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Dominant factors impacting the development of business-to-business (B2B) e-commerce in agriculture☆

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Abstract

There is still much optimism about the potential success of e-commerce in agriculture. Three dominant factors have impacted this development: (1) industry structure; (2) product complexity; and (3) the high-touch nature of transactions. In turn, these factors have led to several different potential types of strategic options. From a mix of these strategic options, potential scenarios have been analyzed and selected. These potential scenarios are the future of business-to-business (B2B) commerce in agriculture.

1. Introduction

There is still much optimism about the potential success of e-commerce's in agriculture. Common agribusiness business-to-business (B2B) transactions such as buying, selling, trading, delivering, and contracting seem to be natural targets for conversion to e-commerce (Shapiro & Varian, 1999). Some authors have made distinctions between e-commerce and e-business (e.g., Hooker, Heilig, & Ernst, 2001). This paper will use the term ''e-commerce'' in its narrowest sense, focusing on transactions between two parties.

Many theoretical benefits of e-commerce in agriculture have been identified by several authors: (1) promotion of information flow, market transparency and price discovery (Poole, 2001); (2) facilitation of industry coordination (Nicolaisen, 2001); and (3) reduction or elimination of transaction costs (Porter, 2001; Thompson, 1996).

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These theoretical benefits appear to be undisputed. However, they have yet to materialize into profitability. The current hiatus in agribusiness e-commerce points to the difficulty of implementing B2B solutions. In September, 1999, Sachs had forecast that B2B revenues from e-commerce in US agribusiness would generate $124 billion by 2004 (Sachs, 1999). In May 2000, Sachs revised these estimates downward to $24 billion in revenue by 2004, while revising upward the total value of the B2B economy as a whole to $2.6 billion from $1.5 billion in 1999 (Sachs, 2000b). These revised forecasts show that while B2B in general will grow at a faster rate than initially anticipated, B2B growth in agriculture probably will take more time than initially anticipated.

Are there external factors that make e-commerce execution in agriculture difficult perhaps even impossible? Why does there seem to be a significant gap between theory and practice? How could one expect to succeed in the future in this environment?

Several Internet-based e-commerce business models exist: auctions, exchanges, and catalogs (Dolan & Moon, 1999; Sawhney & Kaplan, 1999; Thompson et al., 2000). In addition, B2B commerce encompasses settlement transactions such as invoicing, payments, etc. Here, B2B is used to encompass any information exchange between businesses related to a buy or sell transaction.

Sachs (2000a) discussed the general barriers cited by businesses to Internet-based e-commerce adoption. Those include Y2K budgets, unclear return on investments, lack of stakeholder support and complicated technology. These concerns appear to apply to agribusiness as well. However, there may be additional factors slowing down e-commerce adoption in agriculture.

The objectives of this paper are: (1) to evaluate agribusiness-specific factors which slow down success in agricultural e-commerce; (2) to examine the impact of these factors on future B2B success in agriculture; (3) to present a seminal model of the development of B2B e-commerce in agriculture; and (4) to provide several potential scenarios that would solve strategic problems. It will look at three dominant factors that impact the development of B2B commerce in agriculture: change in industry structure, product complexity and high-touch nature of transactions in agriculture. These factors appear to be the most important at this time. They appear to apply to most segments in the food chain.

2. Consolidation

The *first factor* preventing B2B commerce in agriculture to develop fully is *the current change in industry structure*. In the last decade, consolidations at all levels of the value chain have changed the traditional relationships between players. Consolidation in agribusiness may impact e-commerce implementation in three ways: (1) reduction of the need to electronically coordinate fragmented marketplaces; (2) creation of barriers to the development of transparent electronic market places; and (3) development of internal barriers to adoption.

2.1. Greater market concentration

The first impact of consolidation in agribusiness is greater concentration on several different segments of the market. Internet-based e-commerce offers tremendous opportunities

to create collaborative marketplaces out of several fragmented marketplaces in a low-cost, effective way (Nicolaisen, 2001). It has been suggested that the ideal e-commerce marketplace for a ''pure play'' intermediary is characterized by large fragmented markets lacking concentration (power) on the ''buy'' and/or ''sell'' side of transactions. Furthermore, concentration diminishes transaction randomness, which is best described as buyers changing suppliers on a regular basis.

