2005

Partnering for perfection: An economics perspective on B2B electronic market strategic alliances

Qizhi DAI
Drexel University

Robert J. KAUFFMAN
Singapore Management University, rkauffman@smu.edu.sg

Citation

PARTNERING FOR PERFECTION: AN ECONOMICS PERSPECTIVE ON B2B ELECTRONIC MARKET STRATEGIC ALLIANCES

Qizhi Dai
Assistant Professor of Management Information Systems
Lebow College of Business, Drexel University, Philadelphia, PA 19104
Email: qdai@drexel.edu

Robert J. Kauffman
Professor and Chair, Information and Decision Sciences, and Director, MIS Research Center,
Carlson School of Management, University of Minnesota, Minneapolis, MN 55455
Email: rkauffman@csom.umn.edu

ABSTRACT

New technological innovations have made it possible for new intermediaries to create value in business processes that involve the procurement of manufacturing and services supplies. Associated with these innovations is the emergence of business-to-business (**B2B**) electronic markets. These act as digital intermediaries that aim to reduce the transaction costs and mitigate the risks inherent in procurement. They improve buyers' capabilities to search for attractive prices, and also serve to increase the liquidity of sellers' products. In this chapter, the authors explore the evolution of B2B e-market firms in terms of the strategies they employ to "perfect" their value propositions and business processes for the firms. This is a critical aspect of their attractiveness as business partners for the buyers and sellers that participate in their electronic marketplaces.   The key theoretical perspectives of this work are adapted from economics and strategic management. They enable the authors to construct a "partnering for perfection" theory of strategic alliances in e-procurement markets. This perspective is captured in a series of inquiries about "why" and "when" B2B e-markets are observed to form alliances.   The authors carry out an innovative econometric analysis that delivers empirical results to show the efficacy of the theory in interpreting real world events. The chapter concludes with a discussion of the implications of this work in academic and managerial terms.

KEYWORDS: B2B e-commerce, econometric analysis, economic theory, electronic markets, empirical methods, market performance, procurement, strategic alliances, strategic management.

INTRODUCTION

Business-to-business electronic markets proliferated in the mid to late 1990s with the

widespread application of the Internet and World Wide Web to inter-firm transactions. By the

middle of 2000, there were about 1500 B2B marketplaces in the United States, according to the

estimates of Deloitte Consulting (2000). However, this boom turned into a bust in early 2001,

when many B2B exchanges either shut down or were acquired.   Recent estimates suggest that

there are only about surviving 150 B2B e-markets (Day, Fein and Ruppersberger, 2003).

B2B E-Market Firms: Evolution and Transformation on Internet Time

All the changes that we have seen reflect the intense competition that has unfolded in the

arena of B2B e-commerce. In this environment, firms that operated e-markets made great efforts

to develop and adapt their business models and strategies to meet the competition, while the

landscape of digital procurement also rapidly evolved out of their control.   The earliest e-market

firms followed in the footsteps of their business-to-consumer (**B2C**) counterparts to build Web

sites with e-catalogs and search functions. They also created public marketplaces where buyers

and suppliers could exchange product and price information with low transactions costs.

Later on, having observed and participated in the public B2B exchanges, buyers and

suppliers entered into this area with their own online marketplaces. In some industries, firms

combined their efforts and resources to operate a shared platform on which they could buy or sell

products via the Internet. For example, the major automobile manufacturers, including General

Motors, Daimler Chrysler, Ford, Nissan and Renault (later to be joined by Peugoet-Citroen),

formed Covisint. This provided an industry-wide electronic marketplace connecting firms so

that they could buy and sell parts and supplies more cheaply. Another approach that firms took

is to develop private exchanges to conduct transactions online with their selected customers or

suppliers, like what Wal-Mart has done. At the same time, third-party B2B e-market firms that pioneered public exchanges developed functions to meet the demands for private transactions and collaboration between firms that are participating in their online marketplaces.

We define a B2B e-market firm as a separate firm or a subsidiary of a firm that hosts and operates Internet and Web-based information systems by which other firms can purchase and sell products. As a form of business organization, B2B e-market firms present themselves as transformational information technology (**IT**) firms. On the one hand, they are IT firms because they use computer and telecommunication technologies to produce the products and services that they offer. Their products and services are inseparable from the development, design and operation of computer systems and telecommunication networks. On the other hand, they differ from traditional IT firms in that their offerings are completely built upon the Internet and Web technologies instead of legacy systems. Most of them have been recognized as new entrants in the IT industry, and as explorers in the arena of new business models and strategies.

As technology solution providers, B2B e-market firms offer an innovative form of interorganizational information systems (**IOS**), utilizing the Internet and Web technologies to provide shared infrastructure and a means for commercial exchange. They typically offer electronic product catalogs, price discovery mechanisms, and other market-making functions. In addition, they provide new procurement and distribution channels for firms that manufacture or consume the products that are transacted in their online marketplaces.

The Challenges of B2B E-Markets

During their evolution, B2B e-market firms have typically been owned by third-party firms or sponsored by industry consortia. They have faced a number of challenges that have stemmed from the characteristics of the market segment in which they operated, and the nature of the

technologies upon which they built their business.   First, as new ventures in the digital economy, B2B e-market firms have faced the challenges that all new organizations have to conquer. The managers and employees of newly-formed organizations have to accumulate skills and knowledge about operating the business, understand the market and effectively invest in technology (Stinchcombe, 1965). Young firms need to develop stable linkages with key stakeholders, and to enhance their external legitimacy. In addition, new organizations typically are small and do not have the financial and other resources to withstand a sustained period of poor performance. In our context, in order to serve buyers and suppliers in particular industries, B2B e-market firms had to rapidly learn about the inter-firm transaction processes in these industries, and to gain recognition for the quality and effectiveness of their services and products among potential customers. They also need to obtain approval and endorsement from venture capitalists so as to secure financial resources.

In addition to the challenges of being new and small, B2B e-market firms also have had to tackle the various challenges and risks that the fast-growing market and evolving technologies bring about. Although high-growth markets generate opportunities and potential rewards, they also present high risks due to market uncertainties and rapid technological changes. Aaker and Day (1986) point out that high-growth markets are often over-crowded with competitors, so that newly-entering firms will lack the resources to maintain a similarly high rate of growth. At the same time, the rapid technological development increases the level of uncertainty and enables later entrants to leapfrog with a superior product or with a low-cost advantage. This description characterizes the situation in the market for the procurement services offered by B2B e-market firms. In spite of the fact that the number of B2B e-marketplaces rose dramatically from about 300 in 1998 to 1500 in 2000 (Deloitte Consulting, 2000), this rapid growth inevitably intensified

the competition in the young market for e-procurement services, squeezing the marginal players. Most of these firms took advantage of the willingness of venture capitalists to provide financing, but, all too soon, this rapid growth would lead to tightening financial constraints and the recognition by the venture capitalists that they had been badly fooled by the "hype." Moreover, innovative technologies and applications, such as Web services, have continued to flow into the market, giving the later entrants opportunities to jump ahead with cheaper, better and more effective new technologies.

A third source of challenges that B2B e-market firms faced came from the network effects that characterize the Internet and Web technologies underlying online marketplaces. One critical feature of B2B e-market firms is their ability to utilize the Internet and Web to create communication networks that can connect buyers and suppliers. In other words, what a B2B e-market firm offers can be viewed as a "network product." As can be observed in other markets for network products, the growth of B2B e-markets is subject to network effects that bring about more risks for these new enterprises (Shapiro and Varian, 1999). In the presence of network effects, the first challenge to a B2B e-market is to build up a critical mass of buyers and suppliers for its online marketplace so as to get the momentum for growth. However, early B2B e-market firms had difficulties in achieving a critical mass of buyers and suppliers. Buyers were skeptical about the business value of the online marketplaces (Day, Fein and Ruppersberger, 2002).

The second challenge due to network effects is to develop or adopt technological standards that put the B2B e-market firm at an advantageous position in relation to it competitors. Unfortunately however, in this area of B2B e-commerce, different specifications of some of the leading technologies still are vying to become the standards. For example, Commerce One, a leading B2B technology provider, has been supporting ebXML, a variant of XML (Extensible

Markup Language), which is advocated by the Organization for the Advancement of Structured Information Standards (**OASIS**). Another major player in this field, Ariba, promotes cXML, its own proprietary version of XML. As a result, there is no guarantee that documents following the different XML specifications can be exchanged easily. So it is not clear which XML specification will win the standards war. Such uncertainties in the competition among potential standards represent another source of technological risks for the growth of B2B e-market firms.

Overall, since the inception of e-commerce, the competitive landscape of B2B e-procurement has changed dramatically, while B2B e-market firms have been adapting to cope with the challenges they have faced. These challenges constitute market and technological risks that threaten these firms' growth and viability. How can they reduce these risks and overcome the various challenges? We argue that one important strategy that B2B e-market firms have employed is to partner with other organizations to reduce these market and technological risks and "perfect" their business processes.

B2B E-MARKET FIRM STRATEGIES

We now turn to a discussion to set up the basis for understanding business process perfection strategies for B2B e-market firms.

