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Abstract

A new breed of industry known as B2B (business-to-business) ehub operation is emerging. Previous studies in this area focus either on its intermediation function or on its role as a supply chain optimization facilitator. In this study, we observed the functionality of ehubs in an integrative way and categorized them into seven groups. Each of the functional groups is analyzed and its role in B2B ebusiness is defined. The strategic ehub grid in our model allows operators of ehubs to determine the usefulness of their technological platform as a means of intermediation and supply chain management. In addition, the grid allows ehubs to determine their future strategic market positions within the B2B ehub business of a specific industry. Finally, analysis of a survey of B2B ehub companies in five industries was presented. Their current status and future directions were described using the proposed grid.

Key Words: B2B ebusiness, eHub, Strategic Grid, Supply Chain Management, Intermediary

1. Emergence of B2B eHub

The concept of traditional information systems in many organizations is currently being challenged. More attention, for example, is being directed to the redefined concept of B2B (business-to-business) interconnection, or direct consumer interfaces through the Internet (such as B2C), reforming the ways organizations (profit or non-profit) deal with their customers.

There are more differences than similarities between B2B and B2C (business-to-consumer) ebusiness. One of the outstanding differences is the functional aspect of systems architecture. Business-to-business transactions are much more complex than business-to-consumer transactions. Product information, negotiation processes, and the complexity of terms and conditions in contracts are only a few examples of the complexity involved when a business intends to buy or sell industry goods. This is one of the reasons why the B2B ebusiness seems to have evolved so rapidly, but there are still no apparent industry leaders.

Now that the hype of earning great fortunes in technology is fading, we begin to at least notice that there are a few different approaches that have been taken by the survivor companies that contribute to the increased functionality of the B2B ebusiness architecture (Phillips and Meeker, 2000). Some of the most aggressive advances in their features have been developed by traditional ERP players such as ORACLE or SAP. They have built systems that are fundamentally strong in workflow management, planning, and information exchange. On the other hand, these ERP companies do not have a long history of inter-company transactions in an

open community. In addition, they are less experienced in customer management, online marketing, dynamic pricing management, etc.

Another group of market leaders is pure online market makers, such as ARIBA, Commerce One, or VerticalNet. While they came into existence by their ability to create and manage open online markets, they have limited experience in back-office process management. One more group of companies that should be identified is the proprietary B2B ebusiness holders such as Walmart or Cisco. Their early realization of transactional transition into online business allowed them to build their own B2B infrastructure that can fit into their business in the years to come.

A few other contestants may be identified. Examples are focused functional systems (such as CRM) developers, COBAMs (Coop of Brick-and-Mortar) that do not want to lose their technological competitive edge to larger or technology companies, IPOs, niche market makers, etc. Presumably, these different system architectures under each actor's different backgrounds will eventually merge into competitive functional architecture for future B2B ebusiness through learning and M&A.

Our study is basically concerned with the competitive functional architecture for B2B ebusiness hubs. We agree that it is too early to normatively define such a system. Instead, we observed online B2B ebusiness infrastructure providers (B2B ebusiness hubs, or ehubs) and compared the system functionalities of the companies with the functionalities that are described as desirable future trends. We expect to find out whether the development stages of B2B ebusiness functionality are apparent.

Academic literature has been slow to follow up the fast-moving trend of ebusiness in general. Consulting firms, investment banks, and leading technology companies have been faster in identifying the needs and trends in the B2B ebusiness arena (Phillips and Meeker, 2000). However, the viewpoints of their work may be limited to the nature of their businesses. In our study, we distinguished the B2B ebusiness system functionality into multiple groups. The functionality of each group was evaluated within our functional model of B2B ehub. Then, we surveyed B2B ehub operating companies in five industries considering the industry-dependent nature of B2B operations. Needs and trend analysis together with industry comparisons were performed. The results are expected to answer the following research questions: 1) where the ehub companies are in terms of their development, and 2) where they are likely to go next.

2. Theoretical Development

2.1 B2B eHub as an Intermediary

Intermediaries are where buyers and sellers come together for the purposes of procurement, purchase, sales, product and market information, etc. They add value to the products basically by providing the right product or information to the right place at the right time at the right price. When viewed from the vertical value chain model, they often constitute the marketing channel or distribution channel that are defined as "sets of interdependent organizations involved in the process of making a product or service available for consumption or use." (Stern et al, 1996). In the marketing channel, intermediaries constitute a channel level and the number of levels adds up the length of the marketing channel (Kotler, 1996). Since our study defines the ehub only in the scope of B2B relations, retail related e-hubs are excluded.