Notwithstanding, current industry consolidation is reducing the need for industry coordination. In the last two decades, consolidation has been observed at several levels of the agriculture value chain: (1) seed and chemical suppliers (Shoemaker et al., 2001; Hayenga & Kalaitzandonakes, 1999); (2) grain handling (MacDonald, 1999); (3) meat packing and processing (MacDonald, 2000; Matthews, Hahn, Nelson, Duewer, & Gustafson, 1999); and (4) food processing and retailing (Kaufman, 2000a,b). Table 1 offers an assessment of current consolidation and fragmentation for each segment of the food value chain. Consolidation is expected to continue over the next few years (Additional Food Industry Consolidation Expected, 2001). In some segments of the value chain, consolidation leads to

Table 1
Fragmentation and consolidation in North American agribusiness along the value chain

Concentrated = 1, Fragmented = 10	Value Chain Segment	Remarks
1	Meat packing	Top 3 firms hold over 80% of fresh meat market share
2	Poultry production	
2	Crop germplasm	Germplasm production requires several years of R&D investment
3	Crop input distribution	Dominated by less than 10 companies
3	Grain and oilseed processing	A few players control the market internationally
3	Grain handling	Dominated by Cargill, Bunge, ADM
3	Meat processing	Some meat packers are also involved in meat processing but smaller players also occupy niches
4	Crop protection	Industry has been very consolidated for several years
4	Fertilizer production	Economies of scale driven by large investments in production facilities reduce the number of competitors
4	Food service	A few firms dominate national distribution channels
5	Seed production and sale	A few multinationals hold a large share of the market but several local companies are competing
5	Food wholesaling	A by-product of food retailer's worldwide consolidation
6	Food retail	Mergers and acquisition started in mid-1990s, currently in full swing
7	Crop input retailing	Often conducted through country elevator or feed mill
7	Grain country elevators	Presence of local coops and independent elevators
8	Livestock	Some segments fragmented (cow–calf), some segments concentrated (swine)
9	Crop production	Trend toward larger farms

market information about price and product concentrated in a handful of large players. These large players are likely to drive e-commerce adoption. They may adopt e-commerce if it is expected to reduce their transaction costs (i.e., better information, negotiation) and/or their production costs (i.e., improved distribution, inventory management, and logistics) (Henderson, Dooley, & Akridge, 2000).

But larger ''brick and mortar companies'' are also more prone to develop significant internal barriers to e-commerce adoption. In a recent survey of over 750 firms, 11 of the 17 most cited barriers to e-commerce adoption were related to the firm's internal organization. These include: inadequate internal evaluation process and information technology (IT) staff, employees uncomfortable with change, budget priorities, internal conflicts, lack of partners or capital, and lack of understanding or willingness at the top (Kanter, 2001). Larger firms are also more sensitive to IT spending. Indeed, current estimates call for a slow down in IT spending as GDP growth slows down in 2001 (From investment boom to bust, 2001).

2.2. Transparent marketplaces

The second impact of consolidation is on the development of virtual marketplaces. Earlier, e-commerce has been used to replicate traditional physical central markets. These ''exchanges'' allow prices to be discovered through new pricing and market mechanisms and promise greater market access and transparency. Several agribusiness start-ups currently offer e-commerce solutions that take advantage of the possibilities offered by the Internet (e.g., CyberCrop.com, E-Markets.com, E-Merge.com). Consolidated companies (called CoBAMs or Consortia of Bricks and Mortar) are even competing with start-ups and creating their own e-commerce sites: (e.g., Rooster.com, Pradium.com, ICE.com).

Dolan and Moon (1999) have argued that Internet-based e-commerce will fundamentally alter the ways in which exchanges between buyers and sellers take place. Various agribusiness sites and transaction models already offer the promise of better product information (DirectAg.com), better prices (XsAg.com), reduced risk (E-Markets.com with DRC) better market access (CyberCrop.com Exchange), and access to new customers (Agribuys.com) (for a more complete list of models and players, see Burchett, 2001).

