous relationships or transactions to occur, has many potential users, and can create both a delivery mechanism and a marketplace. (Mougayar) In this paper we confine our discussion to Internet based e-commerce.

E-commerce is defined in terms of the internet technology employed but also in terms of the likely behavioral and performance changes expected to occur through technology applications to business functions and organization. These changes include efficiency, relationships, information technology, and strategy. Shouhong views e-commerce in terms of efficiency, "a contemporary methodology that addresses issues of improving the performance of business through the use of advanced information technology". Zwass advances its potential to enhance relationships-- "Electronic commerce is sharing business information, maintaining business relationships, and conducting business transactions by means of telecommunication networks." Other authors such as Becker, Farris and Osborn see e-commerce through the value-chain lens " -- WWW-era technologies, to permit the seamless integration of information, communication and logistical technology along the entire value chain of business processes from the suppliers of raw goods and services to final customers."

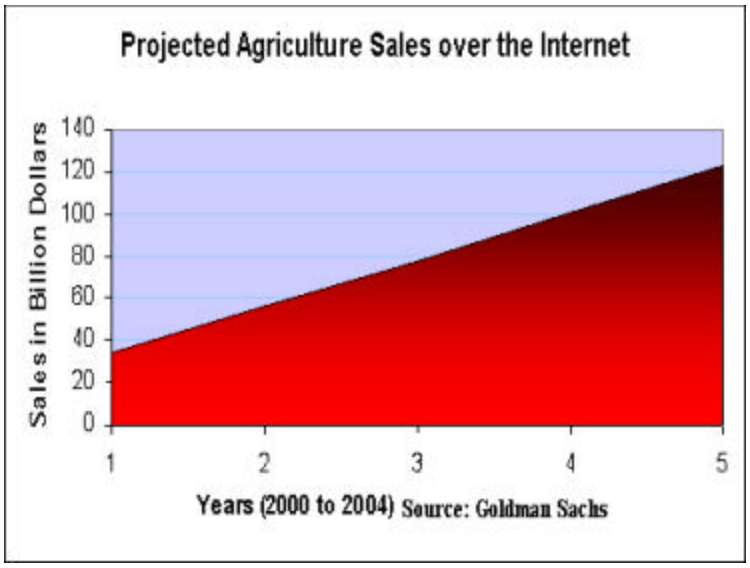
Similarly, Mougayar suggests e-commerce enables the ability to create digital value by transforming digital inputs into value-added outputs.

**B2B Market Size and Growth:**

E-commerce is big business while still in its infancy. The value of business-to-business e-commerce in the US in 1998 was estimated to be $43 B while business to consumer e-commerce was estimated to be $8 B. (The Economist) Goldman Sachs forecasts that global B2B e-commerce will reach 1.9 T US in 2004. Merrill Lynch is more "bullish" about B2B e-commerce and forecasts that it will reach $2.5 T US on a global basis by 2004. In Canada, e-commerce is expected to reach $156 B by 2003. (Canadian E-Business Opportunities Roundtable)

The B2B e-commerce market can be segmented. The Gartner Group forecasts that about 37% of overall global B2B e-commerce will transpire on electronic community sites and that by 2002 auction B2B will have $400 B in sales. (Financial Times) Merrill Lynch expects the majority of B2B will occur on seller sites, with about 15% to 20% occurring on third party or "Market Maker" sites.

Goldman Sachs believes that about 12% of total US agricultural sales could migrate online by 2004. This translates into a $120 B US market by 2004 as this chart from Johnson indicates.




Where is B2B commerce likely to play a major role? Goldman Sachs argues that the potential for B2B e-commerce is greater in industries with the following characteristics: a highly diffuse supply chain; pressure to control costs; complex product specifications; processes accounting for at least 20% of total costs; and technological innovation is part of the industry's culture.

