

# A Study of Firm's Behavior in The B2B E-business Regime

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## **Abstract**

The economic essence of Internet-based B2B business has become an ever-important market concern after the dot-com mania collapsed in early 2001. Many theories have been developed to understand this new business pattern. Nevertheless, lots of puzzles remained unsolved. So far, even whether B2B e-business is a temporary phenomenon; or is it just the extension of the old VAN-EDI system is still under debate. This research tries to answer some of the most fundamental questions of why and how companies adopt e-business application by studying the e-business fast mover's behaviors in the following three domains: the initiative for firm to adopt e-business, the business model and strategy developed to leverage Internet-based network system, and the barriers to implementing e-business practice.

(1) The initiative for firm to adopt B2B e-business: the improvement of economic efficiency is used to measure firm's incentive in adopting E-business. Internet-based business tends to reduce production and distribution cost; and increases market transparency. It is argued that benefits from lowered cost are offset by buyer's higher bargaining power. Nevertheless, study shows that market power is critical as advanced computation capacity improves firm's ability to detect buyer's behavior, firms with larger market power have access to better quality data and gain substantial edge over smaller competitors.

(2) The business models and strategy developed by firms to leverage e-business: Strategies of existing large firms are to pay their suppliers to link to their system in order to leverage the reduced production cost. They can, however, increase revenue by improving IT-based marketing and service quality. Small firm's strategy is to link their system with large firm's interface to gain competitive advantage over rivals. Start-up's strategy has been to reinforcing network externality to gain market share as markups are thin. The new trend for strat-ups will be to differentiate their functionability and create new value-added for production firms.

(3) The barriers for firms to adopt e-business: In the industry level, major barriers including fragmented market structure, unstandardized product and production process. In the firm level, the major barriers including organization and culture restructuring, interoperability between e-business application and with legacy system, lack of qualified personnel and knowledge, and the interoperability with complementary companies.

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# Chapter 1 Research Introduction

## 1.1 Research Background and Purpose

During the past few years, numerous discussions about B2B e-business models and strategies have been raised. Most of them are based on rather generic approaches, looking at the new business pattern case by case, and analyzing the pros and cons of individual firm's behavior. This approach seems to make sense in a new market filled with huge uncertainties. They are also researchers looking at e-business in a more aggregative way, studying the variety of e-business models and the strategic issues been raised. This approach also provides value for providing firms with a comparable benchmark. In a market where the pace of development has been foggy and the future remain unforeseeable; it's essentially very difficult to define a tedious matrix to evaluate firms' behavior, or for firms to develop their e-business strategy. So far, it is observed that, even the perspective of viewing B2B e-business contains huge variation. While some think of B2B e-business as a high-level information revolution that will ultimately reshape the overall business process and business relationship; some people view e-business as a way to promote operation outsourcing and organization redesign; and there are also people who think of the application of B2B e-business as simply a catalyst that will lead to a more condensed integration of the value chain. Different perspectives provide different way to decompose e-business but most of them are loosely correlated and hard to integrated. When companies have inadequate information about their positioning in the e-business regime, it becomes rather hard for them to develop corresponding strategies.

Actually, even the concept that B2B e-business is a new business pattern is in itself arguable. It is known that, corporate EDI-VAN system, as a predecessor of Internet-based e-business, has been existed for decades. Since the network system may essentially not a new idea, people initially thought of the new system as a bigger old one. However, due to the different characteristics between Internet and VAN, people's perception of e-businesses changed over time. For example, e-business has not only made that market more transparent and removed the demographic barrier between businesses; it has

generated more profound impacts over firm's organization, economy, and strategy than the old EDI-VAN system. It is perceived that there should be some new concept embedded in this business pattern. But as the system was removed from the old equilibrium, it is always hard for people to figure out the new equilibrium point.

The above phenomena have therefore raised two issues that may brought to our attention:

(1) There is a need to identify the incentives, barriers, or constraints for firms to conduct e-business practice, and for investors to evaluate the feasibility of firm's strategy. (2)

There will be benefits for new entrants to borrow some concepts from e-business savvy firms (especially large existing companies and Internet start-ups). In order to meet the two goals, this study will be focus on analyzing firm's behavior in the e-business regime. Though the rationale behind the research seems to be rather straight forward, many issues have to be covered in order to forge a comprehensive view. Following are the issues that will be discussed in this research:

(1) Why firms need to adopt B2B e-business, what's the benefit?

This is more from the economic perspective to see the value that will be generated from implementing B2B e-business. This "driving force" analysis helps to clarify whether B2B e-business is a sustainable mechanism or just a temporary phenomenon.

(2) The barriers for firms to enter B2B e-business.

There are various barriers for firms to adopt B2B e-business. These barriers include endogenous factors (i.e., organization, culture and interoperability); and exogenous factors (i.e., product compatibility, market structure, competitive advantage). Barriers create damping effect to the adoption of e-business and the potential to distort the pace of evolution; a phenomenon that has been observed for B2B e-business development in different industries.

(3) The impact of B2B e-business application for different types of firms



Different types of firms bear different types of impacts from B2B e-business. Normally companies can be classified by numerous attributes. In this study, the following two types of classification are used: (a) market power: large companies, small and medium enterprises (SME), intermediaries, and start-ups; (b) business relationship: buyers and sellers. While the attribute of market power indicates the horizontal market competition; business relationship demonstrates the dynamics of vertical business link. The two attributes efficiently weave together firm's position in e-business market and provide a foundation to evaluate the change of value chain after e-business is involved.

#### (4) E-Business model analysis:

Firms' behavior can be demonstrated by their static business model and dynamic strategy (It's notable that these two things are dynamically correlated). Business models study is among the core of e-business researches for the past few years. Business model demonstrates dot-com's position in the value chain and the associated mechanism to generate cash flow, information and business relationship. The study of e-business model helps to verify the new value induced by B2B and the new relationship created by Internet. As operations of companies are getting more and more inter-correlated along the value chain, this analysis helps to verify how the value and market power along the value chain is shifting.

#### (5) E-business strategy analysis

E-business strategy is another critical topic for B2B e-business researchers. It is known that, in the early stage of Internet-based B2B e-business, different hypotheses and e-principles have been promoted; none of them could be proved since the thing was new. And eventually this led to a rather distorted market. Study the e-business strategy helps to remove the irrational noise in the distort market and provide a better understanding of further B2B development.

It is notable that, none of concepts in the above topics can be viewed independently. All of the concepts are highly correlated and when applied, should be taken into account as a whole. Nevertheless, in this study, e-business model and e-strategy will stand in the core as these two attributes provide critical implications to measure the change. The analysis of company's e-business model, for example, can essentially provide the insight to track a company's e-business strategy. And the strategy will further change company's e-business model. A small system dynamic causal loop diagram is applied to demonstrate the dynamic mechanism in Chapter 4.

Even in the early stage of this study, it has been clear that there is no single view angle that can overview the whole issue and also, there will be no single answer or matrix to fit the use of companies in different industries and in different parts of the value chain. Actually, the fact that it is hard to generate a standard solution may imply that there may not exist such absolute solutions. Nevertheless, this study will still provide a clearer picture of the complicated e-business development trend.

## **1.2 Problem Definition**

The purpose of this research is to study the dynamics in the B2B e-business market. E-business market, as is rather loosely defined, contains a variety of topics that may seem all related to our study. In order to hedge the risk of go into details of all those issues and lose the focus of our picture, the boundary of the research has to be first defined. Also, in order to make the research concepts consistent, the terminologies should be identified. Some important issues are clarified as following:

(1) Study the B2B supply chain, will not include B2C

There is a need to distinguish B2B from B2C, and to tell the difference of e-commerce to e-business. The e-commerce phase focuses on consumer applications that allow transactions and interaction between the company and the consumer. The initiatives in

the e-business phase, on the other hand, have focused on business-to-business applications that allow transactions and integration between the company and its business customers and partners. For B2C, most successful transaction-based ventures have been playing the business model as pure Web-based business designed specifically for selling to customers online. As for B2B, most successful ventures have been those established bricks and mortar companies seeking process improvement.

It is very common to see Internet reports discuss online business without distinguishing B2B e-business from B2C e-commerce. It is true that some of the Internet effects are common in both markets, but there are essentially some differences between the two. For example, network effect may seem vital for B2C companies, but the meaning of network externality may be different for different B2B sectors. While network effect may be crucial for online exchange; it may be less important for collaborative design and service companies. B2C also lacks the depth of B2B in terms of process complexity. For example, multiple-to-multiple virtual markets, procurement and resource management, extended value chain and customer relationship management (CRM) applications are frequently applied categories in e-business.

In this research, different characteristics between B2B and B2C will be slightly compared. Although B2B and B2C merge together at the end of the value chain, the focus of this study will remain on B2B sectors and will not engage in the B2C sectors. It is also important to notice that, some of the concepts derived from the B2B market cannot be quoted for use in the B2C market.

## (2) B2B users, not Internet infrastructure provider

The confusion between Internet business, dot-coms and e-business is very common. As a matter of fact, people always mix these three terminologies together and consider them the same thing. So when people talk about the blast of e-business bubbles on March 2001, they are actually referring to the collapse of Hi-tech heavy Nasdaq Composite Index. Though dot-coms presented a certain percentage of Nasdaq, it is not the bull of

dot-coms that pulled down the whole market. In fact, both dot-coms and other hi-tech companies suffered in the bull market but the reasons are different. While dot-coms' bust is a result of their inability to profitability; hi-tech stocks collapsed as a result of industry's over-investment in information technology infrastructure starting from late 90's. The only relationship between the two is that the bust of dot-coms also adds a force to the downturn of hi-tech firms. Another confusing thought is in the e-business domain. People have been talking about the death of e-business. However, it is the poor B2C retailers and B2B online exchanges who filed for bankruptcy. For the B2B e-business as a whole, the market is still evolving. And most existing large companies are still investing in developing more sophisticated B2B transaction platform. And many small companies have explored new niche markets in the new business territory.

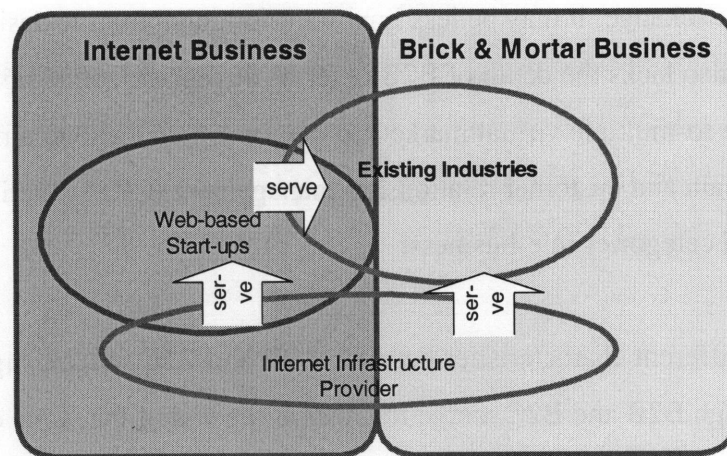


Fig 1-1 Businesses in different domain

The idea of businesses in different domain is presented in Fig 1-1. Internet infrastructure providers, existing industries, and web-based dot-comes (start-ups) are all subsets of the two major business domain: Brick and mortar business; and Internet business. The purpose of this research is confined to study the behavior of web-based start-ups and existing industries who involved in B2B e-business. Nevertheless, Internet infrastructure providers also stand for an exogenous factor to our system as thy released the technology constrain and enabled the development of e-business practice.

### 1.3 Research Framework

The framework of the research can be divided into the following five layers (see Fig 1-2): (1) the general economic impact, (2) industry level factors, (3) company level factors, (4) e-business model and e-business strategy, and (5) industry study. This thesis is structured in this framework in order to decompose the complicated factors that affect the way companies executing e-business.

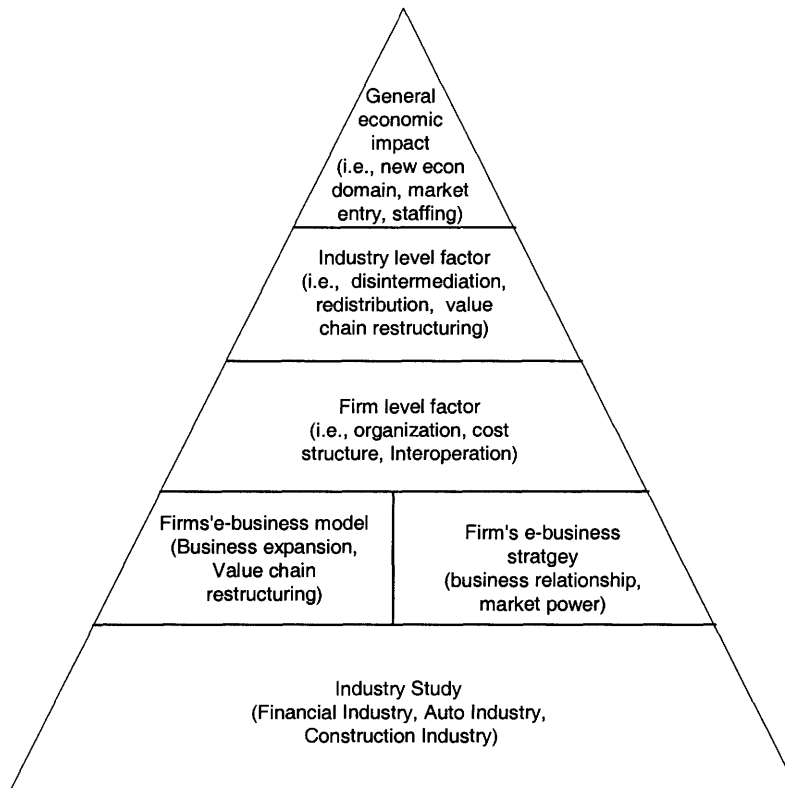


Fig 1-2 Research framework

### (1) General economic impact

The general economic impact includes the analysis of e-business's influence over economic domain, market entry, market transparency, brand, pricing and staffing.

### (2) Industry level factor

B2B's economic impact in the industry level contains a broader discussion of the change of value chain as well as other issues regarding cost restructuring, disintermediation, and redistribution.

### (3) Firm level factor

B2B's economic impact over firm can be divided into two parts: (a) the incentive: including the improved cost structure, better quality control, lowered inventory, and more efficient advertising; and (b) the barrier: organization reengineering, the standardization and compatibility of interoperation with e-business.

### (4) E-business model, and e-strategy

This level contains two topics: e-business model analysis and e-strategy analysis. In this part, we need to separate the analysis into two types of firms: dot-coms and established brick and mortar companies. The reason why we distinguish dot-com from existing companies in this topic is because we found the behavior of establishing brick and mortar companies and dot-coms are very different. Existing firms already have a position in the value chain so all their business restructuring have to expand from the current position. It is quite reasonable that, in the early stage of Internet-based e-business, existing companies' priority would be more to use e-business as a mean to streamline current business process rather than to repositioning themselves in the value chain.

E-business model has always been the most critical issue for dot-coms because basically they have to position themselves in the value chain when entering the market, and the positions actually determine everything they will be doing. This is comparable to the concept of positioning in the real estate market. Once dot-com's e-business model is confirmed, their business scope, information flow, cash flow and business relationship also fixed. The following strategy, just like the existing companies, will have to be evolved from the current position. The discussion of dot-

coms' e-business model encompasses issues regarding the evolution of e-business model, the pros and cons of different e-business model, and the dynamic of e-business model expansion.

In the e-strategy section, we will address both the establishing companies' e-strategy and dot-coms' e-strategy. It is notable that the strategic concerns of dot-coms and existing brick and mortar companies are different. Therefore, it's essential to separate the two types of firms for more precise analysis.

#### (5) Industry study

Industry study is an analysis of B2B's development in three different industries: the financial industry, the auto industry and the construction industry. The three industry can be differentiated by two factors associated with our study: (a) product: standardization and compatibility, and (2) market power: large companies vs. SMEs. In terms of product characteristics, while the products in the financial are almost all digitalized and contains the potential for syndication; the product information in the auto industries are also standardized and web-compatible; and the product information for the construction industry are most all un-standardized and discrete. In terms of market power, while the auto industry has a rather high market concentration, the finance and construction industry has rather fragmental market structure. Observing the dynamics of e-business in these three industries can help to verify the concepts we derive from the previous chapters.

The discussions about the three levels of economic impact are covered in Chapter 2 with a purpose to forge a basic understanding of the endogenous and exogenous factors confronting e-business companies. The following chapters regarding e-business model and strategy analyses will go into detail of how these factors affect firm's business development in the real world. The last chapter, industry study, will provide a valid test machine to verify the conceptual ideas we discussed in the prior chapters.

## **Chapter 2 B2B E-business and Economic Efficiency**

Rapid technological progresses have resulted in the quick and widespread diffusion of Internet business. The development of technology was once considered the guideline that would shape the new business pattern. However, it is gradually recognized that, technology, as a catalyst of the current business evolution, is actually not the sore factor that gears up the pace of change. The economic efficiency induced by e-business application is essentially the core driving force that draws the development of Internet business.

Business development with no economic efficiency improvement provides no value for business participators. Under this condition, there will be no incentive for change. It is therefore important to understand the economic efficiency introduced by Internet business as it helps to map up the development of e-business. This chapter first looks at the development of B2B e-business. Then we will look at the economic effect of Internet business: what economic rationale drives e-business to thrive and how e-business affects economic efficiency. The last part of this chapter will look at the barriers for company to implement e-business practice. The information of the economic effect along with the barriers of entry will be used to construct a matrix that will be used to measure the direction of B2B e-business evolution for sectors in different parts of different industrial value chains.

### **2.1 The Basic Concept of B2B E-business**

Internet business includes electronic trading of physical goods and of intangibles goods such as information. In B2B e-business, businesses use the Internet to integrate the value chain which basically extends from the supplier of raw materials to the final customer.

This business pattern is theoretically able to encompass three elements:

- (1) All the trading steps: from online marketing, bidding, ordering, payments, to delivery.
- (2) The provision of before-sale service like demand forecasting and bid estimation.



- (3) The provision of after-sale service like customer support and legal advice.
- (4) The process collaboration of project and product, such as collaborative design.

The initial rationale behind e-business application is simple: to streamline the complicated business process. In order to see how regular business is processed and how e-business works on this process, a conceptual model provided by Steven Mohr of Xmlab is presented (as Figure 2-1). The model, basically a framework to characterize the architecture of e-business application, is based on six layers of processing. The layers begin with the simplest level of the process -data- and move up through increasing sophisticated functions until the overall process is addressed in the top-most layer.

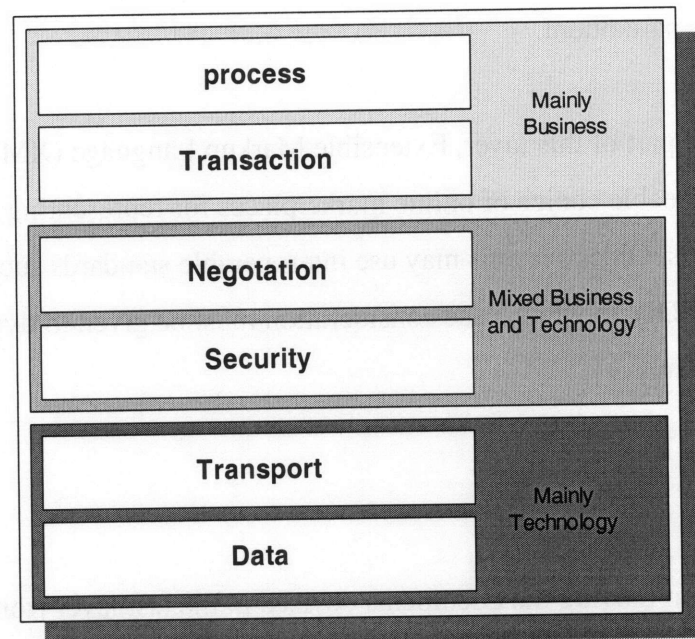


Figure 2-1 the architecture of B2B e-business (Steven Mohr 2000)

Each layer in the model presents a mechanism of activities including planning, information transportation, and decision-making. While the process of a business automation effort will generally be from the bottom of the model to the upper layer. The activity for companies to structure the architecture is actually a whole up and down process. For example, it's not possible to address the issue of what data to capture unless the overall process to implement is understood. Therefore, the basic idea of e-business application is actually to build a more integrated system for business processing.

## 1. Data

This layer is where basic issues of representing business information and business documents must be decided. This does not encompass all the data in the system; individual applications will certainly maintain their own private stores and structures. This layer is concerned with the data that is exchanged between applications or flows between business partners and customers. The basic structure dealt with on the level comprises recognizable business documents such as purchase orders, catalogs, or contracts. It has been crucial to get this layer right, as the building blocks companies devise here will constrain what companies can do at the higher layers. Issues of interoperability are paramount.

As for the technical part of this layer, Extensible Markup Language (XML) is rapidly becoming the foreseeable choice of online marketplaces for representing be transferred between applications. Older systems may use interoperable standards such as Electronic Data Interchange (EDI), in which case consideration must be given to dynamic translation mechanisms.

## 2. Transport

This layer is all about moving the documents devised in the last layer from one place to another. The communications protocols selected depend on the scope of firm's communication. Internet protocol like HTTP are suited to open communication with partners with minimum technical coordination, while closed, platform-specific messaging middleware technologies offer better reliability. Scaling, availability and auditing are critical concerns at this layer.

As for the technical part of this layer, while HTTP is so far the principle communication protocol for web-based application, new initiatives have been proposed that add desirable features on top of HTTP. One such initiative is the Simple Objective Access Protocol

(SOAP), which implements a basic function called metaphor using HTTP or some other protocol. IT is designed to be simple and fast, yet embody common mechanisms needed by business application.

### 3. Security

This layer is concerned with the authentication and privacy of business communications. When and how participants and documents are authenticated and how data is protected in transit are issues of prime importance in networked communications. Public Key Infrastructure (PKI) is accepted as the mechanism for performing this function. The initiatives of interest to planners are those who seek to bring PKI to e-business in standardized ways.

### 4. Negotiation

There are many forms of negotiation in business process. Broadly view, vendors will wish to make their products and services known to their industries, and buyers should have a way of searching for suppliers. When business relations are more narrowly viewed, as when offline arrangement dictate the bounds of automated exchanges, applications must still be able to indicate to other applications what functions are requested in a particular exchange. Rigidly prescribing sequences of messages are a prescription for disaster. Exceptions will arise that require manual intervention, and new opportunities will develop that cannot be pursued within the existing system.

One perspective approach to negotiation at the board and cross industry scale is Universal Description, Discovery and Integration (UDDI). This is an XML vocabulary that allows an organization to publicly describe it's offering or requesting in a systematic way using SOAP protocol.

### 5. Transaction

The first two layers provide the platform to move data between systems. The last layer dealt with the negotiation capability required for settle business deals. In the layer, companies are able to transact businesses. Actually, the common protocols of the Internet do not embrace transactions and the widely distributed nature of e-business make it hard to duplicate a certain degree of control. Nevertheless, confidence in the integrity of the process must be maintained in order to transact large volumes of business without manual intervention. Doing so requires the addition of standards of products that implement transaction in e-business.

Different approaches have being explored. Some companies prescribe several layers of standardized business processes and transactional behavior. Others, like Microsoft, leave process decisions to their customers but provide tools that permit the creation of transactions on top of Internet protocols. Companies need to analyze their transaction need, the platform taken by their customers and partners to decide the standard models to follow.

## 6. Process

Businesses are the processes and procedure followed by human participants in existing forms of transactions. Adjustment of processes must be made when moving transactions online, but these changes must be based on business reasons. The process layer is dictated by business planners and implemented with technical support. It is about the coordination of people, organizations, and applications to accomplish business goals in the real world. In this layer, planners integrate the tools provided by the lower layers in the pursuit of their goals.

Implementing this layer requires application integration software package. Many e-business vendors implement some sorts of workflow tool in their products. Vendors with solutions of this sort include Ariba, CommerceOne, and Microsoft. The specific shape of the process layer is different for different industries, value chains and companies so it requires customization.

## **2.2 The Development of B2B e-business**

Electronic links between businesses are not new. The rapid development of Information and Communication Technology (ICT) over the last 20 years has stimulated the evolution of B2B e-business over the following four stages:

### **Stage 1 – EDI-VAN**

In the first stage, the electronic links between companies existed in the form of electronic data interchange (EDI) supplied by value-added network (VAN) operated over leased telephone lines. EDI was designed to process high volume of highly structured data and supported by proprietary VAN. VAN required all market participants to trade through their network using technically rigid, complex standard. The systems are efficient for transaction that fit the model but they are also expensive.

EDI technology is brittle and difficult to change in a dynamic marketplace. An important character of the point-to-point connection system is that it provides no community or market transparency. Nevertheless, EDI transaction is expected to have a long life. Many current orders are automatically generated out of an ERP system based on inventory replenishment rules under long-term contract.

### **Stage 2 – Basic Internet E-commerce**

The adoption of Internet protocols and use of the Internet infrastructure has transformed EDI from a set of close communication systems for large companies with their established relationships to a flexible system that can draw in a much wider range of firms. However, at this stage, most large firms' major intention was to reinforce their existing relationship by linking their suppliers with their network. EDI over the Internet enjoys great cost-saving advantage over the EDI-VAN system. The estimated cost of the

new system is about one-tenth of the old system and greatly reduces the barrier for small and medium companies to adopt it.<sup>1</sup>

An important characteristic of Stage 2 is the intention to eliminate intermediary or distributor. A few early adopters began pushing their websites as a primary sales channel. (i.e., Dell and Cisco). The early adopters were primary technology companies with technology-savvy customers and little or manageable channel conflict. This concept is prevailed in the B2C market. However, for most companies, the Internet is about displaying catalog content and publishing marketing collateral.

### Stage 3 - Communities of Business

As the creditability of Internet security improved, web-based start-ups started experimenting new business practice along the value chain, and inspired by the networked externality effect in the B2C market, Stage 3 represented the rise of third-party web destinations that bring together trading partners into a common community. Communities of enterprises create market transparency. Once buyers and sellers start regularly gather at common destination, new business opportunities aroused.

Communities have a value unto themselves. Unlike B2C market where 5000 customers or 10000 customers share the same value from the web host, both sides of B2B participants derive benefits from growth of the community. Suppliers' marketing costs go down as they find buyers more easily and buyers spend less time searching and evaluating the suppliers. The intersection of buyers and sellers with related interests creates an opportunity to serve a large percentage of their business.