Despite these possible benefits, a threat to consolidated players is posed by greater price transparency. As a result they will be reluctant to participate in these market mechanisms. A report prepared by Iowa State University discussed the issue of market control and concluded that one of the intangible benefits of the Cargill-continental merger is:

> A broader coverage of the major world suppliers and customers in the world grain and oilseed trade may offer improved market intelligence, a key to effective trading in a very risky environment, as well as more effective and timely sourcing to serve a broader array of discriminating customers (Hayenga & Wisner, 1999).

Monitoring a larger share of the market place provides a consolidated player with increased price and market information. Information control and asymmetric information in the marketplace lead to higher profit markets (Henderson, Dooley, & Akridge, 2000).

Therefore, profits by consolidated players are eroded by more efficient access to information in their marketplace.

3. Product complexity

The *second factor* slowing down e-commerce adoption is the *increasing complexity of products* being sold in agricultural markets. This complexity arises from two sources: traditional and end user-driven.

3.1. Traditional product complexity

The first source of traditional product complexity has been the development of common price references for commodity products. Central marketplaces such as the Chicago Board of Trade or the Chicago Mercantile Exchange have provided these common price references. However, differences in location, time of delivery and actual shipping quality lead to complex individual transactions. Each buy/sell transaction is performed on the basis that buyers know what they are buying and that sellers have adequately represented the product they have for sale. Unlike manufactured goods, agricultural commodities are only partly uniform. Their price depends upon several factors. Standard grades help simplify product description (for instance, No. 2 yellow corn has a definite set of quality attributes), but time and location factors also influence the price of a commodity. The same load of No. 2 yellow corn will have a different price today than a month from now. It may have a different price in Quincy, Illinois (USA) than in Gardner, Iowa (USA). To make matters more complex, local prices also may vary constantly. Digitizing all the information of a common commodity product like No. 2 yellow corn (location, time, price, quality, quantity, etc.) is complex and requires very elaborate databases and search engines. With the current technology, the cost in time and effort to the buyer of searching for all these attributes may outweigh any advantages the buyer may gain.

3.2. End user-driven complexity

The second source of the complexity of products is end-user driven products. This type of complexity has evolved over the last few decade due to: (1) focus on consumer demands for healthier, convenient, and more flavorful foods; and (2) development of trait-specific products valuable to processors along the value chain. Both product drivers create a need for product isolation along commodity channels. This is accomplished through preserving the identity of these products along parallel channels. Boehlje (2000) stated:

> The transformation of crop and livestock production from commodity to differentiated product industries will be driven by consumers' desire for highly differentiated food products; their demands for food safety and trace-back ability; from continued advances in technology; and from the need to minimize to total costs of production, processing, and distribution.

DiPietre (2000) argued that to capture greater value added along the supply chain, commodities have to become branded products. However, these products require consistency and high quality. Those attributes cannot be sustained in a commodity market relying on spot purchases.

In the past, agribusiness has responded to the complexity of responding to consumer preferences by vertically integrating the supply chain backwards. Poultry production is an example of this evolution and pork production has slowly been moving in that direction also. There are several reasons for a more integrated supply chain: (1) capturing profits through ownership; (2) reducing risks (quality, quantity, price, and financial); (3) lowering costs (transactions and operations); (4) assuring adequate inputs or markets; and (5) responding faster to changing consumer demands (Hayenga, 2000).

Can the changing demands on the livestock and grain system be met as well without integration? Contracting is believed to offer the next best alternative to integration. The pork industry is quickly moving in that direction. Hog spot market purchases have gone from 36% of total purchases in 1999 to 17% in 2001 (National Pork Producers Council, 2001). Contracting also creates the need to capture data from decentralized locations. Such data will be aggregated in a way that decision-makers will be able to use. In other words, to realize these advantages, contracting must go beyond a written document with signatures. It needs an integrated data storage, management and retrieval system. An often overlooked advantage of e-commerce is the opportunities it creates for supply chains to ''virtually integrate''. Quick information flow between supply chain participants leads to reduced risk, lower costs, better decision making, market access and faster responses to changing consumer demands (Hayenga, 2000).