Morgan Stanley Dean Witter estimates the near-term B2B market size in agricultural inputs at about $74 B US. This is broken down as follows: seed ($6 B US -$7 B US), feed ($25 B US), chemicals ($9 B to $10 B), fertilizer ($11 B US), vet supplies ($6 B US), and equipment ($15 B US). Agriculture, in Morgan Stanley Dean Witter's view, is receptive to B2B e-commerce because the market is fragmented; the supply chain is inefficient; buyers change sellers regularly; and the value of the product can be volatile. (Bejjani)

Internet use by producers is growing. A 1999 survey by Intertec Publishing of high-income farmers in the US found that 38% of those survey used the Internet for e-mail, business, or to obtain information. While only a small fraction (less than 5%) had made a purchase online, 41% expected that they would do so in the future. Other research indicates that about 40% of farm households in both Canada and the US use the Internet with about 30% of the use being specific to farming operations and the remaining 70% for general information and entertainment purposes.

**B2B Models:**

According to Dayal et al, successful e-businesses combine two or more of the following business models:

- *Retail:* Aggregate sellers or products to make consumer purchases more efficient.
- *Media*: Revenue is earned by aggregating consumers for third parties.
- *Advisory*: Consumers can purchase expert assistance or advise for a fee.
- *Do it yourself*: facilitation of consumer self service such as by technology providers.
- *Information:* Collect, process, synthesize, and sell information.
- *Made to order*: Manufacture products on demand

The interaction of market potential and growth, market power, and benefits will determine whether a firm will participate in e-business and how it will choose to do so. Berryman et al suggest the following "rules of thumb" regarding likely gainers from e-business:

- *Transactions benefits or savings:* Transaction gains accrue to sellers because e-commerce increases the customer base (i.e. reach) and provides cost savings from more efficient processes. The consumer can gain from lower prices or greater transparency.

- *Rate of electronic market development:* Marketplaces characterized by highly inefficient transactions and sophisticated buyers who can buy products using specifications without seeing them will likely move into e-commerce rapidly.

- *Existing market share or buying power:* Buyers with significant market share and many potential suppliers would benefit from establishing their own purchasing site or from the use of an aggregator. Small buyers with many potential suppliers would benefit from malls or auctions. The strategy of buyers should be to set up buyer-controlled markets. Conversely, sellers should attempt to limit the power of buyer-controlled markets by setting up their own.

- *Impact of a neutral market intermediary:* The benefits of neutral intermediaries include economies of scale in transaction processing, anonymity, knowledge transfer to new participants, and the value of information collected. Neutral intermediaries should seek out competitive markets where there is value in information, anonymity, and is likely to move into e-commerce rapidly.

It does certainly appear that the "bricks" (traditional agribusinesses) of agriculture are beginning to view e-commerce as a business imperative. The traditional agribusinesses have strong market share positions as incumbents and some are determined to fight to retain their customers. After a slow start in the e-commerce arena, there has been a flood of announcements from traditional agriculture companies regarding the creation or unveiling of a B2B strategy. Some companies with significant market share as buyers are also establishing procurement sites. The Appendix contains a listing of these companies and some of the details of their e-commerce initiatives.

Traditional firms have also been forced into the standard make or buy decision. Very large corporate firms or strategic groups/alliances may have: the capital to hire talent and spread fixed costs over enough units; the complexity of supplier and/or customer networks to demand the advantages from e-commerce linkages, information generation and transmission, in volume and speed; and the urge for keeping that information in-house rather than exposing that information to so many potential other eyes. However, the market for talent in the e-commerce world is so hyped by the current stock option values that it may be very difficult for the traditional agri-food industry, in terms of stock market potential, to compete effectively for talented e-commerce skills, and perform as effectively as specialized intermediaries pre or post IPO.

J. William Gurley suggests that for "bricks" the question that must be asked about participation in exchanges is "Is the material or process that would be bought on the exchange central to your business?" According to Gurley, only core processes or materials should be "webized".