### Stage 4 - Collaborative E-business

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<sup>1</sup> Boeing, for example, reported a five-times increase of supplier participation in its parts-ordering system as it moved from a strictly EDI-VAN system to an EDI-Internet system.

Collaborative commerce builds on Stage 3 by adding support for other business process before, during, and after the transaction. The broad range of interactions that make the chain of commerce work can also be covered in this process. Collaborative commerce fills in the gap around commerce. This perspective commerce style is a more complete reflection of the complex workflow between demand and supply chain. But it also accounts for the wide range of interactions, beyond the order, spawned from the chain of commerce.

**Table 2-1** The four Stages of B2B E-business Evolution

	<b>Stage 1 EDI-VAN</b>	<b>Stage 2 EDI-Internet</b>	<b>Stage 3 Community Commerce</b>	<b>Stage 4 Collaborative Commerce</b>
Flexibility	Low, Rigid format	High, Open Standard	High, Open Standard	High, Open Standard
Costs	High, Proprietary network	Low, Leverage internet	Low, Leverage internet	Low, Leverage internet
Business Processes Support	Batch orders	Catalog orders	Catalog plus Auction & Bid/Ask	Multiple order terms; B2B interactions
Market Transparency	Low, fixed supplier base	Low, No centralized market	High, Intergeography transparency	High, Intergeography transparency

Source: Based on Morgan Stanley Dean Witter. (2000)

The four stages of B2B e-business evolution are shown in Table 2-1. It is clear that the impact of Internet over the development B2B e-business contains four main schemes: (1) technology: from fixed platform to flexible operation system. (2) Cost: from leveraging lower Internet application cost to leveraging higher economic scale. (3) Process: from batch to collaboration, and (4) Market: from close network to open market.

Automating all transactions between participants was the initial driving force for B2B e-business because it has been observed that simplified and standardized processes help to improve economic efficiency. As industry integration push businesses toward collaboration, it is believed that all business activities will gradually immigrate to online system.

### 2.3 B2B vs B2C

The invention of Internet has an even larger impact on the B2C market compared to B2B. B2C e-business is essentially a totally new business pattern enabled by the Internet and the pace of change has been extremely quick. As a result, researches conducted in the past few years have been focused more on exploring B2C rather than B2B. As more B2C reports and researches released, people get less aware of the essential difference between the nature of B2B and B2C. Some people even think of B2B concept as mostly migrated from B2C. Therefore, there is a need to distinguish B2B from B2C. Following are some crucial factors that differentiate B2B from B2C:

- Much larger Infrastructure to update: The infrastructure in B2B is a major impediment to ramping as quickly as B2C. Many systems and business processes have to be restructures, and the associated technology-integration issues could take years to perfect.
- Much complex procurement and fulfillment: B2C orders are often impulse or spot transactions with a short life span. B2B orders involve many more participants, and are governed by complex business rules of the buyers and sellers, have higher purchase amounts, involve products that are more complex, and require that order fulfillment be much more certain and predictable. B2B buyers are most likely to arbitrage multiple sources of supply to ensure availability and price.
- Portal brand means less: Branding is critical for B2C portals but only important in B2B. Business will send traffic where they derive value and solve more of their transparency problems while optimizing business process. It's tougher to market business around a shoddy product in B2B because there are plenty of people paid to find out the truth.
- Pay to play: Business buyers know the value of purchasing power and will demand more than frequent flyer miles in return. Their decision to direct spending through a particular web site will in fact make that site viable. This purchasing power has great



value beyond the dollars spent, and more business will demand equity in return for their relationships.

- **Strategy rather than technology:** the decision of when and how to participate in the B2B revolution is a strategic choice and not a technology choice for every company. Assessing the markets in which to buy and sell has implications for channels conflicts, how a company will interact with its key customers, the cost of acquiring and keeping a customer, and which a long-term partnerships are of value. These decisions will be made carefully.
- **Larger network effect:** the network effect so frequently associated with B2C markets is actually even more applicable to B2B markets. B2C e-commerce sites become more valuable as the number of their visitors on their sites grows, but the value to the customer is generally the same whether there are 1 million users or 5 million users on a site. But in B2B, both sides derive benefit from growth in the network. Suppliers' marketing costs go down as they find buyers more easily and buyers spend less time searching and evaluating the landscape for suppliers in their industry.
- **Domain expertise critical:** the complexity of the products as well as the expended pre- and post- transaction services in B2B will require third-party exchanges to demonstrate deep expertise to credible.

#### **2.4 The General Economic Impact of B2B E-business**

Looking at the impact of B2B e-business over economy efficiency provides deep insight of the motives and rationales for businesses to move business online. For example, services associated with costs that can be eliminated by Internet application will be moved online. Starting from this section, we will look at the economic impact of B2B from three levels: (1) The general economic impact; (2) The economic impact at industry level; (3) the economic impact at firm level. B2B's general impact over economic efficiency contains the following five factors: (1) broadened economic domain, (2) the

unique cost structure of digital product, (3) the changing pricing regime, (4) the network externality impact, (5) quality assurances and the effect of brand, and (6) the effect on staffing.

### 1. The broadened economic domain

An important character of network economy is the rising value of information. The practices of collaborative business processing, real-time demand projection and online transaction matching are all enabled by high quality and quantity information. It's notable that, not only the function of information becomes more valuable, thanks to the liquidity brought by the Internet, information also becomes a trading target. Portals generate revenue through providing information, while informatory bundles information for different customers. In addition to information trading and the migration of existing activities to online business, new B2B products are being created (i.e., downloadable move, maintenance manual or virtual community). These products are previously not economically viable without the Internet infrastructure. These new business opportunities and business domains have encouraged new business practice trials. And the involvement of new entrants along the value chain has further spurred up the diffusion of Internet business. For example, spot markets that match buyers and sellers for a wide range of goods ranging from electronic components to utilities to transportation futures have sprung up. The concept of global collaborative design also becomes viable. Firms that first engaged in these types of business explorations are mostly small start-up firms with higher flexibility that can customized their business to e-business practice.

### 2. The unique cost structure of digital product

Cost is actually the most profound economic factor that influences e-business diffusion. The cost structure of digital product (Table 2-2) is different from the cost structure of regular product. The total cost curve of most physical products and services are U-shaped. First, as quantity increases the cost declines (Figure 2-3), but latter the cost (average cost per product) increases due to the growth of the variable cost (especially

administrative and marketing). As for digital products, the variable cost per unit is very low and almost fixed regardless of the quantity. Therefore, cost per unit will decline as quantity increases due to the proportion of the fixed component of the cost over more units.

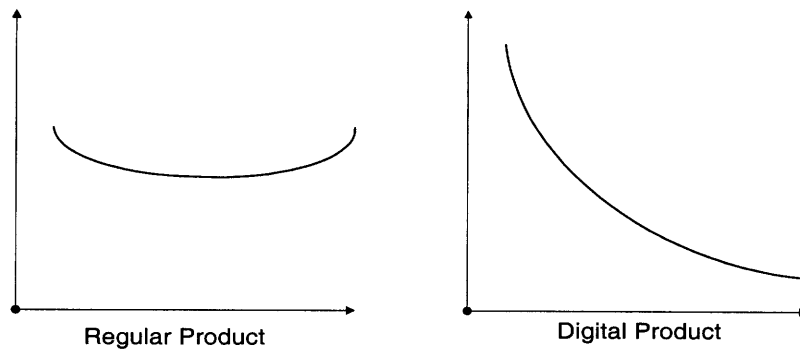


Figure 2-2 Cost Curve of Regular and Digital Products

Table 2-2 Examples of Digital Products that are traded online

<b>Information and entertainment products that are digitized</b>	
•	Paper-based documents: books, newspapers, magazine journals, store coupons, marketing brochures, newspapers, researching papers, and training materials
•	Product information: product specifications, catalogs, user manuals, sales training manual
•	Graphics: photographs, postcards, calendars, maps, posters.
•	Audio: music recordings, speeches, lectures, industrial voice
•	Video: movies, television programs, video clips
•	Software: programs, games, development tools
<b>Symbols, tokens, and concepts</b>	
•	Tickets and reservations: airlines, hotels, concerts, sports events, transportation
•	Financial instruments: checks, electronic currencies, credit cards, securities, letters of credit
<b>Processes and services</b>	
•	Government services: forms, benefits, welfare payments, licenses
•	Electronic messaging: letters, faxes, telephone calls
•	Business-value-creation processes: ordering, bookkeeping, inventorying, contracting
•	Auctions, bidding, bartering
•	Remote education, telemedicine and other interactive services
•	Cybercafe, interactive entertainment, virtual communities

Source: based on Choi. (1997)

Just like with physical products, in e-business one can rent or a group can share digital product. The value of the digitize product, however, will not be diluted when the number of owners increase because digital product is not consumed. This phenomenon can be

interpreted with the concept of syndication. (This topic will be revisited in the latter sections.) Availability of such options significantly influences both demand and supply.

### 3. The changing pricing regime

Price products and services are very important in any economy, including the digital one. The transmission of lower costs into lower prices is not automatic. It depends on the presence of sufficient competition. It is generally believed that e-business will result in very efficient competition that will cause prices to drop and the balance of market power shift from upstream to downstream of the value chain. In the B2B sector, businesses with a large product line used to be locked into set prices because of the high costs and the time required to diffuse new price data to distributors and retailers. E-business lowered these barriers, making more frequent price changes more easily. Internet transaction also provides in-depth information about clients, allowing firms to adjust prices more promptly to meet the market demand.

Pricing in many cases determines sale volume, market share and product profitability. According to Bakos (1998), electronic marketplaces enable new types of price discovery to be employed in different markets. For example, some airline auction last-minute unsold seats to the highest bidders, and web-based auctions have created markets for consumer goods that function like the financial markets. Intermediaries like Priceline.com allow buyers to specify product requirements and the amount they are willing to pay and then make corresponding offers to the participating sellers, reversing the traditional function of retail markets. Besides that, intelligent agents such as Kasbah and Tete-a-Tete, can negotiate purchase on behalf of buyers and sellers, and may restructure the price discovery process in virtual marketplaces.

The ability to customize products, combined with the ability of sellers to access substantial information about prospective buyers, such as demographics, preferences, and past shopping behavior, has greatly improved sellers' ability to price discriminate, which means charge different prices for different buyers. This new type of price discovery

regime are changing the microstructure of the consumer markets, the distribution channels, and the bargaining power of buyers and sellers. Federal Express, for example, uses its transaction data to identify unprofitable clients who and then decides either to dropped or charged a higher price.

Bundling several products or services is also common in software products that are digitized. Bundling is a useful price discrimination method and it has been used extensively by vendors. In e-business there are more opportunities for bundling and the pricing issue becomes critical. Bundling will be an even more important factor in the future when micro-payment mechanism becomes economically feasible.

#### 4. The network externality impact

A critical mass of buyers is needed for pure online players and web-based start-ups (especially the 3<sup>rd</sup> party public online exchanges) to survive. The network externality concept indicates that fast e-business mover will end up take a considerably large market share due to two reasons: (1) In terms of cost: The fixed cost of deploying e-business is actually pretty high for start-ups who have little transaction volume in the early stage of investment. Cope with the low commission fee resulted by fierce competition, without a large number of attendants, online players can barely make money. (1) For e-business service vender: The more clients they have, the more revenue they earn. And because the variable cost is so low, as revenue piles up, it will turn directly into profits. Therefore, the more clients one company has, the stronger the e-business vendor will be. (2) For the attendants: the more participants involved in the market, the more value generates to the participants. So popular e-business companies can strengthen their competitive advantage over time and end up eat up the market because they can add relatively higher value to participants.

#### 3. Quality assurances and the effect of brand

While price is identified an important factor that influences many online purchases, quality remains a key concern in many situations. When firms buy product from a recognized companies, they are quite sure about the quality of the product or service they are buying. When companies buy from a not-so-known vendor, however, quality becomes a major issue. The issue of quality is related to the issue of trust and the issue of customer protection. In either way it is essential to provide quality assurance by a trusted third-party intermediary. For example, TRUST-e and the BBB provide a testimonial seal for participating vendors. Another company, BBB, is known for its quality assurance system of physically testing products.

In the early stage of Internet business, brand is consider a less important factor because people who conducted transaction online cared most about cost reduction. And it was also the time when the trading products are non-complex commodities. However, over time further evidence indicates that brand remains a strong signal of credibility in the e-business market. When web technologies are still not able to ensure the security of Internet-based transaction, large companies will retain the brand advantage.

#### 4. The effect on staffing

Changes in the nature of what constitutes a store and the productivity of sales and customer service staff has a direct impact on the number and nature of staff hired. E-business application requires far fewer, and high-skilled employees. Federal Express reports that their online customer service has represented a saving of 20000 new hires. GE reported that the implementation of e-commerce has resulted in the transfer of 60 percent of their staff involved with requisition and that labor costs associates with procurement have declined by 30 %. It is notable that, though average staff number declines, as high-skilled staffs are relatively scarce and costly, it generates an entry barrier for new businesses to implement e-business. And also, this phenomenon creates an incentive for firms will less skillful manpower to go outsourcing.

### **2.5 The Economic Impact of B2B at Industry Level**

In the industry level, two critical factors appear to have dramatically changed in the new B2B regime. These two factors are: (1) the changed industry structure, and (2) the digitized marketplace. A study of industry structure helps to verify the impact of e-business over firm's competitiveness in their industries. The analysis of the new marketplace helps to understand how companies exercise external activities: how they interact and collaborate with business partners.

### 2.5.1 How E-business Changes Industry Structure

The Internet has created some new industries, such as online-auctions and virtual marketplaces. However, its greatest impact has been to enable the reconfiguration of existing industries that had been constrained by high costs for communicating, gathering information, or accomplishing transactions. Currently, for the most part of its impact, we can see that Internet has already changed the front end of business process. However, not only on business process, how far Internet's impact on industry structure can go directly affects the value that can be generated online. Based on Michael E. Porter's theory, company's profitability will be driven by its industry structure attractiveness, which is in turn affected by the following five forces of competition: the intensity of rivalry among existing competitors, the barriers to entry for new competitors, the threat of substitute products or services, the bargaining power of suppliers, and the bargaining power of buyers.

In the early stage of E-Business, the positive impacts of Internet over the industry structure have been well understood and addressed. For example, Internet helps to dampen the bargaining power of channels by providing companies with new, more direct avenues to customers. The Internet can also boost an industry's efficiency in various ways, expanding the overall size of the market by improving its position relative to traditional substitutes. However, as time goes by, some invisible effects started to emerge.

It's getting clearer that, as Internet technology provides buyers with easier access to information of products and suppliers, it also bolsters buyer bargaining power. Generally speaking, the fact that Internet mitigates the need for an established sales force or access to existing channels implies a danger of lowered barrier to entry. Through the boost information availability, new approaches to meet demands and performing functions become viable and create new substitutes. If online business is structured as an open system, companies will have more difficulty maintaining proprietary offerings, thus intensifying the rivalry among competitors. The use of the Internet tends to expand the geographic market, bringing many more companies into competition with one another. As Internet technology tend to reduce variable costs and tilt cost structures toward fixed cost, it creates significantly greater pressure for companies to engage in destructive price competition.

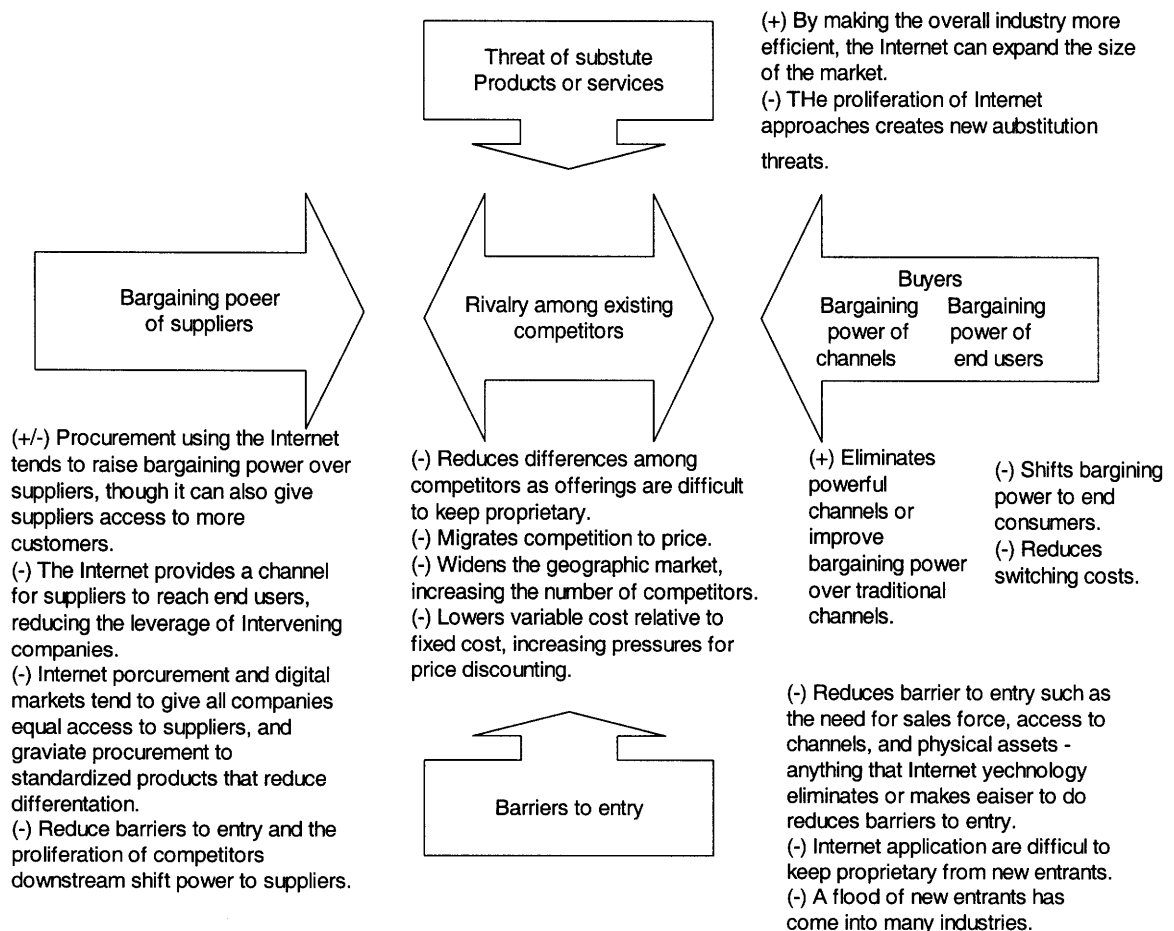




Figure 2.3 How the Internet influence Industry Structure (Michael E. Porter 2001)

It is notable that the changes in firms' relative cost structure affect the competitiveness of existing firms and firms' incentives to enter new businesses. In the early stage of e-business, it is suggested that the barrier of entry for various product markets and international markets have declined and that some characteristics of e-business may favor small businesses over large. This notion is built on the assumptions that the cost to build and maintain a sophisticated front store (a website) will be declining and a more transparent market will increase the exposure of small firms to other businesses. There is also a notion of since the current market structure will be decomposed under the impact of e-business, small start-up firms unencumbered by existing relationships with traditional retail outlets or a large sales force may be an advantage. There are various evidences indicates the difficulties for large companies to restructure existing channels. Compaq, for example, encountered channel conflict when implementing e-business practice when Dell, who then a smaller competitor, built the direct sales process to customize e-business practice with relatively much lower costs.

In terms of cost, just as e-business reduces the internal costs of many transactions, it also changes the cost structure that dictates a firm's relationships with other businesses. At every stage of processing, an intermediary often performs a service to facilitate the flow. This practice not only adds value to the flow but also adds costs. In many cases, this service is information intensive – matching a buyer to a seller, certifying parties in a transaction, providing support for the transaction (e.g., financial or legal services) – and often involves some types of risk sharing. For these types of value, e-business was suspected may reduce the involvement of intermediaries in the value chain and thus reduces the costs.

### 2.5.2 The characteristics of online marketplace

Online marketplace is so far the most important industry-level e-business practice. According to Bakos (1998), markets play a central role in the economy, facilitating the exchange of information, goods, services and payments. In this process markets create economic value for buyers, sellers, market intermediaries, and for the society as a whole.

Markets (electronic or otherwise) have three main functions, as shown in Table 2-3: matching buyers and sellers; facilitating the exchange of information, goods, services, and payments associates with market transaction; and providing an institutional infrastructure, such as a legal and regulatory framework that enables the efficient functioning of the market.

Recent years we have seen a dramatic increase in the number of virtual markets. Basically the theory behind virtual markets is its ability to increase the process efficiency by expediting or improving the functions listed in Table. For example, by moving markets online, digitizing product information, and activating standardize transaction processes, virtual markets have the potential to significantly decrease the cost of executing these functions.

Rayport and Sviokla noted that the process of doing business in the virtual markets is quite different because in stead of processing raw materials and distributing them, virtual markets involves gathering, selecting, synthesizing, and distributing information for every deal. As the expected capability of service increases, the operation process of a virtual market will be far more complex than a traditional one. Therefore, the economics of virtual market, starting with supply and demand and ending with pricing and competition should be re-evaluated.

Table2-3 Functions of a market

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**Matching Buyers and Sellers**

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- Determination of product offerings
  - Product features offered by sellers
  - Aggregation of different products
- Search (of buyers for sellers and of sellers for buyers)
  - Price and product information
  - Organizing bids and bartering

- Matching sellers offerings with buyers preferences
- Price discovery
  - Process and outcome in determination of prices
  - Enabling price comparisons

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#### **Facilitation of Transactions**

- Logistics
  - Delivery of information, goods, or services to buyers
- Settlement
  - Transfer of payment to sellers
- Trust
  - Credit system, reputations, rating agencies, special escrow and trust online agencies

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#### **Institutional Infrastructure**

- Legal
    - Commercial code, contract law, dispute resolution, intellectual property protection
    - Export and import law
  - Regulatory
    - Rules and regulations, monitoring, enforcement
- 

Based on Bakos (1998)

## **2.6 The Economic Impact of B2B at Firm Level**

Porter defines firm's value chain as a measure to evaluate firm's capability to implement its strategic planning. In our study, the firm value chain analysis is especially important to help us understand existing brick and mortar companies' e-business strategy. This is because, in order to move online, these companies have to reengineer from their existing organization structure and business process. The second part of the firm level study is a Driving Force analysis, which lay out the crucial factors that attract firm's to conduct business online.

### **2.6.1 How E-business Affects Firm's Value Chain**

According to Porter's theory, firm's value chain is define as the set of activities through which a product or service is created and delivered to customers. When a company competes in an industry, it performs a number of discrete but inter-connect value-creating activities such as operating a sales force, fabricating a component, or delivering products. These activities have points of connections with suppliers, channels and customers. The value chain is a framework for identifying all these activities and analyzing how they affect both a company's costs and the value delivered to buyers.

Because every activity involves the creation, processing, and communication of information, information technology has a pervasive influence on the value chain. The special advantage of the Internet is the ability to link one activity with others and make real-time data created in one activity widely available. The distribution of information can be within corporate or between outside suppliers, channels and customers. By incorporating a common, open set of communication protocols, Internet technology provides a standard structure, which enable all sectors to access to the information generated.

Most of the prominent applications of the Internet in the value chain are shown in figure 2-4. Some involve moving physical activities online, while others involve making physical activities more cost effective. The firm's value chain framework will be revisited in the next two chapters to help understand the different behaviors between service sector players and manufacturing sector players.

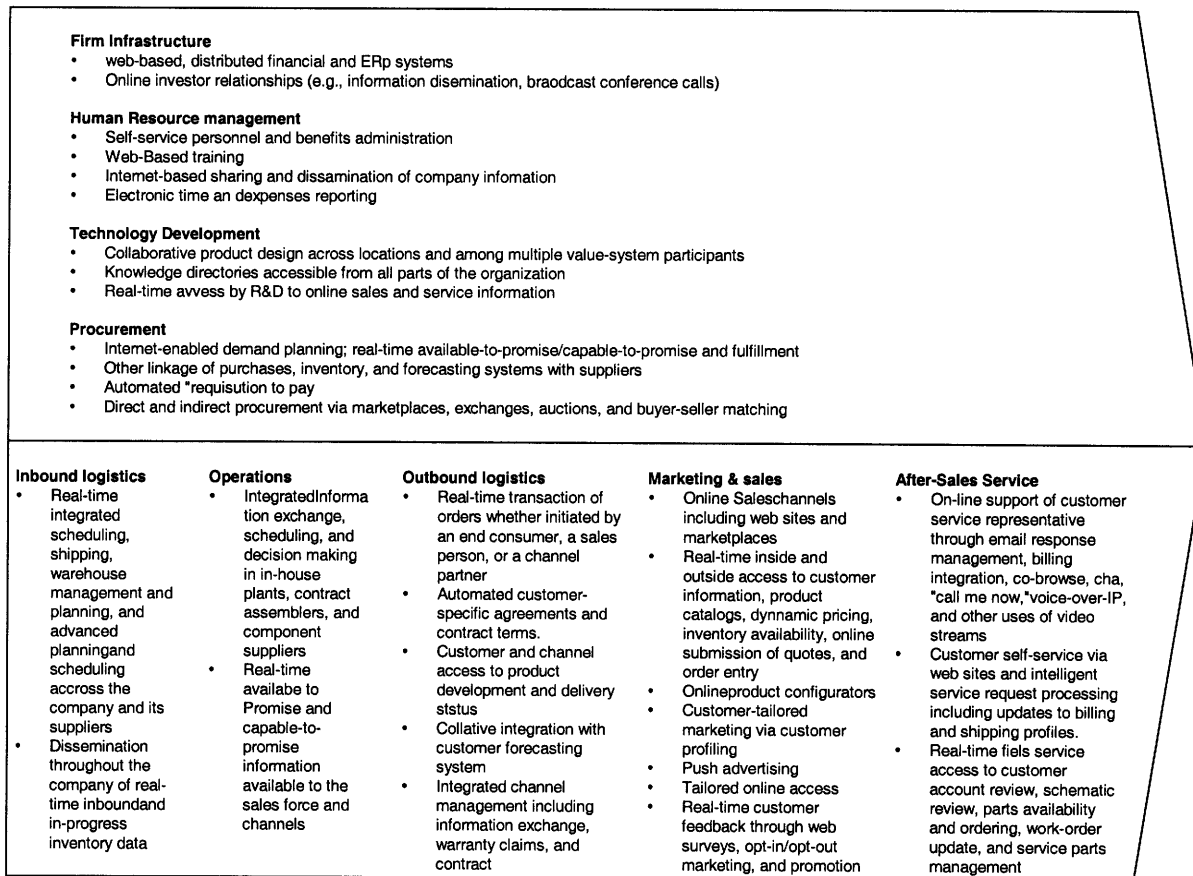


Figure 2-4 How Internet change value chain

--Based on Michael E. Porter (2001)

## 2.6.2 The driving force analysis

In B2B e-business, three factors are likely to lead companies to the quick adoption of Internet business: (1) a reduction in transaction costs and improvement of product quality/customer service; (2) a defensive reaction to competitors engaging in e-business (time-to-market became a critical strategic concern to cope with the network externality effect in Internet business); and (3) guided by large businesses to include all of their suppliers to link into their e-commerce system as a condition of doing business. It is notable that, the first factor, reducing transaction costs, is the primitive initiative that

drives the adoption of e-business. However, in the next chapters, we will see how the other two factors become more and more important in affecting firm's decision in choosing e-business platform.