3.3. Impacts of product complexity

Both types of product complexity create threats to e-commerce. Those threats arise from the individual nature of these product transactions which creates the need for ''point solutions'', or information exchange systems tailored to a specific product or process. The vision of one all-encompassing information system (the ''killer application'' (Downes & Mui, 1998)) seems unrealistic in agriculture. So far, the search for this unique system has generated several business models such as: auction systems (XsAg.com), on line catalogs (DirectAg.com), and bidding systems (ICE.com).

Evaluating various offerings and deciding on the ''right'' model is slowing down B2B e-commerce adoption among agribusinesses. Indeed, there may be a wide variety of ''right'' models, each pursuing different objectives. For instance, we are currently observing several on line cash exchange markets, each claiming to have the winning business model (e.g., CyberCrop.com, Rooster.com and ICE.com). These offerings are showing that different solutions may be appropriate for different types of transaction. An on line exchange model may be appropriate for high-volume commodity trading (for instance, No. 2 yellow corn), but may not be adequate for specialized corn where thin markets (e.g., high oil corn) may prevent price discovery. Product evaluation is one of the steps toward adoption of innovation (Rogers, 1995). Therefore, high complexity in the world of B2B probably will slow down the process of adoption.

4. High-touch transactions

The *third factor* creating barriers to B2B adoption in agribusiness is *the high-touch nature of transactions*. Even though farms have become increasingly more business-like in their structure and farmers operate in a B2B environment, individual farms still receive a great deal of personalized individual attention. Buying inputs, selling grain or livestock, purchasing machinery, obtaining financing, and arranging transportation are all transactions traditionally conducted on a one-to-one basis. Some argue that agriculture is fundamentally driven by relationships (Moss, 2001). It is not uncommon to see agricultural land leases sealed by a handshake (Allan & Lueck, 1992). Farm operator evaluation by farm managers relies more on trust and recommendations than production factors (Barry et al., 1998). A local study in Linn County, Oregon (USA) also found that personal relationships have an impact on land prices (Perry & Robinson, 1999). Physical connectedness has traditionally been a valued component of agricultural transactions. In fact, in the last decade, the study of ''social capital'' has recognized that when making decisions, other factors besides purely economic goals may motivate human behavior. Professional experiences by the authors also support the idea that agricultural markets rely heavily on personal interactions.

Porter (2001) cites an absence of face-to-face contact as a limiting factor of Internet use. Trust, built out of human interaction, is often lacking in a brand entirely Internet-based (Porter, 2001). Early surveys on the use of the Internet as a sales tool have indicated that the majority of agribusiness firms perceive that personal relationships are difficult to develop over the Internet (Boehlje, 2000). Customer and supplier resistance to Internet use are among a firm's top 10 barriers to change (Kanter, 2001). Managers are less likely to develop an Internet strategy if they perceive that farmers lack trust in making Internet purchases (Henderson et al., 2000). Recent studies support these perceptions by demonstrating that prior acquaintance increases trust between the parties (A matter of trust, 2001).

Producers have yet to understand the specific role that the Internet might play in their business (Gloy & Akridge, 2000). Producer use of the Internet for information gathering and purchasing has been shown to vary with age and education level (Gloy & Akridge, 2000). The vision of farm operators and small agribusinesses relying solely on computers to conduct all business transactions ignores the inertia created by established way of doing business. Like all innovations, e-commerce must go through an extended adoption curve. Research on adoption of innovations show that an absence of compatibility with existing practices slows down the adoption of innovations because it creates the need to learn new skills (Rogers, 1995). Introducing computer applications and digitizing transactions create changes in established behavior and a need for learning. Hence, in an industry such as agriculture where high-touch transactions are prevalent, the adoption curve will take longer.

5. Strategic implications

As stated earlier, these barriers slow down e-commerce adoption in agriculture. Nonetheless, despite these obstacles, there is room for creative solutions potentially leading

to successful adoption. Those potential strategies touch on: (1) structure of the industry; (2) market and product expertise; and (3) organizational development.

5.1. Industry structure

Current industry consolidation still leaves room for firms to develop winning strategies. Such strategies involve either creating third party marketplaces, forming strategic alliances, becoming niche players, or evolving into virtual supply channels. Each strategy will fit a unique situation.