The decision to acquire or build is fundamental to success. According to Cisco CEO John Chambers, "The companies who emerge as industry leaders will be those who understand how to partner and those who understand how to acquire." (Tapscott et al) Firms have four choices to acquire digital capital: build, buy, partner, or establish an internal venture fund according to Tapscott et al. There are at least three strikes against building the digital capital. It takes time to gain competency in e-commerce – history and experience matter. Second, unlike more well-mannered physical capital, digital capital is socially complex and thus is much more difficult to manage. The third strike is the cost of uncertainty is significant. Because of the rapid revolution in technology the risks of building the competency in-house may outweigh potential benefits. The buying decision is also fraught with risks such as the difficulties arising from a bad decision, the fact that buying a company can reduce its value if the value is contingent on independence, and leveraging the acquired capabilities. According to Chambers, Cisco looks for the following attributes in a potential acquisition: shared vision of the industry and each partner's role; ability to retain the acquired human capital; long-term strategic fit; cultural similarities; and geographic proximity to current operations. The partnership approach reduces transactions costs, enhances capabilities and leverages competencies. Although there is a risk of loosing control of customer relationships and structural capital, the net does provide a standardized platform for collaboration between partners. The internal venture fund approach is a mid spectrum approach in which companies take minority positions in strategic e-businesses. The e-business then functions as an incubator for internally generated initiatives. This approach creates the opportunity for the "brick" to learn about e-commerce rapidly. (Tapscott et al)

**Market Intermediary E-Business Firms:**

We have chosen to highlight the market intermediary e-business firms in this paper because it is currently a very active area and the activity is more transparent than in-house efforts by agribusinesses. Merrill Lynch argues that in this segment the winner will take most of the value, though we have reservations about that claim.

Merrill Lynch outlines four models for Market Makers (see following table): on-line catalogs, auctions, exchanges, and communities. Although B2B markets can currently be horizontal (across industries) or vertical (within an industry) eventually they will be interwoven. The Appendix provides information about companies that have established third party e-business sites in agriculture.

| **Market Maker B2B Models** | | | | | |
|---|---|---|---|---|---|
| Model ↓ Attributes → | **Description** | **Pricing** | **Buyer Benefits** | **Seller Benefits** | **Revenue Sources** |

| | | | | | |
|---|---|---|---|---|---|
| **Catalog** | Aggregates goods and services from many sellers | Pre-determined, Can have individual pricing agreements | One stop shopping<br>Lower procurement and inventory costs.<br>Increases potential suppliers.<br>Comparison shopping. | Low cost distribution channel.<br>Reduced sales and process costs. Increases potential customers and customer satisfaction. | % of gross transaction.<br>Supplier pays listing fee<br>Ad revenue |
| **Auction** | Venue for the purchase and sale of unique items. | Dynamic pricing. Traditional and reverse auctions. | Means to purchase one-of a kind items.<br>Lower prices in reverse auctions.<br>Broad selection. | More buyers means higher prices.<br>Disintermediate liquidation brokers.<br>Greater turnover of inventory. | % of gross transaction.<br>Supplier pays listing fee<br>Ad revenue |
| **Exchange** | Spot market for commodities. | Dynamic. Bid-ask market. | Can acquire products for immediate needs. | Can sell excess capacity at market price. | % of gross transaction.<br>Membership fees. |
| **Community** | Aggregates targeted buyers for sellers. | Buyers are sent to another site for sales. | Industry specific relevant information. | Target and segment potential buyers. | Ad revenue.<br>Sponsorship.<br>Membership fees.<br>Sharing of revenue with other sites. |
| Merrill Lynch, "The B2B Market Maker Book", February 2000 | | | | | |

Merrill Lynch argues the receptivity of an industry to a Market Maker is a function of the size and fragmentation of the industry. Merrill Lynch has developed a simple measure of receptivity. The industries are ranked by the size of the market and by the number of establishments. The products of these rankings are than ranked. Under this methodology U.S. agriculture and U.S. food manufacturing were ranked number three and ten, respectively in terms of receptivity to market makers. This methodology was applied to U.S. and Canadian agriculture and food to identify areas that could be amenable to Market Makers. The results suggest there is a significant amount of similarity in terms of receptivity. In the U.S., the top industries or commodities were cattle and beef, dairy products, cereals, edible preparations, and oilseeds. In Canada, the most receptive industries or commodities were red meat production, grains and oilseeds, red meat processing, dairy production and other dairy processing.