### 1. Changing Firm's Cost structure

The impact of e-business on firms' internal production and transaction costs falls into three broad categories: (1) the cost of executing the sales, (2) cost associated with the procurement of production inputs, (3) costs associated with making and delivering the products, and (4) cost associated with quality control. This list probably represents only a subset of the cost impact associated with e-business as firms implement the technology, since actually they only represent saving over existing processes and thus do not factor in quality improvement.

#### (1) The cost of executing a sale

The key areas of cost reduction when carrying out a sale via e-business rather than in a traditional channel involves physical establishment, order placement/execution, customer support and after-sale service.

#### (2) Physical establishment

Estimates of the costs of setting up and maintaining an e-business web site have a huge variety. However, it is certainly less expensive to maintain such a storefront than a physical one because it is always open, can be accessed by millions around the globe, and has few variable costs, so that it is scale up to meet demand. By maintaining one store instead of thousands, duplicate inventory costs are eliminated.

### (3) Order placement/execution

By placing the necessary information on line in an accessible format, e-business companies generally transfer costs to the buyer. As a result, even when customers execute the transaction in a traditional way (off-line), for example by buying a product over the phone or coming to a real estate agent store, they come “pre-qualified”. They know precisely what they do and do not want and are more likely to buy. This greatly increases the efficiency of the sales process. Micron computers report a productivity gain of a factor of ten: Their web sales people spend on average of two minutes on the phone with a customer who has looked at their website but 20 minutes with traditional customers. Auto dealers report similar results; they spend about \$25 to deal with an e-business generated bid but several hundreds for a face-to-face transaction.

### (4) Client support/after-sales services

In an economy that are increasingly knowledge-based and dominated by sophisticated products, client support and after-sales service are a major cost for many firms. Traditionally, this meant placing service personnel in the field to visit clients, staffing call centers, publishing extensive documentation, or issuing software. For many firms, these costs are essential, accounting for more than 10 percent of operating costs. Through e-business, firms are able to move much of this support online so that clients can access database or “smart” trouble-shooting software directly and with no extra cost. While mutually benefits both buyers and sellers, this functionality also increase the quality of service.<sup>2</sup>

## 2. Purchase orders/procurement

Just as e-business can significant reduce selling costs, it can also lower the costs associated with buying. While the actual transaction takes place outside the firm, the cost

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<sup>2</sup> Forrest Research estimates that it generally costs \$500 to \$700 to send a service representative to the field, \$15 to \$20 to handle a client question over then phone, and about \$7 to set up and maintain an Internet-based customer-service system.

associated with procurement constitutes significant internal costs. Even for low-value requisitions for office supplies or travel, the typical purchase order costs between \$85 to \$125, a sum which is often higher than the material being bought. The relatively high cost is a result of the complex and time-consuming process that often goes through several departments. Attempts to circumvent these processes usually result in even higher costs because negotiated costs are not obtained or incompatible materials are ordered. Internet-based e-business now makes it possible to apply EDI-type systems to relatively small purchases thereby drastically reducing errors, ensuring compliance with organization norm, and speeding the process. Estimates of the saving gained range from 10 to 50 percent. The reduced processing time also comes as a further benefit.

### 3. Quality control

The electronic interface allows e-business merchants to check that an order is internally consistent and that the orders, receipt, invoice match. While this simple function may seem trivial, both GE and Cisco report that one-quarter of their orders had to be reworked because of errors. E-business has also generated other benefits, such as a 5 to 25 percent drop in material costs due to increased supplier competition and a 50 percent reduction in the procurement cycle.

### 4. Inventories

Directly related to saving in time associated with procurement are saving in inventory carrying costs: the faster an input can be ordered and delivered, the less the need for a large inventory. In the United States, the average value of non-farm inventories represents some 2.3 percent of yearly final sales and 4.2 percent of sales of final goods. Approximately 37 percent of all inventories are carried by manufacturers, while 25 and 27 percent of total non-farm inventories are held by wholesale and retailers respectively. It is estimated that for retailers, the cost of carrying an inventory for a year is equivalent to at least 25 percent of what they receive in payment of the product. Therefore, a two-week saving of inventory represents a cost saving of 1 percent of sales. As most retailers



run their business on margins of 3 to 4 percent, this inventory associated cost saving is significant.

A key factor in reducing the costs of inventory is improving the ability to forecast demand more precisely. E-business merchants who allow clients to customize their order from a wide spectrum of products obtain valuable information on client preferences. In addition, the information can be passed through to the entire supply chain and shared by partners. This practice, known as collaborative planning forecasting replenishment (CPFR), is estimated to lead to a reduction of 20 to 25 percent for overall US inventory.

## 5. Marketing

In terms of the cost to attract new clients, e-business generally has a much lower advertising cost and the advertising recipients are more targeted. In addition, with its hyper links, Internet has the potential to bundle a variety of products (cross-selling) to existing clients. Cross-selling has been estimated to be seven-times cheaper than attracting new clients.

## 2.7 Summary

The preliminary study of e-business examples implies that e-business will impact some industries more than others, and the impact on different type of firms will be in a rather different way and speed. The question then is what are some of the factors that determine this level of impact? Strader and Shaw (1997) have identified several factors that each fall within one of the four categories: product, industry, sellers and consumer characteristics.

### (1) Product characteristics

Digitizable products are particularly suited for electronic markets because they not only take advantage of the digitization of the market mechanism but also the distribution

mechanism, resulting in very low transaction costs. It also enables the order fulfillment cycle time to be minimized.

The level of a product's price may be an important determinant. The higher the product price, the greater the level of risk involved in the market transaction between buyers and sellers who are geographically separated and may have never dealt with each other before. Therefore, some of the most common items currently sold through electronic markets in large quantities are low-price items (or commodities with low unit price).

All in all, computers, electronic products, consumer products, and even cars can be sold electronically because the buyers knows exactly what they are buying. This indicates the fact that the more standardization and the more characterizable product information exist in an industry the better.

## (2) Industry characteristics

Electronic markets are most useful when they are able to directly match buyers and sellers. However, some industries require transaction brokers, and it is still arguable that if these industries will be affected less by e-business than industries where no brokers are required. However, it is observed that the services provided by stockbrokers, insurance agents, and travel agents are still needed. There are also examples indicates that software may be able to replace the need for these brokers. Knowledge management may play a crucial role in integrating existing expert knowledge and migrating the traditional broker system online. Generally speaking, the trend seems to be moving towards de/re-intermediary as more intelligent systems that assist customers become available.

## (3) Seller Characteristics

E-business reduces search costs, enabling consumers to find sellers offering lower prices. In the long run this reduces profit margins for sellers that compete in e-business market, although it may also increase the number of transactions that take place. If sellers in an

industry are unwilling to participate in this environment, then the impact of e-business may be reduced. In highly competitive industries, with low barriers to entry, sellers may not have a choice. In oligopolistic situations, however, sellers may determine the success of electronic markets in a industry if they want to maintain an environment of lower-volume, higher-profit margin transactions.

#### (4) Consumer characteristics

E-business may have little impact on industries where a sizable percentage of purchases are made by impulse buyers. For example, a high percentage of grocery store purchases are impulsive. Because electronic markets require a certain degree of effort on the part of the consumer, these markets are more conducive to consumers who do some comparisons and analysis before buying (the patient or analytical buyers). Analytical buyers can use the facilities available to analyze a wide range of information before deciding where to buy.

In this chapter, some crucial issues that prevailed in the e-business regime are identified. However, the influences of these factors are hard to quantified. We should notice that, for different industries and different types of firms, as long as they want to adopt online business, they have to make the trade-off between different factors. In the end of this chapter, we summarize these factors as Fig 2-5.

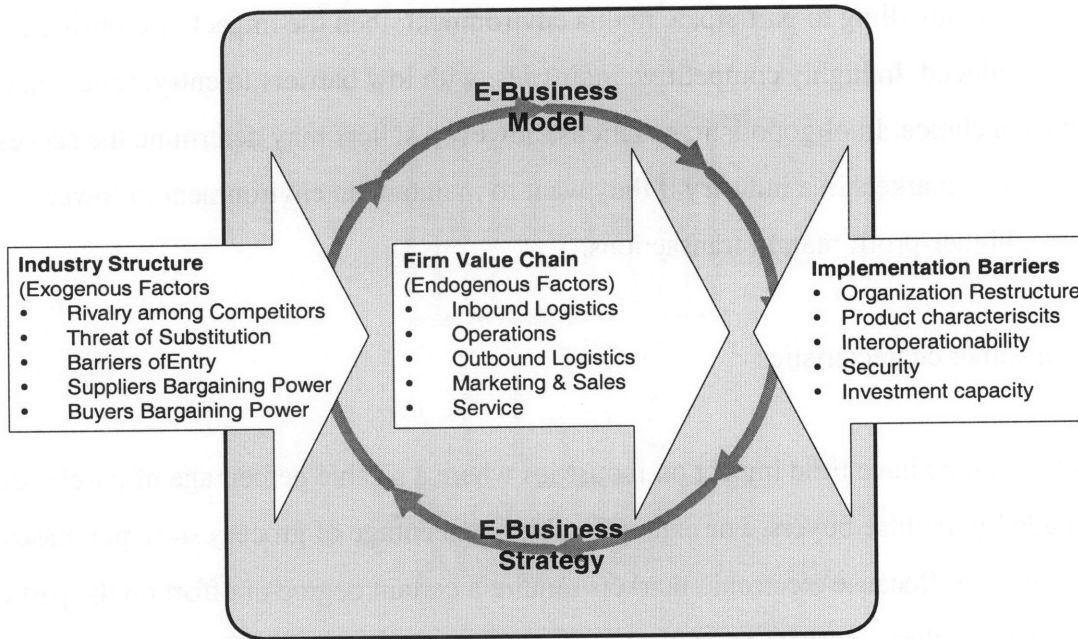


Figure 2-5 Key factors that affect firm's behavior in the B2B regime

For firm, while the industry structure present as an exogenous factor because of its incontrollable characteristics, value chain demonstrates the endogenous factor. Implementation barriers are some generic issues that will practically affect firm's strategic planning. From this conceptual framework, we create a generic matrix (Table that will be used in the next chapter for strategic analysis.

Table 2-4 Matrix to evaluate firm's strategic concern

<b>Industry structure</b>	
Attributes	Impact
Industry Competitors Intensity of Rivalry	
Threat of substitute	
Barriers to Entry	
Bargaining Power of Buyers	
Bargaining Power of Suppliers	Large firm as supplier
	SME as supplier
<b>Implementation barriers</b>	
Organization restructuring	
Product characteristics	
Investment in new business	
Interoperability	
Partner platform	
<b>The interface of value chain with business partners</b>	
CRM	
Selling chain management	
ERP	
E-procurement	
<b>Conclusion</b>	

## **Chapter 3 The Business Model and Strategy of Existing Companies**

This chapter is dedicated to study how firms define their strategic priority and develop corresponding e-business strategies and e-business models. In order to understand the rationale behind firms' decision, it is essential to inspect firms' business environment in a more comprehensive view. Porter's industry structure and value chain model incorporates the exogenous impacts as well as the internal motivation of change and provides a mean to decompose the complex dynamics.

This study divides firms into two categories: large existing firms and SMEs. This definition not only helps to differentiate the different behaviors between the two types of firms; since large existing firms' and SMEs' business behavior are so highly correlated, the understanding of one player also helps to understand the other player. Last chapter we have identified some economic factors and have a rough discussion of e-business's impact over them. However, it is important to notice that, even for the same factor, the impact from e-business is asymmetric for different players.

This chapter contains two major bodies: the behavior of existing firms; and the behavior of SMEs. Each of them basically comprises of the following issues: the challenges from e-business, the rising strategic concern, and the corresponding e-business model and strategy. Porter's theory is used primary to analyze the challenges, and to illuminate the rational behind the strategic concern. And finally, we will look at how observed firms' behavior is associated with these rationales.

### **3.1 Different characteristics between large firms and SMEs in the B2B regime**

The behavior of large existing companies and SMEs are observed different in the B2B regime. This phenomenon is a result of the different resources and constraints the two types of firms possess. Although there are many different attributes between these two types of firms (i.e., organization structure, or business process), the following characteristics are identified as key factors that result in the heteroskedasticity of firm's

behavior: (1) market power; (2) brand; (3) investment capability; and (4) E-business infrastructure.

### 1. Market power

Large existing firms enjoy larger market power over SMEs. Economic theory indicates that resource mobility is the key factor that ensures a perfect competition market. In a perfect competition market, as resources are mobile and equally accessible, competitors tend to have the same cost structure and they compete on price. However, market power can be created if a firm successfully achieves the following works. (1) the control of resources, (2) control of production process and products, (3) economics of scale, (4) legal barrier.

The above four factors provide a good measurement to evaluate the competitive advantages existing large firms enjoy through market power. In a concentrated market, most proprietary products, expertise knowledge/processes and industry resource are controlled by existing large firms. And the economic of scale they possess create a entry barrier for new comers to penetrates the market. For SMEs, the condition is different. Lack of market power means SMEs are more likely to compete on price. Many SMEs work primary as suppliers for existing large firms so they may only produce parts and not final products. The different market power between these two types of firms and their upstream-downstream relationship creates a new dynamics in the B2B regime.

### 2. Brand

Large existing firms enjoy greater brand advantage than SMEs. Brand is an invaluable asset for firms as a superb differentiation mean. Competitors may copy firm's production process but they cannot copy its brand. Also, as it takes a long time to build up a brand, brand not only creates an entry barrier for new entrants, it also demonstrates the credibility of a firm. Some SMEs also create their credibility so they can get long-term contract from business partners. Nevertheless, brand's effect is different for large existing firms and SMEs.

### 3. Investment capability

Traditionally, large existing firms have stronger investment capability than SMEs. From the strategic viewpoint, large firms are always more energetic in business expansion and is more capable to bear the risks from new business exploration. However, it is also observed that, in the past few years, the trend in the financial markets indicated that investors don't like large existing firms to enter new business practice. This is because investors feel like to decide the portfolio by themselves rather than by existing large firms, especially cross-industry conglomerates. To the contrary, SMEs have less cash flow for new business expansion but they actually have higher flexibility to do the trial.

### 3. E-business infrastructure

Starting from late 80's, large existing firms have started to install their ERP systems. And starting from late 90's, these firms also begin to expand their value chain management system from ERP to CRM and other back-office systems. The investment on IT infrastructure was rocket shooting in 1999 in order to tackle the enterprise millennium bug issue. To the contrary, most SMEs have been late in the wave of IT infrastructure build-up and most of them are on the way to create an integrated value chain management platform. Most SME are very nimble and flexible in meeting customer's need but the poor infrastructure limited their ability to link to the e-business market, which means the difficulty to access new business opportunity.

Table 3-1 the major different attributes between large existing firms and SMEs in e-business

	<b>Market Power</b>	<b>Brand</b>	<b>Investment capacity</b>	<b>e-business infrastructure</b>
Large existing firms	High, Concentrated market structure	High Known to end-user	High, with low flexibility	ERP is in place, CRM and other platforms are on the way
Existing SMEs	Low, Fragmented market structure	Low Unknown to end-user	Low, with high flexibility	Basic value chain management system

The characteristics of the above four attributes provide us with a very important measurement proxy. Theoretically, numerical data is essential for us to conduct a generic analysis. However, because if the relative attribute strength for these two types of firms is known, we can apply a qualitative model to verify the basic trend of change without conducting a quantitative analysis. Nevertheless, robust economic models and dynamic system analyses are always more helpful to verify different attributes' influence for different types of firms if numerical data is available.

### **3.2 Large Existing Firm's Behavior in the E-business Regime**

This section focuses on the study of large firms' behavior in the e-business regime. The model constructed in the second chapter is applied to measure large existing companies e-business challenges and track the rationale behind their strategic planning. This section contains three parts: (1) the e-business challenges that facing existing large firm, (2) the strategic concerns in the current stage, and (3) large existing firms' corresponding e-business strategy and e-business model application.

#### **3.2.1 The e-business challenges that facing existing large firm**

There is a need to re-exam large firm's industry structure as the business environment has changed. E-business environment and its economic impact for large firms can be characterize by the model that includes the following three elements: (1) industry structure analysis; (2) value chain analysis; and (3) implementation barrier analysis.

##### **3.2.1.1 Industry structure analysis**

The basic industry structure analysis for large firms is shown in Figure 3-1. It is notable that as the changes of industry structure for service sectors and manufacturing sectors have been found quite different, we need to separate these two sectors in the following discussions.



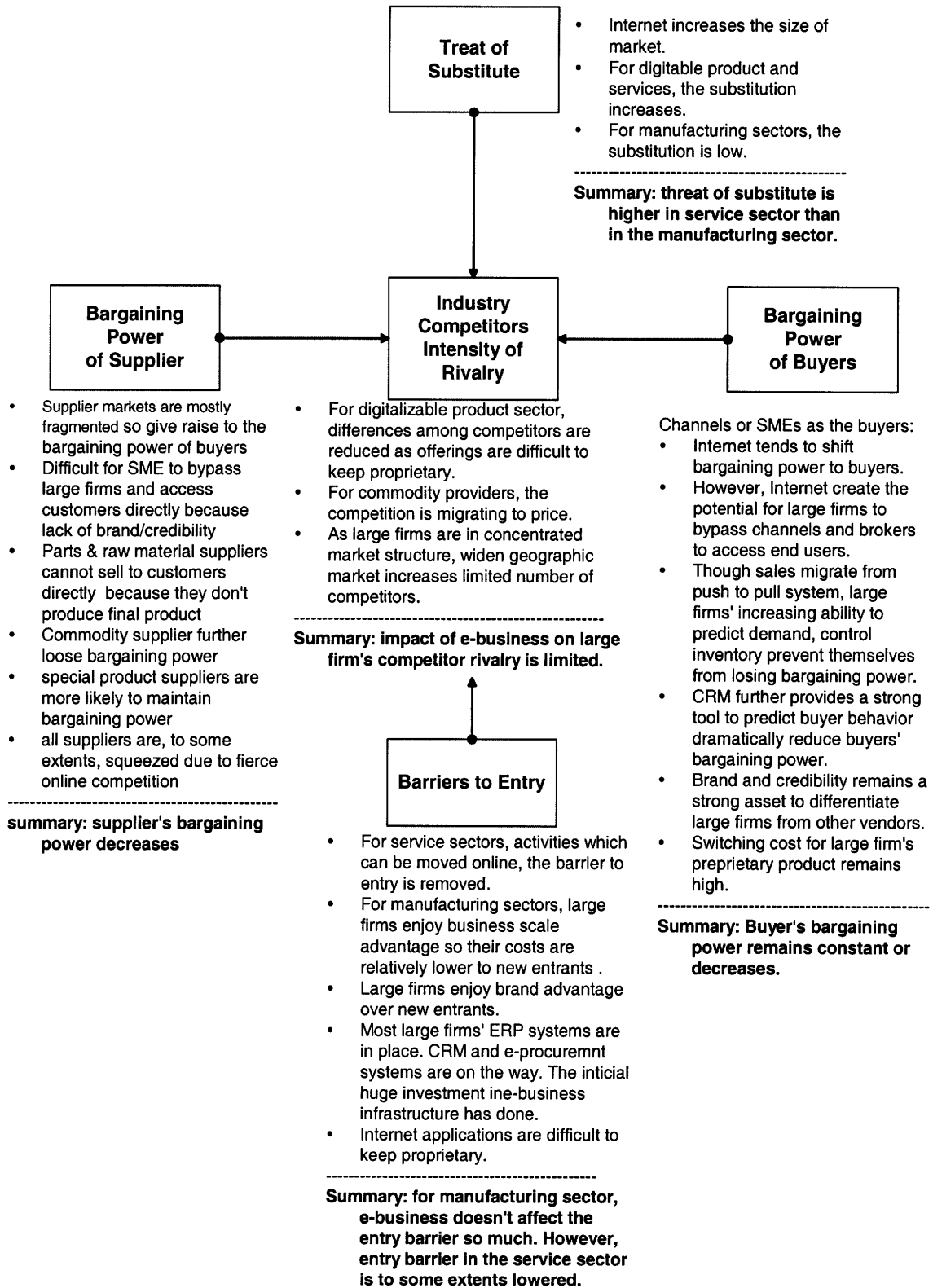


Figure 3-1 How Internet influences large firm's industry structure

### 1. The industry competitor's intensity of rivalry

For large existing firms in the manufacturing sector, the widened geographic market increases few number of similar scale competitors. This phenomenon especially holds in industry where the product transportation cost is high. Also, for commodity providers, the competition tends to migrate to price. Generally speaking, the impact on large firms in the manufacturing sector is limited.

For large existing firms in the service industry, the competition becomes more intensive as most of their products are digitizable and players have strong incentive to migrate service online because of the lowered sales and operation cost. The widened geographic market also increases rival competition as products are mobile on the web. Search engine and cross-sales system enable rivals to reach customer. Generally speaking, the impact on large existing firms in the service sector is increasing.

### 2. Threat of Substitute

For large existing firms in the manufacturing industry, the application of e-business doesn't increase the threat of substitute. But for large existing firms in the service industry, substitute is increasing. For example, Charles Schwab introduced online broker system to challenge traditional broker channel. This impact pushed Merrill Lynch to provide the same online broker service.

### 3. Barriers to Entry

For large firms in the manufacturing sector, the impact on barrier to entry is very limited. This is because existing manufacturing possess business scale and learning curve advantage so the production costs is already low. The production facility and equipment cannot be replaced by e-business application. Large firms also enjoy brand advantage over new entrants. Dell, for example, is the most known case of a manufacturing firm who leverage the e-business to strengthen its competency. Nevertheless, Dell is not a new

entrant since it has already involved in the PC industry for more than 10 years, and it possesses all the production capacity. E-business's benefit for the manufacturing sector is mostly on streamline the production process. So far there is no evidence indicating new entrants can leverage e-business to restructuring industry production process. This implies the fact that huge initial cost of production investment essentially overcomes the benefits from adopting e-business.

For large firms in the service sector, the entry barrier is to some extent lowered. For these companies, activities which can be moved online, the entry barrier is removed because Internet applications are hard to keep proprietary. Nevertheless, these firms have brand advantage and industry expertise and these factors create the entry barrier.

#### 4. Bargaining power of buyers

For companies in the manufacturing industry, the bargaining power of buyers decreases. This analysis is contract to the general concept that bargaining power tends to shift to buyers in an e-business transaction. This result can be explained by the following reasons: (1) If the buyer is distributor or broker, Internet creates the possibility for large firms to bypass these channels and reach the customers directly. (2) Though sales migrates from push to pull system, large firm's increasing ability to predict demand and control inventory prevent themselves from losing bargaining power. (3) Advanced CRM system further provides a strong tool to predict buyer behavior and thus reduce the bargaining power of buyers. (4) In this early of e-business, brand and creditability remains a strong asset to differentiate large firms from other vendors. (5) Switching cost for large firm's proprietary product remains high.

For companies in the service sector, the bargaining power of buyers is also decreased. Most of the reasons are the same as above. However, as for the factor of proprietary product, Internet application makes it hard to keep e-business context proprietary, but the service content can remain proprietary.

## 5. The bargaining power of suppliers

For companies in the manufacturing sector, the bargaining power of large firms over suppliers increases. This is because it 's difficult for SMEs to bypass large firms and reach the customers directly because of the two reasons: (1) SME don't have the brand and the credibility to end-users. (2) part and raw material suppliers cannot sell to customers directly because they don't make final products. Besides the two factors, the commodity product vendor will loose bargaining power as the number of competitor increases.

For service sector, the syndication effect makes the content vendors able to sell to multiple-buyers with constant cost, however, there is no evidence of whether this product proliferation increases or decreases buyer's power. Therefore, the bargaining power of supplier over large firms in the service sector should be lowered. Summary of the industry structure change is summarized in Table 3-2.

Table 3-2 Summary of large firm's industry structure change

<b>Manufacturing sector</b>	
Attributes	Impact
Industry Competitors Intensity of Rivalry	Constant
Threat of substitute	Constant
Barriers to Entry	Constant
Bargaining Power of Buyers	Constant/Lowered
Bargaining Power of Suppliers	Lowered
Conclusion	<ul style="list-style-type: none"> <li>E-business's impact is mostly positive for large existing companies in the manufacturing sector. This stimulates strong incentive to promote e-business application.</li> <li>The lowered buyer/supplier bargaining power provides a rising opportunities for vertical business expansion.</li> </ul>
<b>Service sector</b>	
Industry Competitors Intensity of Rivalry	Increasing
Threat of substitute	Increasing
Barriers to Entry	Lowered
Bargaining Power of Buyers	Constant/Lowered
Bargaining Power of Suppliers	Lowered
Conclusion	<ul style="list-style-type: none"> <li>The increasing competition between rivals and new entrants forces large firms to engage in e-business application.</li> <li>The lowered buyer/supplier bargaining power provides a rising opportunities for vertical business expansion.</li> </ul>

The industry structure analysis reveals the fact that the large firm's adoption of e-business basically helps to increase their competitive advantage. For manufacturing sectors, the factors of rivalry competition, entry barrier, and threat of substitute remains stable, while their bargaining power over both buyers and sellers increase. This condition creates a strong motive for large firms to promote e-business application.