Intermediation has been the primary function of B2B eHub. Successful online B2B ehubs have been able to capitalize on their strengths to create a large exchange market community. Similar

to the measurements of success in B2C companies, success was often approximated by the size of it community or by the number of transactions.

With the increasing competition of these B2B ehubs, B2B intermediary's simple exchange marketplace function is giving way either to a more complex infrastructure provider or to more specialized functional portal. In the process, different types of disintermediation and reintermediation have been experienced in many industries. The specialized functions can be diverse, and a company may focus on the network effect of information (Infomediary, Hagel III and Rayport, 1997). The functions may be directed to a niche market. But major market leaders are more interested in improving the functionality of the general B2B operations market in order to add value to their customers.

Bailey and Bakos (1997) describe the roles of B2B intermediaries as aggregation, trust, facilitation, and matching. Kaplan and Sawhney (1999) focus on various commerce types. Sarker et al (1995) is more specific by separating the benefits of intermediation into buyer's advantage and seller's advantage as in Table 1.

[Table 1] Functions of an Intermediary

Functions that Benefit Consumer	Functions that Benefit Producer
Search and Evaluation Needs Assessment and Product Matching Customer Risk Management Product Distribution	Product Information Dissemination Purchase Influence Provision of Customer Information Product Risk Management Transaction Economies of Scale
Integration of Consumer and Producer Needs	

2.2 B2B eHub as a Supply Chain Management (SCM) Facilitator

The supply chain entails the length of processes in which the raw materials add value as they are converted to a final product until the user of the final product places it in the desired location. Since the entire process involves more than one company in general, inter-company coordination is crucial. Kalakota and Robinson (2000) observe that three major flows – material, information, and financial – should be integrated for effective SCM.

Material flow is the physical movement of raw materials to be transformed, of parts that are added, and of storage and delivery. Most online inter-company integration efforts for SCM have resided within the scope of EDI until recently.

Part of the flows may be internal processes for production or storage. Other parts are external to the company such as delivery. Proliferation of outsourcing, global manufacturing, mass customization, global competition, and multi-site production require material flows to be tightly coupled with the rest of supply chain partners. Conversely, ever-changing supply chain partners, varying market demand, diverse system architecture in other companies require the management of the virtual supply chain where loosely coupled material flow management is necessary.

Information flow plays an important role for more efficient and effective material flow management through more accurate forecasting and faster delivery of market information. Better information flow management reduces the 'ripple effect,' which means that a small change in the demand of a final product causes an amplifying effect as it travels up the supply

chain. For example, a customer buys a PC, which actually is a bundle of main body, monitor, speakers, etc. The manufacturer of each component has to order parts or materials from multiple vendors. This is repeated as the demand travels upstream. Incorrect demand forecasts will result in extra-stock in the expanding number of companies as the demand change is transferred to the vendors in each upper level of the supply chain.

Effectively integrated SCM is likely to reduce the financial risks of both buyers and sellers. Automated electronic financial transfers reduce the risk of default account receivable for sellers while buyers may be able to negotiate a better price for the convenience to the sellers.

Traditional EDI-based, closed system architecture is giving way to the Internet-based open architecture (Strader, 1999). The possibility of managing virtual supply chain through open IT architecture gives rise to the idea that virtual SCM is becoming a reality. Still, however, many technological and operational difficulties exist for a company to operate in a virtual supply chain environment where supply chain partners change, for example, per order or per production item. Some of the B2B ebusiness companies begin to challenge the difficulties of coordinating any set of supply chain partners that has been formed online. Time is expected to be a factor in determining when we may be able to observe seamless supply chain operations that are fully flexible. Our attention is given to the B2B ehubs that aim to accomplish this SCM function as well as the intermediary function as noted above.

We build our study on the recognition of the ehub's role both as an intermediary and as a SCM facilitator whereas previous studies have focused only on one of these two aspects of the ehub's role. Integrating the two roles together allows the managers of ehubs to observe their market positioning as well as to recognize their strengths and weaknesses. Further discussion of the advantage of our model is prepared in the later chapters.