**Evolution:**

How e-commerce evolves in the agri-food sector will depend on several factors. The rate of adoption of the Internet by producers as a business tool, and their scale of operations will obviously influence the size of the market. Evidence suggests that producers with large-scale operations are migrating online. Another factor is the magnitude of the benefits accruing to participants of e-commerce. Economic theory does suggest that because of the fragmented nature of the industry and the inefficiency of the supply chain the benefits may be

substantial. Resolution of Internet security issues will be a prerequisite for success.

Although it is probably too early to tell which business model will dominate, the online communities have the potential to become vast hubs of economic activity linking the supply chain within a vertical industry segment and connecting with horizontal supply chains operating across industries. Certainly some of the third party e-agribusiness sites will fail because of strategic mistakes (business model does not create value), operational mistakes/inefficiencies, or shortages of capital (now that the internet bubble which investment capital firms have been helping to inflate may be becoming more consistent with "realistic" long term profit prospects). Many (such as Hamel and Sampler) argue that e-commerce is just business and more about strategy than technology. Just like in the “old world” the better business model will win. The current dot.coms could be replaced by businesses that have integrated the Internet into their strategy and achieve real financial returns.

**Implications:**

At such an early stage of development, it is difficult to say categorically how e-business will affect agriculture. Instead we present two alternate views of the future. In all likelihood, reality will lie somewhere in the middle.

Scenario one evolves around two implications. First, the firms that supply inputs into farming will soon be able to work directly with farmers. This will put enormous pressures on those individuals that currently act as middlemen. As this sector adjusts, input costs for products as diverse as crop insurance to seed to chemicals will fall. Second the farmer (or farm group) will establish direct contact with retailers, restaurant chains or even with some consumers. Once this link is established the consumer signals will flow directly to the producer. Some commodity markets will be replaced with branded products from contractually linked segregated identity-preserved production and handling systems.

Under the current market structure many agricultural products are purchased by processors who commingle products from many farmers. The processor is unable to create a differentiated product because of the commingling, and because of a sometimes-antagonistic relationship between the farmer and processor. In scenario one, the farmer will know who the consumer is and will therefore be in a position to rent the services of the processor, much as occurs in the transportation sector today. Market power will shift from the processor/retailer and to the food producer and food consumer. As the food producer responds to signals from consumers a wide variety of new products will emerge. Some consumers will find these new attributes to be valuable and new branded lines will emerge. We cannot tell what these attributes will look like until the experiment begins, however it is instructive to look at the beer and soft drink industries to capture some understanding of where agriculture will go. If beer and

soft drinks were sold as commodities today, then beer would cost about $4 per case and would come in cans labeled “beer”. Soft drinks would come in large containers and would be labeled “brown (or clear) sugar water”.

As farm groups attempt to respond to these opportunities a new set of marketing skills will be needed in agriculture. Those who anticipate and respond to consumer needs will be rewarded with valuable brand equity.

The direct link between consumers and producers will also allow consumers to sue for defective or unsafe products and the ensuing legal battles will provide an incentive to improve food quality and food safety.

The bottom line for scenario one is that the Internet will allow agriculture to evolve away from today’s competitive commodity market, and into a structure that is similar to the rest of the US economy.