For manufacturing sectors, large firms can not only enjoy the benefits of strong competitive advantage, but they can also leverage the weakened bargaining power of suppliers and increase outsourcing. As for the service industry, the increasing competition between rivals and the afraid of network affect create the momentum for large firm's to conduct e-business. Nevertheless, e-business still increase their bargaining power over both buyers and suppliers.

### 3.2.1.2 Existing large firm's value chain analysis

Existing large firm's value chain analysis is shown in Figure 3-2. According to Porter's theory, while industry structure analysis provides a matrix to evaluate the competitive advantage of an industry; the function of value chain analysis provides another matrix to measure firm's competitive advantage against their rivals in the same industry. From the analysis of the activities within the firm, one can identify the pros and cons of the current business process and the value generated in each stage.

However, after we conducted the industry structure analysis, we found that: the most important e-business impact that affects large firm's behavior is not the competition between rivals (the competition tends to be a moderate increase); but rather it's the increasing bargaining power over business partners. Therefore, our value chain analysis is used primary to observe whether the links between business partners is been built-up or not. This is because facilitating the connection (or the interface) with business partners implies an important benefit for large firms because the links enable them to leverage the new bargaining power.

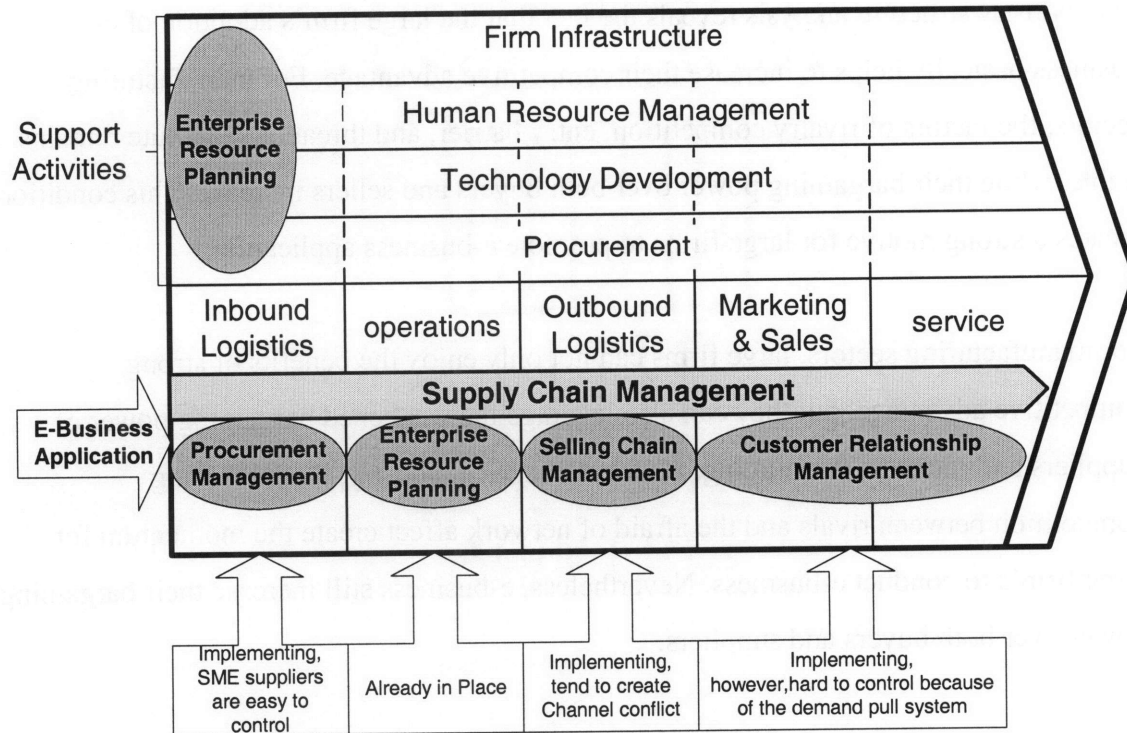


Figure 3-2 The current development of existing large firm's value chain

As indicated in Figure 3-2, basically most large companies have ERP system in place and are almost all on the way to implement their CRM, selling chain and e-procurement systems. Among the four e-business applications, CRM and selling chain management tend to be more difficult to implement because: (1) the selling chain restructure often comes with channel restructuring and implies a result of channel conflicts. Compaq, for example, did not sell computers online until 1998 because of the intention to avoid channel conflicts with existing PC resellers and distributors. (2) Customer relationship management is also hard to control because the current sales system is changing from push system to pull system. E-procurement system, on the other hand, is probably the easiest practice to execute because buyers always have larger power against sellers. Also, because of the old EDI-VAN system experience, the e-procurement is not new for most firms. The constraints on implementing the four e-business applications actually affect firm's strategic planning, which will be discussed in latter sections.

### 3.2.1.3 Implementation barrier

In 2000 fall, CommerceNet conducted a B2B barriers study. Because the IT infrastructure and e-business expertise of large firms and SMEs are rather different, the study was divided into two parts: B2B barriers for large firms; and B2B barriers for SMEs. In this section, we will only look at large firm's barrier to implement B2B e-business. (see Table 3-3)

Table 3-3 Top ten B2B barriers for large corporations in 2000 relative to 1999

<b>2000 Ranking</b>	<b>Top Ten Barriers</b>	<b>1999 Ranking</b>	<b>Top Ten Barriers</b>
1	Culture	1	Culture
2	Organization	2	Interoperability between e-business applications and with legacy systems
3	Interoperability between e-business applications and with legacy systems	3	Organization
4	International trade barriers	4	Executive awareness
5	User authentication and lack of public key infrastructure	5	User authentication and lack of public key infrastructure
6	Lack of qualified personnel	6	Lack of standards
7	Lack of standards	7	Lack of knowledge or qualified personnel
8	Interoperability with e-business sites of complementary companies	8	Interoperability with e-business sites of complementary companies
9	Partner e-business readiness	9	Trust and risk
10	Executive awareness	10	International trade barrier

by CommerceNet (2000)

The most significant barriers of large firms deal with managing change, both organizational and technological. There is a perception that many works remains to be done in designing the right organizational structure and a corporate structure that will promote widespread e-business application. On the technology front, there are significant concerns about interoperability of the new systems with legacy systems, and with systems of complementary companies. Additionally there is a perception that business partners face similar organizational and technological problems, hence their lack of readiness is seen as a barrier.

### 3.2.2 Existing large firm's strategic concerns in the current stage

The prior discussions are summarized as Table 3-4. This matrix provides a more aggregate and generic view to evaluate the key factors that affect large firm's e-business strategy.

The industry structure analysis indicates that: while the threats from new entrants and substitutes are quite low, large firm's bargaining power over business partners can be increased through e-business application. This analysis result has a big meaning for large firms because while their cost of procurement has the potential to be reduced, the pricing of their products can be sustained or even increased through reinforcing brand effect; direct and cross sale; and price discrimination. Therefore, there is a strong incentive for large firms to enhance vertical value chain connection and business collaboration.

Table 3-4 Matrix to evaluate large firm's strategic concern

<b>Industry structure</b>	
Attributes	e-business impact
Industry Competitors Intensity of Rivalry	Constant
Threat of substitute	Constant
Barriers to Entry	Constant
Bargaining Power of Buyers	Constant/Lowered
Bargaining Power of Suppliers	Lowered <b>leverage</b>
<b>Implementation barriers</b>	
Organization restructuring	A difficult and time consuming task
Product characteristics	Promote digital process
Interoperationability	Integration between ERP, CRM and e-procurement is still on the way
Partner collaboration	Need to consider business partner's e-business platform, see below:
<b>The interface of value chain with business partners</b>	
CRM	Hard to push buyers
Selling chain management	Potential to create channel conflict
ERP	In place <b>leverage</b>
E-procurement	SME suppliers are easier to control
<b>Conclusion</b>	The current strategic concern will be to promote value chain integration, leverage the market power over business partners through easier-achievable e-procurement.

From the implementation barrier index, we can find the following characteristics:

(1) Organization (or culture) restructuring is considered the most difficult thing to implement because reengineering is always a very time-consuming process, it's painful and it's also difficult to measure the effect and performance. Nevertheless, as organization structure stands as the foundation for a firm to transfer to a genuine e-



enterprise, many large firms are still on the way of organization reengineering. However, as the effect may takes years to appear, organization restructuring can be identified as a crucial strategic concern but not in the highest priority at the present time.

(2) Product characteristics: the motive is to move digitizable activities online. Moving activities online means maximizing the utility of ERP and other e-business applications. Also, being late in migrating digitizable activities online means the potential to lose competitive advantages over rivals. This helps to explain the phenomenon that in every industry, once a player start to adopt e-business, other players will follow suit to conduct e-business practice.

(3) Interoperationability: large firms have been very aggressively in integrating their existing business process with e-business platform. This is also a utility maximization initiative. However, interoperationability tends to not to be a strategic concern since it can be done internally.

(4) Partner collaboration: partner collaboration appeared to be the more important strategic concern in the current stage. If we look at the three interfaces that link large existing firms with their business partners, we can find that e-procurement system is definitely the one that can be easily implemented and the effect is quick and measurable.

From this series of analysis, e-procurement system is identified as the most important strategic concern at the current stage. The reasons about why e-procurement becomes the most crucial concern can be summarized as below:

(1) E-procurement helps to reduce purchasing cost. This impact is direct, measurable and the effect can be recognized in a short time.

(2) Large companies can leverage their market power to draw suppliers to attend the e-procurement program, which means e-procurement is relatively easier to implement.

(3) Procurement process and platform are mostly standardized so it requires few internal reengineering and thus hedge the risk of organization change.

After the rationale of e-procurement as the most important e-businesses strategic concern for large firms is defined, the next question becomes whether firms should use their proprietary channel (private exchange) or public exchange. A research conducted by AMR Research (AMR, 2001) indicated that private exchanges would corral more than half of the \$5.7 trillion e-business spend by 2004. The report went on predict that the world's largest enterprises would earmark between \$50 to \$100 million each for building private exchanges. Another research conducted by eMarketer Inc., a New York-based Internet research firm, reports that 93% of all business-to-business commerce is currently transacted through private or so-called proprietary exchanges, many of which have generated huge and well-documented supply-chain efficiencies. No matter which estimation is correct, the trend toward proprietary exchange is clear.

### 3.2.3 The e-business models deployed by large existing firms

Companies can always learn from industry-leading company's strategy. So far, some e-business-savvy companies have successfully implemented their e-procurement system and moving forward to integrate their whole value system. There is a need to look at the basic e-business models applied by large companies to link with their business partners.

In this section, three electronic market models of existing leading companies are described. The three models are classified depending upon who controls the marketplace: the suppliers, the customers, or the intermediaries. Basically, large or leading companies tend to have a combine the three models to streamline their operation process. They may use the supplier-orient market for sales while adopt customer-oriented market for procurement. It is notable that the three electronic market models are all proprietary systems, which means the system is open to companies' business partners, and rule out the attendance of business competitor.

## 1. Supplier-oriented marketplace

The most common B2B electronic market model for existing companies is the supplier-oriented marketplace. Most of the manufacturing-driven electronic stores belong to this category. In this model, both individual consumers and business buyers use the same supplier-provided marketplace as depicted in Figure 3-1. The architecture of this B2B model is basically the same as B2C, and the purchasing process is similar.

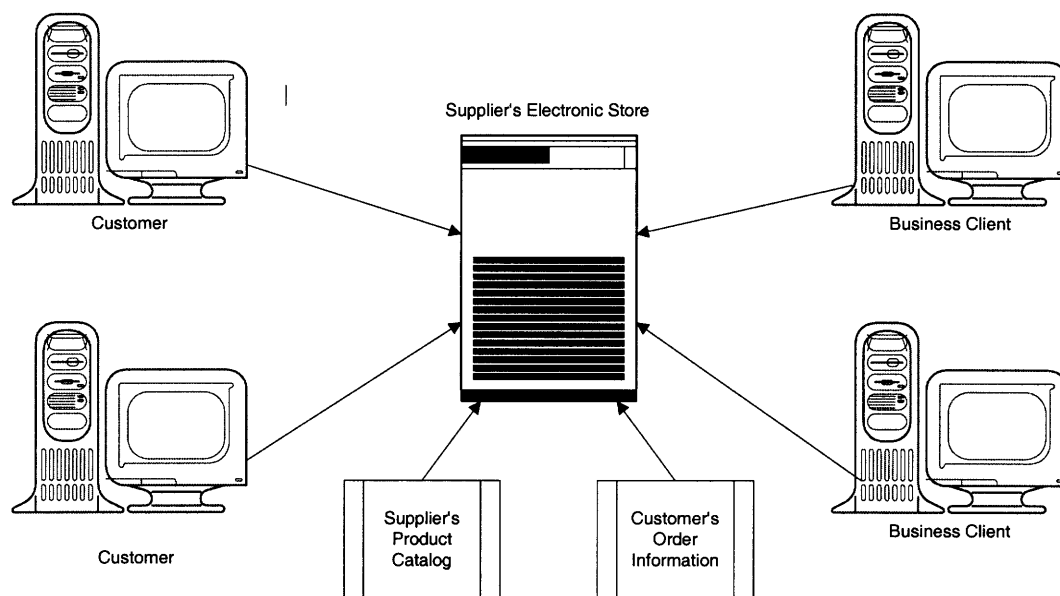


Figure 3-3 Supplier-oriented market architecture  
-from Turban, Lee, King and Chung (2000)

Examples of companies who adopt this type of business model are Dell, Intel, Cisco and IBM. It was reported that Dell sold 90 percent of their computers to business buyers, and Cisco sold \$1 billion of worth routers, switches, and other network interconnection devices to business clients through their electronic front-store as early as in 1998. The site with this model may be sustained as long as the vendor has a superb reputation in the market and a group of loyal customers. And also, the frequency of orders is not formidable from the buyer's point of view. Cisco's marketplace demonstrates a good example for this type of market. (Maddox 1998)

## Cisco Connection Online (CCO)

Cisco sold more than \$ 1 billion online out of a total worth of 6.4 billion sales in 1998. Cisco's website has evolved over several years, beginning with technical support for customers and developing into one of the world's largest Internet commercial site. Currently, Cisco offers nearly a dozen Internet-based applications to both end-use customers and reseller partners.

Cisco began providing electronic support in 1991 using the Internet. Software downloads, defect tracking, and technical advice were among the first applications. Starting from 1994, Cisco put its sales system on the web and named its site Cisco Connection Online. In 1998, Cisco's customers and reseller partners were logging onto Cisco's website about 1 million times a month to receive technical assistance, check orders, or download software. The online service has been so well received that nearly 70 percent of all customer service inquiries are delivered online, as are 90% of software updates.

The adoption of CCO as Cisco's front-office provides the following benefits:

- Reduce operating cost: Cisco estimates that putting its applications online generally saved the company \$360 million per year, or approximately 17.5 percent of the total operating costs.
- Enhanced technical support and customer service: with 70 percent of its technical support and customer service calls handled online, Cisco's technical support productivity has increased by 200 to 300 percent per year.
- Reduced technical support staff cost: The online technical support reduced technical support staff costs by roughly \$125 million per year.
- Reduced distribution and marketing cost: Customers download new software release directly from Cisco's site, saving the company \$180 million in distribution,

packaging, and duplicating costs. By applying direct marketing online, Cisco reduces 50 million of costs per year in printing and distributing catalogs and marketing materials to customers.

## 2. Buyer-oriented marketplace

The buyer-oriented marketplace is a key element for procurement management. The most popular type of buyer-oriented marketplace is the buyer's bidding site. A good example to look at the mechanism of buyer's bidding site is GE's TPN, a back-end store which built to enhance GE's procurement process. The basic architecture of a buyer-based marketplace is shown in Figure 3-2.

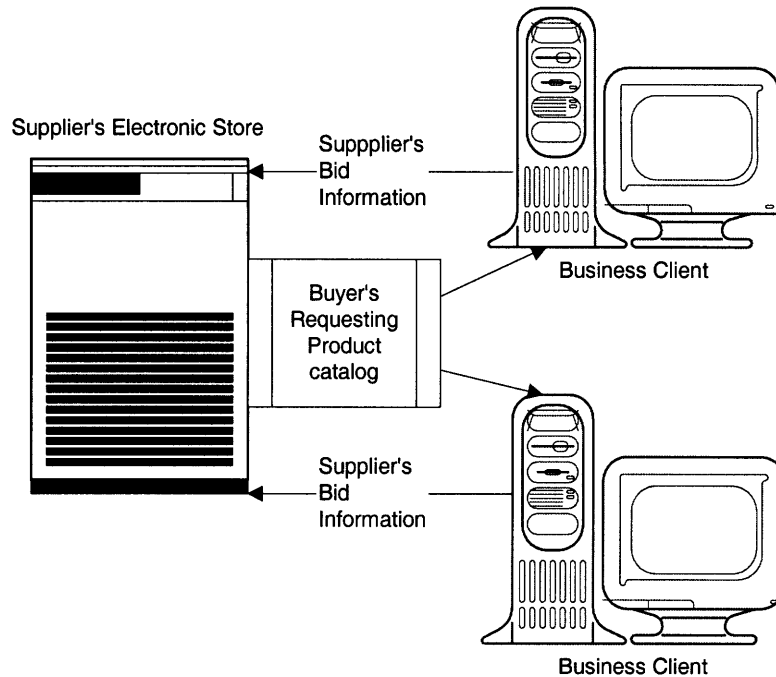


Figure 3-4 Buyer-oriented marketplace architecture  
-from Turban, Lee, King and Chung (2000)

Under the buyer-oriented marketplace model, sellers can no longer sit and wait for visit from business buyers, as in seller-oriented electronic malls. Instead, they need to approach the buyer-oriented site to access business opportunities. It is notable that this electronic market model is especially feasible when the market vendor possesses huge purchasing volume. Under this condition, sellers will be more willing to make efforts to

attend the bidding process. According to GE's TPN, the general bidding process in the seller-oriented markets contain the following procedures:

- (1) Buyers prepare bidding project/product information.
- (2) Buyers post the bidding projects (RFQs) on the Internet
- (3) Buyers identify potential suppliers
- (4) Buyers invite suppliers to bid on projects
- (5) Suppliers download the project information from the Internet
- (6) Supplier submit bids for project
- (7) Buyers evaluate the suppliers' bids and may negotiate electronically to achieve the best deal.
- (8) Buyers accept the bids that best meet their requirements.

The GE TPN system can improve the productivity of the buyer's sourcing process and allow buyers to access quality goods and services that customized to their needs. The larger pool of competition fosters competition and enables the buyers to spend more time negotiating the best deals and less time on administrative procedures. The benefits of GE's TPN system for GE are:

- Identifying and building partnerships with potential suppliers worldwide.
- Strengthening relationships and streamlining sourcing processes with recent business partners.
- Rapidly distributing information and specifications to business partners.
- Transmitting electronic drawings to multiple suppliers simultaneously.
- Cutting sourcing cycle times and reducing costs for sourcing goods.
- Quickly receiving and comparing bids from large number of suppliers to negotiate better prices.

Since other large companies can easily duplicate the benefits, this kind of buyer-oriented marketplace will grow more popular. This will attract more vendors to develop their

information technology platform in order to hook up with the supplier-oriented marketplaces.

### (3) Intermediary-oriented marketplace

Boeing's PART case demonstrates the intermediary-oriented marketplace. Boeing plays the role of intermediary in supplying maintenance parts to airlines. Unlike other pure intermediaries like ProcureNet and Industry.net, revenue as an intermediary may be a minor concern to Boeing. Supporting the customer's maintenance, in stead, seems to be the major goal. That is why this model is very important to many assembling companies who provide parts for maintenance. The basic architecture of an intermediary-oriented marketplace is shown in Figure 2-3.

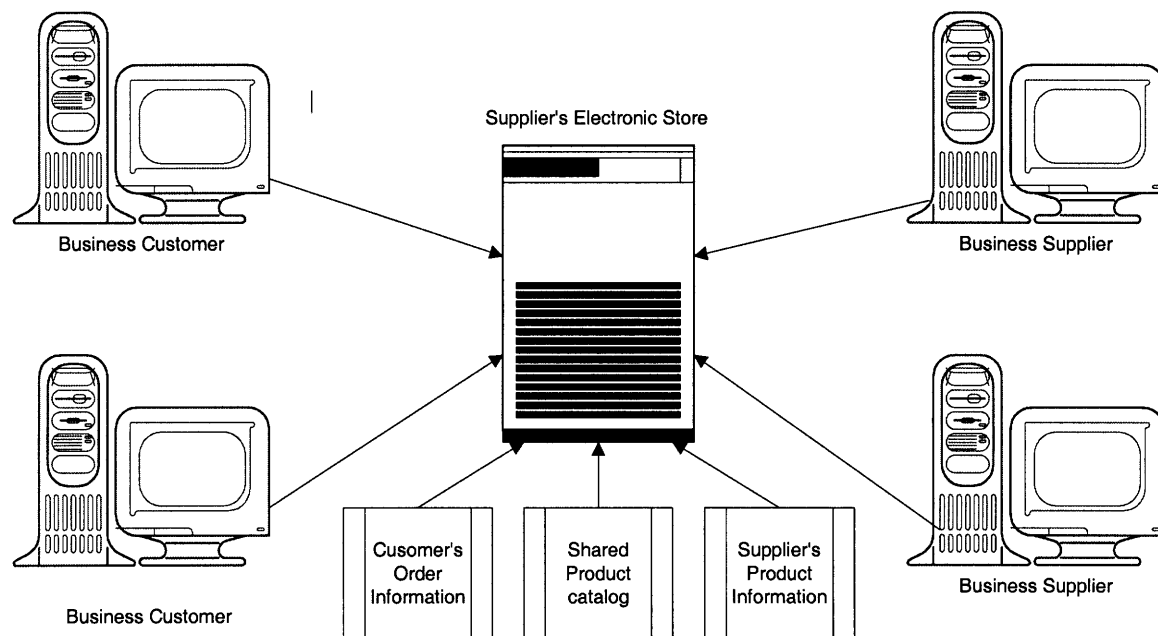


Figure 3-5 Intermediary-oriented marketplace model

-from Turban, Lee, King and Chung (2000)

The purpose of Boeing's PART is to link airlines who need maintenance parts with suppliers who are producing the parts for Boeing's aircraft (Teasdale 1997). Boeing's e-business strategy is to provide a single point of online access through which airlines (the buyers of Boeing aircraft) and maintenance providers can access the data about parts

needed to maintain and operate aircraft, regardless of whether the data is from the airframe builder, component supplier, engine manufacturer, or the airline itself. With data from 300 key suppliers of Boeing's airplane parts, Boeing's goal is to provide its customers with one-stop shopping with online maintenance information and ordering capability.

Ordering spare parts has been a multi-step process for many of Boeing's old EDI customers. An airline's mechanic informs the purchasing department when a part is needed. Purchasing approves the purchase order and sends it to Boeing by phone or fax. At this point the mechanic does not know who produced the part because the aircraft was purchased from Boeing as one body. However, Boeing has to find out who produced the part and then ask the producer to deliver the part (unless Boeing happens to keep an inventory of the part). The largest airlines began to streamline the ordering process nearly 20 years ago. Because of the volume and regularity of their orders, the largest airlines established EDI connection with Boeing over VANs. However, not all airlines were quick to follow suit. It took until 1992 to enlist 10 percent of the largest customers, representing 60 percent of the volume, to order through the EDI-VAN system. The numbers have not changed much since then due to the cost and complexity of EDI-VAN system.

Boeing views the Internet as an opportunity to encourage more of its customers to order parts electronically. With the initial investment limited to a standard PC and basic Internet access, even its smallest customers can now participate. Because of its interactive capability, many customer service functions that were handled by the telephone are now handled over the Internet. In 1996, Boeing debuted its PART page on the Internet, giving its customers around the world the ability to check parts availability and pricing, order parts, and track order status online. Less than a year later, about 50 percent of Boeing's customers used it for parts orders and customer service inquiries.

Boeing primary objective for the PART page was to improve services to its customers. Boeing also expects to realize significant operating savings as more of its customers use



the Internet. In addition, as many as 600 phone calls a day to telephone service staff have been eliminated because customers access information about pricing, availability, and order status online. Over time, Boeing anticipates that the PART intermediary system will result in fewer parts being returned due to administrative errors. Also, airlines are more likely to become return buyers, as Boeing's customer service getting more satisfied.

Airline maintenance is spread out over a wide geographical area. It takes place everywhere in the world the airline flies. As an airport, maintenance activities may take place at the gate, in the line-maintenance department, or at the maintenance operation center. Mechanics are traditionally forced to make repeated, time-consuming trips to the office to consult paper or microfilm reference materials. A single manual may contain as many as 30,000 pages. For this purpose, in 1996 Boeing OnLine Data (BOLD) went into operation, incorporating engineering drawings but manuals, catalogs, and other technical information. Another project, Portable Maintenance Aid (PMA), also helps to solve the issue of portable access. Owing to BOLD and PMA, mechanics or technicians are able to access the information they need to make decisions about necessary repairs at the time and place they need the information.

The combination of BOLD and PMA and online maintenance and parts ordering system forge a foundation for Boeing's intermediary-oriented marketplace model. The benefits from this system to the participants are as following:

- Increased productivity: spending less time searching for information freed up engineers and maintenance technicians to focus on more productive activities. One U.S. airline saved \$ 1 million a year when it gave 400 users access to Boeing's online service system. Seeing the result of the initial implementation, the airline expanded the service to 2000 users.
- Reduced cost: With information becomes available at the field, and prompt order can be made with no delay, the associated cost can be reduced.

- Increase revenue: Every 3,3000 hours, an airline does a schedule C maintenance check that can keep an airplane grounded for up to a week. Idle aircraft cost tens of thousands of dollars a day. Not having parts and information readily available can lengthen the process. The longer the maintenance check, the less revenue the opportunity. Through Boeing's online service, one European airline estimates it will save 1 to 2 days per year for each aircraft, resulting in \$43 million I revenue increase.

### **3.3 SME's behavior in the e-business regime**

This section focuses on the study of SME's behavior in the e-business regime. The model used to evaluate large existing firm's behavior is again used to measure SME's e-business challenges and track the rationales behind their strategic planning. This section contains three parts: (1) the e-business challenges that facing SME, (2) the strategic concerns in the current stage, and (3) SME' corresponding e-business strategy and e-business model application.