5.1.1. Third party marketplaces

Porter (2001) pointed out that industry structure is a key determinant of the types of e-commerce solution that will be adopted in an industry. Marketplaces with fragmented buyers and sellers will be the best fit for ''third party'' marketplaces. If either the buying or selling side is concentrated or consolidated, bargaining power is in the hands of the consolidated side. In this case, the dominant party in the relationship has no incentive to delegate market power to a third party marketplace. Acer and Sawhney (2000) discussed the shortfalls of B2B industry alliances (CoBAMs). They concluded that the challenges of structuring, governing, and operating joint ventures involving multiple sponsors with conflicting interests slow down progress and often lead to failure.

5.1.2. Strategic alliances

The survival of e-commerce start-ups may depend upon their ability to forge strategic alliances with industry participants of all sizes. Large, consolidated companies are attractive as business partners because of the volume they command. However, their indecisiveness and the uncertainty they face may slow down e-commerce adoption among agribusiness. Alliances between smaller players may allow them to form electronic synergies and perhaps compete more effectively with large players.

5.1.3. Niche players

Industry consolidation does not necessarily lead to oligopoly and there are smaller players who are ready to adopt new solutions and take the risk to be innovators. By aligning with these partners and developing e-commerce solutions that fit their needs, start-ups may be able to push true innovation. In fact, Sachs (1999) reported that small businesses will be a key driver of B2B economics. Internet e-commerce enables smaller businesses to compete on a more equal footing with larger corporations and to communicate directly with them in a cost-effective way.

5.1.4. Virtual supply channels

A possible winning strategy in the face of exploding supply channel is the creation of ''virtual supply channels'', or virtual integration. The low cost advantage offered by Internet transmission is narrowing the gap between consolidated or integrated players and smaller participants. Lower transaction cost, Internet-based e-commerce provide the technology to allow for supply chain coordination in an efficient, inexpensive way.

5.2. Market and product expertise

Given the increasing product complexity found in agriculture, market and product expertise become critical element of a winning strategy. Three elements are discussed: (1) market knowledge, (2) product expertise, and (3) risk profile.

5.2.1. Market knowledge

This is perhaps the most critical element of a successful e-commerce strategy. In their excitement to develop ''new'' business models, some companies have ignored the fundamental dynamics of their industry. Porter (2001) gives the example of a chemical electronic marketplace where suppliers are pinned against each other in a price wars while the industry has been moving toward more value added relationships. Agribusiness is moving toward more value added and closer supplier–customer relationships. On line exchanges promising better prices through greater geographic reach may not achieve large transaction volumes.

5.2.2. Product expertise

In a globalized economy, product transactions will become more complex and the list of specifications to be met will become longer. e-Commerce needs to push the envelope of technology and offer solutions that fit the needs of the commodity offered. A thorough understanding of their product specifications will allow companies to better design the e-commerce process and offer greater value to buyers and sellers. Successful businesses in the e-commerce world will be those that possess strong product expertise.

5.2.3. Risk profile

Drawing from developments in the financial industries, Wise and Morrison (2000) concluded that deep market knowledge is required to be able to transition successfully into the world of B2B. A company's ability to spot disruptive trends and its ability to take risks and reposition its business to respond to those trends will be important assets in the B2B world. With the fast evolution of several mega trends in agribusiness, firms contemplating e-commerce adoption decisions today face the daunting task of having to make assumptions about the future of the industry and hope that their choices do not impair their competitiveness in the marketplace tomorrow.

5.3. Organizational development

If we accept the idea that the Internet and e-commerce will fundamentally change the way transactions take place in agriculture, at least three implications emerge for organizations: (1) the need for learning and training; (2) the ongoing presence of human touch in transactions; and (3) the acquisition of knowledge.

5.3.1. Learning and training

Today's high-tech transactions mean that e-commerce players have to lead individual users toward a new way of conducting business. The nature of adoption of innovation will

create opportunities for those who cater to individuals' need for learning and training (Judson & Kelly, 1999). To make the transition from high-touch to high-tech, successful businesses in e-commerce must have strong sales, customer service and marketing orientation. An early myth in B2B e-commerce was that "if you build it, 'they' will come". This perception downplayed the influence of existing behavior and the security of the familiar.

