

of cards would need either to be banks, or would need to apply for authorization as a restricted license bank for the specific purpose of issuing the cards. Non-bank companies – transport or telecom organizations or card issuers such as Mondex or Visa – need to apply for authorization as deposit-taking companies in order to issue cards. The legislation would not apply to single-use cards, which are considered “prepayments” (Hettinga et al., 1997).

Though Hong Kong is bullish on e-cash, there are discordant notes among the songs of praise. Cash is anonymous, divisible, and usable anywhere – from street hawkers to the upscale retailers. Cold cash can be a hard act to follow. On one hand the anonymity of Mondex transactions has been called into question (as has anonymity of most other modes of electronic trans-

action) (Banking World Hong Kong). And David Carse, the Hong Kong Monetary Authority’s deputy chief executive, suggests that e-cash might ultimately relegate banks “to providers of commodities with the high value activity being conducted elsewhere” (Mondex International Magazine). Kawika Daguio of the American Bankers Association (Hettinga and Daguio 1994) in Washington, is more specific:

“Technology alone won’t provide participants sufficient security for e-commerce to flourish. Law, tradition, good reputations and technology give rise to trust ... I think we agree that if society isn’t careful about the development of e-commerce, some electronic transactions could be made without the protection of statute or they could be covered by rules or laws which aren’t easily enforceable ... I have

trouble accepting that technical protocols may replace law, tradition, and trust. Governments’ and traditional financial institutions’ roles will not be swept away by a technological and social whirlwind.”

Electronic cash poses a serious challenge to the role of banking institutions. Electronic cash will ultimately reduce bank customers’ dependence on bank branches, a weaning process for both customers and the banks themselves. Caution may be warranted, but may arise too from the normal resistance seen when new technologies shift wealth and power from one group to another. The broad consensus seems to be that electronic cash shifts power to the hands of the consumer. This alone would be a deserving reward, however Hong Kong’s financial elite struggle to adjust to the realities of the digital age.

## THE GOVERNMENT’S ROLE IN DIFFUSION OF EC IN KOREA

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Electronic communication has been used fairly long in business transaction. Let alone with Telex, which has been in use since 1940’s, Electronic Order Entry and EDI (Electronic Data Interchange) technologies were also under consideration in limited areas back in the 1960’s. Such applications as EDI for the transportation industry, EFT (Electronic Fund Transfer) in the banking industry and CRS (Computer Reservation System) in the airline industry started their operation in the mid 70’s. The concept of IOS (Inter-organizational Information Systems) and the use of electronic media for business transactions were topics discussed widely among researchers and practitioners throughout the 80’s. Now, since the early 90’s, the Internet is used for commercial activities, and is expected to gain growing popularity. Reflecting these expectations, EC (Electronic Commerce) over Internet is being discussed more seriously from various perspectives.

The use of EDI, the precursor of EC, has contributed both to reducing data entry errors, time, and cost, and to enhancing efficiency in several aspects. As the use of advanced IT accelerates, EC is expected to make a tremendous impact on the competitiveness of firms and the structure of markets and industries (Malone et al. 1987; Benjamin/Wigand, 1995). Korea, of course, cannot be an exception. In this report we will briefly review the current state of EC in Korea and its impact in her economy. Additionally, the role of the government and the various related activities will be discussed.

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### EC IN KOREA.

Although there is no universally accepted definition of EC, by putting essential features together we can identify a working concept of EC as ‘an IT-based transaction practice among organizations that hopes to supply and/or acquire goods and services’. The business relationships related to EC can take many forms. Business-to-business, business-to-consumer, business-to-administration, and consumer-to-administration are the typical types of such relationships (ESPRIT, 1996).

The business-to-consumer type is often classified as ‘electronic retailing, where the customer is an ordinary consumer rather than another company’. In this type, Electronic/Cyber Shopping Mall based on the WWW technology on the Internet composes the major part. Advertising and transactions of such digital products as software, music, publishing are being tried on the Internet. Complete transactions should be supported by electronic payment systems.