#### **3.3.1 The e-business challenges that facing SME**

There is a need to re-exam SME's industry structure as the business environment has changed. E-business environment and its economic impact for SMEs can be characterize by the model that includes the following three elements: (1) industry structure analysis; (2) value chain analysis; and (3) implementation barrier analysis

##### **3.3.1.1 Industry structure analysis**

The basic industry structure analysis for SMEs is shown in Figure 3-1. It is notable that as the changes of industry structure for service sectors and manufacturing sectors have been found quite different so we need to separate these two sectors in the following discussions.

### 1. The industry competitor's intensity of rivalry

For SMEs in the manufacturing sector, the widened geographic market increases the number of competitors. Also, for commodity providers, the competition the competitive market means the competition will be migrating to price, and the margin is further squeezed (like in a perfect competition market). However, for SMEs in the industry with strong geographic characteristic (i.e., a contractor tend to buying raw material from local suppliers), the impact can be mitigated. Generally speaking, Internet increase the competition between manufacturing SME rivals.

For SMEs in the service industry, the competition becomes more intensive as most of their products are digitizable and players have strong incentive to migrate service online because of the lowered sales and operation cost. The widened geographic market also increases rival competition, as products are mobile on the web. Search engine and cross-sales system also enable rivals to reach customer. Generally speaking, the competition between SMEs in the service sector is increasing.

### 2. Threat of Substitute

For SMEs in the manufacturing industry, the application of e-business doesn't increase the threat of substitute. But for SMEs in the service industry, substitute is increasing.

### 3. Barriers to Entry

For SMEs in the manufacturing sector, the impact on barrier to entry is limited. This is because existing manufacturing possess business scale and learning curve advantage so the production costs is already low. The production facility and equipment cannot be replaced by e-business application.

For SMEs in the service sector, the entry barrier is lowered. For these companies, activities which can be moved online, the entry barrier is removed because Internet applications are hard to keep proprietary.

#### 4. Bargaining power of buyers

For companies in both the manufacturing industry and the service industry, their bargaining power over buyers decreases. This analysis is consistent with the general concept that bargaining power tends to shift to buyers in an e-business transaction. And actually the widened geographic market will not only increase the number of competitors, the current e-business platform will also shift the competition to price. Only firms focusing on non-commodity products or niche market may be able to hedge the intensified competition.

For companies in the service sector, their bargaining power over buyers is also decreased. Most of the reasons are the same as above. However, as for the factor of proprietary product, Internet application makes it even hard to keep e-business context proprietary, but the service content can remain proprietary.

#### 5. The bargaining power of suppliers

For companies in the manufacturing sector, the bargaining power of SME over SME suppliers increases. However, SME can not leverage their buyer's position to strengthen their bargaining power over larger sellers because: (1) There is a potential for large firms to bypass SMEs and reach the customers directly. (2). Large firms have better information of the market and can conduct price discrimination for different buyers. However, the large commodity product vendor will lose bargaining power if the number of competitor increases.

For service sector, the syndication effect makes the content vendors able to sell to multiple-buyers with constant cost, however, there is no evidence of whether this product

proliferation increases or decreases buyer's power. Therefore, the bargaining power of supplier over SMEs in the service sector should be lowered. Summary of the industry structure change is shown in Table 3-5.

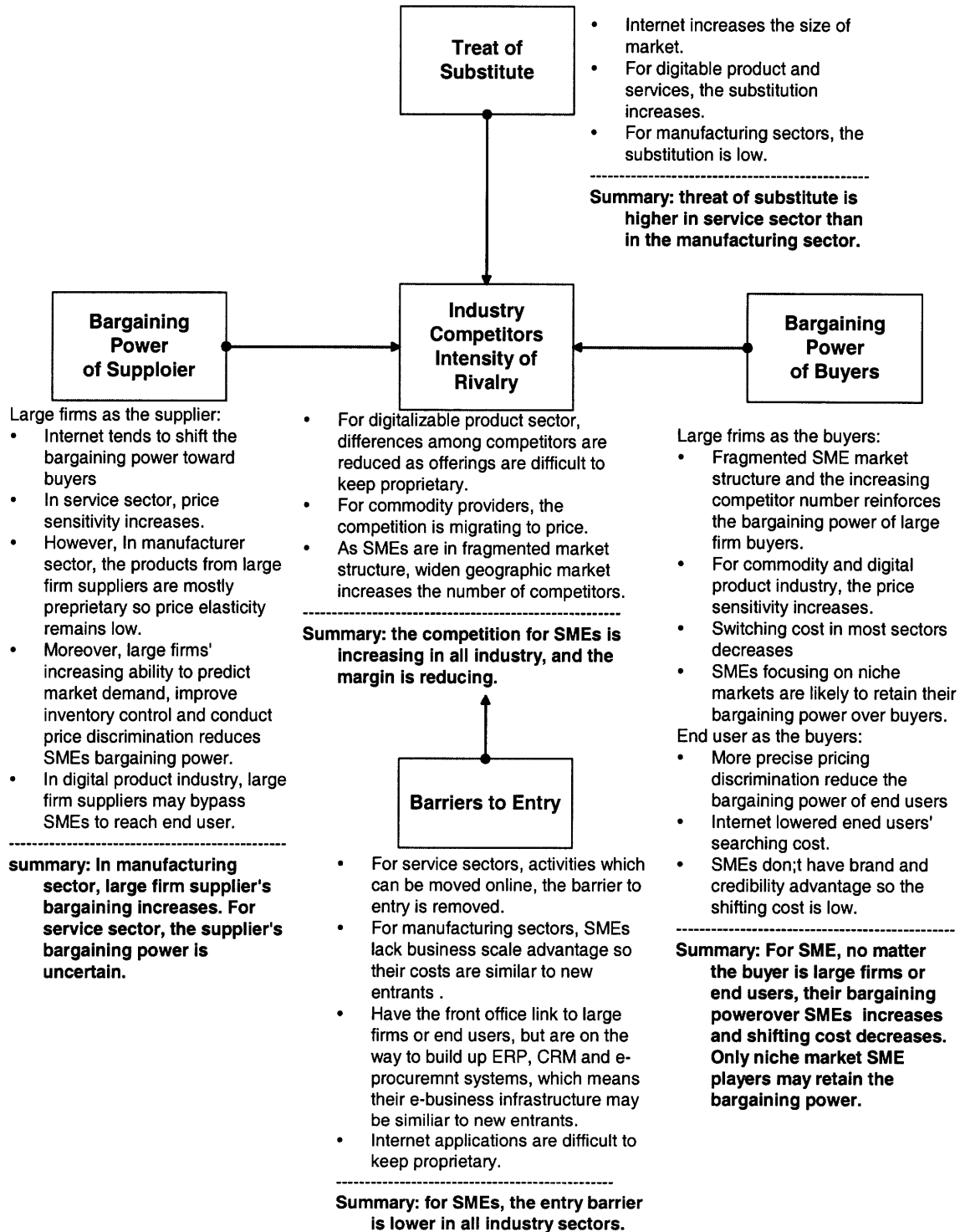


Figure 3-6 How Internet influences SME's industry structure

Table 3-5 Summary of SME's industry structure change

<b>Manufacturing sector</b>		
Attributes	Impact	
Industry Competitors Intensity of Rivalry	Increasing	
Threat of substitute	Constant	
Barriers to Entry	Constant	
Bargaining Power of Buyers	Increasing	
Bargaining Power of Suppliers	Large firm as supplier	Increasing
	SME as supplier	Decreasing
Conclusion	<ul style="list-style-type: none"> <li>• The increasing competition between rivals squeezes the margin of SME.</li> <li>• The increasing buyer/supplier bargaining power further squeezes SME's margin.</li> <li>• The weaker bargaining power pushes SME to adopt e-business platform that favored by its large business partner.</li> </ul>	
<b>Service sector</b>		
Industry Competitors Intensity of Rivalry	Increasing	
Threat of substitute	Increasing	
Barriers to Entry	Lowered	
Bargaining Power of Buyers	Increasing	
Bargaining Power of Suppliers	Large firm as supplier	Increasing
	SME as supplier	Decreasing
Conclusion	<ul style="list-style-type: none"> <li>• The increasing competition between rivals squeezes the margin of SME.</li> <li>• The increasing buyer/supplier bargaining power further squeezes SME's margin.</li> <li>• The weaker bargaining power pushes SME to adopt e-business platform that favored by its large business partner.</li> <li>• Large companies may bypass service sector SME to reach end user.</li> </ul>	

The industry structure analysis reveals the fact that SME's intention to adopt e-business is more driven by exogenous factor rather than endogenous motive. For manufacturing sectors, the factors of entry barrier, and threat of substitute remains stable, while their rival competition increases and, bargaining power over both large buyers and sellers decrease. However, as large firms are pushing toward the application of e-business, SMEs will lose the business opportunities and their competitive advantage if they resist joining the mainstream.

### 3.3.1.2 SME's value chain analysis

SME's value chain analysis is shown in Figure 3-7. According to Porter's theory, while industry structure analysis provides a matrix to evaluate the competitive advantage of an industry; the function of value chain analysis provides another matrix to measure firm's competitive advantage against their rivals in the same industry. From the analysis of the activities within the firm, one can identify the pros and cons of the current business process and the value generated in each stage.

However, after we conducted the industry structure analysis, we found that: the most important e-business impact that affects SME's behavior is for SMEs to acquire competitive advantage against rivals by involved in large company's e-business exchange. Therefore, our value chain analysis is used primary to observe whether the links between these business partners is been built-up or not.

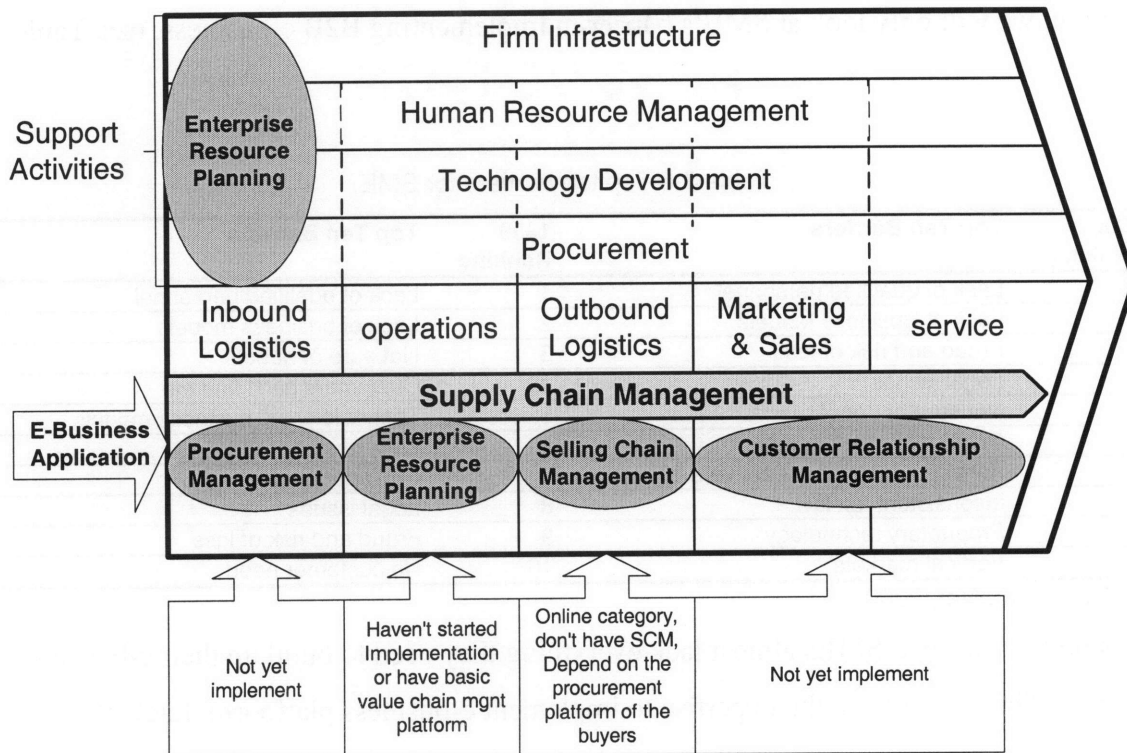


Figure 3-7 The current development of existing SME's value chain

As indicated in Figure 3-7, basically most SMEs don't have their ERP systems in place but some of them already have basic value chain management system. Because ERP

stands as the back bond of a e-enterprise. SMEs are actually lack of the capability to leverage the benefits of economic efficiency induced by e-business. Different from large firms, SMEs have difficult in choosing e-business system if they need to connect to multiple business partners who have different technology vendors. (It is known that e-business systems with different brand have problems in compatibility.) Therefore, a more concentrated market and long-term contracts become two critical factors to bring SME online. This is because both factors enable SME to generate more profits from picking out one system and thus will increase the motive of SME to adopt e-business.

### 3.3.1.3 Implementation Barrier

In 2000 fall, CommerceNet conducted a B2B barriers study. Because the IT infrastructure and e-business expertise of large firms and SMEs are rather different, the study was divided into two parts: B2B barriers for large firms; and B2B barriers for SMEs. In this section, we will only look at SME's barrier in implementing B2B e-business. (see Table 3-6)

Table 3-6 Top ten barriers for SME

<b>2000 Ranking</b>	<b>Top Ten Barriers</b>	<b>1999 Ranking</b>	<b>Top Ten Barriers</b>
1	Lack of qualified personnel	1	Lack of qualified personnel
2	Lack of Business Models	2	Lack of business models
3	Fraud and risk of loss	3	Not sure of benefit
4	Legal issues	4	Customers can't find me
5	Not sure of benefit	5	Technology vs. business models
6	Customers can't find me	6	Lack of standards
7	Partner e-business readiness	7	Can't get paid
8	Inconsistent tax law	8	Legal issues
9	Proprietary technology	9	Fraud and risk of loss
10	Vertical markets	10	No customer need

by CommerceNet, 2000

It is quite clear that, SMEs almost lack everything they need to build up their e-business system. They don't have the expertise to implement e-business platform. Lack of business model indicates the difficulty to define an e-business strategy that can bring in revenue. This phenomenon actually reflects the facts that SME can hardly determine their business model by themselves, a good strategy would be to determine their business model based on large existing firm's business model. Once they jump on the band wagon,



they would have the chance to leverage the network effect in the exchange and further their competitive advantage. “Customers can’t find me” also prove the fact that: lack of brand will result in a miserable condition because the inability to differentiate the firm from its rivals will migrate the competition to price.

### 3.3.2 SME’s strategic concern in the current stage

The prior discussions are summarized as Table 3-7. This matrix provides a more aggregate and generic view to evaluate the key factors that affect SME’s e-business strategy.

Table 3-7 Matrix to evaluate SME’s strategic concern

<b>Industry structure</b>		
Attributes	Impact	
Industry Competitors Intensity of Rivalry	Increasing	
Threat of substitute	Increasing	
Barriers to Entry	Lowered	
Bargaining Power of Buyers	Increasing	
Bargaining Power of Suppliers	Large firm as supplier	Increasing
	SME as supplier	Decreasing
<b>Implementation barriers</b>		
Organization restructuring	A difficult and time consuming task	
Product characteristics	SME in digital product market may be bypassed by large firms	
Investment in new business	Difficult	
Interoperationability	Integration of ERP with current operational process is on the way, hasn’t been able to adopt CRM and e-procurement system	
Partner platform	Need to consider business partner’s e-business platform, see below:	
<b>The interface of value chain with business partners</b>		
CRM	Not yet adopted	
Selling chain management	Pulled by large existing firms	
ERP	either not in place or on the way of developing	
E-procurement	Pulled by large existing firms	
<b>Conclusion</b>	<ul style="list-style-type: none"> <li>• The diffusion of e-business in SME is more an exogenous force rather than an endogenous force.</li> <li>• The current strategic concern for SMEs will be to link their value chain systems with large companies.</li> <li>• For SME who deals with multiple large companies, it’s difficult to choose the interface because e-business platform between different brand are incompatible.</li> </ul>	

It is expected that, as time goes by, many barriers, such as problems of platform compatibility which now limit the extension of e-business to SME, will be overcome. As a result, there will be a significant increase in the scale of e-business as it draws in small

second- and three-tier suppliers.<sup>3</sup> The largest impact of B2B e-business is likely to be on SME, because many large companies already have EDI in place.

The industry structure analysis indicates that: while the threats from new entrants and substitutes are quite low, large firm's bargaining power over SME will be increased through e-business application. Therefore, the diffusion of e-business for SME is more an exogenous force rather than an endogenous force. The following two issues are identified critical for SME in the current stage:

- The need to link their value chain systems with large companies.
- For SME who deals with multiple large companies, it's difficult to choose the interface because e-business platform between different brands are incompatible.

This analysis result has a big meaning for SMEs because while there is no way they can increase their bargaining power over large firms in the B2B regime, the key concern shift to: how to increase my competitive advantage against rivals. So one of the strategic concern for SMEs is to differentiate themselves from their rivals via customerization product or focusing on niche market. The other strategic concern would be to be engaged in large firm's e-business practice so SME can leverage the network effect prevailed in online exchange.

### 3.3.3 The strategy and e-business model of SMEs

As we found from the prior discussion, SME's e-business strategy and e-business model should be determined based on the e-business platform deployed by their large business partners. Actually, auto industry provides a superb example to demonstrate how industry players maximize their utility through strategic planning. GM, Ford and Chrysler have

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<sup>3</sup> The US Automotive exchange (ANX), developed by the Automotive Industry Action Group (AIAG), made use of the Internet to link automotive suppliers to each other and to Original Equipment Manufacturers (OEM). Dispensing with the close system that used to link only first-tier suppliers to OEMs, the new system provides a single common system that can be easily extended to include all suppliers.

been aggressively provide financial support to their first-tier and second-tier suppliers to link to their ERP and e-procurement system. This is because the Big Three know the benefits they can get from e-business practice. Once SMEs are drawn to a system, they can develop their expertise to create competitive advantage against their rivals. This scheme provides a win-win result for e-business promoters. The auto industry is a highly-concentrated market so Big Three have the market power to implement their strategic planning. Nevertheless, this gives an invaluable lesson for other industries.

## **Chapter 4 The Business Model and Strategy of Pure Online Players**

While deploying the Internet can expand the market, then, doing so often comes at the expense of average profitability. The great paradox of the Internet is that its every benefits- making information widely available; reducing the difficulty of purchasing, marketing, and distribution; allowing buyers and sellers to find and transact business with one another more easily- also make it more difficult for companies to capture those benefits as profits.

It is not the visible facts that change corporate strategy; it is the people's awareness of the fact that change their strategies. As we can see, the understanding of e-business has also been evolved like exploring an unknown map. At different stage, online players structure their strategy based on their understanding of the essence of e-business. In the next section, we will discuss the strategies that have been deployed in different stages and by different sectors.

### **4.1 Evolution of dot-com's e-business model**

With the advent of Internet, new ways of doing business have been developed, and are still evolving as time goes on. Ever since the booming of E-commerce, several B2B E-Business model researches have been conducted. There are many different ways to describe and classify E-Business models, but basically all of their initiatives tend to address the same issue: map out the obscure B2B E-Business domain.

In this section, a review of e-business model researches is presented in chronicle order. As different researches appeared to view or even define e-business models in a rather different way, this review may not forge a basis for directly model comparison.

Nevertheless, the review still provides some clues of how the concept of e-business model evolves. The following are the researches that have been included:

- Paul Timmers (April 1998)
- Jeffrey F. Rayport (Sep. 1999)
- Lynda M. Applegate and Neredith Collura (August 2000)

**Table 4-1 E-business model analyses by Paul Timmer (April 1998)**

<b>TIME</b>	<b>RESEARCHER</b>	<b>CLASSIFICATION CRITERION</b>		
<b>April 1998</b>	<b>Paul Timmer</b>	<b>Functionality in value chain</b>		
<i>Existing Business Model</i>	<i>Description</i>	<i>Value</i>	<i>Revenue</i>	<i>Companies</i>
<b>e-shop</b>	For existing companies, (Promotion, cost-reduction, addition outlet)	For owner: Increase demand pool For buyer: reduced price due to reduced cost	Transaction revenue	Fleurop, Travelocity
<b>e-procurement</b>	For existing companies, (additional inlet)	For owner: Increase supply pool leads to lower cost For suppliers: exposure to business opportunities, lower sale cost	Transaction revenue	JAL
<b>e-auction</b>	3 <sup>rd</sup> party, (Electronic bidding for existing companies)	For suppliers: reduced inventory, better utilization of production capacity, For buyers: reduced purchasing overhead cost	Transaction fee, advertising fee	Esprit, FastParts
<b>e-mall</b>	Collection of e-shops, (Aggregators, industry sector marketplace)	For individual shop: lower cost to be online, traffic from other businesses For buyers: lower cost of searching	Host fee, advertising fee	Electronic Mall, Industry.net
<b>3<sup>rd</sup> party marketplace</b>	3 <sup>rd</sup> party, (Common marketing front- end and transaction support to multiple business)	For suppliers: an add-on channel, a full scale of secure transaction service For buyers: lower cost of searching	Service fee, transaction fee	Citius, Tradezone
<i>Emerging Business Model</i>	<i>Description</i>	<i>Value</i>	<i>Revenue</i>	<i>Companies</i>
<b>Virtual communities</b>	3 <sup>rd</sup> party (Providing a basic communication environment)	For members: Add value of communication and information	Membership fee, advertising fee	Amazon, Steel Industry
<b>Value chain service provider</b>	3 <sup>rd</sup> party, (Support part of value chain, e.g. logistics, payments)	For user: better management or logistic support of part of the supply chain	Fee or percentage based scheme	FedEx, UPS
<b>Value chain integrator</b>	3 <sup>rd</sup> party, (added-value by integrating multiple steps of the value chain)	For user: integrating multiple steps of the value chain	Consultancy fee, transaction fee	PartnerNet, MarshallNet
<b>Collaboration platforms</b>	3 <sup>rd</sup> party (providing collaborative platform between enterprises)	For user: the capacity to proceed collaborative design or manufacturing, improved project support	User fee, constancy and management fee	Deutsche Telecom
<b>Information brokers</b>	3 <sup>rd</sup> party (trust provider, business information and consultancy)	For user: add value to the use of huge amount of data online	Pay-per-use fee, subscription fee	Yahoo, Belsign

Based on Paul Timmer (1998)

**Table 4-2 E-business Model Analyses by Steven Kaplan/Mohanbir Sawhney (December 1999)**

Time	Researcher	Classification criterion		
Dec 1999	Steven Kaplan/ Mohanbir Sawhney	Focus on the functionality of B2B online exchange		
Business Model	Description	Value	Revenue	Companies
MRO Hubs	Horizontal markets that enable systematic sourcing of operating inputs	Increase efficiency in the procurement process. Targeting at the transaction of operating inputs with low value but relatively high transaction cost	Transaction fee or advertising fee	Ariba, MRO.com, BizBuyer.com
Yield Managers	Horizontal markets that enable spot sourcing of operating input	Increase efficiency in the procurement process. Targeting at the transaction of operating inputs with high degree of price and demand volatility (e.g., utility) or inputs with huge fixed-cost assets that cannot be liquidated quickly (e.g., manpower or manufacturing capacity)	Transaction fee or advertising fee	Employeas, Aduaction.com
Exchanges	Vertical markets that enable spot sourcing of manufacturing inputs	Similar to traditional exchange: Allow purchasing managers to smooth out the peaks and valleys in demand and supply by rapidly exchanging the commodities needed for production	Transaction fee, advertising fee	Chemdex, SciQuest.com
Catalog Hubs	Vertical markets that enable systematic sourcing of manufacturing inputs	Automate the sourcing of non-commodity manufacturing inputs, creating value by reducing transaction cost of specialized products	Transaction fee, advertising fee	e-steel, IMX Exchange

Based on Steven Kaplan/Mohanbir Sawhney (1999)

**Table 4-3 E-business model analyses conducted by Lynda M. Applegate/Meredith Collura (August 2000)**

Time	Researcher	Classification criterion					
August 2000	Lynda M. Applegate/ Meredith Collura	Covering both B2C and B2B					
Focus Distributor							
Business Model	Model Differentiators				Likely Cost	Revenue	Companies
	Control	Sell	Price	Physical			
	Inventor	Online	Set	Product/			
	y		Online	Svc			
Retailer	Yes	Yes	No	No	Advertising and Marketing; Physical facility, Inventory & customer service; R&D; IT infrastructure	Product/service/sales	Amazon.com LandsEnd.com Walmart.com
Marketplace	Possibly	Yes	No	No	Advertising and Marketing; R&D; IT infrastructure	Transaction fees; Advertising & Marketing fees	E-loan Quicken_ Insurance.com

Aggregator/ Informatory	No	No	No	Possibly	Advertising and Marketing; R&D; IT infrastructure	Referral fees; Advertising & Marketing fees	InsWeb AutoWeb.com Individual.com
Exchange	Possibly	Possibly	Yes	Possibly	Advertising and Marketing; Staff support for auctions (especially B2B); Inventory & logistics; R&D; IT infrastructure	Depends on model	Amazon.com (B2C) Ebay (C2C) Priceline (C2B) FreeMarkets (B2B)
<b>Portal</b>							
Business Model	Model Differentiators			Likely Cost	Revenue	Companies	
	Gateway Access	Deep Content & Solution	Affinity Group Focus				
Horizontal Portals	Yes	Through Partnerships with vertical & affinity portals	Possible; Often through partnerships	Advertising, Marketing & Sales; Content/info asset mgmt; R&D; IT infrastructure	Advertising, affiliation & slotting fees; Possibly subscription or access fees	AOL.com Yahoo! iWon.com Virgin.com	
Vertical Portals	Limited	Yes	No	Advertising, Marketing & Sales; Content/info asset mgmt; R&D; IT infrastructure	Transaction fees; Commissions; Advertising, affiliation & slotting fees	Quicken.com Healthon/Web MD	
Affinity Portals	Possibly	Within affinity group	Yes	Advertising, Marketing & Sales; Content/info asset mgmt; R&D; IT infrastructure	Referral fees; Advertising affiliation & slotting fees	Women.com TheKnot.com	
<b>Producer</b>							
Business Models	Model Differentiators			Likely Cost	Revenue	Companies	
	Sell/Service Online	Sell/Service Offline	Level of Customiza- tion				
Manufacturers	Yes	Yes	Low to Moderate	Advertising, Marketing & Sales; Content/info asset mgmt; R&D; IT infrastructure	Product Sales, Service fee	Ford.com, GE.com, Medronic.com	
Service Providers	Yes	Possibly	Moderate to High	Advertising, Marketing & Sales; Content/info asset mgmt; R&D; IT infrastructure	Commission service or transaction fee	American Express, eCoverage.com , American Ariline	
Educators	Yes	Possibly	Moderate to High	Content/info asset mgmt; R&D; IT infrastructure	Registration or event fee, Subscription fee, Hosting fee	Ecollege.com, HBS, Pensare.com	
Advisors	Yes	Usually	Moderate to High	Content/info asset mgmt; R&D; IT infrastructure	Subscription fee, Registration or event fee, membership fee, commission, transaction or service fee	Ernst & Young, Mainspring.co m	
Information and News services	Yes	Possibly	Moderate to High	Advertising, Marketing & Sales; Content/info asset mgmt; IT infrastructure	Subscription fee, Commission, transaction or service fee	Financial Times, Forrester, WST.com	
Custom Suppliers	Yes	Yes	High	Advertising, Marketing & Sales; Content/info asset mgmt; R&D; IT infrastructure	Product sales, service fees	e-steel, IMX Exchange	

Based on Lynda M. Applegate/Meredith Collura (2000)

The most important implication from this e-business model researches comparison is: though there are different views to characterize e-business model, there is actually no new business models emerged during the past four years. If we look at Paul Timmer's research, we can say his category has covered almost all of the e-business models people are applying now. This can be explained by the following reasons:

### 1 Technology constrained the development of e-business application package

It is observed that, the cost of software development is an exponential growth curve. In the early stage, simple e-business function is easier to develop and then, the speed of technology development declined as cost and difficulty increases. Also, some web protocol has not yet standardized. The declining technology innovation speed creates a constraint for technology-oriented e-business application.