5.3.2. Human touch

Successful companies will the ones who understand their customers and provide them with human interaction. Pioneer Hi-Bred International's dealership network is a good example of how high-touch companies achieved success under "old economy" rules. In addition, extending e-commerce to the sales force may free employees from paperwork and filing duties and allow them to focus on more value-added activities such as client recommendations, leading to greater customer satisfaction (Porter, 2001).

5.3.3. Knowledge acquisition

Internet-based e-commerce is a very recent phenomenon. Given the wide array of solutions possible and because of organizational inertia or delays in deciding on the "best solution", some companies may find themselves at a competitive disadvantage in the future. Early industry adopters and "pure play" e-commerce companies will have acquired knowledge and know-how that late adopters will lack. This knowledge and experience advantage will make early adopters and "pure play" companies a prime target for acquisition or mergers.

6. Potential scenarios

Evaluating, choosing and implementing an e-commerce solution will involve a thorough understanding of a firm's industry, market, and organization. Clearly, the dominant factors will lead to strategic options which will in turn lead to one or more possible scenarios (see Fig. 1). As suggested above, each firm will evaluate the impact of the dominant factors in a given industry setting. Based upon the individual factor or combination of factors, one or more strategic options can be used. Not all strategic options would be used in all potential scenarios for success in an e-business. Each company would have to decide on its strategy based upon its individual situation. Fig. 1 illustrates how these factors may interact to form such potential solution. Letters and numbers in parenthesis refer to the figure.

For instance, in a first three-step scenario (see Scenario 1, Fig. 1), a firm could choose a strategic option path from the following: if the firm is operating in a consolidated industry (A) and if it possesses excellent market knowledge of traditionally complex products (B), this may lead to the firm to decide to enter into a virtual supply channel arrangement (4) and to develop sophisticated database systems that adequately capture the complexity of the product with which they operate (6).

Another potential scenario (see Scenario 2, Fig. 1) could call for a firm showing unequaled product expertise (B) in a high-touch industry (C) to become a niche player (3) in its industry and to invest in customer service to maintain its human touch approach (9).