Perfecting B2B E-Market Firm Functionality

During the process of evolution and adaptation, B2B e-market firms have gone through three developmental phases to perfect their functions and underlying technologies. According to Bakos (1998), in the early days of B2B e-commerce, B2B e-market firms built virtual marketplaces around their role as digital intermediaries to reduce transaction costs, support transaction-making by electronic means all the way from information search, through price discovery, and finally to transaction settlement. B2B e-markets compiled product information

for many suppliers as e-catalogs so that buyers could do one-stop shopping on the Internet. They also implemented dynamic trading processes to match demand and supply for spot purchase and other transactions in uncertain environments. In addition, they provided facilitation services, including financial services and logistics arrangements that helped firms to close interfirm transactions. So overall, the first impetus of B2B e-market firms was to create virtual marketplaces with the basic market making functions on the Internet. For example, ChemConnect (www.chemconnect.com), a B2B e-market firm in chemicals industry, was first built as an Internet-based bulletin board for exchanging information about chemical products. Later it launched online auction and negotiation functions to expand its market-making capabilities.

While their role as market makers remains essential for online marketplaces, B2B e-market firms also recognized their second role as interorganizational information systems, and the needs of buyers and suppliers for nurturing their relationships and managing inter-firm business processes. One potential of IOS in this context is to enable innovative interorganizational business processes accompanying their implementation (Truman, 1998). In this way, B2B e-markets have offered platforms to streamline workflows and promote interorganizational collaboration, supporting effective business process management. A typical example is BenefitPoint (www.benefitpoint.com) that operates a Web-based network for insurance distribution and administration. Insurance carriers and their agents can log on to the BenefitPoint system to manage all the activities involved in ordering and renewing underwriting requirements, updating and tracking client data, and so forth. Furthermore, B2B e-markets can also provide functions for collaborative supply chain management by coordinating demand

forecasting and production scheduling, as observed in the online platform of Transora

(www.transora.com), a B2B e-market that operates in the retailing industry.

Figure 1. Transora's B2B E-Market Alliance Partners

As B2B e-market firms serve buyers and suppliers that participate in their online marketplaces, they have been developing their capabilities as technological adapters, extending the connectivity of their trading networks via systems integration, the implementation of technical standards, and IT outsourcing services (Dai and Kauffman, 2002). To reduce the efforts that firms have to take to join their networks, B2B e-market firms provide solutions and services to integrate member firms' back-end enterprise systems with the marketplaces they wish to trade in so that the benefits of participation increase. In addition, they implement standards for common data formats and business processes, such as industry-specific XML standards, to enhance the connectivity of their networks. We also see this with Transora's relationships with the EAN Uniform Code Council (global standards group for XML), and the Voluntary Interindustry Commerce Standards (**VICS**) group. (See Figure 2.)

Figure 2. Standards Organization: EAN.UCC—The Uniform Code Council for XML
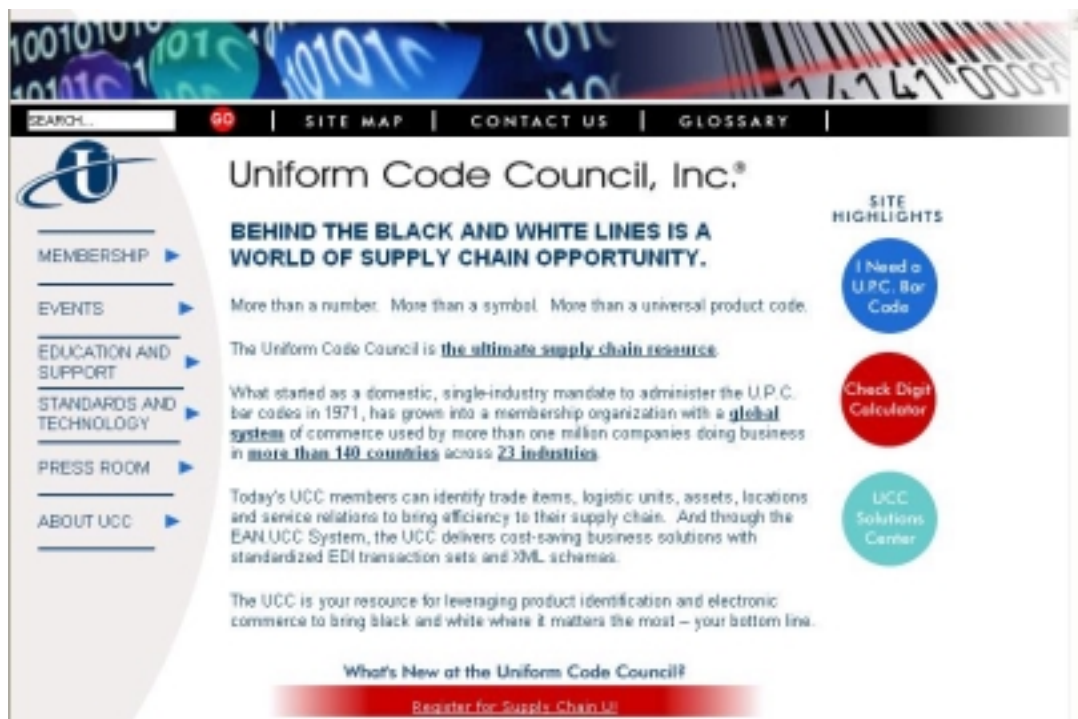
Source: Uniform Code Council, www.uc-council.org/ean_ucc_system/. Accessed November 13, 2003.

Another example is NewView Technologies Inc. (www.newview.com), a marketplace for the steel industry. It created a systems integration solution called "NewView Connect," that is based on the latest XML technology and can be deployed to set up a seamless connection between a firm's back-end system and NewView's Web-based systems.

The above discussion shows that as a platform and electronic channel for inter-firm transactions, B2B e-market firms assume the roles as market makers, business process facilitators and technology adapters. Although individual B2B e-market firms may weigh each role differently, the market demand pushes them to aggregate a matrix of functions and capabilities onto a single platform, forming all-in-one markets in which buyers and suppliers can shift between different transacting mechanisms and also streamline business processes (Kambil, Nunes and Wilson, 1999). It is a challenging task to achieve all the functionalities to fulfill these roles, and this task is further complicated by the typical business hazards in the B2B e-markets arena.

Managerial Choices and Alternatives

One way for B2B e-market firms to build up the capabilities for performing these roles is to develop the related functions through internal growth. For example, ChemConnect added auction and negotiation mechanisms into its online marketplace platform through internal development to expand its transaction capabilities (www.chemconnect.com/history.html). However, firms also have found that they need partnerships to leverage external resources to enrich their market's functions through alliances and acquisitions (Segil, 2000). For instance, ChemConnect merged with Envera (previously www.envera.com) to obtain connectivity technologies, while partnering with ForestExpress (www.forestexpress.com), a B2B e-market application provider for forest products, to expand the reach of ChemConnect's trading network.

The firm uses alliances for financial services, hub-to-hub capabilities, distribution logistics,

market information, risk management, core business strategic function and technology providers.

See Figure 3.

Figure 3. Chemconnect's Financial Services and Logistics Alliances

Source: Chemconnect, www.chemconnect.com/ alliances.html. Accessed November 13, 2003.

The importance and prevalence of alliances in B2B e-procurement are reflected in a study published in the McKinsey Quarterly.   Ernst, Halevy, Monier and Sarrazin (2001) reported that as B2B e-markets experience growth and market change, they have found it essential to leverage strategic alliances to gain effective access to products, customers and new business opportunities. Moreover, Rajgopal, Venkatachalam and Kotha (2002) found that alliances were a commonly employed strategy among B2B firms, and that announcements of strategic alliances generated positive abnormal returns on stocks.   The market value of partnerships is also captured in a study that Lenz, Zimmermann and Heitmann (2002) conducted among European B2B e-markets. Through a field survey, the authors showed that B2B e-market firms formed alliances to obtain access to resources that will enhance their capabilities in information services, transaction services and other value-added services. And, with partnerships, B2B e-market firms perceived themselves to be more capable and stronger than competitors in offering these services.

By bringing in external skills and resources via alliances (Teece, 1992), B2B e-market firms aim to add new functions or enhance existing functions, perfecting their services and business processes. (See Table 1 for some examples.)

Table 1. B2B E-Market Firm Alliance Examples

B2B E-MARKET FIRM	START DATE	INDUSTRY, PRODUCT EXCHANGED	STRATEGIC ALLIANCE: PARTNER AND ACTIVITIES	APPARENT RATIONAL FOR STRATEGIC ALLIANCE
Bandwidth.com	1999	Telecommunications, specifically for Internet access	Co-developed match-making service with Byers Engineering	Obtain skills, assets to enhance product, service functionality
BuyerZone.com	1992	Small business, specifically for MRO, IT and office supplies and services	Partnered with AOL to distribute services to AOL users	Send positive signals on product to boost reputation
CheMatch	1995	Chemicals, especially bulk chemicals and plastics	Linked with Chem-Cross to offer users direct access to marketplace	Expand reach of trading network

A typical example is the partnership between Bandwidth.com (www.bandwidth.com), an online marketplace for telecommunications services and other carriers, and the Byers Engineering Company. These two firms jointly developed a matchmaking service that aimed to provide a tool for firms in the telecommunications industry to identify partners in constructing network facilities and infrastructures (PRWeb, 2000). This partnership enables Bandwidth.com to build the new function to expand its offerings.