Another major part of EC is transaction based on EDI technology to accommo-

date a larger share of transaction volume, business-to-business and business-to-administration. Traditionally EDI is implemented based on the MHS (Message Handling System) and the batch processing. The Internet-based EDI has recently been launched. EDI over the Internet has the potential to reduce communication costs and to enhance users' convenience. But the security problem must be resolved to make it more useful for transaction. To accommodate small volume transactions, more efficient use of electronic forms and interactive-EDI should also be developed.

The initial type of EC in Korea took the form of proprietary IOS and the EDI in the public sector was introduced in the early 80's. On-line shopping services and electronic banking were being realized. Recently, attempts to open electronic shopping malls on the Internet are spreading rapidly in the private sector.

During the introduction of EC (EDI) in Korea, the government took full initiatives in such major areas as logistics, customs, taxation, government procurement under the supervision of the Ministry of Trade and Industry, followed by the Marine and Port Board, the Railroad Board, the Ministry of Construction and Transportation, National Tax Service, Customs Office, the Ministry of Defense, Supply Administration, and the MIC (Ministry of Information and Communication). The EDI is considered an integral part of the major social overhead capital.

The first IOS in Korea was introduced in 1987 between Pohang Steel Corporation and its suppliers. Since then, companies such as Korea Trade Net, Dacom, Samsung Data Systems, LG-EDS Systems, PosData, Hyundai Information Technology entered the EDI business, which helps to widen the business horizon in EC. The number of organizations that adopt and use EDI technology reached about 8,800 by Dec. 1995 (CCPAK, 1996).

The EC over the Internet in Korea initiated by the private sector is drawing lots

of attention from the government in that it has a wide range of applicability in the government. Dacom and MetaLand are the two most active companies in this area. Based on its previous experience in EDI and home shopping services, Dacom is providing or preparing to provide the following services:

- ◆ Interpark - the electronic shopping mall over the Internet ('96. 6)
- ◆ MagicLink Service that encompasses overall EDI related services ('96. 12)
- ◆ CommerceNet, Korea - an affiliate of CommerceNet, U.S.A.
- ◆ Electronic Payment System - along with 10 banks ('97. 1) (Currently, the participating banks are reluctant to use it due to the lack of confidence in security)
- ◆ Credit card related services under the agreement with Visa ('97. 8)
- ◆ CyberCoin service under the agreement with CyberCash Com.

MetaLand was established in Dec. 1996 with U.S. \$3 million capital to build a mall of electronic malls (meta electronic mall). The largest shareholder of this company is ICEC (International Center for Electronic Commerce) - a non-profit organization formed by a consortium of 25 companies and research institutions to develop EC related technologies.

Korea Telecom and several commercial banks are preparing to implement electronic payment systems. Korea Telecom made an agreement with Master Card to test a trial service during the first quarter of '98 and to provide commercial service in the second quarter of the same year.

The Korean government is actively seeking ways to facilitate the introduction of EC. The MIC is working with SERI (System Engineering Research Institute) to develop EC technologies and is trying to make up a master plan for CALS/EC in Korea. An electronic market for products from Kangwon province and the EDI/EC for governmental procurement are in progress to be an exemplary application.

The Ministry of Trade and Industry has a plan to establish an EDI/EC support center for the SMEs (small and medium size enterprises), which is similar to the ECRC (Electronic Commerce Resource Center) in the U.S.A.

#### THE IMPACT OF EC ON KOREAN ECONOMY

The economic growth of Korea was one of the most successful stories over the past three decades. Since recently, the Korean economy faces a tough situation experiencing low growth and a large current-account deficit. In part, the problem is a structural one. The price competitiveness is being eroded by the newly developing economies and the product quality is not good enough to offset the price disadvantage. A situation called a 'high cost/low efficiency' structure is formed. Insufficient physical infrastructure, the limited technological and managerial capabilities are pointed out as culprits for gloomy prospect. Domestic producers could not efficiently fulfill consumers' heightened quality expectation, resulting in steep growth of foreign import. To be competitive, Korean firms will have to build up more specialized capabilities, sharpen managerial skills through use of IT, and facilitate interorganizational cooperation.