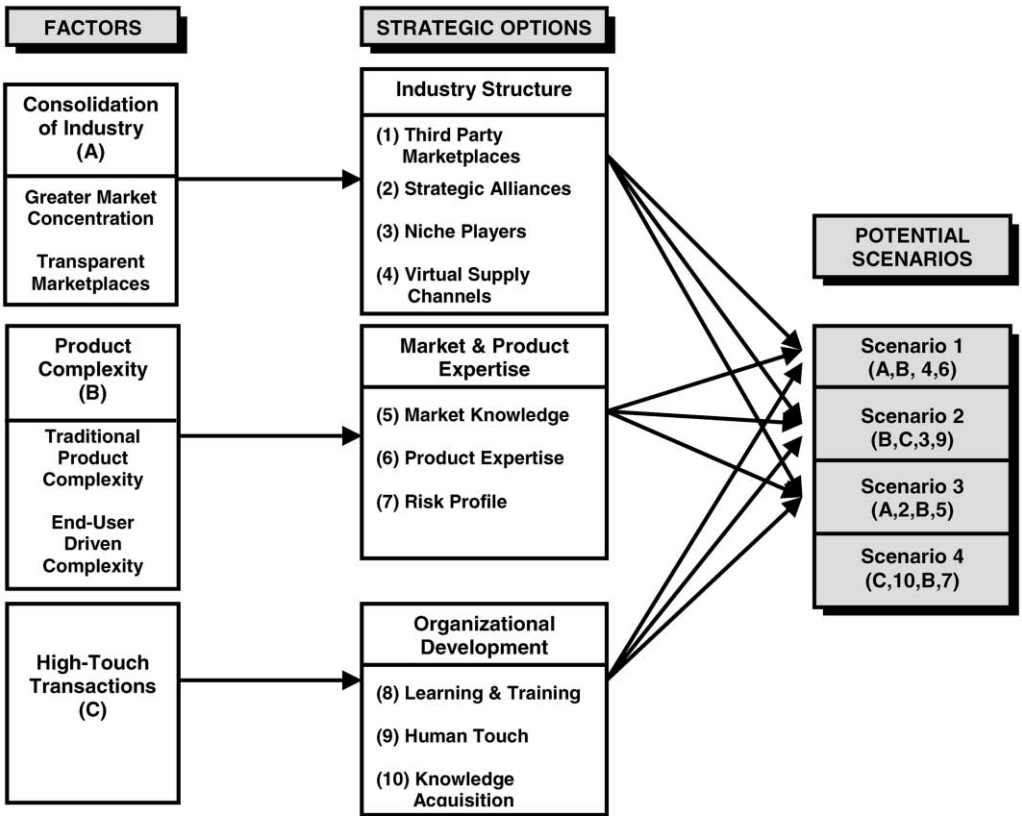

Fig. 1. Development of business-to-business e-commerce models in agriculture. Refer to Section 6 for discussion of this figure.

A scenario (see Scenario 3, Fig. 1) for a pure play third party e-commerce firm operating in a concentrated marketplace (A) would call for the firm to develop strategic alliances (2) with either dominant or smaller players. In addition, if the firm possesses excellent grasp of its industry (B), it will be well positioned to take advantage of this expertise to facilitate commerce between players in the supply chain (5).

Finally, an existing firm operating in a high-touch environment (C) but lacking the knowledge to successfully develop an e-commerce strategy (see Scenario 4, Fig. 1) may elect to acquire this knowledge by merging with or acquiring an active e-commerce firm (10). If in addition the original firm is involved in activities where high end-user complexity is present (B), it will also have to consider its risk profile and assess the future of its industry (7).

7. Conclusion

Given the above challenges facing B2B in agribusiness, it becomes readily apparent that not only the value, but also the mere existence and profitability of third-party, ''pure-play''

ventures are marginal at best. This conclusion is based on the premise that consolidation alters the competitive dynamic at both ends of the value chains (farm inputs and food retailers). As a result, we are faced with a new and evolving paradigm in the agri-food sector.

Therefore, the true value of the Internet, and hence the market capitalization of pure play ventures is ultimately going to be determined by their ability to introduce efficiencies into antiquated and inefficient business practices and systems. Competition in most marketplaces is shifting away from direct competition between competing firms, and toward competition between supply networks. Such a shift can be illustrated by examining the competitive dynamics characteristic of modern grain production. Not much competition exists between neighboring farmers (competing agribusinesses) as compared to the intense competition between the recently formed seed-chemical conglomerates (supply networks) (e.g., Syngenta, Aventis, DuPont). Therefore, the theoretical ''killer application'' involves combining supply chain management, electronic data interchanges (EDIs), and physical exchanges (e.g., electronic livestock auctions).

It is questionable whether third party ''pure plays'' are capable of providing much value to the Cargill's and ConAgra's of the world because there is little ''surplus value'' for one to extract. However, value does exist in providing non-vertically aligned producers and processors with information systems, thereby allowing trade and coordination among themselves as though they were vertically integrated (virtual integration). In the not too distant future, venture capital funds and producers alike will realize that the true Internet play is one based on coordination and not the pure exchange play.

Regardless of the specific strategy or market sector that a given third party ''pure play'' intends to operate, it becomes imperative to be physically involved with a significant amount of the selected commodity. Having gained physical control of a commodity, work then can begin on developing an electronic transaction system where the competitive advantage is based on making the supply network more efficient vis-à-vis ''old-economy'' (non-Internet-based) supply networks. Furthermore, physically possessing a commodity, via contract production or similar means should partly negate concerns of being reduced to an application provider. In other words, a pure play operating in grain trading would be at less risk of obsolescence if it were trading, hedging, or developing delivery and logistics system for grain it physically possessed. This recommendation is of particular relevance when considering pure electronic cash exchange ventures that need to attain critical mass for liquidity purposes.

The theory driving the development of Internet-based exchanges is the reduction of market fragmentation. In other words, market fragmentation would be reduced and efficiencies gained if a single commodity-specific exchange should exist. However, the multiplication of Internet-based exchanges has resulted in actually increasing the same type of market fragmentation that such exchanges were originally designed to eliminate.

The future success of B2B e-commerce in agribusiness is undeniable. Factors specific to agriculture will create additional challenges which must be overcome before success may be attained. The ability of each player to work though these challenges will determine the speed of adoption of B2B in agriculture.

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