COMPETITIVE STRATEGY FOR ELECTRONIC COMMERCE

In many respects, Korean economy has been coordinated by the visible hand of the government. The world economy is becoming a borderless one, which directly affects the Korean economy driving it into an open economy. The rising cost of production factors, wage rates, interest rates, and land costs stalls economic growth. Both internal and external economic environment casts doubt over the prospects of the Korean economy.

Both public and private sectors are looking for ways to maintain their competitive edge by improving economic efficiency, and one of those efforts is the use of IT. They are making an utmost effort to build the information-communication infrastructure, and promoting EC to explore new business opportunities.

Various efforts are being made to facilitate the diffusion of the EC in Korea. The diffusion of proprietary EC within a conglomerate may be made quickly with little trouble. The IOS or EC within a conglomerate is highly likely to be a closed one, which is not unusual among Korean conglomerates. This may result in a situation that goes against global technological future: an open EC system.

Korean corporates have recently devoted a vast amount of effort to business process reengineering using IT to improve efficiency. In contrasts, SMEs lack appropriate IT skills required for such innovative movements. This may result in a widening gap between SMEs and conglomerates in their corporate efficiency. Since cooperation among conglomerates and SMEs is very important to gain competitiveness in the global market, it is desired that conglomerates make up cooperative partnership with SMEs and promote more open relationships. Both parties will benefit from strategically cooperative relationships while specializing and repositioning themselves in the network of organizations via a smart adoption and use of IT.

INFORMATION TECHNOLOGY INFRASTRUCTURE FOR TEXTILE AND APPAREL INDUSTRY IN HONG KONG

BY BENJAMIN P.-C. YEN AND C.J. SU, IEEM, HKUST, HONG KONG *

Globalization of industries is a defining trend of our time. The textile and apparel industry, in particular, is one of the most globalized industries in today's world. Hong Kong's textile and apparel industry is a leader in managing the supply chain on a world-wide basis. To maintain its prosperity and to deploy new computing and communication technology, we proposed an information technology (IT) infrastructure by which Hong Kong's textile and apparel industrialists can effectively and efficiently manage their global business. In order to succeed in the competitive global market, Hong Kong textile and apparel companies need effective communication among buyers, designers, merchandisers, suppliers and factories. With the increasing availability of computing and communication information networks, there is an imperative to deploy technologies such as the Internet, World Wide Webs, and client/server architecture, to serve the needs of industries.

INTRODUCTION

The textile and apparel industry stands out as one of the most globalized industries in the world today. It differs from producer-driven supply chains led by multinational companies. The apparel industry is a buyer-driven commodity chain led by a coalition of retailers, contractors, subcontractors, merchandisers, buyers, and suppliers. Each participating entity plays a role in a network of supply chains which span from fibers, to yarn, to fabrics, to accessories, to garments, to trading and marketing. Geographically, they span multi-continents and cut across regional and national boundaries. With the shrinking profit margin and advent of modern computing communication networks, it is imperative that Hong Kong's textile and apparel industry seriously consider establishing a cost effective IT infrastructure to maintain their competitive edge.

The functionality of the Information Technology based systems can be classified into three types:

- Information access - Information can be retrieved and shared through the Internet, EDI or other electronic systems. The information servers serve as information repository and distribution center, such as most of the homepages on the Internet.
- Information coordination - Information can be contributed and utilized within multiple organizations. The information flow becomes two way communication instead of one way flow in the information access. In information coordination, the information is updated and retrieved by multiple users for different purposes. Furthermore, the information server can coordinate the information for syncronization or management, such as project management and electronic markets.
- Information processing - In addition to information access and coordination, information processing is very useful for many applications. The information servers need to process the information or data from the clients and return the result. In this case, the servers function as application programs transparent to users.

In this paper, we focus on the first two types of systems (information access and information coordination) mentioned above. We first introduce the components and structure of generic information technology infrastructure. We then give examples, Hong Kong Clothing Accessory Information Network System (HKCAINS) and Hong Kong Textile and Apparel Industry Global Applications (HKTAIGA) on top of this infrastructure, dedicated for textile and apparel industry in Hong Kong. The implementation issues of these two systems are also addressed.

SYSTEM DESIGN/IMPLEMENTATION

OVERALL SYSTEM DESIGN

The overall system design is to achieve the application requirements while the communication infrastructure will adopt the prevailing industry standards and protocols supported by the Internet. For example, to handle the amount of graphic and image data required by apparel industries, various alternatives such as data compression, mirror nodes, and dedicated communication circuits will be evaluated. Issues such as security, journalizing, update procedures also need to be addressed.