The impact of EC can be summarized in three words; paperless, timeless, borderless (Park, 1997). Decreased restrictions in time and space, thanks to EC, mean a broader scope of competition. Institutional arrangements such as the WTO and the spread of international EC will make import barriers virtually ineffective. To stay competitive in the global market an efficient and effective adoption of EC will be critical.

The Korean situation is different from the advanced countries in many respects. Contrary to those in advanced countries, many Korean firms are introducing EDI/EC without enough prior experience and preparation in their organizational use of IT. A relatively small number of total computer users means thin market viability. The

Korean government chose a system of designated service provider to speed up the introduction of EDI/EC at the early stage. The selected organizations exerted a monopolistic power in related services. This policy has turned into an obstacle to the spread of EDI/EC, leaving other VANS (value-added network services) companies insufficient business opportunities. The business practices not tracking transaction nor keeping receipts strictly can be cited as another obstacle. Legal and institutional arrangements for EC have not been put in place yet either.

#### THE ROLE OF GOVERNMENT IN EC

The EC is introduced to enhance the efficiency and to reduce the transaction costs. Since on-line transaction is not very popular yet in Korea, Korean companies are very careful to purchase the expensive software that is highly likely to be underused, meaning a risk to the companies. The government can play a positive role in minimizing the risk by providing a solid policy toward EC. The government has an economic and strategic rationale for promoting the spread of EC, because it has a potential to dramatically lower transaction costs. Establishment of standards for electronic documents, preparation of the legal and institutional arrangements, construction of the physical infrastructure are essential grounds that require active role of government for facilitating the use of EDI/EC.

The private companies have little incentive to assume the risk involved in massively sunk costs required for EDI/EC activities until a critical mass of market is formed. This situation calls for a role of government as an investor and as a user, especially because Korean economy is facing cyclical and structural problems at this moment. Implementation of EDI/EC in Korea requires concurrent technical, functional and organizational changes. The government can lead the private sector up to the point where critical mass is formed. To achieve a dramatic reduction of transaction costs and an efficient use of social resources, the government can take such

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roles as creating new demand, setting rules, providing public services, promoting R&D and physical infrastructure (Evans, 1992 and Murchland, 1995). For example, EDI in Customs/Trade EDI and government procurement are underway in Korea under the support of government to create enough demand in the public sector.

According to Porter (1989) National competitiveness is a function of technological innovation. The government may jointly provide venture capital to support several risky EDI/EC projects as in Korea. Government intervention in EDI/EC projects has a ground in economic theories of public goods, market failure, and externalities. Creating standards is one of the key element to successful EDI/EC. An economy dominated by a few conglomerates is likely to be locked to a few proprietary standards set by those conglomerates with a sufficiently self-contained level of demand. Existence of many proprietary, possibly fragmentary, EDI/EC systems will require a coordination by the government.

From the point that government must guarantee access to the EC market to reduce transaction costs (Benjamin/Wigand, 1995), government should promote competition and market transparency by eliminating entry barriers and unfair trade practices. Since the market share of the conglomerates (chaebol) is very high in Korea it is highly likely that they coerce others to join their proprietary systems. Competition can be restricted only to the selected suppliers within a conglomerate, excluding many parts of the whole economy. This may hamper an efficient utilization of national resources. For this reason, the government should find a role to promote fair competition and cooperation among conglomerates in implementing EDI/EC. The SMEs will face difficulties in participating in EDI/EC compared to large ones because of their limited financial, technological, and human resources. To improve this situation, the Korean government set a plan to establish an ECRC-like institution to support SMEs.

### 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 contrast, 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

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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-continent 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 synchronization 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.