

**Report on the
Enhancement of the Financial Infrastructure
in Hong Kong**

“An eFrastructure for a Leading eEconomy”

**Steering Committee on the
Enhancement of the Financial Infrastructure**

**Hong Kong
September 1999**

**REPORT ON THE
ENHANCEMENT OF THE FINANCIAL INFRASTRUCTURE IN HONG KONG**

“An eFrastructure for a Leading eEconomy”

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CHAPTER ONE

INTRODUCTION

In his Budget Speech on March 3, 1999, the Financial Secretary announced a comprehensive financial market reform to strengthen Hong Kong's competitiveness and to enable Hong Kong to remain in the premier league of international financial centers.

The Financial Secretary recognized, while Hong Kong's securities and derivatives markets have achieved tremendous growth and success in the last decade, recent developments in the global market, such as the rapid advent of the eEconomy, emergence of alternative electronic trading systems, increasing sophistication of investors, and the globalization of markets and investments, have created increasing competition and challenged the position of Hong Kong as a leading regional and international financial center.

Responding to these global market challenges, the Financial Secretary announced a three-prong reform program for the securities and futures markets in Hong Kong:

- (1) Fundamental change in the market structure accomplished through the demutualization and merger of the exchanges and clearing houses;
- (2) Enhancement of the financial infrastructure to improve risk management, increase efficiency, and reduce cost; and
- (3) Regulatory and legislative reform to improve the supervisory framework and protection of market participants.

Major reforms are on-going in the demutualization and merger of the exchanges and clearing houses. The Composite Securities and Futures Bill is in the final stages of drafting and will be submitted to the Legislative Council by early December 1999. To address the strengthening of the technology base in the securities and futures market, the Financial Secretary appointed a Steering Committee on the Enhancement of the Financial Infrastructure in Hong Kong ("SCEFI"), chaired by Mr. Andrew Sheng, the Chairman of the Securities and Futures Commission ("SFC"), in March 1999 to study and recommend the necessary improvements to the financial infrastructure in Hong Kong.

The terms of reference and a list of members of SCEFI are included in Appendices A and B respectively. Over the period from March to September 1999. SCEFI met 12 times. The SCEFI study is aimed to specifically address the following issues with the objective of enhancing the competitiveness of Hong Kong as an international financial center in terms of risk management, increased efficiency and cost reduction:

"We need to embrace state-of-the-art technology to remain in the premier league of world financial centers. The reforms of our securities and futures markets are substantial and their implications far-reaching."

The Financial Secretary

- Setting up of a single clearing arrangement for securities, stock options, futures and other exchange-traded transactions;
- Enhancing the financial technology infrastructure to facilitate straight-through processing of transactions across financial markets; and
- Moving towards a secure, scripless securities market.

In order to understand the perspectives of the industry and relevant parties, and to obtain their input, the SCEFI set up a User Working Group (“UWG”) and a Technology Working Group (“TWG”). Over the period from March to September 1999, the UWG met 7 times and the TWG 13 times. They have provided invaluable contributions to the study. A list of members of the two working groups is included in Appendix B.

This report documents the findings and recommendations of the SCEFI study. The market challenges and opportunities, and the vision for success will be discussed. The target financial infrastructure for Hong Kong will be elaborated in terms of the proposed single clearing arrangement, straight-through processing, scripless securities market, and technology structure. Finally, infrastructure initiatives are recommended for the journey to the future.

CHAPTER TWO

EMBRACING MARKET CHALLENGES AND OPPORTUNITIES

Hong Kong has emerged as one of the leading service economies in the world, with a “service sector value added”-to-GDP ratio of 84%. The World Bank estimates that from 1994-97, exports of services world-wide grew by more than 25%. After the Asian financial turmoil, however, with significant currency devaluations in the region, Hong Kong faces growing competition in terms of prices as well as in the range and quality of financial services offered by other Asian centers. Global markets and 24-hour trading also imply that competition for financial services comes from not only the Asia Pacific time zone, but also from centers in Europe and America.