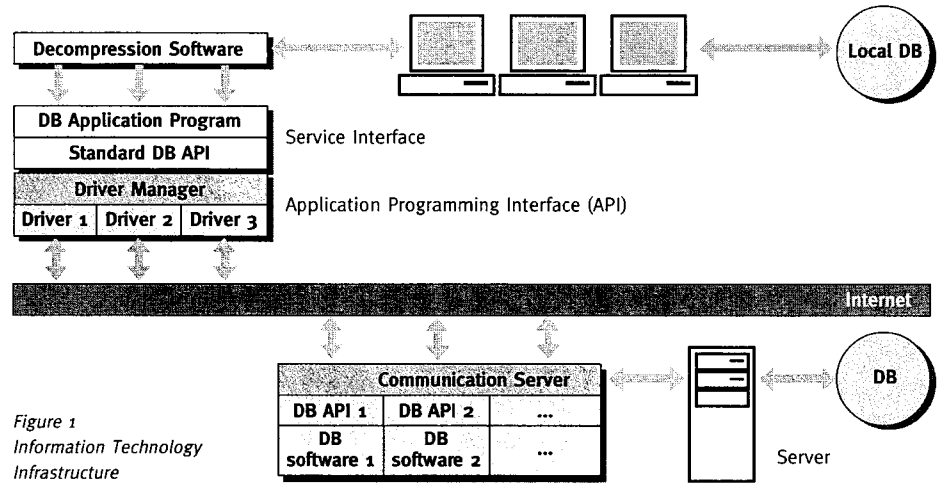

Figure 1
Information Technology Infrastructure

In addition, one of the goals of this infrastructure is to support a heterogeneous environment which consists of systems developed by four universities. A variety of operating platforms might be supported, including Apple, IBM, Microsoft, various Unix-type operating systems, and the proprietary operating systems often used on mainframes and minicomputers. It might also be desirable to support a variety of different communication mechanisms (message passing, remote procedure call (RPC), message queuing, etc.) and data transport protocols (SNA, TCP/IP, NetWare IPX/SPX, etc.). The functions that the distributed database software must perform in a heterogeneous environment are orders of magnitude more complex than the functions required in a homogeneous environment. To facilitate the creation of a heterogeneous distributed database environment to support various applications developed by several universities, we propose to use a Standard Interface Model (SIM) which has been proved to be efficient and effective. The standard interface model is designed to allow an application program written using a given database API to request the services of database software that support some other Application Programming Interface (API). In the proposed system, the server consists of database software, database API for various applications and communications server software. The application running on a client machine contains one or more driver components designed to interface with a particular type of foreign application. The application in a client machine includes a driver manager that implements two standard interfaces:

- Service Interface - which the API drivers use to interface with the driver manager. The foreign database applications need to write drivers that conform to the service interface to allow their database applications to interface with the driver manager.
- Standard Application Programming Interface (SAPI) - which the API that application programs use to request database services.

Database application developers that wish to participate in the proposed distributed environment must program to the standard API proposed in the system or use software that converts a specific API to the standard API (see Figure 1).

SYSTEM MANAGEMENT POLICY FORMULATION

The network is divided into four different types of nodes, each with clear tasks or functions, and provides specific information to other nodes. The four types of nodes are the central server, the application servers, the regional servers, and the hosts/users nodes (see Figure 2). The central server is in charge of network management, including user validation and authentication, network security, database updating and accounting. The application servers support information sources while the regional servers, the user's access point to the network, support information databases locally to speed up data retrievals. The company hosts/end users play the role of clients demanding information.

There are four main tasks performed in the system management module:

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- Registration is concerned with building up a logical view of the network. The task is needed for application servers, regional servers, and all hosts/end users.
- Database creation/updating involves initialization and maintenance of distributed databases.
- User validation/authentication is the primary task for system protection and security.
- Accounting includes statistics measurement, performance evaluation and accounting management.

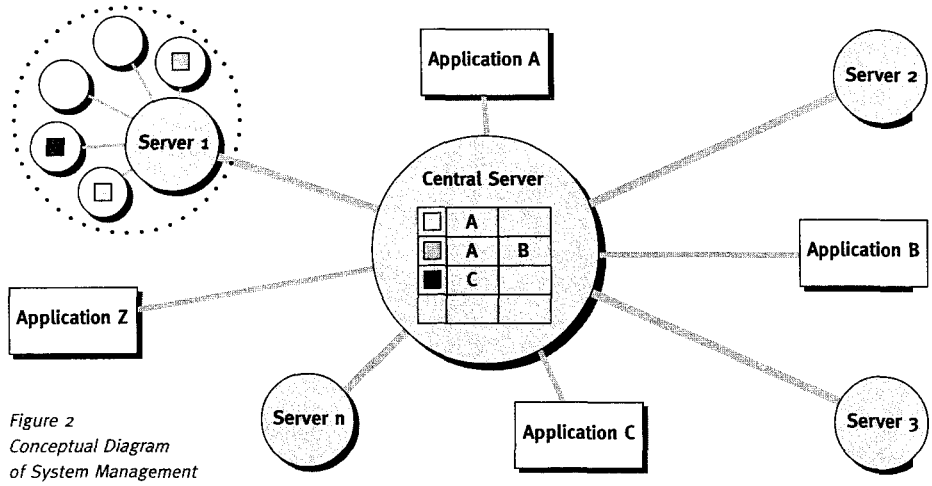

Figure 2
Conceptual Diagram of System Management Policy Formulation

EXAMPLES: HKCAINS AND HKTAIGA

Hong Kong Clothing Accessory Information Network System (HKCAINS) is a client/server oriented and local area network based database system with browsers for clothing accessory. Hong Kong Textile and Apparel Industry Global Applications (HKTAIGA) system is a communication infrastructure for textile and apparel applications. HKCAINS serves as a browser for HKTAIGA which is on top of the information technology infrastructure. The system was designed and developed at the IEEM department of HKUST. The primary functions of HKTAIGA are information access/sharing/distribution/coordination between accessory suppliers and apparel manufacturers. By using local database and incremental update technique, the system ensures the efficiency of search and display. The many-to-many service links and client/server architecture can further maintain the security level of the communication, including quotation and purchasing order, between suppliers and manufacturers. Figure 3 shows the client interface for manufacturers in HKTAIGA.