2.3 Division of B2B eHub Functionality

Those who operate online businesses realize that Internet-based B2C online systems are much more complex than they appear (Watson et al, 2000). This iceberg effect is even stronger in the B2B ebusiness arena. There are enough reasons for the complexity. Products require more detailed and specialized descriptions, installation itself may require months, contracts are complex and require time and efforts to both parties, price is not always fixed as in catalogs. In addition, there are various dynamic pricing schemes.

An ehub must be able to support various situations of B2B transactions. The tradition of commerce in the industry in a specific region has to be reflected appropriately in the system. Industry-specific knowledge is the most necessary component of developing and operating an ehub. This industry-dependent nature of B2B transactions makes it difficult to generalize the functionality of B2b ehub.

We have concluded that the B2B ehub functions can be categorized into seven groups: ecommerce, work process management, community management, security, collaboration, CRM, and knowledge management. The division into seven groups resulted from observing the development history of many ehubs with their practical categorization for their operational purpose, as well as from theoretical derivation that has been discussed above. It should be added, however, that while part of the functionality are practically available, some other part of the functionality is still not generalized and therefore expected to be in operation in the near future for many ehubs.

2.3.1 eCommerce

Most B2B ehubs have been developed in order to support ecommerce between businesses. Their functionality, however, has mostly been limited to simple exchanges in which buyers and sellers meet to find trade partners. But they have improved over time to more sophisticated systems. Now the major ehubs support ecommerce through a wider array of functions, as summarized in Table 2. From Table 2, it is not difficult to observe that ecommerce supports active transactions in a market place.

[Table 2] eCommerce Functions

Searching products or trade partners
Group buying and selling
Used products trading
Spot buying, long-term contract
Real-time transaction completion
Exchange of inventories
Choice of pricing schemes
Catalog management
Substitute products, product bundling, supplementary products

2.3.2 Work Process Management

This category of B2B ehub functionality may be seen as the extension of intra-company ERP into an inter-company one. As such, it is aimed at optimal operation of workflow, material flow, and information management. When this category of functionality becomes completed, virtual SCM may become more realistic.
As seen in the Table 3, many of the individual functions have been derived from the traditional ERP. Such functions as order tracking, contract management, payment, international trade support, transaction monitoring, and interface with different ERP are more focused on the inter-company relations.

[Table 3] Work Process Management Functions

Order Management
Order Tracking
Pricing Scheme Management
Delivery Management
Contract Management
Cooperation Forecasting and Planning
Payment, Accounting
International Trade Management
MRO
Transaction Monitoring
ASP (Application Service Provider)
Interfaces with various ERP

2.3.3 Community Management

The success of an ehub depends primarily on whether it can maintain a sizable ecommerce community. There are many possibilities that the buyer and seller communities will stay loyal to the hub. But this group of functions is where the community members actually log on to exchange their information, find news or share publications, and obtain information on promotion, industry trends, technology changes, benchmarking, legal information, training and education.

2.3.4 Security

Security has been given high priority in any type of online transaction. The emergence of various security schemes, such as public key encryption, has allowed many online actors to feel safer. Security issues to be considered in operating a B2B ehub, however, are broader. For example, when the buyer and seller exchange sensitive information, they want their communication to be kept secure within themselves so that no third party, including the ehub operator, will be able to intercept information they communicate. User companies of the ehub may have to set up a closed supply chain and may desire to keep it closed for a period. Security issues that may concern buyers and sellers when using hubs are summarized in Table 4.

[Table 4] Security Issues

| Buyer's Concerns	Seller's Concerns
Product return	Collections of payment
Information Security	Product Information Security
On time delivery	Buyer credit
Seller Credit	
Seller's Service Level	

2.3.5 Collaboration

Collaboration is a relatively new area in the B2B ebusiness arena that is being explored recently by market leaders. The need for collaboration has emerged because ehubs will remain merely an exchange marketplace without collaboration. Exchanges do not offer differentiated value to user companies of the ehub. Since ehubs are in a position to be able to coordinate any set of partners in a supply chain (Figure 1) they can support collaboration among direct trading partners, or with any other partners in the supply chain. Collaboration has been partially explored through EDI by the large automobile manufactures. A good example is the online engineering design of parts where designers, engineers, automobile manufacturers, and parts manufacturers collaborate to reduce the development cycle time, error, and cost.