### 2. The barrier of implementation

Traditional organization hierarchy creates a strong barrier for e-business application. Unfortunately, large firms, as the driving force of e-business diffusion, are entities who have been deeply trapped in the organization reengineering issue. Dell, for example, has a organization hierarchy more fit to the application of e-business so it has the potential to restructure the industry by exploring new e-business model. For IBM and Compaq, their organization structures prevent them from creating new business model so their approach is to expand the use of e-business from the current business practice.

### 3. The economic nature of e-business

The current application of e-business is not to replace any economic elements (i.e., labor, land or capital). Rather, its usage is now more focus on assisting or facilitating the function of these economic elements. However, this argument may not be static. Over time, after most organization restructuring have completed, it is foreseeable that e-business will heavily reduce the importance of some economic elements.



## 4.2 Dynamics of Business Model

One of the early discussions in the B2B space has revolved around the question of “Who is the power spot?” Is it better to be a horizontal player focus on many vertical markets? Is it better to be a strong vertical player and expand horizontal later? Is it better to create a software platform and move to services in horizontal and vertical domains? For start-ups, is it better to develop domain expertise internally or partner with traditional leaders? For traditional companies, is it better to work alone or in partnership? If they are to build up an online business, is it better to keep it in the company or spin-off as an independent entity? No one knows the answer. Online players have to figure out their strategies based on the fuzzy game rules in the new business domain.

However, it has been observed that the trend is toward vertical online exchanges. FreeMarkets, for example, has rapidly expanded its service offering to a certain number of vertical markets, Vantor has also adopted a build/buy/invest approach to deepen its business into chemical, pharmacy and plastic industries. The reason is simple. As commission fee for traditional operating product transaction are essentially slim, and the revenue from advertising and referring has been all the way down. The higher margin of complex manufacturing product transaction becomes more appealing. In the early stage of B2B e-business, it is generally believed that industries with the following factors can be attribute to the development of vertical online exchange. (MSDW 2001)

- Low concentration of buyer – fragmented market
- High number of trades
- Low touch, standard products
- High number of repeat trades per product
- Industry with few self-service options and low customer service level
- Frequent excess capacity
- Regional markets that could potential go global
- Low brand-name impact
- Volatile supplier/buyer relationships

- High value to transparency
- Global industries accustomed to cross-border trade and logistics
- Low shipping costs/packaging
- Absolute level of cost associated with the function in time or money

To date, most of the principles still hold. However, as the market gets more mature, some of the game rules have been changes. Standardized product, for example, can no longer be relied on as a major resource of income because the entry barrier is rather low and the competition is intensive. So far, online exchanges need either to help industries to develop the standard or buildup domain expertise in complicated transaction in order to get competitive advantage.

### **4.3 The B2B Online Exchange**

Information and Communication Technology (ICT) has created the possibility for business transactions to migrate from the marketplace to the marketspace. Online exchange is the visual marketspace where almost all information and cash flow can transport with no barrier, and even lower cost. It is notable that, as transactions, data, customer relationship and cash flow come into the online exchanges, the value it generates and accumulates have placed it as the neural system of the new business mechanism. As online exchanges expand their businesses to the other domains of the network market, these visual marketspace will become neural system in the network economy. There is a trend that other entities in the network system are trying to immigrate or, at least, incorporate the exchange functionality into their businesses through mergers and acquisition. As companies believe that the essence of exchanges helps to create liquidity and expand business scope, there is a need to examine the core nodes of the business neural network in order to understand the future trend of the new system.

#### **4.3.1 Definition of B2B Online Exchange**

Starting from mid-90s, the booming economy and the mature information technology have nourished a solid foundation for e-business. The infrastructure is in place and company management feel an urgency to reap the perspective benefits from technology investment. The online exchange is the pioneer concepts for industries to embrace E-business due to the traditional concerns on high transaction cost. However, the online exchange has a different mechanism compared with traditional marketplace. While its functionality is to provide aggregated service, the structure of the marketspace is disaggregated.

In the marketplace, brand equity is established and managed by manipulating content, context and infrastructure through the marketing strategy. The three elements are usually aggregated. Customers and managers see a brand as a representation of customer-perceived value that comprise the value of product, service and communication program as a whole. In the marketspace, however, content, context, and infrastructure can be easily disaggregated to create new ways of adding value, lowering cost, forging relationships with nontraditional partners. Information technology adds or alters content, changes the context of the interaction, and enables the delivery of varied content and a variety of contexts over different infrastructure.

The B2B online exchanges illustrated in this research refers to those dot-coms which focus on delivering context and content to industries. Still, it is notable that larger online exchanges may possess their own infrastructures. Some industries may provide their contents to the online exchanges but host their data behind their firewall. Nevertheless, online exchanges should have the function as a context provider.

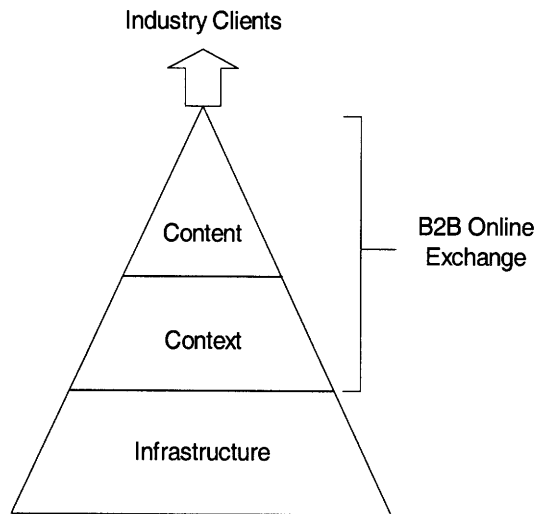


Figure4-1 B2B Exchange landscape

#### 4.3.2 The Functions of Online Exchange

While it's still doubtful that if participants of online trading are better off with the service offered by online exchanges, there is another question about whether online exchange is in itself a good business or not. People's argument is that: Look at the New York Stock Exchange, the mother of all trading exchanges, established in 1792, supports \$7.3 trillion and 163 billion shares in trading volume, can only generate \$101 million in income annually (1998 results). However, online exchangers claim that the NYSE example does not fit their business model because there exists functionality difference. NYSE's function is to provide an infrastructure for stock exchanges, it doesn't encompass the functions like research, advice, payment, settlement and marketing, the tasks that are mostly done by stockbrokers and are also where most value is. Online exchanges, on the other hand, will provide a more collaborative function beyond pure trading. The more vertical integrity function an online exchange can provide, the more value it added and the more profit it derives.

Online exchanges start their business from facilitating and incorporating the information flow. They are supposed to cover the functions that can streamline the business process of an industry or a company. To date, the functions been provided by online exchanges

including requisition routing and approval, supplier sourcing, order matching, fulfillment, settlement and content management. (MSDW 2001)

### 1. Requisition Routing and Approval

The purchasing enterprise typically has an internal approval process for orders over a certain size, and they are not about to let employees go clicking away unchecked. Procurement software codifies the approval process in workflow technology that can be modified as corporate policies change.

### 2. Supplier Sourcing

An exchange has to source suppliers to sell through its network, which is part of the value. Much like sourcing network operated by consulting firms, the online exchanges should provide strategic sourcing to secure contracts for quality, availability, and price. This bottom line is the ability for online exchanges to sell thousands of suppliers on the concept and provide the technical integration service.

### 3. Order Matching

Order matching, as the core exchange function, takes different forms depending on the market-making technology. They are four order-matching patterns listed as below:

- **Catalog Order:** the buyer browses a catalog to identify a fixed-price item. Most items are too low price to justify negotiation. This is the most traditional but still popular order-matching pattern. Some industries with more sophisticated and standardized procurement process benefit from advanced configuration technology that can build an order to a working system.
- **Dynamic Pricing:** for product that trades frequently with volatile pricing; the exchange matches the order at real time as quotes and bids come into the market. Real-time bidding is most appropriate for commodity products with standard

identification, volatile pricing, and substantial volume so that small changes in price are important to the participants.

- **Auctioning:** the auction process usually involves infrequent traded or unique items that can significant vary in value depending on the buyer. Equipment disposal and rental trading are typical auctioning objects. This trading pattern is expected to boom as the inspection technology become more sophisticated and buyers are more secured to identify the product value form the web.
- **Request for Proposal:** service to facilitate complex requisitions in time. A transaction in time with detailed specifications online and bids are consolidated and compared. Appropriate for project-oriented work like system integration and construction.

Table 4-4 Types of Order matching

	<b>Temporal Matching</b>	<b>Pricing</b>	<b>Good Fit</b>
Dynamic Pricing	Real time, frequent trades	Volatile; real time	Commodities; narrow selection
Catalog	Recurring orders	Standard or negotiated pricing	Standard products; Broad choice
Auction	Infrequent Trades	Wide disparity, depending on bidders	Standard and non-standard product
RFP	Weeks or months per transaction	Custom pricing, negotiated	Complex services and product

Base on Morgan Stanley Dean Witter (2001)

So far, large horizontal exchanges have adopted the mix of all the models on their website. One of the reasons is because their complex service targets, other reasons including the threshold of economics scale and technology investment.

#### 4. Fulfillment

Fulfillment is the most complicated, costly step but also the step with potential cost saving. A matched order sets off a complex series of events that lead to shipment and

delivery of the product. Fulfillment gets complicated because of exceptions (backorders, partial shipments, returns, substitute products, incorrect orders). These exceptions are expensive to resolve because they are so labor-intensive. Since preventing the occurrence of exception will be more economical efficient than trouble-shooting, as most of the exceptions were misled by wrong information, moving transaction online has provides a huge potential to reduce fulfillment costs.

## 5. Settlement

Exchanges are largely relying on P-Cards (procurement cards) and credit cards for financial settlement of orders. For large transactions, larger credit lines and a different fee structure is required. Currently some neural financial exchanges like eCredit has been involved in the development of the technologies that coped with the settlement function.

## 6. Content Management

Displaying merchandises for sales through an online catalog is a fundamental requirement for online exchanges. Sound content management can not only provide the real-time information for product or inventory, it will also streamline the transaction process as a whole. Though currently large companies tend to host their content within their firewall, the online exchanges are developing their credit to host and maintain corporate content.

### **4.3.3 The Different Operation Concepts: Aggregation and Matching**

Aggregation and matching are two primary operation concepts that applied by online exchanges. Different operation concepts add different values to their clients. Operation pattern is always a strategic issue for dot-coms, and it influences the development of marketing and pricing strategies.

#### 1. Aggregation

Online exchanges that use the aggregation mechanism bring together number of buyers and sellers under one virtual roof. They reduce transaction costs by providing one-stop shopping. PlasticNet.com, for example, allows plastic processors to issue a single purchase order for hundreds of plastic products sourced from a diverse set of supplier. The aggregation mechanism is mostly static because prices are prenegotiated. An important characteristic of the mechanism is that adding another buyer to the exchange benefits only the buyers and adding another seller benefits only the buyers. The reason is because, in an aggregation model, buyer and seller positions are fixed.

The aggregation mechanism works best in the following settings:

- The cost of processing a purchase order is high relative to the cost of items purchases.
- Products are specialized, not commodities.
- The number of individual products, or stock-keeping units (SKUs), is extremely large.
- The supplier universe is highly fragmented.
- Buyers are not sophisticated enough to understand dynamic pricing mechanisms.
- Purchasing is done through prenegotiated contracts.
- A catalog of products carried by a large number of supplies can be created.

The aggregation mechanism contains two sub-applications: the forward aggregator and reverse aggregator. “Forward “ in this sense means that the process follows the traditional supply chain model, with the supplier at the start and the buyer at the end. A forward aggregator form groups of suppliers and sell their products through the visual catalog host on a centralized marketplace. A reverse aggregator, on the other hand, forms groups of buyers within specific vertical markets. By gathering together the purchasing power – particular small and midsize buyers – they can negotiate price reductions. Forward aggregator and reverse aggregator fit in different styles of industries and the mechanism is shown at figure3.3.



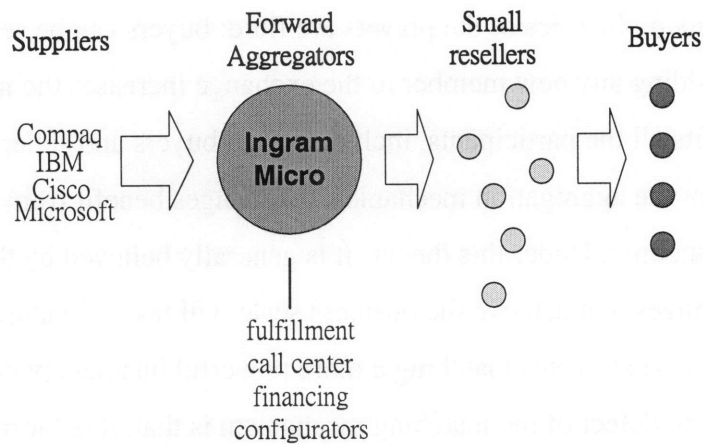


Fig. 4-2: The Forward Aggregator Model

- Based on MSDW(2001)

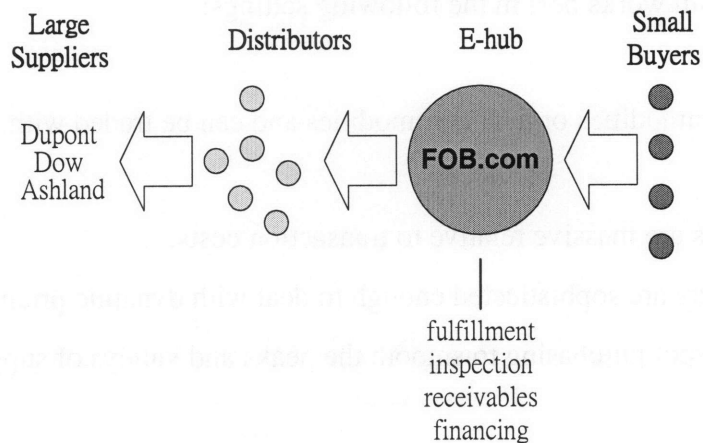


Fig. 4-3 The Reverse Aggregator Model

- Based on MSDW(2001)

## 2. Matching

Unlike the static aggregation mechanism, the matching mechanism brings buyers and sellers together to negotiate prices on a dynamic and real-time basis. For example, Altra Energy makes a market in energy and electricity by allowing industry participants to list bids and asks on specific quantities of liquid fuels, natural gas, and electric power. The matching mechanism is required for spot sourcing situations, where prices are determined

at the moment of purchase. The matching mechanism can also take the form of an auction, as is the case of FreeMarkets.

In the matching mechanism, the roles of the players are fluid: buyers can be sellers, and vice versa. Therefore, adding any new member to the exchange increases the market's liquidity and thus benefits all the participants, including both buyers and sellers. While catalog benefit only from the aggregation mechanism, exchanges benefit from both from both aggregation and matching. Under this theory, it is generally believed by the dot-coms that the first exchanges that achieve the business scale will take on natural monopoly characteristics. That makes matching a more powerful business pattern than aggregation. However, the defect of the matching mechanism is that, it is far more complex for operation.

The matching mechanism works best in the following settings:

- Products are commodities or near commodities and can be traded with actually seen.
- Trading volumes are massive relative to transaction costs.
- Buyers and sellers are sophisticated enough to deal with dynamic pricing.
- Companies use spot purchasing to smooth the peaks and valleys of supply and demand.
- Logistics and fulfillment can be conducted by third parties, often without revealing the identity of the buyer or seller.
- Demand and prices are volatile.

#### **4.3.4 The Bias of Online Exchanges**

Besides the operation concept that defines the functions and services of an online exchange, the bias of an exchange is another key factor that affects dot-com's strategy. Bias is always the most debatable issue in the online exchange industry. Different bias attracts different so it confines dot-coms ability to extend their relationships and business

scope. While forward aggregator favors the sellers, reverse aggregators tend to bias the buyers. Ingram Micro, for example, is a forward aggregator in the computer industry and it buildup strong relationships with big PC and software companies.

There are also neural exchanges that have been trying to create equally attractiveness to buyers and sellers. However, neutral exchanges face some daunting challenges: They tend to confront a “chicken and egg” problem. Buyers do not want to participate unless there are a sufficient number of sellers, and sellers do not want to participate unless there are a sufficient number of buyers. In order to succeed, these exchanges must spend much on marketing in order to attract both buyers and sellers quickly and create liquidity at both ends. Neural exchanges also have to overcome the sellers’ channel conflict. Actually, sellers usually participate the market at the expense of their normal distribution cost.

As for the biased exchanges, they do not have the “chick and egg” problem, they just go for their client, the one they bias. As a result, they have the potential to grow faster than neural exchanges. They are also able to attract smaller buyer or sellers because they can aggregate demand or supply. Besides, exchanges that are biased toward buyers don’t have to overcome sellers’ channel conflict. However, the reverse aggregators are not attractive to large buyers that already enjoy substantial volume discount.

Neural and Bias exchanges differ in another important way. Neutral exchanges are most likely to succeed in markets that are fragmented on both buyers and sellers. In such markets, neural exchanges add value by reducing transaction cost and improve matching by providing high liquidity. If only one side of the markets is fragmented, the benefits are greatly reduced for the non-fragmented side. FOB.com, for example, add the most value when the supplier side is relatively concentrated while the buye

#### **4.4 The Strategy of Dot-coms in The Distorted Market**

Besides the real essence of Internet that lead to different application of strategy, as an newly-born business that has never existed in history, the market has been reacted in an abnormal way which leads to some distorted dynamics. This unusual phenomenon is triggered by the fast pace of Internet technology deployment that made the capital market to reallocate its resource and further pushed almost every industry to restructure its value chain in a speed that nobody can digest.

In the earlier stage of E-Business, companies involved in Internet business have used to be led by distorted market signals and developed ineffective strategies. It is understandable to look to the market for guidance when companies confronted with a new business phenomenon. However, in the early stage of a new business pattern, market signals may be unreliable. Distort market and abnormal behavior always mean the “noise” that should be get rid of when we are to understand the real essence of E-Business. Distorted market has basically led to the following ineffective or even wrong strategies.

1. No differentiation with traditional counterpart:

As the start-ups first came to the market, many of them subsidized their transactions and services in hope of staking out a position on the Internet and attracting a base of clients. While the initial invest is huge for online auction start-ups, their competitive advantage is sustained by lower product price. Many content providers, for example, rushed to provide their information to big-brand horizontal portals for next to nothing in hopes of establishing a beachhead on one of the Internet’s most visited website. Some providers have even paid popular portals to distribute their content. It is natural that, come with the curiosity of online trading and the artificially low price, the demand becomes artificially high. Actually, as commission fee has been getting slim even in the traditional markets, it is very hard to sustain dot-coms’ competitive strategy by lower cost. Moreover, as online exchanges running out of their cash, they will need to come back to the fundamental pricing model. In order to sustain their thrive, there is a need for them to develop differentiation advantage other than cost advantage.

## 2. The adoption of stock as source of revenue:

Some revenues from online business have been received in the form of stock rather than cash. Much of the estimated \$450 million in revenues that Amazon has recognized from its corporate partners has come as stock. And this phenomenon is also prevailed in the B2B sectors. The sustainability of such revenue is questionable, and its true value hinges on fluctuations in stock prices.

## 3. The adoption of equity payment leads to hidden cost:

Many suppliers and employees have agreed to accept equity, warrants, or stock options from Internet-related companies and ventures in payment for their services or products. Payment in equity does not appear on the income statement, but it is a real cost to shareholders. Such supplier practices have artificially depressed the cost of doing business on the Internet and made it more appeal than it really is.

## 4. The underestimation of online service cost:

It is a common phenomenon that costs have also been distorted by the underestimate of capital needed. Company after company touted out the low asset intensity of doing business online, only to find that inventory, warehouses, and other investments were necessary to provide value to customers. This is actually a very dangerous sign for online players who have low entry barrier in the initial stage and high cost threshold for further business development.

### **4.5 The Dynamics of Dot-coms' E-strategy**

It is clear that the evolution of e-business model is a process driven by new technology. On the time when information technology came out from the labs and became functional applicable, people's first thinking is to know how to take advantage of the new

technology, how to incorporate the new tool to their business. As people gradually aware of the fact that IT is a mean to create differentiate competitive advantage, their business strategy tiled to become more and more technology driven. Eventually, people develop their strategy from looking at the available technology and then try to create value out of it.

The essentially big Internet impact has spurred up a confusing “new economy” argument. The way that Internet facilitates business transparency and incorporation has been so unique and has thus shifted people’s focus from classical economical principles to new business rules. For the past few years, it was a time when start-ups people talks more about revenue rather than profitability, first mover advantage rather than differentiation advantage. When the focus is no longer the real value generated in the business activities, the distorted market embedded an environment for a potential dot-com bubble.

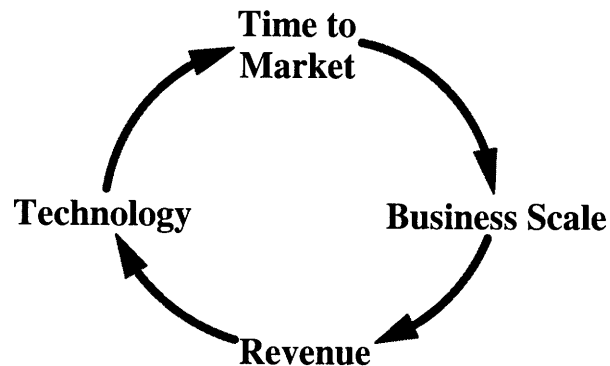


Fig. 4-4:Dot-com’s initial Mindset

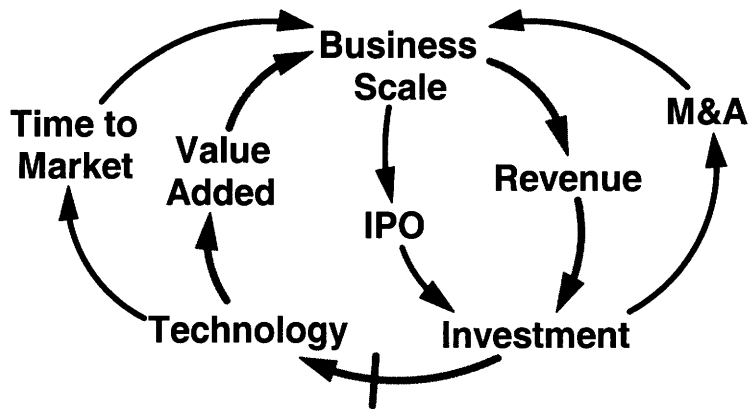


Fig 4-5 Dynamics of the Ultimate Strategy

If we look at dot-com's mindset, (shown as Fig 4-4) it is clear that the basic concept of the online business is simple. Companies raise funds to develop, or purchase, new technologies. Technology enables them to achieve quicker time to market. Fast movers are able to attract the fast adopters and created the liquidity. Liquidity will reinforce "winner take all" phenomenon, gear up the revenue, and further enhances companies' ability to develop/acquire more cutting-edge technology.

However, the dynamics ended up quite different in the real world. In order to rush to the market quicker, dot-coms tended to cut the features of their technologies/services or worked in systems with relatively poor security (especially when compared with their VAN counterparts). This strategy is not new. This is a working strategy proved by Microsoft when selling their operation system product: Windows. It is true that new service/technology did help to attract new customers and create liquidity and business scale. However, as the time required to develop physical technologies became extensive, another shortcut to gear up R&D capital and liquidity is booming: the financial means: mergers, acquisitions and IPO. Starting from 1998 after Amazon.com went public, the financial market's mania about dot-com perspective has forged a foundation of this trend. Cisco, for example, is probably the most well-known case of companies increase technology capacity via buying up middle or small competitors; while there are too many cases of dot-coms been criticized of running for IPO as their business goal rather than for profit.

In a classic market, the way companies conduct business is through the “business scale”- “revenue”-“investment”-“technology”-“value-added”- “business scale” loop. In this loop, the correlation between consequent factors is very clearly. There is no fuzzy correlation between these factors. However, in the dot-com loop: “IPO”-“investment”- “M&A”- “business scale” loop, and use “time-to market” as a substitute for “value added”: there contains too many uncertainties in the correlation. For example, it has been estimated that, only 30% of mergers and acquisition have been proved working, other 70% have been failed to meet the initial goal.