Scenario two views any competitive advantage from e-business as transitory. The developer of innovative product or technology and the merchandiser of the branded product most in tune with the consumer needs will be in the best position to capture part of the added value perceived by consumers or customers, same as in biotech. The e-commerce companies gaining above-normal profits will be the innovators getting the first mover advantages, the gains from economies of size versus rapidly entering competitors who will soon provide me-too alternatives, or large corporate agribusinesses who will chose to do it themselves if there are significant profits to be had. Thus, farmers, grain elevators, transport companies, etc. will have substantial competition and earn first mover benefits for a while for being part of a successful branded supply chain, but will quickly revert to normal competitive returns. In this scenario, efficiencies from the management of the supply chain intensify competition and eliminate above normal profits.

**Conclusions:**

Internet-based e-commerce will transform the agri-food sector, although exactly how is still indeterminate. Supply chains may become more efficient. The stronger connection between producers and consumers may result in more differentiated products that meet consumers’ needs. Markets may become more transparent. Because the Internet transcends geography the globalization of the sector may increase.

Transformation is about change, and change creates winners and losers. The winners will be the fastest innovators best serving unmet needs; the losers are likely to be those unwilling or unable to successfully serve as engineer, or catch this powerful train. According to an expert on change, Charles Darwin, “It’s not the strongest of the species that survives, nor the most intelligent; it is the one most adaptable to change.”

## References


Becker J., T. Farris and P. Osborn, “Electronic Commerce and Rapid Delivery: The Missing “Logistical” Link”, Information Systems Research Center, University of North Texas, 1998.

Bejjani, G., Morgan Stanley, Dean Witter, “Capital Investment and Market Makers”, E-Commerce: the Net Effect on Agribusiness”, February 28, 2000

Berryman K., L. Harrington, and D, Layton- Rodin, “Electronic Commerce: Three Emerging Strategies”, McKinsey Quarterly, 1998, #1

Canadian E-Business Opportunities Roundtable, “Fast Forward”, January 2000

Dayal S., H. Landesberg, and M. Zeisser, “Building Digital Brands”, McKinsey Quarterly, 2000, #2.

Financial Times, March 1, 2000.

Gerstner Jr. L., “Blinded by Dot-Com Alchemy, “Business Week, March 27, 2000, page 40.

Goldman Sachs, “B2B: 2B or Not 2B?: An Excerpt”, September 1999

Gurley J. William, “”BigCompany.com” Should You Start a B2B Exchange”, Fortune, April 3, 2000, page 260.

Hamel and Sampler, “The e-corporation”, Fortune, December 7, 1998

Intertec Publishing Corporation, “A2K Ag Beyond 2000”, 1999

Rod Johnson, “Agribusiness in the New Economy”, E-Commerce: the Net Effect on Agribusiness”, February 28, 2000

Karjaiainen N., “The Effect of Electronic Commerce on Businesses” Master’s Thesis, Lappeenranta University of Technology.

Merrill Lynch, “The B2B Market Maker Book”, February 2000

Mougayar W. Opening Digital Markets. CommerceNet Press, 1998.

Shouhong, W., “Electronic Commerce: A New Subject for Organization Design”, ASB 1997 Conference Paper, University of New Brunswick, USA.

Tapscott D., D. Ticoll and A. Lowy. Digital Capital. Harvard Business School Press, 2000.

The Economist, June 26, 1998

Zwass, V. Foundations of Information Systems. McGraw-Hill, 1997

## Appendix

| Buyer or Seller Established E-Commerce Sites for Agriculture and Food | | |
|---|---|---|
| URL | Model | Details |
| novopoint.com | Exchange | JV between Cargill and Ariba to function as a neutral exchange for food and beverage manufacturers and suppliers |
| rooster.com | Catalogue | JV between Cargill, Dupont and Cenex Harvest States. Will "open" in May as a 2-way electronic mall where producers can buy farm inputs and market their crops. |
| planetag.com | Community | Launched by Simplot in March 2000. Will ultimately provide news, weather, commodity prices, online crop manuals, articles, advice, classified ads, access to ag retailers, crop insurance, negotiated contracts, music, and clothing |
| powerfarm.com | Community | Division of Ag Services of America. Producers can buy seed, chemicals, fertilizer, services, and access credit. Product distributed through dealerships of many companies. |
| farmsource.com | Community | Established by Monsanto. Provides information, prices, and product information. |
| agpartsonline.com | Catalogue | Established by Wicham Tractor to sell Case and New Holland parts. |
| farmwarehouse.com | Catalogue | Established by Applied Industrial Technology. Sells repair parts, bearing, seals, auto petroleum products and farm and home supplies. |
| machinefind.com | Catalogue/Auction | Established by Deere. |
| To be announced | | JV between General Mills and Land O'Lakes. Is a supply chain alliance for joint purchasing and refrigerated distribution activities |