B2B e-market firms also employ alliances as a means for reducing their market and technology risks. They enter into co-marketing agreements to gain recognition of their capabilities among customers, suppliers and partners, which reduce risks that they face as new organizations in an emerging industry sector. Buyerzone.com (www.buyerzone.com), a market for small businesses, formed a marketing alliance with AOL to distribute its one-stop shopping services to firms via AOL (BuyerZone.com, 2000). This way, the name and reputation of Buyerzone.com was boosted through AOL's distribution channels.   Today the firm partners with Minolta, BusinessWeek, Primepay, Artsoft, and Yahoo. See Figure 4.

Figure 4. The Buyerzone.com's Alliance Partners

Source: The Buyerzone.com, www.buyerzone.com. Accessed November 13, 2003.

In addition, B2B e-market firms also leverage alliances to promote the connectivity and participation in their trading networks to reduce the risks that originate from the network effects of Internet technologies. For instance, CheMatch.com, a now defunct Internet-based marketplace in the chemical industry, formed an alliance with Seoul, South Korea-based ChemCross.com (www.chemcross.com), a chemical e-marketplace, to set up a direct linkage between their systems. To CheMatch, this partnership extended the reach of its trading network by bringing Asian chemical companies onto its marketplace through ChemCross. For the former, although it failed, it was a means to build critical mass in participation to leverage the network effects. Meanwhile, ChemCross entered into this partnership for the same purpose.

Figure 5.   ChemCross.com's Approach to Alliance-Making
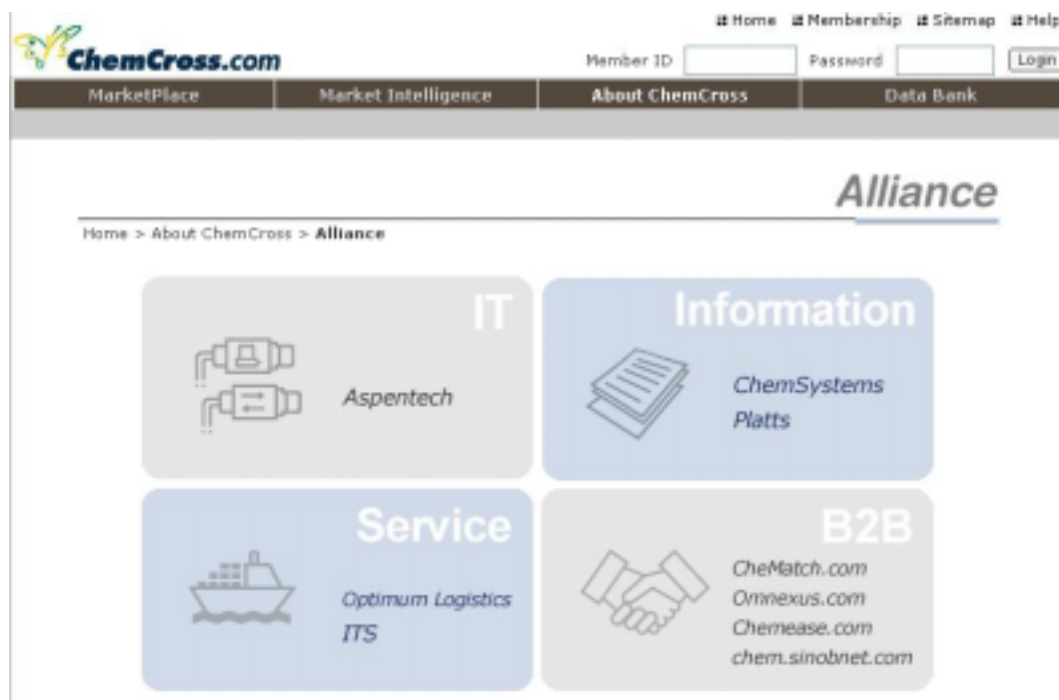
Source: ChemCross.com, www.chemcross.com/aboutChemcross/
CACFrJpAboutChemcrossHtmlView.jsp?ACAlliance.html. Accessed November 13, 2003.

In summary, we see that strategic alliances of various sorts have been an important strategy that B2B e-market firms have leveraged to obtain resources to develop important operating functions and to reduce market and technology risks.

THEORETICAL PERSPECTIVES ON ALLIANCES

Strategic alliances are formal cooperative relationships between firms that pool or exchange their resources and share returns from a pooled investment (Teece, 1992). Along with showcasing the efficacy of cooperative strategies among firms that search for partners to improve their competitiveness, the academic literature offers various perspectives that address the issues that arise related to alliances from an economics and strategic management view (Faulkner and De Rond, 2000; Lorange and Roos, 1992).

One benefit of alliances is the access to complementary resources and assets at a lower cost than if they were to develop the capabilities internally, and by doing this, partnering firms are able to improve performance (Teece, 1992; Hagedoorn, 1993). The alliance literature recognizes three kinds of critical resources in this context: technical, commercial and social resources (Ahuja, 2000). Technical resources are the skills and capabilities for developing and offering new products. Commercial resources include firm marketing and distribution skills that can bring products to customers. Social resources reflect the linkages that firms have already formed and can be leveraged to obtain other resources. For example, through an arrangement called "code sharing," the airlines have managed to cooperate with each other on connecting flight routes. This has increased their traffic on the shared routes and has permitted them to gain market share from other airlines (Bamberger, Carlton and Neumann, 2001). Code sharing can be viewed as a strategy for partnering airlines to tap into each other's distribution channels, an important commercial resource. Alliances also provide good opportunities for firms to obtain knowledge and know-how that reside within partner organizations, as learning is an important rationale for firms to form partnerships (Mody, 1993). In the biotechnology industry, small firms partner with established pharmaceutical companies so that the former obtains access to market while the latter obtains knowledge in developing new drugs (Lerner and Merges, 1997).

Another function of strategic alliances is to enhance perceptions about a firm in the marketplace by associating it with more well-established partners. Rao and Ruekert (1994) argued that brand alliances act as signals that disseminate information about product quality in the marketplace. Companies can boost reputation and brand identity by marketing together with other well-known brands—something that works especially well for experience goods that have important unobservable quality (Rao, Qu and Ruert, 1999; Kirma and Rao, 2000). Not only are

perceptions of product quality enhanced, but also firm capabilities will be perceived differently when a strategic alliance has been made. For example, small biotechnology firms send positive signals about their capabilities to prospective investors by partnering with market-leading pharmaceutical firms (Nicholson, Danzon and McCollough, 2002).

Along with obtaining access to external resources and signaling quality to the marketplace, companies can employ alliances to add organizational flexibility and to protect specialized assets under market uncertainty. As a quasi-organizational form, strategic alliances give firms the flexibility of forming and disbanding linkages with partners swiftly in response to changes in demand or other aspects of their business environment (Mody, 1993; Chan, Kensinger and Keown, 1997). Under market uncertainty, firms will seek close longer-term relationships, not arms-length market transactions, to overcome opportunistic behavior (Williams, 1985). In this way, alliances offer an organizational form that enables firms to obtain assets rapidly and flexibly.   Stuart, Hoang and Hybels (1999) have observed that strategic alliances will be preferred, and will create more positive leverage on firm performance when the uncertainty is higher. In addition, in the early stages of technology development and commercialization, the high product and market uncertainty makes alliances a preferred strategy for product functionality innovations and product promotion for market acceptance (Roberts and Liu, 2001).

By providing access to resources, enhanced market perceptions and organizational flexibility, strategic alliances enable partnering firms to improve their performance and position in competitive markets, their stakeholder valuations, product innovations and long-term survivability. Chan, Kensinger and Keown (1997) found that stock prices responded positively to the formation of alliances and partnering firms displayed better operating performance than their industry peers over a five-year period. The value of alliances is especially plain to see

when the partnerships involve the exchange of technological assets and skills (Chan, Kensinger, Keown and Martin, 1999; Hagedoorn and Schakenraad, 1990). Moreover, in high-technology industries, enterprises leverage alliances to enhance their competitiveness. Baum, Calabrese and Silverman (2000) found that new biotechnology firms that formed more alliances and were involved in efficient relationships outperformed other firms in the market for initial public offerings of stock. Stuart (2000) studied the impact of partners' capabilities on a firm's innovativeness and sales growth in electronics industry, and showed that firms enjoyed higher rates of product innovation and sales growth when their partners had a higher level of technological capabilities and revenues.

HOW B2B E-MARKET ALLIANCES ASSIST FIRMS TO DEAL WITH RISKS

Based on the above discussion, we identify three types of risks that B2B e-market firms face: their risks as new organizations, the risks of fast-growing markets and technologies, and the risks associated with network effects. We next will discuss why we think that strategic alliances enable B2B e-markets to reduce these risks with the benefits that the alliances bring about.