Collaboration can be divided into three groups. The first group supports collaboration between companies in product development, planning, design, engineering, and manufacturing. Functions such as joint CAD/CAM or BOM (Bill of Material) sharing may be necessary.

The second group relates the workflow management that could be derived from the ERP platforms of the companies involved. Collaborative demand forecasting, production planning, and transportation scheduling are part of the functions included. The third group supports other inter-company activities such as interactive negotiation or contracting.

[Figure 1] The Role of B2B eHub in SCM and Intermediation

Company A	Company B	Company C	Company D

SCM/Intermediation

B2B eHub
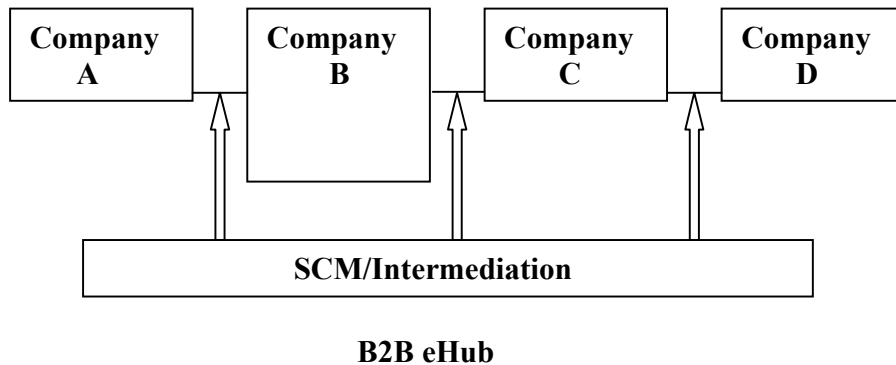
2.3.6   *CRM (Customer Relationships Management)*

CRM functionality were divided into two classes. The first class relates the functions for the ehub that aim to manage the customers (user companies) of the ehub itself. The second class defines necessary functions to be used by the user companies of the ehub in order to manage their own customers. This is closer to the concept of ASP (Application Service Provider). In either case, functions that are expected to be necessary are similar. Our study focused on the first group at this time. They are defined in Table 5.

[Table 5] CRM Functions

1. Data Management
  - Integration of Customer Information
  - Integration of Product Information

2. Analysis
  - Customer Differentiation
  - Customer Categorization
  - Data Mining
  - System Usage Analysis
  - Product Analysis

3. Campaign Management   - Target Customer Generation

- Customer Survey, Campaign Supporting Activities
- Result Analysis
4. Customer Services
- Service Call Management
- Help-Desk
- Sales Force Automation
- Personalized Interface support

2.3.7 Knowledge Management

Knowledge management, as is known in general, refers to the storage and utilization of information resources, experiences, and cases that have been accumulated through the operation of the company. By its nature, knowledge management has been explored for intra-company purpose due to the fact that knowledge itself can be considered an asset of the company.

The knowledge that has to be maintained and updated for use in a B2B ehub is different in the sense that the knowledge base is external to the user companies. User companies are likely to utilize the knowledge base of the ehub to solve their own problems as well as to understand their partner companies' operations. Therefore, the knowledge base must be linked to other functions such as work process management and collaboration. Industry-specific knowledge, technological knowledge, manufacturing knowledge, links to high-tech companies and outsourced experts may be provided through the knowledge management function.

3. The eHub Classification Model

Those who operate B2B ehubs are aware of the fact that additional value-added services will be continuously necessary in order to be competitive in technologically. Many of them also agree on the fact that the next generation of value to the user companies is at least highly related with the collaboration and knowledge management. CRM will be useful as a fundamental tool to maintain customers as well as to increase their loyalty. Industry-specific nature of B2B ehub requires that managers of the ehubs maintain thorough knowledge of the industry including the SCM-related issues. Competitive ehubs are likely to attempt to utilize collaboration tools to optimize the supply chain operation. Traditional B2B ecommerce is likely to require a more sophisticated completion of each transaction by integrating the transaction into the internal system of the transaction partners. This implies that the functionality of ehub as an intermediary will go beyond the role of traditional middleman.