| Third Party Established E-Commerce Sites for Agriculture and Food | | |
|---|---|---|
| URL | Model | Details |
| xsag.com | Exchange | Established in January 1999 as a neutral exchange for ag chemicals and seed. Has a strategic marketing alliance with agriculture.com. |
| agriculture.com | Community | Established in 1995 by Meredith Corporation, a publicly traded communications/publishing company. Provides ag news, weather, and discussion. Strategic alliance with xsag.com |
| poultryfirst.com | Auction | Established in Jan 2000 to service as a neutral auction for the poultry industry. Also provides information and catalogues. |
| agribuys.com | Exchange | Established in November 1999 as a neutral exchange for food. Revenue from transaction fees. |
| emergeinteractive.com | Community | A public company, launched in 1999. Serves as a community for the cattle industry with exchange, auction, and information. cyberstockyard.com for cattle sales and auctions and cattleinfonet.con for industry specific info |
| cbhcommoditiesonline.com<br><br>** | Community | Aggregates commodities for sales to buyers and does back-office processes for buyers. Has a membership fee. |
| agralink.ca<br><br>** | Exchange | Exchange for domestic Western Canadian grain |
| e-markets.com | Community | Private, founded in 1996<br><br>Alliance with iXL, a Internet service company for web based applications and tools<br><br>JV with Croplan Genetics (Land O'Lakes) for<br><br>SOAR21 to create and manage seed orders |
| eharvest.com<br><br>** | Community | Provides market news, career listing, and hog sales. Merging with Farms.com. vTraction (Rabobank's e-cooperative) has a equity position. |
| Agex.com | Exchange | Established to initially provide electronic trading for almonds. Will move into other nuts and dried fruits. Offers financing and logistical services. |
| foodvision.com | Community about food | Food focused. Public, Internet operation began April 1999. Company's main business is operating restaurants. Strategic marketing alliances with eHarvest.com and Netgrocer.com. |
| aginfonet.com | Community | Revenue from sponsorships and e-business |

| | | |
|---|---|---|
| ** | | services. Provides information, market prices, etc. |
| directag.com | Community | Launched in August 1999. Provides information, services and sells seeds via a catalogue. Has an alliance with Royal Bank to provide electronic banking and financial services. |
| ecfood.com | Community cybermall with storefronts, auction, and exchanges | Launched in April 1999 to serve the food industry. Revenue comes from listing and transaction fees |
| farms.com | Auction | Founded in 1995 and now merging with eHarvest. Received equity from Rabobank. Auctions for cattle, ag chemicals, pigs, feed, eggs, and animal healthcare. |
| globalfoodexchange.com | Auction and exchange | Launched in mid 1999 as an auction and exchange for food industry specializing in poultry, meat, and seafood. |
| bisonauctions.com | Auction | Auction services for specialty and traditional livestock and farm equipment. |
| equipment-locator.com | Catalogue | Service that locates construction, ag and ground care equipment |
| fastfinder.com | Catalogue | Catalogue of new and used farm equipment, machinery and farm supplies. Also has online community for singles. |
| netseed.com | Catalogue | Sells seed direct to producers. Producers can access credit. |
| producersvideoauction.com | Auction | Cattle video and internet auctions. |
| ** indicates Canadian company | | |