Why Strategic Alliances Reduce the Risks of B2B E-Market Firms

First, B2B e-market firms, as new organizations, need to accumulate management skills and to establish stable exchange relationships (Stinchcombe, 1965). They must get beyond the novelty of the technology, to cope with the difficulties of market acceptance and problems associated with developing the appropriate management resources that constitute a set of risks for the growth and the survivability of new firms (Shepherd, Douglas and Shanley, 2000). Building up external linkages is an effective method to deal with these problems. Why? New firms can learn from their partners about how to manage effectively in a specific industry

context, how to gain access to the necessary resources, and how to secure key relationships with customers and suppliers. Moreover, the ability of alliances to send positive signals about product quality and firm capabilities to the marketplace will help B2B e-market firms build reputation and gain recognition among potential customers and suppliers, strengthening their crucial external linkages.

Second, B2B e-market firms have been commercializing the Internet and new Web technologies for inter-firm transactions in a high-growth marketplace where demand and technologies have been changing fast. This brings about another set of risks for B2B e-market firms. Aldrich and Fiol (1994) pointed out that in such marketplaces, forming external linkages will enable firms to improve performance. And, at an early stage of technology development, demand uncertainty poses a risk on product development, and innovative product functionality is critical for success (Roberts and Liu, 2001). B2B e-market firms have sought to integrate their capabilities for digital intermediation, the management of interorganizational processes, and technology adaptation to better support buyers and suppliers (Dai and Kauffman, 2002). How can they build effective functionality in the changing marketplace?   Strategic alliances provide an available and effective method for alleviating the risks with new product innovations, since firms can utilize their partners' business assets to develop new functionality swiftly and flexibly.

As providers of network products, B2B e-market firms face the challenge of building a critical mass of participants to sustain network growth. Katz and Shapiro (1994) showed that innovative network products fail if they do not gain a sufficient number of adopters. Apparently this is true, even if the intrinsic quality of the products is superior to existing products.   They observed that potential adopters demonstrate some reluctance in joining the new networks for fear of losing connections with other users—a source of inertia. To reduce the risk of failure due

to adoption inertia, B2B e-market firms can build their functionality and service capabilities on the basis of accepted technology standards. They can also make their networks compatible with other technologies, and offer products and services that allow participants to connect and integrate their information systems, so that the switching costs are held in check (Dai and Kauffman, 2002).

Buyers and suppliers must make substantial efforts and must have the resources available to switch trading networks. This often includes changing computer and telecommunications systems, putting new applications into place, and redesigning a number of business procedures. By allying with firms that are potential participants, a B2B e-market firm increases the incentives for participants to make relationship-specific investments and to switch to its network, reducing the risk of network inertia. Alliances will encourage costs and benefits sharing, and follow-on investment from network participants can help to improve network performance (Bakos and Nault, 1997). This will further reduce the risk of failure for B2B e-market firms.

In a world of network products, standardization requires the coordination of suppliers of various components of the network system. For example, in recent years, firms in the IT industry have formed alliances to develop and promote standards for various technologies (Roberts and Liu, 2001). Through partnering with organizations that are providers of the technologies that underlie digital procurement, B2B e-market firms are better able to leverage proprietary technologies for their benefit and to gain favorable support in implementing standards. This way, they can reduce the uncertainties that potential adopters face in switching trading networks, which, in turn, has a beneficial effect for reducing any signs of adoption inertia that may threaten B2B e-market growth.

Overall, strategic alliances open favorable access to resources, provide endorsement for

product quality and firm capabilities, and add flexibility under uncertain environments. By

leveraging alliances, B2B e-market firms are able to reduce the risks of failure. (See Figure 6.)

Figure 6. Why Strategic Alliances Diminish the Risks of B2B E-Market Firms

Strategic Alliances:
- Open access to necessary resources
- Provide endorsement for product quality and firm capabilities
- Add flexibility under market uncertainty

Reduce

Risks:
- Being new organizations
- Uncertainty in a high-growth market
- Adoption inertia from network effects
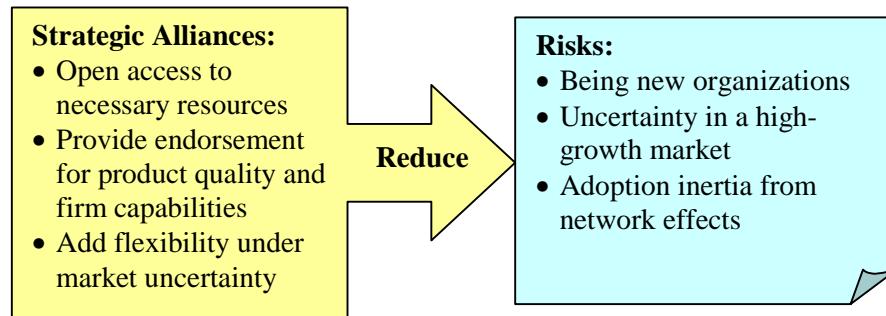
Theory Development: Explaining B2B E-Market Firms' Strategic Alliances

We next translate these observations into some basic statements of a new theory that is

intended to explain why B2B e-market firms form strategic alliances. A starting point is our

observation that the higher the risks that B2B e-market firms face, the more likely they will

resort to strategies alliances to reduce them. To evaluate this assertion, we can identify the

situations where B2B e-market firms face high risks versus relatively low risks. Although all

new organizations face the risks of failure, pioneering ventures tend to face higher risks than

later entrants (Shepherd, Douglas and Shanley, 2000). This is because they also have to create

the industry or industry sector, in addition to their own business. Also, in the formative stages of

an industry, external legitimacy is critical. So cooperation with other organizations enables new

ventures to gain legitimacy and broad acceptance of their new business models among key

stakeholders (Aldrich and Fiol, 1994). As a result, we expect that B2B e-markets that are early

entrants will tend to form more alliances than later entrants.

Since the online marketplaces represent new transaction channels for buyers and sellers who

do not completely know about how these channels work, the capabilities of B2B e-market firms'

are often of concern. Firms purchasing online will tend to perceive higher procurement risks compared to the conventional procurement channels (Chircu and Kauffman, 2001). This, in turn, will affect the perceived effectiveness of B2B e-markets in facilitating markets for different procurement needs. In the presence of high channel uncertainty, firms will be more willing to use B2B e-markets for purchasing indirect products which have low strategic significance (Kauffman and Mohtadi, 2003). Concerns about *transparency* in e-markets may also make suppliers more cautious about joining (Zhu, 2002). They would like to avoid price competition.

The above studies suggest that buyers and suppliers are likely to view online markets as a riskier channel for transacting strategic products, or exchanging complex specifications and strategic information. To buyers, strategic products are those that will have direct and significant impacts on the production of their final goods and their market positions. Baily (1987) identifies five types of business purchasing requirements: merchandise for resale; parts and material for production; maintenance, repair and operating supplies; plant and equipment; services such as maintenance of equipment, and cleaning. The first two categories of products provide the basic inputs for final products. So they are strategic products. Another type of strategic product that is not included in Baily's categories is business services, including financial and marketing services that are essential for executing a company's strategies.

The key point is that most firms tend to view B2B e-markets as a riskier channel for procurement (Kauffman and Mohtadi, 2003), and may wish to avoid purchasing strategic products through online marketplaces. As a result, B2B e-market firms will face more challenges to achieve critical mass adoption when they are serving buyers and suppliers who are involved in large-scale or strategic transactions or products. When this is the case, we argue, e-market firms will have greater incentive to search for external support to signal their service

quality and firm capabilities. This will lead B2B e-markets that deliver strategic products to buyers to form more alliances than those that are involved in non-strategic products.

The competitive position of a B2B e-market firm in the marketplace is also a predictor of the formation of strategic alliances, in our view. Market followers are not as resourceful as the leaders with regard to managerial skills, and technological and financial support. They are at a disadvantage to the competition, and face higher risks of failure. To catch up with the leaders rapidly, they are more likely to leverage alliances to obtain necessary resources from partners. So B2B e-markets that are market followers ought to form more alliances than market leaders. These observations are summed up in Figure 7.

Figure 7. Player Types That Drive B2B E-Market Firm Alliance Formation
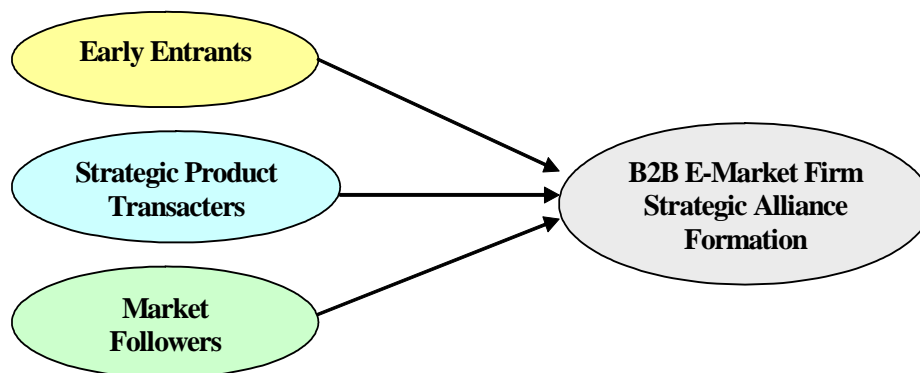
DATA COLLECTION AND VARIABLES

We next present an overview of data collection, measurement issues and description for the variables in the study that we will use to test the theory discussed earlier.