The seven function groups defined thus far can be placed as in Figure 2. Work process management and collaboration functions support more efficient interactions between the partners in a supply chain. Partners may (company A and B in Figure 1) or may not (company A and C in Figure 1) be juxtaposed in the chain. The primary function of work process management and collaboration is to optimize part or all of the supply chain operation.

The objective of ecommerce is what we have widely observed in the traditional exchanges. The goals of the buyer are to find the best fitted goods for each purchase order, and to avoid the risks discussed in the earlier chapter. The sellers' goals are similar. eCommerce transactions may be

best accomplished through the intermediation role of ehub. Maintaining the knowledge of customers and products using CRM tools increases future sales. Therefore, the CRM function is highly related to e-commerce. On the other hand, such knowledge is likely to improve efficiency when working with companies that have previously worked in the same supply chain. So the meaningfulness of CRM in SCM optimization is more than minimal.

[Figure 2] eHub Function Grid

high	Work Process Management Collaboration	Knowledge Management Security Community Management
SCM Optimization		CRM eCommerce
low		high

Intermediation

Community management is considered less important in SCM optimization than in intermediation. But this functional category may help SCM optimization through benchmarking other supply chains and as a market information resource.

Security will be considered highly meaningful both in SCM and in intermediation. Knowledge management tools are not yet common, but they will affect SCM by providing necessary knowledge into various occasions of collaboration. In addition, they will support intermediation by supplying the knowledge required for the entire steps of purchase/sales. It should be noted, however, that positioning of the functions as has been described cannot be definitive. Positions will change depending on the industry and regional tradition. As a result, an analysis of the specific industry in the region has to be performed in order to obtain a meaningful result.

4. The Survey and Strategic Use of the eHub Function Grid

We have surveyed independent ehub operators. This was aiming at separating them from the proprietary ehubs where the owner of the ehub is usually too influential in determining the direction of their ehub development. We used a questionnaire for the survey. In doing so, detailed functions in each category were prepared in the questionnaire to ask whether the functions have been incorporated into their system. The questionnaire is composed of eight parts. The first part asks general information about the company. Rest of the questionnaire asks the existence of detailed functions in each of the seven functional categories. Detailed functions are specific functional role within the ehub such as 'Does your Web site provide such function as

'optimal product recommendation'?'. These detailed functions were prepared by observing more than one hundred B2B ehubs as well as by researching necessary and desirable functions (Phillips and Meeker, 2000; Strader et al, 1999). The questionnaire was up to twenty pages long with 91 questions. As a result, respondents had to be contacted beforehand for cooperation.

Less than one hundred ehubs are known to be in operation or are under development in Korea. About sixty of them are known to operate at least partially. A total of fifty companies from five industries were contacted. The industries are computer/electronics, construction, metal/steel, chemicals, and textile. Thirty-three of them responded. Among them, one company was more focused on plastics than on chemicals. The answers of another company were not consistent. Accordingly, those two companies were excluded in the analysis. To clarify unclear answers, we contacted the personnel by telephone. Twelve companies out of thirty-one had just started their operations. As a result, these companies have not yet earned any revenue. Most others have operated their ehubs for less than a year.

Industry-specific knowledge was gathered before our survey by interviewing selected personnel in each industry. Those who were interviewed have been in the industry for five to twelve years. Each interviewee allowed about two hours with the average of two visits to answer questions about the facts and trends in the industry.

We have analyzed the level of preparedness for each of the seven functionalities. The functional ratio is the percentage of detailed functions incorporated into their system out of the entire detailed functions we presented to them. The result is shown in Table 6.

[Table 6] Ratio of Functions Incorporated into the eHubs of Each Industry

	Computer/ Electronics	Construction	Steel/ Metal	Textile	Chemicals	
eCommerce	58.33 (%)	48.22	55	62.5	76	58.55
Work Process Management	56.21	47.80	56.47	55.88	90.59	59.58
Community Management	62.96	43.75	60	41.67	86.67	58.60
Security	64.82	47.92	60	64.58	88.33	63.44
Collaboration	25.93	20.83	13	25	70	29.57
CRM	66.01	46.32	62.35	50	84.71	61.29
Knowledge Management	61.11	31.25	55	43.75	90	54.84
	58.54	44.51	54.88	53.66	83.66	