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RELATED ONGOING PROJECTS AND FUTURE DIRECTIONS

In addition to the HKCAINS and HKTAIGA projects mentioned above based on this information technology infrastructure, there are many other related systems that were or will be built on top of it, such as garment acquisition systems, image search engines, virtual exhibition systems, and scheduling systems (see Figure 4). Other than information access and information

Figure 3
Client Interface for Manufacturers in HKTAIGA

Figure 4
Some of the related systems on top of the information technology infrastructure for textile and apparel industry Hong Kong

System Title	Description	Organization	Type
Internet Garment Acquisition Systems	garment acquisition systems on the Internet	CITA	information access
Montage	content-based image search engines	CSE, CUHK	information access
Virtual Exhibition Systems	virtual reality based exhibition system	IEEM, HKUST	information coordination
Internet Scheduling Systems	Internet scheduling system for textile manufacturing	IEEM, HKUST	information processing

coordination, the systems on top of this can be information processing types of information systems.

The information technology infrastructure does not only favour textile and apparel industry. The infrastructure is also adopted by other industrial applications in Hong Kong, such as service industry, transportation logistics, and CAD/CAPP/CAM. Most of these applications cover all of the information access, coordination and processing functions.

The information technology infrastructure is highly cost effective for the executive managers, designers and merchandisers in the textile and apparel industry. The information technology infrastructure also helps to speed up their retrieval of worldwide industry information. By always being able to keep track of the most current product trends world-wide, the users' competitive advantage will be increased. This provides the necessary information infrastructure to put the Government Industry Projects' applications to practical use. With the advent of the new technology, we can continuously improve the performance, such as real-time access and solid security, for this infrastructure.

Toward the Construction of Customer Interfaces for Cyber Shopping Malls - HCI Research for Electronic Commerce

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Introduction

Nowadays, one of the most evident changes in the area of information technology is the Internet. The rate of increase in the use of the Internet is second to none compared to any other technological advances in the modern era (Chon, 1996). Twenty to thirty million people are estimated to use the Internet currently, and the number is expected to grow to two hundred million by the year 2000 (Hoffman, Kalsbeek, and Novak, 1996). As the use of the Internet becomes prevalent, it is expected to have a profound impact on our everyday life (Kraut, 1996).

One important change that can be brought by the Internet is manifested by electronic commerce. Electronic commerce is defined as the execution of information-laden transactions between two or more parties using inter-connected networks (Kalakota and Whinston, 1997). It is a generic term to include all the commercial activities using any kind of networks such as EDI or the Internet. Due to the rapid diffusion of the Internet, the market for electronic commerce is also expected to increase sharply to 600 million dollars by the year 2000 (IDC, 1997).

Electronic commerce can be classified into three distinct categories: inter-organizational electronic commerce, intra-organizational electronic commerce, and consumer-to-business electronic commerce (Kalakota and Whinston, 1996). Of the three, consumer-to-business electronic commerce, mostly implemented as cyber shopping malls, has the greatest potential to influence everyday life (Chung, 1996). Through cyber shopping malls, customers can learn about products through electronic publishing, buy products with electronic cash, and even have information goods delivered over the network. Customers are spared the drudgery of traffic and long lines of conventional shopping. Suppliers can reduce overhead costs through less expensive distribution channels. For these reasons, the size of the cyber mall market will grow to 660 million dollars, with twenty percent of total household expenses spent via the Internet (Booz and Hamilton, 1996).

An important precondition to the success of cyber shopping malls is the construction of appropriate customer interfaces. The customer interface is defined as the user interfaces of cyber shopping mall systems, through which customers interact to search for the target items and to purchase the identified items (Kim and Moon, 1997). The customer interface differs from the conventional user interface of software systems, because user interfaces mainly focus on the issues of conveying information in an efficient way such as ease of use and ease of learning (Nielsen, 1993). Although conveying information efficiently is also important in the design of customer interfaces, the customer interface should also provide a pleasant shopping environment. It is not enough to simply provide a shopping mall that is easy to use or easy to learn. The cyber mall should satisfy or "impress" the customers so as to make their shopping experience a pleasurable one, so much that customers are tempted to return. Otherwise, customers would not visit the shopping mall again or would easily switch to an alternative mall, because the switching cost is extremely low in cyber space. Competitors are just a "click" away from the current mall in the cyber space.

In spite of the importance of customer interfaces in electronic commerce systems, most prior studies focus on the technological issues related to their implemen-