Data Collection

We collected data from Thomson Financial's (www.tfn.com) Joint Venture/Strategic Alliances database. This database provides "one-stop" information about alliances from multiple

sources, including SEC filings, trade publications and international and national newswire sources.

Data Set and Unit of Observation. For the period from January 1995 to February 2002, we retrieved 6,241 entries of alliances in which at least one participant had an e-commerce business line, or where alliances were reported in the e-commerce area. We then filtered these according to the business descriptions of partnering firms to select alliance announcements with at least one participating firm being a B2B e-market firm. We also supplemented the Thomson Financial data with Lexis-Nexis (www.lexisnexis.com) information on the same alliance announcements, and retained those data with entries in both databases. Finally, we collected 319 alliance entries, involving 193 different B2B e-market firms.

Then, we incorporated B2B e-market firms that were listed in the Forbes magazine's B2B Web site directories, but were not reported to have formed alliances, adding another 136 firms. As a result, in total, there are 329 B2B e-market firms in our data set. Among these 329 firms, just 94 were listed as "Best-of-the-Web" B2B e-markets by Forbes.   Our unit of observation is a strategic alliance event initiated by a business establishment and accompanied by an identifiable announcement or news item that describes the alliance. A business establishment can be a firm, branch or firm subsidiary.

Identification of B2B E-Market and Partner Firm Characteristics. We compiled data from various sources to identify and evaluate relevant characteristics of B2B e-markets. For publicly-traded firms, we collected data from the Mergent FIS online database (www.fisonline.com).   For privately-held firms, we used company Web sites, Lexis-Nexis, and the United States Patent and Trademark Office's Trademark Electronic Search System (tess.uspto.gov). We coded the characteristics of B2B e-markets and partnering firms.

Variables

We identified and coded a set of variables for B2B e-market firm characteristics and product

characteristics. The variable names and definitions are shown in Table 2.

Table 2. Variable Definitions

VARIABLES	DEFINITIONS
#Alliances	Total number of alliances that a B2B e-market formed during period of study, January 1995 to February 2002
MktLeader	Binary variable for market leader, based on Forbes' "Best-of-the-Web" B2B directories for 2000 and 2001 (www.forbes.com/bow/)
VerticalExch	Binary variable for B2B e-market firm serving a specific industry or a specific business function, which defines it as a "vertical exchange"
ConsortExch	Binary variable for B2B e-market sponsored by industry consortium.
EarlyEntrant	Binary variable for whether B2B e-market founded by 1998, and is an early entrant
DigitalSvcs	Binary variable for whether product transacted is digital business services or information products
MROSvcs	Binary variable for whether B2B e-market firm transacts MRO products
DirectGoods	Binary variable for whether buyers in e-market purchase raw materials, parts, and components for their manufacturing and production processes
ResaleGoods	Binary variable for whether B2B e-market has buyers who purchase goods for resale to consumers
CapitalEquip	Binary variable for firms in e-market that buy/sell capital equipment
OtherGoods	Binary variable for firms that see other goods or product types
StrategicProd	Binary variable to indicate that goods transacted are strategic products to buyers; includes business services, direct goods, or resale goods
Note: We use many binary variable codings, to indicate the presence or absence of various characteristics. The binary variable codings do not always indicate exclusive categorizations of what a B2B e-market does in its business. Instead, a firm may have a number of characteristics that are taken from among a group of variables. This permits us to include binary variables without specifying a "base case."	

Several comments on the variable definitions are appropriate. A report from Deloitte

Consulting (2000) showed that new B2B e-markets came into the marketplace gradually from

1995 to 1998, and then the number of new B2B e-markets increased rapidly in 1999 and 2000.

The Dow Jones Internet Index (www.djindexes.com/jsp/internetIndexes.jsp/) also reached a new

high at the end of 1998. So B2B e-markets that were in operation by 1998 can be viewed as

early entrants. Among the product types that we identified in the table, *MROSvcs* and

CapitalEquip are non-strategic products to buyers. In contrast, *DirectGoods*, *ResaleGoods*, and *DigitalSvcs* are strategic products because these products directly affect the product and service quality of the buyers. Therefore, we also define the binary variable, *StrategicProd*, to represent the case where goods transacted on the B2B e-market are direct goods, business services and/or resale goods.

Data Set Description

In our data set, there are 329 B2B e-market firms, among which 160 or 48.6% are market leaders that are listed in Forbes' "Best-of-the-Web" directories (www.forbes.com/bow/). The majority, 78% of the B2B e-markets, are vertical exchanges. Many B2B e-markets serve more than one product type, including business services and digital products (97 firms), direct products (161 firms), resale goods (48 firms), MRO and office supply services (45 firms) and capital equipment (24 firms).

Table 3. Distribution of Bilateral Strategic Alliances Announcements by Year

YEAR	1998	1999	2000	2001	2002	TOTAL
Number of Strategic Alliance Events	4	22	215	73	5	319

In total, we identified 319 bilateral strategic alliance events in our data set, distributed across the years 1998 to 2002, as shown in Table 3. There are 63 instances out of the total 319 alliances that involved equity investments or exclusive agreements. In 141 cases, B2B e-market firms formed alliances with Internet firms; in seven instances, they partnered with trade associations; and in the remaining 171 cases, they had conventional firms as partners. Among these 171 cases, in 15 instances, B2B e-market firms partnered with traditional intermediaries, such as distributors.

EMPIRICAL MODELS, ANALYSIS AND RESULTS

We next present three different models—an ordinary least squares model, a Poisson count data regression model and a negative binomial regression model—to analyze strategic alliance formation related to the theory we have laid out earlier in this chapter. We coded *#Alliances* as the dependent variable, and our unit of analysis is the B2B e-market firm.

An Ordinary Least Squares (OLS) Model

We first estimate an OLS model with our data as in the following equation.

$$\# Alliances = \beta_0 + \beta_1 \cdot MktLeader + \beta_2 \cdot VerticalExch + \beta_3 \cdot Strategic\Pr od + \\ \beta_4 \cdot EarlyEntrant + \beta_5 \cdot ConsortExch \tag{1}$$

The estimation results are summarized in Table 4.

Table 4. OLS Estimation Results

	OLS MODEL
VARIABLE	**Coefficient (Standard Error)**
Constant	1.117 (0.229)***
MktLeader	-0.401 (0.149)***
VerticalExch	-0.879 (0.195)***
StrategicProd	0.625 (0.243)***
EarlyEntrant	0.630 (0.157)***
ConsortExch	0.018 (0.245)
Note: Model R^2 = 11.5%. Degrees of freedom = 323. Significant at 0.01 level *** , 0.05 **, 0.1 *. Number of observations = 329.	

The OLS estimation results show a negative coefficient on the variable *MktLeader*. This indicates that market-leading B2B e-market firms tend to form fewer alliance than market followers. The positive coefficient of the variable *EarlyEntrant* tells us that the earlier a B2B e-market firm entered the marketplace, the more alliances it has tended to form. Similarly, the positive coefficient of *StrategicProd* means that B2B e-market firms for strategic products have formed more partnerships than others. Taken together, these results support our explanations of

the observed patterns of strategic alliance formation among B2B e-market firms. However, the reader should note that the OLS model estimation results assume a continuous dependent variable, which is an approximation to the bounded count data that we have in this research setting. As a result, the OLS regression is only an approximation (similar to the use of OLS to estimate continuous market shares between 0% and 100%). *#Alliances* can be thought of as a discrete count variable, with a lower bound of 0 and an upper bound of 12 in our data set. To capture this in the dependent variable, we estimate a Poisson regression model.

A Poisson Count Data Regression (PCDR) Model

In our B2B e-market context, strategic alliance announcements are events that occur discretely and infrequently, leading to a limited-dependent count variable.

Limited-Dependent Count Variables. There are numerous models that can effectively deal with limited-dependent variables (Maddala, 1983), among which the *Poisson count data regression* (**PCDR**) *model* is appropriate in situations where the dependent variable is a count or frequency of occurrence, and large counts are rare (Cameron and Trivedi, 1986; Winkelmann and Zimmermann, 1995). In our context, instances of strategic alliances can be assumed to occur independently, and the total number of strategic alliances that a firm forms indicates the combined effects of its motivation and opportunities to employ partnering strategies. As a result, it is appropriate to assume that the occurrence of discrete alliance announcement events follows a Poisson distribution, and hence the PCDR model turns to be an appropriate test approach. That is, the distribution of the number of alliances is represented as:

$$\Pr(Y = y_i) = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!}, \qquad\qquad (2)$$

where y_i is the number of alliances (*#Alliances*) that a B2B e-market firm *i* formed during the sample period.

In the above expression, λ_i generally is a *log-linear link function* of explanatory variables with $log\ \lambda_i = \beta'X_i$. X_i is the vector of explanatory variables for firm *i*'s alliance choices and the β's are the estimation parameters. In our context, we have selected explanatory variables in the vector X_i for the different characteristics of B2B e-market firms, and represent the link function in the following equation.

$$
\begin{aligned}
log\ \lambda_i = \beta_0 &+ \beta_1 \cdot MktLeader + \beta_2 \cdot VerticalExch + \beta_3 \cdot Strategic\Pr od + \\
&\beta_4 \cdot EarlyEntrant + \beta_5 \cdot ConsortExch
\end{aligned}
\tag{3}
$$

Based on the theoretical interpretation that we offered earlier, we expect to observe positive coefficients for the following explanatory variables: *EarlyEntrant* and *StrategicProd*. However, we expect to see negative coefficient for *MktLeader*.