It is not that the dot-coms’ business strategy is totally wrong or invalid. Financial means are definitely a positive way to fulfill firm’s business goal. However, the underline problem for dot-com is that: the fundamental business goal has been shifted from profit to other measures, like liquidity. This practice is dangerous especially when market is premature and liquidity does not necessary link to profitability (it’s notable that some of the e-business practices, like online exchange, actually have very low shifting cost). There are also other invisible constraints and barriers in the industries that make this experiment bitter. We should know that there are industries that have been better off from the new business pattern. The financial service industry, for example, has been aggressively adopting the new business pattern and restructuring their industry structure. Now this industry has a more streamline value chain, provide customers with easy-access, sophisticated and incorporated service and generate more profits from the improvement. However, the story of e-business development is not the same in different industry.

#### **4.6 Summary**

E-business is not unsustainable, nor is it unmanageable for dot-coms. One of the key factors embedded in the dot-com bubble is the inability for dot-coms to create an equilibrium business with distinctive competitive advantage. In order to establish and



main distinguish strategic positioning, Michael E. Porter has suggested dot-coms to follow the six key factors for strategic positioning.

(1) The Right Goal

A company must start with the right goal: superior long-term return on investment. Only by grounding strategy in sustained profitability will real economic value be generated. Economic value is created when customers are willing to pay a price for a product or service that exceeds the cost of producing it. When goals are defined in terms of volume or market share leadership, with profits assumed to follow, poor strategies often result. The same is true when strategies are set to respond to the perceived desires of investors.

(2) A value proposition

A company's strategy must enable it to deliver a value proposition, or set of benefits, different from those that competitors offer. Strategy, all after all, is neither a quest for the best way of competing nor an effort to be all the things to every customer. Strategy is to define a way of competing that delivers unique value in a particular set of uses for a particular set of customers.

(3) Distinctive value chain

Strategy needs to be reflected in a distinctive value chain. To establish a sustainable competitive advantage, a company must perform different activities than rivals or perform similar activities in different ways. A company must configure the way it conducts manufacturing, logistics, service delivery, marketing, human resource management; and so on differently from rivals and tailored to its unique value proposition. If a firm focuses on adopting best practices, it may end up with most activities similar to competitors, making it hard to gain an advantage.

#### (4) Trade-offs

A company must abandon or forgo some product features, services, or activities in order to be unique at others. Such trade-offs, in the product and in the value chain, are what make a company truly distinctive. When improvements in the product or in the value chain do not require trade-offs; they often become new best practices that are imitated because competitors can do so with no sacrifice to their existing ways of competing. Try to be all the good things to all customers almost mean the company will lose any advantage.

#### (5) Business elements fit together

Strategy defines how all the elements of what a company does fit together. A strategy involves making choices throughout the value chain that are interdependent; all a company's activities must be mutually reinforcing. A company's product design, for example, should reinforce its approach to the manufacturing process, and both should leverage the way it conducts after-sale service. Fit not only increases competitive advantage but also makes a strategy harder to imitate. Rivals can copy one activity or a whole system of competing. Without fit, discrete improvements in manufacturing, marketing, or distribution are quickly matched.

#### (6) Continuity of direction

A company must define a distinctive value proposition that it will stand for, even if that means forgoing certain opportunities. Without continuity of direction, it is difficult for companies to develop unique skills and assets or build strong reputations with customers. Frequent corporate "reinvention", then, is usually a sign of poor strategic thinking and a route to mediocrity. Continuous improvement is necessary. But it must always be guided by a strategic direction.

## **CHAPTER 5: Industry Study in the Financial and Construction**

### **Industry**

The theoretical framework presented in chapter 2 has helped us to get some insights on the dynamics of firm's behavior in the B2B regime. In this chapter, we will look at e-business development in two industries: the financial industry and the construction industry. Financial industry is an early adopter of e-business practice and is widely regarded as the most e-business-savvy industry. Looking at e-business's development in the financial industry provides a window for us to project the future of e-business in other industry. As for the construction industry, we found that the value chain system of a construction company is rather different from their counterparts in other industry and the e-business application is also different. Under this condition, we will create a generic model to analyze the dynamics of e-business in the construction industry.

#### **5.1 B2B in The Financial Industry**

The financial industry has always been the pioneer who explored the B2B wonderland. Most innovative e-business models are developed and explored in the financial industry. In this section, we will look at the emerging e-business model in the financial and see why implications can be derived from these practices.

##### **5.1.1 The emerging e-business models in the financial industry**

As Internet business market is still in the developing stage, the potential uncertainties and obscure dynamics keep its structure and players remain in rapid flux. Despite breathless press coverage, very little is known about how B2B e-business will evolve on the Internet. Fortunately, the financial service market has provided a window for the future shape of B2B. We believe in Richard Wise and David Morrison's argument that: Characterized of information-based transactions, large and liquid exchanges, and intense

competition, financial markets can closely resemble the new B2B markets in other industries.

It has been known that, unlike their B2B counterparts, the financial market exchange system has been around for centuries. Their evolution provides important clues to the likely evolution of B2B in other industries. In particular, the recent restructuring of the financial industry suggests that, counter to the common knowledge about B2B today, exchanges are not the primary source of value in information-intensive markets. Rather, value tends to accumulate among a diverse group of specialists that focus on such tasks as packaging, standard setting, arbitrage, and information management. This trend implies that, before a solid business platform is in place, the function of a collaborative online exchange will be distributed and conducted by several specialist entities.

Until recently, B2B markets in most industries had little common with financial markets. But with the spread of digitalization and the booming of Internet, B2B markets have taken on many of the characteristics of financial trading. Potential market liquidity and greater transparency have enabled more efficient pricing and more effective matching of buyers and sellers.

Over the last two decades, as deregulation and digitization have swept through financial services, the industry has gone through a radical restructuring. Traditional brokerage and banking channels have been dismantled, and transaction fees have fallen precipitously. As a result, power and profit have migrated away from centuries-old business models toward a wide variety of innovative and highly specialized new models. There are four major trends that underlined the implications in this evolution: (1) Transaction: from simple to complex, (2) Channels: from middleman to speculators. (3) Deliverables: from transaction to solution, and (4) Exchange: from buyer-seller exchange transaction to seller asset swaps.

#### 1. Transaction: from simple to complex

To fulfill complicated financing needs, a company once had to forge a close working relationship with a major bank that offer tailor loans. Even though the process of customizing a financing package was time consuming, expensive, and restricting, there was often no alternative. In recent years, however, highly complex financial transactions have been successfully packaged as securities that can be freely bought and sold. Securitization has vastly increased the financing choices available to companies – and vastly reduced the fees earned by traditional banks.

Standards made securitization possible. By adopting universal standards for loan terms and leading parameters, the financial industry enabled more customization within open marketplaces. Consider the mortgage market. Traditionally, mortgages were customized loans handled by local or general banks. Rates, terms, and lending requirements varied greatly. However, spurred by the advent of lending agencies such as Fannie Mae and Ginnie Mae, the mortgage business has evolved into an efficient national marketplace of securities, with arm's-strength transactions between disperse buyers and sellers. The traditional bank's rule as generalists, in which it handles every aspects of a mortgage and generate value from this process, has been split into three specialist's roles: origination, a customer relationship task still handled by local banks or mortgage brokers; securitization, a financial task handled by companies like Fannie Mae and Ginnie Mae working with investment banks; and loan servicing, a processing task handled by large-scale service companies.

It is foreseeable that a similar fragmentation of roles in the B2B world as markets will be restructured to accommodate the complex goods and services that account for the bulk of most companies' spending. Already, some exchanges are repositioning themselves to play narrower but more lucrative roles. FreeMarkets, best known for running internet auction, is rapidly turning itself into what might be called a specialist originator – a company that helps buyers gather and analyze the information necessary to purchase complex products and services electronically. FreeMarkets knows that its greatest value lies not in conducting auctions, which is rapidly becoming a commodity service, but in identifying and qualifying bidders and in creating detailed, standardized requests for

proposals that enable the bidders to provide comparable quotes even on highly specialized products. Auctions are becoming adjuncts to FreeMarkets' primary role of providing structure, standards, and liquidity for complex transactions.

As FreeMarkets handled more transactions, its product descriptions will become more refined and specialized, reducing the investment it has to make in subsequent auctions and expanding the range of auctionable items. However, it is unlikely that FreeMarkets will be able to retain proprietary control over the standards it has been helping create. The experience of the financial industry provides another implications here: while many securitized products, from auto leases to credit card receivables, started out as proprietary inventions, they eventually became routine, widely traded offerings. In much the same way, the standards for describing products for online sale will become universal as other exchanges copy FreeMarkets' templates or as industry-specific standards emerge for describing product and transaction attributes.

As this happens, FreeMarket's focus will likely shift to two areas: providing online expertise in sorting out which product features best meet a particular buyer's needs and leverage its knowledge of qualified suppliers to serve buyers as a demand aggregator. Like a mortgage originator, FreeMarkets will concentrate on the initial qualification, specification, and packaging role, handling off the transaction itself to larger, more liquid exchange partners.

## 2. Channels: from middleman to speculators

As financial markets became more competitive, transaction fees steadily eroded. Stock trades that used to generate fat commissions are now executed for a few dollars, or even for free. The disappearance of transaction income has triggered an intensive search for new sources of revenue, which has in turn given rise to a new set of business models. Instead of extracting fees from transactions, a number of financial services companies now make their money by actively trading in the underlying market. Several of the leading investment banks, for instance, have increasingly dedicated their capital and

people to investing for their own accounts, and these investments generate a large and growing share of their overall profits. The companies still need to be closely involved in client transactions, but mainly for the market information they provide.

As the profit margins of B2B exchanges get pushed down by competition, some exchanges will start to take their own speculative positions and start buying and selling large quantities of the goods traded in their market. In this “e-speculator” model, running the biggest exchange still provides a source of competitive advantage. But, like the financial market, the advantage comes not from fees but from a superior access to the dynamics of the market. In some of the most extreme cases, exchanges might even pay for a flow of deals to gain valuable information about the market.

One pioneer in e-speculation, Knight Trading Group, provides a vivid window to this trend. Knight Trading group, a wholesale market maker for stocks, executes trades behind the scene for the largest online trading firms, including E\*Trade and Ameritrade. Knight has invested in a highly automated system that can execute a large volume of trades efficiently, and roughly 40% trading of all online trading now flows through the company. Rather than earning profits through trading commissions, Knight pays the online brokers for their order flows. The company enjoys the business scale created by these order flows to analyze the market movements and adjust its own positions accordingly.

Enron is also using the e-speculator model. Starting from a gas pipeline operator, Enron steadily expanded its business to become a major provider of many other energy products. As the B2B trading mania boomed, it has exploited its privileged position to establish a thriving online exchange in which it makes money not from commissions but from buying and selling a variety of energy products, including natural gas, electric power, pulp, and pollution credits, for its own account. Following the lead of investment banks, Enzon is now expanding its e-speculator model: creating and selling derivatives such as options, future, and swaps, which allow other market participants to mitigate their price risks. Enron currently transact \$1.5 billion in derivatives per day online, and it

has been doubling its transaction volume each quarter. These instruments further benefit the company to hedge its exposure to trading losses.

### 3. Deliverables: from transaction to solution

Decreases in transaction income have also led financial companies to emphasize comprehensive money-management services to enhance profit margins, strengthen customer relationships, and lock in predictable revenue streams. An early sign of this shift was the rise of mutual funds and asset management service in the late 1980s. Recently, a proliferation of sophisticated services such as investment planning, tax and estate planning, and tailored investment accounts. In addition to generating substantial return for the providers, such integrated services have considerable appeal to demanding clients, who want to manage the overall costs and returns of their portfolios rather than maximize the value of any one transaction.

The B2B landscape is also well suited to solution providers. By using Internet to bundle products with related information and services, creative companies can improve the effectiveness and efficiency of their client's businesses. This approach helps to forge strong and long-lasting client relationships that will de-emphasize product price and exchange-based transactions. Early examples of solution sites are now appearing on the Internet. Some of them are operated by suppliers who position themselves counter to the roles of exchanges; other are portals operated by third-party intermediaries.

An example of the first type is Milpro.com, a site operated by machine-tool manufacturer Milacron. Milpro sells high-margin Milacron coolants, cutting wheels, and drillers directly to small machine shops. But this site also helps these small customers handle a broad array of related business challenges, such as buying and selling used equipment, identifying new business opportunities, and troubleshooting problems. For example, the site contains a "wizard" function that guide customers through a set of questions about a process (such as grinding) and related problems (such as chatter marks) and then recommends particular products. This customized service provides the function much as



an experienced sales representative can do. Through such services, Milacron has been able to attract the attention and the business of small machine shops, a group which is expensive and difficult to reach through traditional channels. Those shops, in turn, gain access to both the expertise that they could not acquire through a transaction-focused online exchange and the bundled service that has been expensive through old channels.

An example of a third-party solution site is Biztro.com, a portal for small-business transactions. Biztro aims to solve small-business manager's back-office problems through an integrated suite of services covering the functions of payroll, benefits management, human resource management, and procurement. Biztro has signed deals with a group of product and service providers, including Dell and OfficeMax. The providers are able to sell through the portal, and Biztro earns a commission on the transactions. By providing a high level of convenience, Biztro shifts their transaction away from purely price-based trading.

#### 4. Exchange: from buyer-seller exchange transaction to seller asset swaps

With the rise of large, sophisticated market makers and the emergence of digital networks, more and more securities trades are being executed without knocking the door of established exchanges. Many financial companies are joining electronic communications networks, (ENC) in which they can match trades with other participants, saving them the cost of going through an exchange and allowing them to trade day or night. Charles Schwab has gone even further. It runs its own internal trading operation and carry out the transactions by swapping shares among its clients without involving the mutual funds companies. Besides eliminating transaction costs, such internal trading system preserve Schwab's control over client transaction without leaking any resulting information to outsiders.

Similar sell-side swap models are emerging in B2B online arena. In contrast to most existing exchanges, which tend to penalize sellers, asset swaps benefit suppliers by

allowing them to better utilize their key assets. At the same time, they enable buyers to tap a broader, more efficient supply base.

The swapping model is particularly attractive in highly fragmented industries, where small-scale suppliers often lack a broad geographic reach and are highly vulnerable to fluctuation in demand. The trucking business is a perfect example. Many segments of the trucking market are operated by independents or small firms that cannot individually achieve scale economics due to the unpredictability of their routes. Unable to coordinate pickups and deliveries among their own small sets of customers, truckers routinely return from deliveries without cargo, which means highly cost for the truckers and slower delivery times for their clients.

Most B2B websites in the trucking business don't help truckers address these problems. Instead, the auctions functions they adopt squeeze the truckers by putting them in cutthroat bidding wars. Transportal Network, in contrast, uses the Internet to allow carriers to trade capacity with other carriers, filling those empty trucks and creating real value and a better system for all players involved. In conjunction with its asset-swapping service, Transportal also offers truckers the ability to purchase employee benefits and insurance, parts and equipment, financing, and other product. This approach enables these small businesses to gain scale advantage without losing their independence. Meanwhile, customers benefit from a stronger, more efficient base of carrier.

### 5.1.2 The implications from financial service industry

From the way that the financial industry have been moving toward a more diversified business pool with specific and sophisticated functions, we can be inspired that the B2B E-Business will be structured very differently from the way it is today. Rather than being dominated by monolithic exchanges, it will basically encompass the following distinct, interdependent business models: Mage-exchanges, Specialist originators, E-speculators, Solution Providers and sell-side asset exchanges. The framework is shown as Figure 5-1.

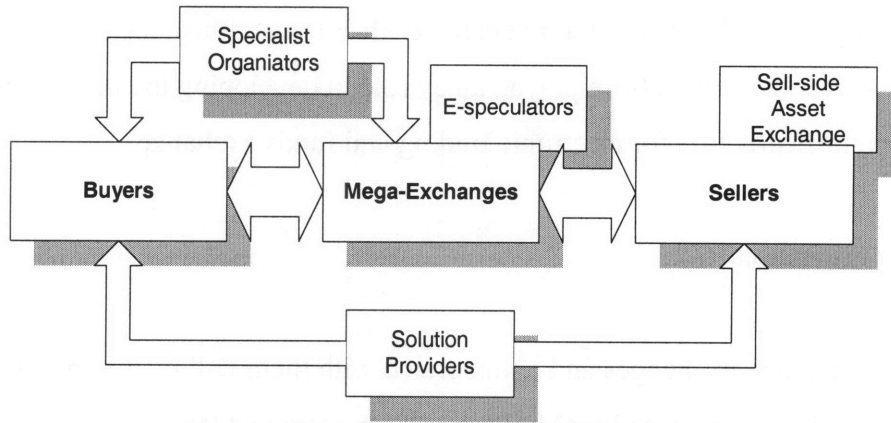


Figure 5-1: The potential B2B E-Business Models  
Based on Wise and Morrison 2000

### 1. Mega-exchanges

Because scale and liquidity are vitally important to efficient trading, today's fragmented and illiquid exchanges will consolidate into a relatively small set of mega-exchanges that will stand in the center of the B2B network. Although most transactions will flow through them, they will not generate much profit. As transaction fee fall or even disappear, the transaction may likely to evolve into two different ways. First, since the best method of achieving sufficient market liquidity is to enlist every participant's support, the exchanges will move away from being for-profit entities move toward being a fair transaction hub for the benefits of all.

Second, they will move from purely executing transactions toward creating the infrastructure and standards necessary to streamline connections between buyers and sellers. This will address intensive need of efficiency, such as speeding up the flow of product information, automating billing and payment, and linking buyer and seller production processes more closely. And this will allow the exchanges to handle not only simple product but also complex custom procurements and services, which will account for most business transactions.

The above two trends echoed the same concepts that has been evolved in the financial industry. Over the past several decades, numerous subscale regional stock exchanges were replaced by two large exchanges, the NYSE and the NASDAQ. Both exchanges

operate primary for the benefit of members rather than to maximize the profits of the exchanges. And both of them have played a key role in developing the information standards and infrastructure for electronic trading and funds exchange.

## 2. Specialist originators

Surrounding the mega-exchanges and collaborated with them will be the specialist originators. Originators such as FreeMarkets will structure and take orders for complex transactions, bundle them into large order requests and send them to large mega-exchanges for execution. The originator role will be most valuable in markets with relatively expensive products that are either complicated or require customization. The ideal markets are, for example, automotive and aircraft components, industrial equipment subassemblies, and complex services such as insurance.

In order to become successful, an originator will need to concentrate initially on creating standards for trading complicated products and providing real-time support for customers online. An originator will be able to achieving an advantage by undertaking a complex product category and customer decision-making parameters better than its competitors. It will also benefit by using configuration and decision-support tools. Profits will come primary from commissions and from slotting fees paid by vendors and exchanges in return for preferential positions with the originator. Many of the niche portals already in operation will likely use their knowledge of narrow business communities to move toward an originator model.

## 3. E-speculators

E-speculators, which aim to capitalize on an abundance of market information, will tend to concentrate where relatively standardized products can be transferred with large transaction volume. They will also look for markets with volatile price, which will provide profit margin. It is expected that e-speculators will emerged in the markets like chemicals, paper, energy and certain basic industrial parts.

To tackle their business, e-speculators will need to develop strong financial and risk management skills. A speculator's advantage will come from having better, more timely market information than other participants. To get that information, it will have to partner closely with mega-exchanges or operate for the exchanges' account. Speculators will likely earn profits not only by trading but also by creating and selling various hedging instruments.

#### 4. Solution Providers.

In many markets, a handful of independent solution providers with well-known brand names and solid reputations will thrive alongside the mega-exchanges. Like Milacron, a good number of them will leverage distinctive technical expertise to become indispensable to customers and thus reduce the importance of price in buying decisions. Many will derive a substantial proportion of their profits from high-margin consumables. The solution provider model will be most common in markets where the product itself presents a small portion of a customer's overall costs but highly influence other costs. For example, special chemical admixtures represent a small percentage of the cost of concrete, but the wrong admixtures won't cure the concrete properly.

#### 5. Sell-side asset exchanges

Many B2B transactions will consist of sell-side asset exchange, in which suppliers will trade orders among themselves, sometimes after initial transactions with customers are made on the mega-exchanges. Sell-side swapping will be most valuable where markets are highly fragmented, both on the buyers and sellers sides. It is most fit to the industries where, for geographic or information reasons, demand-supplier are always mismatch and where suppliers can benefit greatly from keeping expensive fixed assets fully utilized. These are the industries like construction, transportation, plastic and farming.

A company seeking to pursue the asset-exchange model will need to have strong relations with the supplier community, since success will rely on gaining a critical mass of supplier transaction. It will also need to be adept at understanding supplier problems.

The characteristics of these business models are illustrated as Table 5-1.

Table 5-1: Overview of Potential E-Business model

	<b>Stance</b>	<b>Key Enabling characteristics</b>	<b>Required capacities</b>	<b>Source of Profit</b>
Mega-exchange	Neutral	<ul style="list-style-type: none"> <li>• Maximum liquidity</li> <li>• Common transaction standards</li> </ul>	<ul style="list-style-type: none"> <li>• Large-scale transaction processing</li> <li>• Perceived neutrality</li> </ul>	<ul style="list-style-type: none"> <li>• Profits are slim or exchange is non for profit</li> </ul>
Specialist Originator	Buyer-bias	<ul style="list-style-type: none"> <li>• Complex products</li> <li>• Relatively expensive products</li> </ul>	<ul style="list-style-type: none"> <li>• Strong consultative sales skills</li> <li>• Deep product understanding</li> <li>• Strong customer relationship</li> </ul>	<ul style="list-style-type: none"> <li>• Transaction commissions</li> <li>• Slotting fees from vendors, exchanges</li> </ul>
E-Speculator	Exchange-bias	<ul style="list-style-type: none"> <li>• High degree of product standardization</li> <li>• Moderate to high price volatility</li> </ul>	<ul style="list-style-type: none"> <li>• Financial engineering and hedging skills</li> <li>• In-depth knowledge of market and market dynamics</li> </ul>	<ul style="list-style-type: none"> <li>• Playing the spread</li> <li>• Selling hedging instruments to participants</li> </ul>
Solution Provider	Neutral	<ul style="list-style-type: none"> <li>• Product costs a small portion</li> <li>• Product-related issues impact other costs</li> </ul>	<ul style="list-style-type: none"> <li>• Strong technical skills</li> <li>• Problem-solving mindset</li> </ul>	<ul style="list-style-type: none"> <li>• Higher product margins</li> <li>• Valuable add-ons and refills</li> </ul>
Sell-side Asset Exchange	Seller bias	<ul style="list-style-type: none"> <li>• High fixed costs</li> <li>• Related fragmented supplier and customer base</li> </ul>	<ul style="list-style-type: none"> <li>• Strong supplier relationships</li> <li>• Ability to offer additional relevant services</li> <li>• Perceived neutrality</li> </ul>	<ul style="list-style-type: none"> <li>• Selling ancillary products/ services to members</li> </ul>

Based on Wise and Morrison 2000

## 5.2 B2B in the Construction Industry

The development of B2B in the construction has been very different in many ways compared with its counterparts in other industries. Most companies don't have the sophisticated IT systems and they focus, not on corporate integration, but on project

collaboration, and the online transaction stands for a tiny portion of the overall volume. Most people consider this phenomenon as a reflection of the industry's notorious tradition in lag in adopting innovative technology. Nevertheless, we think there should be some more rigid rationales behind the scheme. This section will try to analyze the development of e-business in the construction industry in a more systematic approach.

### 5.2.1 Industry Introduction

With a total value of \$660 billion, the construction industry represents approximately 8% of US GDP in 1998. Construction has been and continues to be a very fragmented and regional industry on the owner side, the contractor side, and even the material supplier side. The 1997 DOC Census of Construction Industries reports that there were approximately 2 million construction establishments in the US; however, only 400,000 consisted of 5 or more employees. The top 400 US contractors made up only 17.1% of the entire U.S. construction industry. The top five contractors, including Bechtel Group, Fluor Daniel, Brown & Root, Contex Corporation and Turner Corporation, accounted for a mere 2.6% of the overall market.

Unlike other industries, the participants of the construction projects have relatively little access to the information of other players in the market. Firms often limit their contact to the network that they are familiar with. In some cases, this kind of fragmented market may create higher profit margin for the contractors because it generates fewer competitors in the bidding process. However, contractors also feel that they are losing the chance to create new business opportunities for their companies. This type of market structure is not stable, which means when there are players start to leverage the benefit of Internet to strengthen their business connection, the other firms will soon follow suit to sustain their competitive advantage.

The unique characteristics of construction industry lies not only on its industry structure, but also on its product. The value chain applied to deliver the products tremendously affects the business pattern in this industry. Basically people always divide the

construction products into the following two categories: (1) the physical product: material and equipment, (2) the virtual product: project.

## 1. Material

Material purchases in the construction industry can be broken down into two categories: commodity products, such as lumber, concrete, asphalt, and steel, and non-commodity products, such as plumbing supplies, electrical components, roofing and flooring materials. Non-commodity products represent approximately 70% or \$135 billion of the construction supplies industry. In general, the \$126.5 billion non-building structure market utilizes mostly commodity products; these are generally large, public-works infrastructure projects that require a lot of earth-moving work and the construction of basic structures using large quantities of concrete, lumber, form-work, and reinforcing steel. Such projects are highly equipment and labor intensive, with materials accounting for only 35-40% of total project costs. In a typical building project, by contrast, material make up 50-60% of total costs and non-commodity products are the norm.

The fragmentation of the construction materials industry creates a complex and inefficient supply chain where materials often pass through two or three layers of intermediaries. This fragmentation creates opportunities for retailers to demand large volume of discounts from manufacturers and acquire significant markup on the materials they sell to the end-user. Large warehouse retailers such as Home Depot and Lowes typically buy at about 40% below the manufacturers' list price, and then markup prices to buyers in the range of 10-40%, depending on the product. The current supply chain is inefficient and costly for buyers (general contractors and subcontractors) who are forced to pay substantial premiums for products and to weed through confusing layers of suppliers to find the products they want.

## 2. Project



Unlike the other manufacturing or service industries, construction is a project-oriented business. Each company develops its value chain based on its target market, expertise and corporate constraints. Due to the diversity of the project's different delivery system, technology requirement and combination of players, it has been found that a standard enterprise-oriented e-business platform is hard to be implemented by construction companies. Knowledge management is considered as a critical tool to classify these diversities and integrate the information flow. However, the difficulty in codification of construction knowledge sets a strong barrier for knowledge dissemination. Proprietary technology and patented process further strengthen the barrier.