The ehubs of chemical industry was observed that they are providing best functionality for the serious requirements of user companies. Chemical industry is a buyer's market where the product lines are broad with the exception of a few of medical chemistry products. Chemical industry is known to suffer from the complex and inefficient distribution channel with the large number of buyers and sellers. Fine chemical products and scientific experimental products often require disparate distribution channels depending on the product type. These products are distributed through knowledgeable intermediaries. On the other hand, chemical products are well standardized because product descriptions can be structured easily. Structured and clear description of products provides favorable condition for open market online commerce. Also,

the background of employees in the industry was understood to be better suited for computerized workloads. These industry characteristics together with the ehubs' longer history of business lead us to understand their overall high ratio of functional readiness.

Functions related with work process management and knowledge management are particularly well provided in the chemical industry ehubs. Continuous production process has to be guaranteed by accurate demand forecast for optimal production planning. Integration with various ERP suites, order tracking, or capable to promise may be requested by the user companies of the ehubs.

Fine chemical products are technology intensive, high value-added items where the relevant knowledge is the key asset. Most of the companies, however, are relatively small in size that they are limited in acquiring the timely technological knowledge. They are eager to stay informed about the technological developments as well as the specialists in the area. Such requirements were reflected on the functionality of ehubs.

Steel/Metal industry is relatively stable in demand. As a result, functions that support work processes were given higher priority than functions related to ecommerce. On the contrary, ecommerce-related functions received more attention in the computer/electronics because limited sales channel is the most serious problem to many manufacturers (particularly small and medium size manufacturers). Steel/Metal industry suffers from overstock. Inventory information exchange is likely to help reduce the overstock. Collaborative product development is necessary to reduce the production costs. Production monitoring and evaluation may be implanted into the ehub function.

Most of the companies in the industry, however, are small in size except for the few who produce raw metal products and the few final product manufacturers such as automobile companies. These small companies are very limited in their readiness for online transaction. Use of sophisticated systems such as interactive collaboration tools was considered unlikely in the near future for these companies. Very low ratio of collaboration in Table 6 confirms the situation.

The construction market is competitive and restructuring is currently in progress. Contracts are usually long-term. Their market is known to precede the general economic condition. As a result, construction companies are interested in subtle changes in the customer preferences, new technology, or any other resources that can create value to their company. Information technology utilization in this sector is a relatively new concept, however. They are less familiar with the online activities. Functions of ehubs in this industry seem to be least sophisticated overall.

Interesting comparisons are also found in the textile industry. There are many and various levels in each distribution channel. Companies are mostly small or medium in size in the supply chain other than the few that are located at the top of the chain. eHub operating companies are now eager to provide attractive marketplace (by providing appropriate ecommerce functions) to become the leader in the industry as is shown in higher ecommerce ratio from Table 6. On the other hand, less attention seems to be given to the community management. This was not consistent with their primary intention of attracting user companies into their sites.

Security was regarded important because of the frequent exchanges of product design. Many ehub operators were thinking that collaborative design is going to become their next step of system development.

Collaboration is considered to be the next generation technological movement allowing trading partners interact and jointly work online. The results of our survey show that at this early stage

of ehub development, collaboration tools were not getting much attention from the ehub operators, with the exception of chemical industry. Particularly, awareness of collaboration as a major ehub functionality was minimal in the steel/metal industry where product design and development is limited, markets are localized, demand is static, and seller-oriented.

The majority of companies in the computer/electronics supply chain are also SMEs (Small and Medium sized enterprise). Their primary concern is to find sales channels that match their products' characteristics best. Such function as transaction matching or searching optimal trading partner was considered important among the ehubs.

In the procurement, the SMEs suffer from higher purchase prices of parts and materials because each company makes purchases individually without better volume discounts. Another problem is that their products are not standardized. Such functions as demand aggregation and joint sales were recognized as necessary by many of the ehubs.

Traditionally, only a handful of part manufacturers and subcontractors have had online work process connected to the large final product manufacturer. Disconnected work processes have led to inefficient product planning, order management, order tracking, and delivery. Many ehubs who recognized these problems attempted to install relevant work process management functions.