Empirical Model Checks. We checked for problems with pairwise correlations between all the explanatory variables, none of which cross the frequently-used threshold of 0.6 suggested by Kennedy (1998). To detect multicollinearity among the explanatory variables, we also calculated variance inflation factors (**VIF**s) (Neter, Kutner, Nachstheim and Wasserman, 1996), and found that there were no VIFs in excess of 10 that would be a cause for being concerned about multicollinearity.

PCDR Results. We fit our data using the PCDR model in Equation 2 with the explanatory variables that are included in Equation 3, and summarize the results in Table 5 (the middle column). As expected, our results show positive coefficients for *StrategicProd* and *EarlyEntrant*, and a negative coefficient for *MktLeader*.

In general, Poisson regression assumes *equidispersion* (Cameron and Trivedi, 1998). This means that the conditional mean given by $E[y_i \mid X_i] = exp(\beta'X_i)$ equals the conditional variance, $Var[y_i \mid X_i]$. This assumption implies that the expected value of the event count, y_i, changes only with the explanatory variables. A failure of the assumption of equidispersion has similar qualitative consequences to a failure of the assumption of homoskedasticity in OLS regression. The standard errors of the estimated model parameters will be large so that the estimation will be inefficient. We present the results of a PCDR model that assumes equidisperson as a baseline for understanding the information that econometric analysis can provide in this context. Next we evaluate the equidispersion assumption and discuss the test results.

Table 5. Estimation Results for B2B E-Markets Strategic Alliance Formation

VARIABLE	PCDR MODEL Coeff (Std Error)	NEGATIVE BINOMIAL Coeff (Std Error)
Constant	0.020 (0.168)	0.021 (0.298)
MktLeader	-0.409 (0.115)***	-0.421 (0.135)***
VerticalExch	-0.718 (0.126)***	-0.696 (0.144)***
StrategicProd	0.512 (0.175)***	0.502 (0.304)*
EarlyEntrant	0.580 (0.114)***	0.578 (0.138)***
ConsortExch	-0.010 (0.222)	-0.021 (0.230)
α *(overdispersion parameter)*		0.333 (0.100)***
Model Fit		
Log-likelihood	-441.55	-430.16
χ^2 (degrees of freedom)	66.26 (5)***	22.78 (1)***
Note: Significant at 0.01 level ***, 0.05 **, 0.1 *. Number of observations: 329.		

A Negative Binomial Regression (NBR) Model

In evaluating the equidispersion assumption, we found evidence to suggest that the null hypothesis of equidispersion, $Var[y_i] = \lambda_i$, fails to hold for our data.

Diagnosing the Equidispersion Problem. To make this check, we conducted the regression-based test on over-dispersion as discussed by Cameron and Trivedi (1990). The test

evaluates two alternative hypotheses: H_0: $Var[y_i] = \lambda_i$ and H_1: $Var[y_i] = \lambda_i + \alpha\,g(\lambda_i)$. Under

equidispersion, $\{y - E[y]\}^2 - E[y]$, should have a mean value of zero, and hence the coefficient α

should be zero in $\alpha g(\lambda_i)$. In our context, we used λ_i^2 for $g(\lambda_i)$, and found that the coefficient α is

significantly different from 0 by our estimates, which rejects the equidispersion hypothesis. (See

Table 5, right column. The estimated value of $\alpha = 0.333$, with standard error = 0.100, significant

at the .01 level.)

NBR Model Results. To account for the *overdispersion*, we estimated a negative binomial

regression (**NBR**) model which incorporates the possibility of error term heterogeneity into the

PCDR model (Greene, 2000). The maximum likelihood estimation results of the NBR model are

reported in the right column in Table 5. The χ^2 for the Poisson model shows the difference of

the log-likelihood of the estimated model and the model with only the intercept. The χ^2 of the

NBR model is based on the difference of the log likelihood of it and the PCDR model. It tells us

that the former is an improvement over the latter. As a result, we can use the NBR model

estimates to explain the effects of the explanatory variables. The reader should compare the

PCDR and NBR results (i.e., the middle column results with the right column results). We note

that although we rejected the equidispersion hypothesis, the NBR model results do not greatly

differ in the signs of their effects or their absolute magnitudes. In particular, the negative

coefficient on the *MktLeader* variable is retained, as are the positive coefficients on the

StrategicProd and *EarlyEntrant* variables.

The NBR model estimation results show that *EarlyEntrant* (0.578, std. error = 0.138,

$p < 0.001$) has a significant positive association with the number of alliances that B2B e-markets

form. This supports our claim that B2B e-markets that were founded in the early years of e-

commerce era have tended to form more partnerships than later entrants. Apparently first

movers in this marketplace may have more motivation to seek partnerships or greater capabilities to attract other firms to form strategic alliances. The coefficient on *StrategicProd* (0.502, std. error = 0.304, $p < 0.1$) is also positive and weakly significant. This is consistent with the prediction of the theory we cited earlier: B2B e-markets that trade strategic products are more likely to employ alliances. Finally, based on our estimate of the *MktLeader* variable in the NBR model, with a significant negative coefficient (-0.421, std. error = 0.135, $p < 0.001$), we see that market leaders are observed to have fewer strategic alliances than market followers.

In order to further understand the patterns of alliance formation by B2B e-market firms, we next include in the negative binomial model the variables for the product characteristics that B2B e-market firms trade. The estimation results are summarized in Table 6. The middle column repeats the results in the third column of Table 5, and the third column shows the results with the five different product types.

Table 6. Estimation Results with Different Product Types

VARIABLE	NEGATIVE BINOMIAL I Coeff (Std Error)	NEGATIVE BINOMIAL II Coeff (Std Error)
Constant	0.021 (0.298)	-0.011 (0.257)
MktLeader	-0.421 (0.135)***	-0.400 (0.156)***
VerticalExch	-0.696 (0.144)***	-0.707 (0.166)***
StrategicProd	0.502 (0.304)*	
EarlyEntrant	0.578 (0.138)***	0.593 (0.140)***
ConsortExch	-0.021 (0.230)	-0.057 (0.229)
DirectGoods		0.514 (0.201)***
ResaleGoods		0.500 (0.254)**
DigitalSvcs		0.488 (0.208)**
CapitalEquip		-0.030 (0.232)
MROSvcs		-0.078 (0.263)
Log-likelihood	-430.16	-427.22
Note: Significant at 0.01 level ***, 0.05 **, 0.1 *. Number of observations: 329.		

With these five variables for product types included instead of the binary variable *StrategicProd*, our results show that the effects of other variables in the model have little change.

Among the five variables representing the five product types, *DirectGoods*, *ResaleGoods* and *DigitalSvcs* have significant positive associations with *#Alliances*, while *CapitalEquip* and *MROSvcs* has a very weak negative association. This indicates that B2B e-market firms which trade direct goods, resale goods, or business services tend to form more alliances. Meanwhile, our results are inconclusive as to whether B2B e-market firms for capital equipment and MRO products and services are less likely to enter into partnerships.

Discussion

Primary Managerial Insights. Our empirical investigation of the partnerships that B2B e-markets have formed offers insights about the formation of B2B e-market alliances, and the analysis results from the OLS, PCDR and NBR models support our argument that B2B e-market firms form partnerships to reduce the risks of failure. We find that early entrants and market followers in the arena of B2B e-markets tend to use partnerships more frequently than later entrants and market leaders. Also, B2B e-markets that transact strategic products employ alliances more frequently than those for non-strategic products. Apparently B2B e-market firms look for partnerships when they believe they are facing higher risks.

Our results raise an interesting point regarding how different types of B2B e-market firms use partnerships. Vertical e-markets tend to have fewer alliances, as indicated by the estimated negative coefficient of *VerticalExch* (-0.696, std. error = 0.144, $p < 0.001$). Our tentative explanation is that vertical e-markets are focused on specific industries, and thus, they have a more restricted scope for developing cooperation and partnerships. Another reason may be that vertical exchanges perform in a more predicable environment than horizontal exchanges-- their market niches involve somewhat less risk because they are more narrowly defined. Specifically, to the extent that industry-specific exchanges accumulate their knowledge about this industry,

they are better able to handle the market uncertainty, and so they have a diminished need for external resources.

We also note that industry-consortium sponsored B2B e-markets do not perform differently from other third-party operated firms in the formation of alliances since the coefficient of variable *ConsortExch* is insignificant in all the above models. These firms entered the marketplace later, because they were established after their founding firms had observed the operation of other B2B e-markets. In addition, they are often perceived to be market leaders since they are backed up by influential firms in particular industries with financial resources and managerial skills. These two characteristics indicate that industry-consortium sponsored B2B e-market firms probably faced lower risks than their counterparts that are operated by third-party firms. As a result, our logic tells us that they ought to form fewer alliances. But we observed no strong effect for *ConsortExch*, positive or negative. An appropriate next step is to look into the alliance strategies of industry consortium-sponsored B2B e-market firms, to gain a better modeling understanding.