### 5.2.2 E-business in the Construction Industry

Based on the problem described previously, it is broadly agreed that, for this industry, there is a need to create a mutual platform to facilitate inter-organization communication and to integrate project information and documentation. However, before the invention of Internet, there existed two barriers that prevented this type of industry integration to come true:

#### (1) Too costly to afford

Most construction companies are SMEs and the industry has always been notorious for its tiny margin. Most construction firms couldn't afford to build up the Edi-VAN system.

#### (2) Project-oriented means few long-term contracts

Qualification system was prevailed because it acts as a substitute of brand in this industry. Most projects are a combination of different architects, contractors, sub-contractors and suppliers. Though there business relationship did exist between local companies. For large firms with IT systems, long business relationships tend to be more scarce.

(3) Production is on-site and hard to control.

Construction project is not within the company or sit in the factory. It is moving everywhere, before the advent of ICT (Information & Communication Technology) revolution, it has always been hard to implement a collaborative system on to the project site.

However, Internet along with innovation of the communication technology makes all these things feasible. Starting from 1998, some pure online players- dot-coms, have emerged. The next chapter will discuss how e-business is applied in the construction industry, and how its function increases the economic efficiency of this industry.

#### 5.2.2.1 Application of e-business in the construction industry

Basically, companies providing e-business services can basically be divided into the following two categories: (1) pure online players (or dot-coms), and (2) hybrid players who focus on professional or niche market.

##### 1. Pure online Players

Pure online players comprise of the following two types of firms: (1) Application service provider- who provide project collaboration service; and (2) exchange- who facilitate the procurement process.

##### (1) Application Service Providers (ASP):

ASPs serve the back-end of a project. This kind of online program is basically composed of two components:

- Online meeting & team communication: the programs enable project teams to capture practices and existing process knowledge and to leverage them through digital

connection and online meeting. Participants of the project are given authority and notification to access updated project information gathered on the project website.

- Document management: ASP provides comprehensive document management and collaboration to standardize project documents and hook up these digital data with the corporate database. This standardization allows project team members to share project documents such as design drawings and specifications in a secure online environment.

Specifically, the ASPs are expected to fulfill the following functions at different stages of Exhibit 2 presented previously:

- Pre-construction Stage: The system should allow architects, contractors and owners to exchange drawings, schedules, specifications, permit applications, budgets, contracts, and other documents instantly over the Internet.
- Construction Stage: Services include sets of workflow processes that streamline the management of Requests-For-Information (RFIs), material review submittals, progress billings for contractors, meeting minutes, and other standard business forms, contracts and documents.
- Closeout and Commissioning Stage: operations and maintenance manuals, CAD drawings and project-generated transactions records are saved in the server for backup.

## (2) Online exchange

The online exchange provides one-stop shopping for procuring materials, equipment, operational goods and services. Buyers and sellers set up their catalogues in the marketplace for dealing. They can also create, issue and manage Request-For-Quotations (RFQs) and Purchase Orders (POs) for stock and custom-ordered items via the Internet to expedite and automate the procurement process.

Specifically, the current online market provides the following functions:

- Enhance existing vendor relationships by moving purchasing online -- streamlining the entire procurement process.
- Provide multiple authorized users within a company to access the market, allowing the project team to collaborate internally on the creation and review of bid packages.
- Issue RFQs automatically to multiple vendors at the click of a button.
- Attach electronic plans and specifications to bid packages through market.
- Keep track of all new and pending transactions through a single, personalized "dashboard" as well as maintaining a complete transaction history.
- Quickly compare and analyze bids received through the unique comparison worksheet, which is created automatically as bids are received.
- Automatically issue purchase orders to successful bidders.

A summary of the online services provided by pure players is listed in Table 5-2.

Table 5-2 Web-based Services Offered by Whole Package Provider

Collaboration Capabilities	Workflow Capabilities	Work Process Management	Communication
Review Drawing Check in/out  Redline/comment Archive versions Lock  Review CAD models  Review photos Review without application Message board/discussions Schedule/host online meeting	Meeting minutes Manage correspondence RIFs Transmittals Submittals  Approvals  Change notifications	Estimating/Budgeting Bid solicitation  Bid submission Scheduling Job progress reporting  Multiple project progress reporting Purchasing/procurement Accounting Facilities management	Print Fax  E-mail within project E-mail outside project Personal digital assistant

From ENR 2000

## 2. Hybrid Players:

These companies are more focus in specific market niches, such as enterprise financial portals, legal companies, equipment rental and raw material supply online. These websites are mostly maintained or sponsored by existing bricks-and-mortar companies in

an attempt to provide a hybrid model. They present a neutral position to provide people with the option to perform transaction online or in the traditional way.

#### 5.2.2.2 The trend of e-business development in the construction industry

Is the e-business trend in the construction industry moving toward private-proprietary system? Three of the industry's largest Internet project management and collaboration companies (ASPs), Bricnet, Buzzsaw.com and Citadon, together lost almost \$200 million in 2000. By themselves, the companies that merged to create Citadon-Bidcom and Cephren-posted combined revenue in 2000 of \$5.6 million and had operating expenses of \$125 million, according to a document produced for the merger. That means their operating loss for the year came to \$119.4 million. As for the online exchanges, things are going even worse. Currently, most of the public exchanges, (i.e, eBricks.com) have already failed.

As the most prestigious online players in this industry, Bricnet, Buzzsaw.com and Citadon all pledge to continue to innovate, these companies may not be able to add as many new features to their products as quickly as their customers would like. They also may have less money to spend on acquisitions or joint ventures that could inch the industry closer to the Promised Land of integration envisioned by technology managers. And if further consolidation continues, some believe the software companies that have only within the last few years or so made the big jump to Web-related products may slow their pace of improvements to a frustrating crawl.

Fragmentation is one of the obstacles blocking the creation of collaboration tools that mesh with design, estimating, project management, accounting and change order processing. As things stand now, the idea that these functions could be integrated into a seamless whole remains a super-challenging task. While many companies point hopefully to the few attempts to integrate different functions, such as Meridian Project Systems' work with J.D. Edward's business software, others say the efforts haven't yet delivered as

much as they had hoped for at first. The inability to deliver a genuine secure and collaborative e-business platform results in the slim cash flow of online ASP service.

For e-business exchanges, the business environment is also chilly. The industry's lack of standard product specification has been notorious for many years. An identical screw may have different serial number or product code if the vendor is different. Therefore, content management has been critical for these online exchanges. The geographic barrier creates another issue, construction equipment or raw materials are costly to move and this means, even for the commodity product, the deal may not be determined by price. This condition constrains the function of online exchange.

### 5.2.3 The strategy of e-business in the construction industry

In this chapter, we will apply Porter's model again to examine the unique characteristic of the construction. The first part is a discussion of the current strategic concern. And the second part deals with the strategic dynamics of the industry structure.

#### 5.2.3.1 The current strategic concern of the industry

So far, the most enthusiastic impact of e-business application on construction industry remains to be the development of project collaboration system. Different from firms in other industries who have an integrated value chain of the firm itself, a critical value of construction company's function is to facilitate the value chain of the project. Figure 5-2 presents the value chain of a typical design-build project. It is quite clear that the traditional project value chain does not have the upper-bound support activities. So every activity was very loosely connected, so the economic efficiency of the value chain is very low. Through the application of project collaborative system, the linkage between activities can be strengthened.

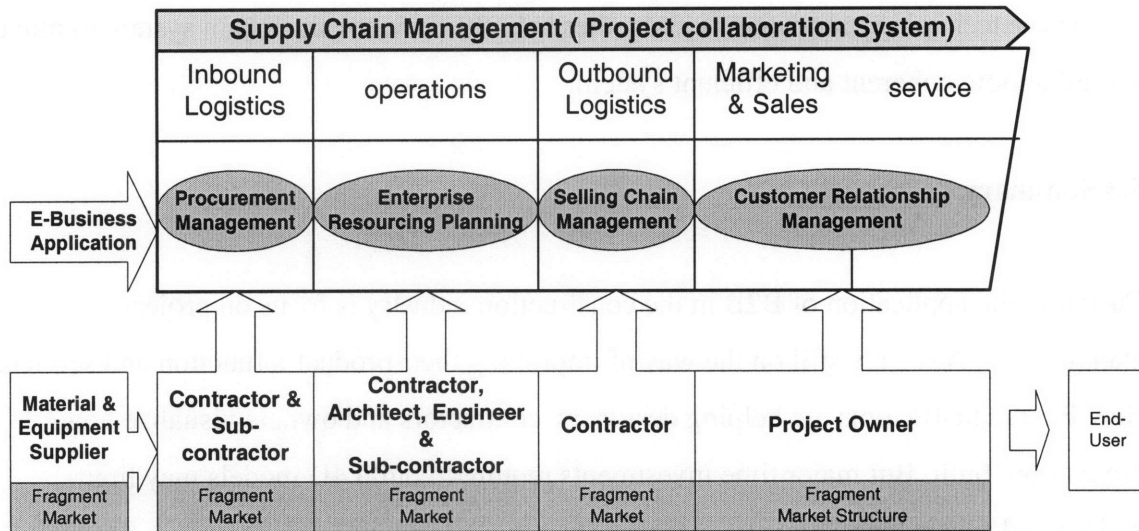


Figure 5-2 The value chain of Design-Build Construction Project

On the contrary, for the e-procurement system, the nature of construction industry's fragmented market structure decrease its attractiveness. There is no companies can leverage the market power, as indicated in chapter 3, so this reduces the pressure to push SME suppliers online. The logic can be clarified as following:

1. As indicated in Chapter 3, the margin of SME suppliers is squeezed in the online exchange. So, if there are no powerful buyers to push them, the incentive to attend online transaction is low.
2. SME buyers want to leverage the lower price through online bidding, however, their market power is not strong enough to quarantine a long-term and steady order flow. Combined with the un-standardized product characteristics effect, this reduce their ability to push bidders online.

This model basically explains why currently most of the huge players in the market are enthusiastic in developing project collaboration system. Now PC-based 4D tools are helping designers, contractors and owners visualize how projects are built. But major time investments required to build 4D models may lower the pace of adoption. Mobile systems bear with project drawing and data are also getting prevailed in the construction

site. These technology innovations altogether help the project value chain system to move toward a more coherent and efficient system.

### **5.3 Summary**

Currently the application of B2B in the construction industry is focus on project management. ASPs are still on the way of improving their product's function and service. New PC-based 4D tools are helping designers, contractors and owners visualize how projects are built. But major time investments require to build 4D models may limit widespread acceptance.

As for the online exchange companies, the future remains gloomy. Why does the online exchange not work in the construction industry? From the prior discussion in chapter 3, it is quite clear that the fragmented industry structure do not have a large company with enough market power to implement "more traditional" B2B platform. (i.e., e-procurement and CRM and selling chain management ). So companies will focus more on improving the project performance through collaborative project management package.



## **Chapter 6 Summary and Discussion**

The impacts of e-business application have been broadly discussed for many years. It is generally believed that e-business creates new economic efficiency and its profound influence will affect current business concepts and lead to a new business order. There are many views that can be used to characterize this business evolution. In this research, we focus more on studying the strategic consequence of e-business and firm's corresponding behavior. The prior chapters basically separated the analysis for different industry sectors and players. In the last part of this thesis, we summarize these analyses in a more aggregate way. This chapter contains two parts: the first part is a summary of the research; the second part includes the discussions regarding the e-business effect in the current stage and its perspective development in the future.

### **6.1 Summary**

This research has provided a framework to understand the strategic consequences embedded in e-business development. In this section, the strategic concerns and the corresponding plans for existing large firms, SME, and pure online players are summarized as below.

#### **6.1.1 Existing large firms**

The industry structure analysis indicates that: while the threats from new entrants and substitutes are quite low, large firm's bargaining power over business partners can be increased through e-business application. This analysis result has a big meaning for large firms because while their cost of procurement has the potential to be reduced, the pricing of their products can be sustained or even increased through reinforcing brand effect; direct and cross sale; and price discrimination. Therefore, there is a strong incentive for large firms to enhance vertical value chain connection and business collaboration.

Based on our analysis, e-procurement system is identified as the most important strategic concern at the current stage. The reasons why e-procurement becomes the most crucial concern can be summarized as below:

- (1) E-procurement helps to reduce purchasing cost. This impact is direct, measurable and the effect can be recognized in a short time.
- (2) Large companies can leverage their market power to draw suppliers to attend the e-procurement program, which means e-procurement is relatively easier to implement.
- (3) Procurement process and platform are mostly standardized so it requires few internal reengineering and thus hedge the risk of organization change.

After the rationale of e-procurement as the most important e-businesses strategic concern for large firms is defined, the next question becomes whether firms should use their proprietary channel (private exchange) or public exchange. A research conducted by AMR Research (AMR, 2001) indicated that private exchanges would corral more than half of the \$5.7 trillion e-business spend by 2004. The report went on predict that the world's largest enterprises would earmark between \$50 to \$100 million each for building private exchanges. Another research conducted by eMarketer Inc., a New York-based Internet research firm, reports that 93% of all business-to-business commerce is currently transacted through private or so-called proprietary exchanges, many of which have generated huge and well-documented supply-chain efficiencies. No matter which estimation is correct, the trend toward proprietary exchange is clear.

#### 6.1.2 SME

It is expected that, as time goes by, many barriers, such as problems of platform compatibility which now limit the extension of e-business to SME, will be overcome. As a result, there will be a significant increase in the scale of e-business as it draws in small

second- and three-tier suppliers.<sup>4</sup> The largest impact of B2B e-business is likely to be on SME, because many large companies already have EDI in place.

The industry structure analysis indicates that: while the threats from new entrants and substitutes are quite low, large firm's bargaining power over SME will be increased through e-business application. Therefore, the diffusion of e-business for SME is more an exogenous force rather than an endogenous force. The following two issues are identified critical for SME in the current stage:

- The need to link their value chain systems with large companies.
- For SME who deals with multiple large companies, it's difficult to choose the interface because e-business platform between different brands are incompatible.

This analysis result has a big meaning for SMEs because while there is no way they can increase their bargaining power over large firms in the B2B regime, the key concern shift to: how to increase my competitive advantage against rivals. So one of the strategic concern for SMEs is to differentiate themselves from their rivals via customerization product or focusing on niche market. The other strategic concern would be to be engaged in large firm's e-business practice so SME can leverage the network effect prevailed in online exchange.

### 6.1.3 Pure Online Player

In chapter 4 we have discussed the distorted market and abnormal online player's behavior in year 1999-2000. We can basically summary these factors as below:

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<sup>4</sup> The US Automotive exchange (ANX), developed by the Automotive Industry Action Group (AIAG), made use of the Internet to link automotive suppliers to each other and to Original Equipment Manufacturers (OEM). Dispensing with the close system that used to link only first-tier suppliers to OEMs, the new system provides a single common system that can be easily extended to include all suppliers.

1. No differentiation with traditional counterpart: As the start-ups first came to the market, many of them subsidized their transactions and services in hope of staking out a position on the Internet and attracting a base of clients.
2. The adoption of stock as source of revenue: Some revenues from online business have been received in the form of stock rather than cash.
3. The adoption of equity payment leads to hidden cost: Many suppliers and employees have agreed to accept equity, warrants, or stock options from Internet-related companies and ventures in payment for their services or products.
4. 4. The underestimation of online service cost: It is a common phenomenon that costs have also been distorted by the underestimate of capital needed. Company after company touted out the low asset intensity of doing business online, only to find that inventory, warehouses, and other investments were necessary to provide value to customers.

In the next stage of e-business development, we expect the following e-business models to emerge:

1. Mega-exchanges: Because scale and liquidity are vitally important to efficient trading, today's fragmented and illiquid exchanges will consolidate into a relatively small set of mega-exchanges that will stand in the center of the B2B network.
2. Specialist originators: Surrounding the mega-exchanges and collaborated with them will be the specialist originators. Originators such as FreeMarkets will structure and take orders for complex transactions, bundle them into large order requests and send them to large mega-exchanges for execution.
3. E-speculators: E-speculators, which aim to capitalize on an abundance of market information, will tend to concentrate where relatively standardized products can be transferred with large transaction volume.

#### 4. Solution Providers.

In many markets, a handful of independent solution providers with well-known brand names and solid reputations will thrive alongside the mega-exchanges.

## 6.2 Discussion

One of the most important implications we derive from this research is that: “timing” presents as a critical factor that dramatically influence firm’s strategy in the e-business regime. It is quite clear that, for the time being, the application of e-business is still in a premature stage. Different sectors and business players are in different stages of e-business evolution, so the impacts from e-business are quite different for different types of firms. The dynamic interactions between these firms further strengthened the complexity and make it difficult for people to understand the embedded momentum behind the scene. Therefore, it is important for managements to be aware of the pre-equilibrium nature of e-business when applying economic theory in doing deciding-making.

In the last part of the thesis, “timing” is used as a thread for a deeper discussion. The first part of the discussion is to articulate the pre-mature nature of e-business development at the current stage, while the second part is associated with the emerging keys issues that will reshape the development of e-business in the future.

### 6.2.1 The aggregate economic impact of e-business at the current stage

In our research, we found that the proposed economic impact described in chapter 2 is not totally fulfilled in the real world. This is because companies tend to leverage the positive parts of e-business and hedge the negative part through strategic planning. When market is in perfect competition, only e-business fast mover can leverage the new business pattern and create differentiation advantage. However, when the market power is

asymmetric, powerful player possess the ability to shift negative impact to smaller business partners. In this section, we look at how firm's behavior and e-business strategy affect the economic efficiency.

### 1. Cost structure

As discussed in chapter 2, production, sales cost is supposed to be reduced. However, at the current time, different companies can have different impact over cost. While companies with aggregate e-business system can leverage the fruit, their business partners will end up losing the cost advantage. So the cost reduction scheme will be prevailed for all players only after all of them possess sophisticated e-business system. Before that time, large firm with strong market power will grasp more benefits than SME. At that time, market will return to its equilibrium.

### 2. Network externality affect

The scheme of network externality is different from large firms and small firms, Large firms tend to use private exchange to maximize its utility and hedge public exchange to prevent the dilution of its market power over both sellers and buyers. As for SMEs, the network effect is a reinforcing impact. This means if it doesn't engage in the games host by the large firms, the more players involve in the online exchange, the weaker competitive advantage the firm get. If the firm engage in e-business with a aggregate enterprise e-business system, it will be able to reap the benefits of e-business because of the enhanced ability to control inventory, predict buyer behavior, etc.

This process is a recursive way for thinking. From analyzing firm's strategic behavior by tracking the economic impact, we can figure out the aggregate economic impacts of e-business in the real world. Though this discussion tends to be rather general and require robust quantitative analysis for further verification. This framework still helps to pinpoint out some key factors from the complex system and provide a good start for further discussion and research.

## 6.2.2 The next stage of e-business

What does be the next stage of e-business look like? Will it be a utopia with better economic efficiency and make our lives better? Or will it be a disaster for some business players? We may not be able to get the answer right now. But we identify the following two issues as critical factors that will dramatically affect the development of e-business in the foreseeable future.

### 1. Platform intercompatibility

In the near future, platform intercompatibility is foreseeable to be a crucial factor that will spur up the adoption and development of e-business. Platform intercompatibility refers to the following two parts: (1) the intercompatibility of CRM, ERP and E-procurement systems, which means the integration of firm's value chain. (2) the intercompatibility of e-business interfaces between different firms, which means the integration of industry value chain.

### 2. Organization restructuring

Chapter 2 has indicated that, organization reengineering is a difficult task for every company who wants to transfer to a genuine e-enterprise. It is observed that, large firm will continue to lead the trend in executing organization restructuring as they possess strong motive to adopt e-business. For SMEs, though currently their adoption of e-business is more like an exogenous force pushed by large firms and other competitors, their motive to adopt e-business will increase over time. Also, one of SME's motives to reengineer their organization would be to integrate with large firm's value chain, so SMEs can only reengineer their structures after large firm's structure is determined.

Just like what it has happened in the past, the future of e-business development may remain difficult to predict. An economic paradox embedded in this organization-

reengineering scheme is: outsourcing has proved to be a good mean to shift costs and risks to business partners. If outsourcing is more efficient, companies should promote the practice of outsourcing. However, economic theory also indicates that integrating business activities within a firm is more cost efficient so that's why firm exists. For e-business, it possesses both of the two characteristics: it not only facilitates the practice of outsourcing, it also strengthens the integration of firm's value chain. So what will be the better practice for a firm?

For the time being, the solution is not clear. Nevertheless, some business practices explored by industry pioneers may help to shed some lights on this paradox. Wafer industry, for example, is exploring the concept of "virtual foundry" concept. Chip designers can focus on designing chip and outsourcing the chip production to foundries via e-business platform. Currently outsourcing is found most efficient in the production domain and that's why OEM (Original Enterprise Manufacturing) is getting more and more prevailed. Firm's other functions tend hard to be replaced by outsourcing. Under this condition, there may exist two possible trends for future business practice: (1) Firms may be divided into two categories: production firms that focus on lowering production cost; and knowledge-intensive companies whose competency lies on value-added knowledge. (2) Firm will become more focus on their competitive expertise and outsource all other functions to business partners.

Organization restructure is the most important factor that will shape the structure of e-business in the future. However, it is also a factor contains huge uncertainties and complex dynamics. The current visible topics concerning this issue are mostly about centralization/federalization organization structure, spin-off e-business department or keep it as a part within the company. However, more thorough study on large firm's reengineering evolution will shed some lights on this issue. This is also a good field for further researches.



## 6.3 Conclusion

We can summarize the insight we get from this research in the following questions: (1) whether firm needs to involve in e-business practice or not? Is e-business just a temporary phenomenon or will it be a business pattern that all firms will end up adopt in the future? (2) Whether e-business changes firm's business environment or not? If so, what is the change? (3) Why different types of firms expose to different type of impacts from e-business? At the current stage, what is the resulting strategic concern and corresponding strategy? (4) When all the above questions are answered, then the question comes to: how will e-business evolve in the next stage? What will be the next strategic concern and the next e-business strategy?

For the first question, whether firm should involve in e-business application or not, our answer is positive. There are two basic rationales behind this argument: (1) e-business enhances the economic efficiency for the firm as well as the business society as a whole. E-business application helps to reduce cost, increase market transparency, streamline business process and thus create opportunities for adding new value to the product. Firms who move faster to this new business domain can reap the benefits from increasing efficiency. (2) E-business appears to be an application that can strongly enhance firm's competitive advantage. Even from a very defensive perspective, firms need to react to competitor's engaging in e-business application.

As for the second question, we evaluate the change on the business environment in two levels: the industry level, and the firm level. In the firm level, the critical impact from e-business is on firm's value chain management. ICT along with e-business application has provided a solid platform to improve all the value chain activities: For example, ERP for integrated corporate planning and operation, e-procurement for inbound logistics, selling chain management for outbound logistics, and CRM for marketing, sales and after-sales service. In the industry level, we found that e-business increase firm's bargaining power over both upstream and downstream business partners. However, e-business also reduces

the entry barrier and increases the threat from substitute and intensity of rivalry for digital product.

Based on the analysis of the firm-level and industry-level e-business impacts, we observed that, at the current stage, the strategic concern for large existing firms, SME and dot-coms are different. For large existing firms with superior e-business platform in place, e-business has positive effect. So the current strategic concern for large firm is to draw in its business partners into the new practice so it can leverage its e-business utility. After analysis, e-procurement appeared to be the one with high strategic priority because it is relatively easy to implement, easy to measure, few barrier and easy to leverage the network effect. For SME whose e-business platform is relatively poor, our analysis found that e-business generates negative impact over them. SME not only loose bargaining power over large partners, the improved market transparency increases the rivalry intensity and squeeze their margin. Nevertheless, SME's strategy would not be to hedge the application of e-business, on the contrary, they should be more aggressively involve in e-business to buildup their competency over rivals.

For dot-coms, our analysis found that network effect is crucial for these new firms to raise capital in the distorted market. However, dot-com's competitiveness against the existing firms are weaker because of the smaller business scales and the lack in logistic system, which requires time to buildout. They also lack the depth of existing firm's value chain so they can add relatively few value onto the product, and the entry barrier is low. Dot-com's strategy would be to leverage the lowered entry barrier in digital product market, focus on specialized or niche markets, or to explore new business domain that doesn't exist in the old world. These types of dot-com's e-business strategy can be found in the financial industry. For the construction industry, we found that because the industry value chain is project-oriented. In order to leverage e-business's ability to streamline the process, most e-business will be surrounding on project rather than companies. Therefore, project collaboration service has evolved to be the key strategic concern in this industry.

For the next stage, we think that organization restructuring in large existing firms would be the determine factor and the driving force that will direct the evolution of e-business. Organization reengineering is not new. For most large existing firms, organization structuring has been undertaken for decades. Nevertheless, the huge impact of e-business will push the structuring process to an even larger scale. However, the direction is still unclear and requires further exploring. But still, it is positive for us that, without a further restructuring of large existing firms, e-business cannot step into the next stage. And the current strategic games we concluded in this research will remain prevail in the business world.

## **Glossary**

**CRM** (*Customer Relationship Management*): an integrated sales, marketing and service application that precludes long showmanship and depends on coordinated actions.

**EDI** (*Electronic Data Interchange*): works by providing a collection of standard message formats and element dictionary in a simple way for businesses to exchange data via any electronic messaging service.

**ERP** (*Enterprise Resource Planning*): A collection of applications that can be used to manage the whole business. ERP Systems integrate sales, manufacturing, human resources, logistics, accounting, and other enterprise functions. Allow all functions to share a common database and business analysis tools.

**ICT** (*Information and Communication Technology*): In 1998, OECD Member countries agreed on a definition of the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. Basically ICT refers to the associates technologies for data transitions.

**SME** (*Small and Medium Enterprise*): A strict definition of SME used by EU member is as below: number of persons employed, turnover, balance-sheet total and independence, while proposing thresholds of 50 and 250 employees for small and for medium-sized enterprises respectively. In the business world, the term SME is broadly referred to the companies with relatively smaller business scale compared to the leading firms, and have no influence on product price and market trend.

**VAN** (*Value Added Network*): A network using the communication services of other commercial carriers, using hardware and software that permit enhanced telecommunication services to be offered. VAN are mostly close systems in traditional enterprise application.

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