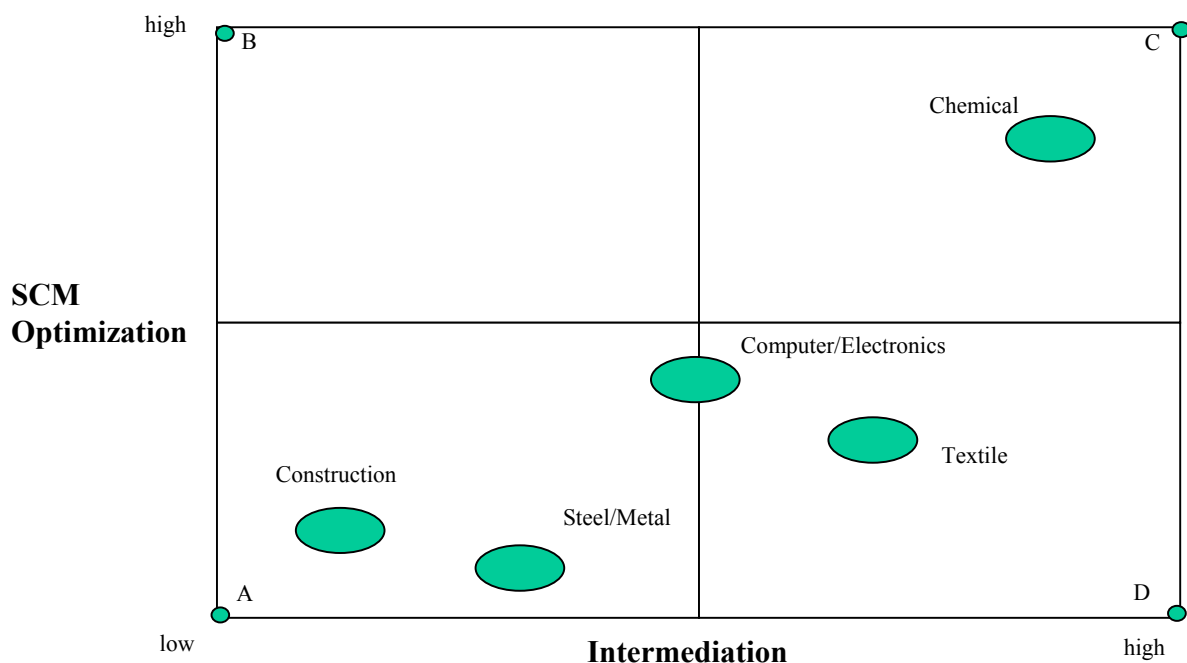[Figure 3] Positioning eHubs of the Five Industries on the Functional Grid

Figure 3 classifies the ehubs of different industries in Korea on the ehub functional grid. Chemistry ehubs were positioned where their system functionality is likely to support both SCM optimization and intermediation well. eHubs in the computer/electronics industry are relatively aware of the importance of collaboration and, particularly, knowledge management. The construction and the steel/metal industry do not seem to be ready yet for the open market B2B ebusiness exploiting many of the possible functionality of ehubs. As a result, they were

positioned near point A. Textile industry ehubs are relatively well equipped with intermediation supporting functions while their systems are less sophisticated in managing supply chains.

5. Implications

Our study has attempted to accomplish two objectives. First, we have categorized the diverse functionalities of many B2B ehubs. Second, a strategic grid has been introduced for the managers of ehubs. Our expectation is that in the years to come, these seven functional groups will soon become necessary than sufficient. eHub operators need to assess the importance of each group to determine their future plan based on their strengths and weaknesses.

One way of determining their strategic planning is to use the ehub function grid. By positioning their company on the grid, they can decide whether to stay where they are, or invest in order to move to another position. Large ehubs may desire to be placed near C, but for some other smaller ehubs, positions near B or D could be an option. This means that they may concentrate on specific functionality such as collaboration tools. Well-developed tools are likely to gain value as the B2B ebusiness market grows.

The companies surveyed are in their youth. Most of them are in tight capital condition basically due to the lack of recognition by the investors that it takes time to build competitive B2B ehubs. Geographic approximation of the ehub operating companies and of potential user companies, however, allowed them to benchmark each other up to a degree. As a result, many of the ehubs' functional system architectures are not significantly different from each other. After the survey, and then after having positioned the ehubs on the ehub functional grid, it was found that they need to focus more on their industry specific needs as well as on future plans to place them in a more competitive position.

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