Secondary Managerial Insights. Our study brings three managerial issues into focus. First, strategic alliances appear to impact the evolution and adaptation of B2B e-market firms. Through their alliances, B2B e-markets have the capability to change their strategic direction and reposition themselves to meet market demand. For example, in the healthcare industry, Neoforma (www.neoforma.com) started as a neutral B2B electronic market to offer public exchanges. Later on, it re-positioned itself to provide platforms for private exchanges. This strategic redirection was completed through an alliance with Novation (www.novationco.com) that is a purchasing organization and offers an industry-wide e-market. See Figure 8.

Figure 8. An Alliance-Based Repositioning Strategy Involving Neoforma and Novation
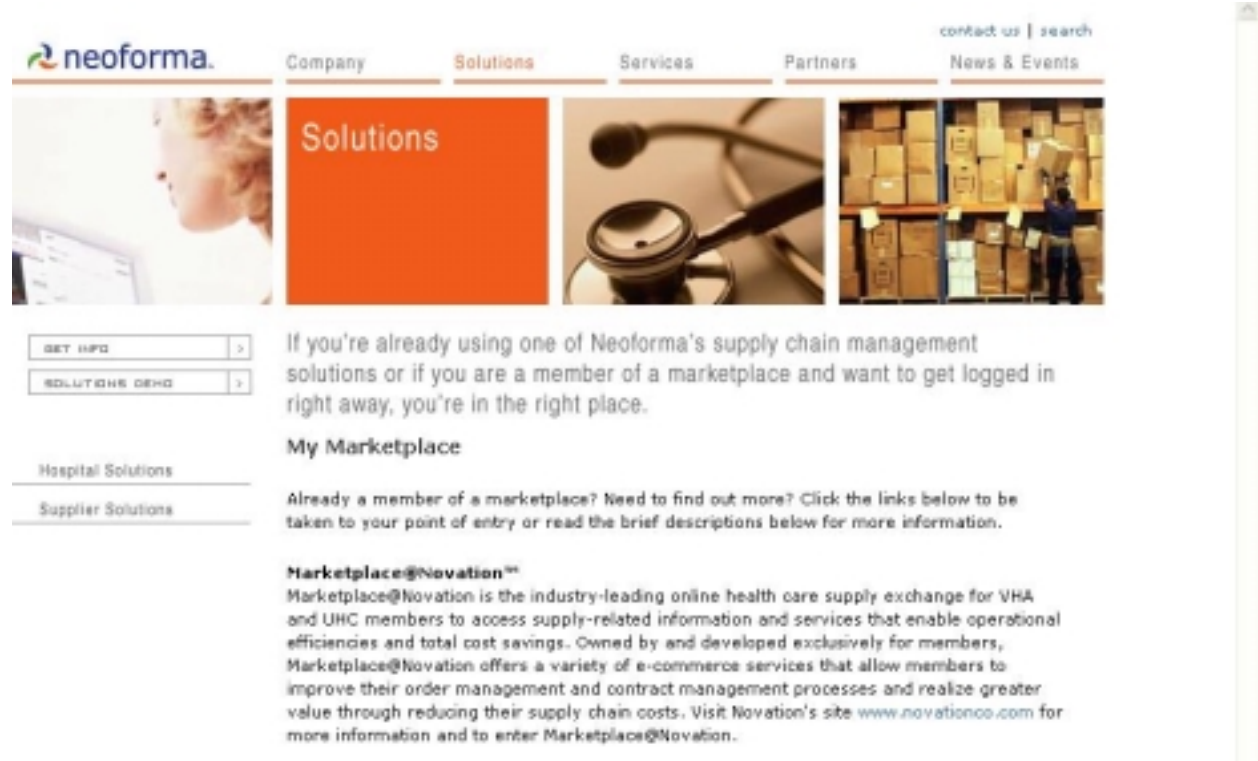
Source: www.neoforma.com/corp/solutions/my_marketplace.html. Accessed November 13, 2003.

Second, alliances offer incumbent firms opportunities to enter into B2B procurement services arena by taking a "short-cut." They face the usual difficulties that startups face, especially the lack of knowledge about the technologies and market. Through strategic alliances, they can get access to the technology skills and organizational assets with far less effort, and without repeating the mistakes that pioneer firms typically make. Strategic alliances, at the same time, enable incumbent firms to learn about new technology and new business practices from the startups. They also create real options to acquire their startup partners, if the joint ventures surpass financial expectations (Kogut, 1991). For example, during 2000, the enterprise software provider, SAP (www.sap.com), allied with Commerce One (www.commerceone.com), a B2B e-markets systems solutions startup, to co-develop and co-market a comprehensive software suite

for e-procurement business process automation (Boudette, 2000). One year later, SAP exercised

this real option to increase its commitment to this relationship and completed an acquisition of

Commerce One (Boudette, 2001).

The third issue is related to the inter-firm relationships and ownerships that these alliances

impact. When B2B e-market firms partner with buyers and suppliers to overcome adoption

inertia, they typically include buyers and suppliers of their online marketplaces in sharing the IT

investments, the gains, and the responsibility for decisionmaking about market functionality and

operating policies. In some cases, these partnerships may involve rivals in their particular

product markets. So it is important to investigate how B2B e-market firms structure alliances

and balance power among partners to obtain effective results from these partnerships.

Limitations and Future Directions

Limitations of the Data Set. In our data set, some B2B e-market firms were able to go

public and, as a result, achieved more visibility and access to funds than other firms. This may

affect their opportunities in forming alliances, and even their performance. In future research,

we plan to look more closely at whether publicly-held and privately-held B2B e-market firms

exhibit different strategic alliance patterns. Another factor that may influence the performance

of B2B e-market firms is the venture funds that they were able to obtain from the capital market.

In future research, we will try to control for the effects of more abundant and more limited

venture capital funding. Due to limitations on the availability of data, we were not able to

explore the financial performance of B2B e-markets. Most of them are privately-held, and so

data about financial performance, such as annual revenues or sales, are not available.

Future Research Directions. The results of this study open some other avenues for future

research as well. First, since alliances help reduces risks of failure, forming alliances should tend

to improve the performance of B2B e-market firms. In a market that has experienced a shakeout, an examination of the effects of alliance formation on firm performance, and particularly the viability of B2B e-market firms, will provide rich knowledge about what worked and what did not. Second, the results of our study may be applicable in other industrial sectors where interorganizational linkages and cooperation play an important role in alleviating market and technology risks. One such sector is digital mobile phone technology and services industry, which is greatly affected by network effects and has seen high growth.

Third, we have ignored the differences among strategic alliances and focused entirely on the total number of alliances. Clearly, not all B2B e-market strategic alliances were created equal. The heterogeneous risks that B2B e-market firms face originated from various sources, so their partnerships were built for various purposes. Some alliances were formed for co-marketing; others were developed to build new business functionality. It would be interesting to conduct a more refined study of the formation and effects of the different kinds of alliances by B2B e-market firms. In addition, our analysis is based on firm-level data that is aggregated over the whole period of time of the study. We may be able to create additional insights about B2B e-markets' alliance strategies if we were able to disaggregate the data over time and study the path-dependent changes of alliances.

CONTRIBUTIONS

B2B e-market firms have competed in the past several years in a rapidly changing market, where demand is uncertain and the technology continues to evolve. The nature of their services as trading and exchange networks has created unique challenges for them to achieve acceptance in their industry marketplaces. To cope with the various risks of failure, B2B e-market firms have sought allies that can provide complementary resources to perfect their business processes

and core functionality, boost their market reputation and add flexibility in product innovation. Our research presents preliminary empirical evidence for the employment of strategic alliances as a risk-reducing strategy. We find that the more risks they face, the more alliances that B2B e-market firms form. We characterize this overall strategy as one of "partnering for perfection" in business process capabilities.

This study contributes to the literature in electronic markets through an empirical investigation of the strategies of B2B e-market firms, by revealing how they employ cooperative approaches. This work also adds to what we know about alliance strategy formation by examining relevant theories in the context of emerging and dynamic B2B e-markets. The main message of our study is that alliances help reduce risks. So firms will be more likely to seek partnerships when the market and the technology risks they face are higher. This research will form an important basis for future research that aims to provide deeper insights on the efficacy of industrial practices in assessing the value of alliance strategies under various business conditions.

REFERENCES

Aaker, D. A. and Day, G. S. "The Perils of High-Growth Markets," Strategic Management Journal (7:5), September-October 1986, 409-421.

Ahuja, G. "The Duality of Collaboration: Inducements and Opportunities in the Formation of Interfirm Linkages," Strategic Management Journal (21:3), March 2000, 317-343.

Aldrich, H. E., and Fiol, C. M. "Fools Rush In? The Institutional Context of Industry Creation," Academy of Management Review (19:4), October 1994, 645-670.

Baily, P. Purchasing and Supply Management. Chapman and Hall Ltd., London, UK, 1987.

Bakos, J. Y. "The Emerging Role of Electronic Marketplaces on the Internet," Communications of the ACM (41: 8), August 1998, 35-42.

Bakos, J. Y., and Nault, B. "Ownership and Investment in Electronic Networks," Information Systems Research. (8:4), December 1997, 321-341.

Bamberger, G. E., Carlton, D. W., and Neumann, L. R. "An Empirical Investigation of the Competitive Effects of Domestic Airline Alliances," Working Paper, Graduate School of Business, University of Chicago, Chicago, IL, 2001.

Baum, J. A. C., Calabrese, T., and Silverman, B. S. "Don't Go It Alone: Alliance Network Composition and Performance in Canadian Biotechnology," Strategic Management Journal (21:3), March 2000, 267-294.

Boudette, N. E. "Germany's SAP, Commerce One Rekindle Ties," Wall Street Journal, June 15, 2000, pg.B8.

Boudette, N. E. "E-Business: SAP Boosts Commerce One Stake," Wall Street Journal, July 2, 2001, pg.B8.

BuyerZone.com. "BuyerZone.com Announces Strategic Alliances with America Online," February 18, 2000. Available at http://www.buyerzone.com/corporate/about_buyerzone/pr021800.html.

Cameron, A. C., and Trivedi, P. K. "Econometric Models Based on Count Data: Comparisons and Applications of Some Estimators and Tests," Journal of Applied Econometrics (1:1), January 1986, 29-54.

Cameron, A. C., and Trivedi, P. K. "Regression-Based Tests for Overdispersion in the Poisson Model," Journal of Econometrics (46:3), December 1990, 347-364.

Cameron, A. C., and Trivedi, P. K. Regression Analysis of Count Data, Econometric Society Monograph No.30, Cambridge, UK: Cambridge University Press, 1998.

Chan, S. H., Kensinger, J. and Keown, A. "Do Strategic Alliances Create Value?" Journal of Financial Economics (46:2), November 1997, 199-221.

Chan, S. H., Kensinger, J., Keown, J., and Martin, J. "When Do Strategic Alliances Create Value?" Journal of Applied Corporate Finance, (11:4) Winter 1999, 82-87.

Chircu, A. M., and Kauffman, R. J. "Intermediation in Electronic Markets: An Analytical Model," in Proceedings of the 2001 Workshop on Digitisation of Commerce: E-Intermediation, International Institute on Infonomics / Maastricht Economic Research Institute on Innovation and Technology, Maastricht, Netherlands, November 2001.

Dai, Q. and Kauffman, R.J. "Business Models for Internet Based Procurement Systems and B2B Electronic Markets," International Journal of Electronic Commerce (6:4), Summer 2002, 41-72.

Day, G. S., Fein, A. J., and Ruppersberger, G. "Shakeouts in Digital Markets: Lessons from B2B Exchanges," California Management Review (45:2), Winter 2003, 131-151.

Deloitte Consulting. "The Future of B2B: A New Genesis," 2000. Available on the Internet at www.dc.com/pdf/b2b_genesis.pdf.

eChemPeople. "ChemCross and CheMatch Form Strategic Alliance," February 20, 2001. Available on the Internet at www.echempeople.com/News/Feb_news.htm.

Ernst, D., Halevy, T., Monier, J., and Sarrazin, H. "A Future for E-Alliances," McKinsey Quarterly (2), 2001, 92-102.

Farrell, J., and Saloner, G. "Converters, Compatibility, and the Control of Interfaces," Journal of Industrial Economics (40:1), March 1992, 9-35.

Faulkner, D., and de Rond, M. (Eds.). Cooperative Strategy: Economic, Business and Organizational Issues, Oxford University Press: Cambridge, UK, 2000.

Greene, W. Econometric Analysis, Fourth Edition, Prentice Hall, Englewood Cliffs, NJ, 2000.

Hagedoorn, J. "Understanding the Rationale of Strategic Technology Partnering: Interorganizational Modes of Cooperation and Sectoral Differences," Strategic Management Journal (14:5), July 1993, 371-385.

Hagedoorn, J. and Schakenraad, J. "Interfirm Partnerships and Cooperative Strategies in Core Technologies," in C. Freeman and L. Soete (Eds.), New Explorations in the Economics of Technical Change, Pinter, London, UK, 1990, 3-37.

Kambil, A., Nunes, P. F., and Wilson, D. "Transforming the Marketplace with All-in-One Markets," International Journal of Electronic Commerce (3:4), Summer 1999, 11-28.

Katz, M. L.; and Shapiro, C. "System Competition and Network Effects," Journal of Economic Perspectives (8:2), Spring 1994, 93-115.

Kauffman, R. J. and Mohtadi, H. "Proprietary and Open Systems Adoption: A Risk-Augmented Transactions Cost Perspective," Working Paper, MIS Research Center, Carlson School of Management, University of Minnesota, Minneapolis, MN, November 2003.

Kennedy, P. A. Guide to Econometrics, 4th edition, MIT Press, Cambridge, MA, 1998.

Kirma, A., and Rao, A. R. "No Pain, No Gain: A Critical Review of the Literature on Signaling Unobservable Product Quality," Journal of Marketing Research (64:2), April 2000, 66-79.

Lenz, M., Zimmermann, H-D., and Heitmann, M. "Strategic Partnerships and Competitiveness of Business-to-Business E-Marketplaces: Preliminary Evidence from Europe," Electronic Markets (12:2), Spring 2002, 100-111.

Lerner, J., and Merges, R. P. "The Control of Strategic Alliances: An Empirical Analysis of Biotechnology Collaborations," Working Paper #6014, National Bureau of Economic Research, Cambridge, MA, 1997.

Lorange, P. and Roos, J. Strategic Alliances, Blackwell Publishers, Cambridge, MA, 1992.

Maddala, G. S. Limited-Dependent and Qualitative Variables in Econometrics, Cambridge University Press, Cambridge, UK, 1983.

Mody, A. "Learning from Alliances," Journal of Economic Behavior and Organization, (20:2), February 1993, 151-170.

Neter, J., Kutner, H. M., Nachtsheim, C., and Wasserman, W. Applied Linear Regression Models, 3rd Edition, McGraw Hill, New York, NY, 1996.

Nicholson, S., Danzon, P. M., and McCollough, J. "Biotech-Pharmaceutical Alliances As a Signal of Asset and Firm Quality," Working Paper #W9007, National Bureau of Economic Research, Cambridge, MA, 2002.

PR Web. "Byers Engineering Company and BandWidth.com Announce Launch of New Telecommunications Carrier-to-Carrier," PR Web, Ferndale, WA, February 7, 2000. Available on the Internet at www.prweb.com/releases/2000/2/prweb11831.php.

Rajgopal, S., Venkatachalam, M., and Kotha, S. "Managerial Actions, Stock Returns, and Earnings: The Case of Business-to-Business Internet Firms," Journal of Accounting Research (40:2), May 2002, 529-557.

Rao, A. R., Qu, L., and Ruekert, R. W. "Signaling Unobservable Product Quality Through a Brand Ally," Journal of Marketing Research, (36:2), May 1999, 258-268.

Rao, A. R. and Ruekert, R.W. "Brand Alliances As Signals of Product Quality," Sloan Management Review, (36:1), Fall 1994, 87-97.

Roberts, E. B., and Liu, W. K. "Ally or Acquire? How Technology Leaders Decide," Sloan Management Review (43:1), Fall 2001, 26-34.

Segil, L. "Fast Alliances are the Keys to Dot-Com Success," Journal for Quality and Participation (23:4), Fall 2000, 40-42.

Shapiro, C., and Varian, H. Information Rules: A Strategic Guide to the Network Economy, Harvard University Press, Cambridge, MA, 1999.

Shepherd, D. A., Douglas, E. J., and Shanley, M. "New Venture Survival: Ignorance, External Shocks, and Risk Reduction Strategies," Journal of Business Venturing (15:5/6), September-November 2000, 393-410.

Stinchcombe, A. L. "Social Structure and Organizations," in J. March (Ed.) Handbook of Organizations, Rand McNally and Company, Chicago, IL, 1965.

Stuart, T. E., Hoang, H., and Hybels, R. C. "Interorganizational Endorsement and the Performance of Entrpreneurial Ventures," Administrative Science Quarterly (44:2), June 1999, 315-349.

Stuart, T. E. "Interorganizational Alliances and the Performance of Firms: A Study of Growth and Innovation Rates in a High Technology Industry," Strategic Management Journal (21:8), August 2000, 791-811.

Teece, D. J. "Competition, Cooperation, and Innovation," Journal of Economic Behavior and Organization (18:1) June 1992, 1-25.

Truman, G. E. "An Empirical Appraisal of EDI Implementation Strategies," International Journal of Electronic Commerce (2:4), Summer 1998, 43-70.

Williamson, O.E. "Transaction Cost Economics," Chapter 3 in R. Schmalensee and R. Willig (Eds.), The Handbook of Industrial Organization, North-Holland, Amsterdam, Netherlands, 1989.

Winkelmann, R. and Zimmermann, K. F. "Recent Developments in Count Data Modeling: Theory and Application," Journal of Economic Surveys (9:1), March 1995, 1-24.

Zhu, K. "Information Transparency in Electronic Marketplaces: Why Data Transparency May Hinder the Adoption of B2B Exchanges," Electronic Markets (12:2), Spring 2002, 92-99.