Meeting competition through technology

While rents and wages have adjusted significantly, Hong Kong recognizes that it must continue to upgrade the quality and range of its services, especially the value added through technology, innovation and user friendly access. Recent surveys suggest that the presence of advanced infrastructure, particularly in transport, communications, legal, accounting and commercial services, is the most important consideration in the location of regional headquarters, service and sourcing operations, and is the second most important factor in siting production.

Recent developments in the United States demonstrate how relentless improvements in technology can compensate for high costs. The U.S. Department of Commerce’s report on “the Emerging Digital Economy II” (June 1999) indicated that the decline in U.S. inflation despite three years of robust GDP growth of 4% per annum was attributable to the massive price declines in the IT-producing industries. For example, in 1997, the falling prices of IT goods and services (a 7.5% decrease) offset the 2.6% price increase for the rest of the economy to give an overall inflation rate of 1.9%. This demonstrates that it is imperative for Hong Kong to use IT to help boost productivity, reduce costs and enhance competitiveness (Exhibit 2.1).

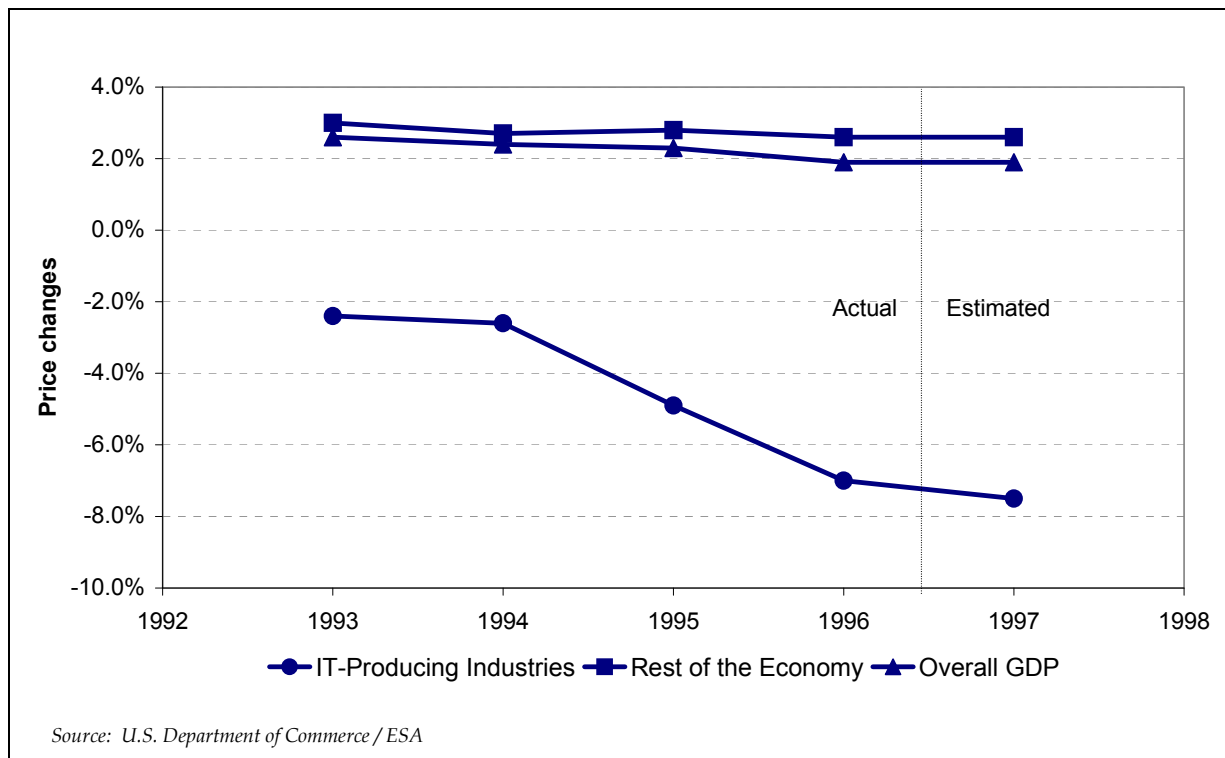


Exhibit 2.1 Price Changes in IT-Producing Industries & the Rest of the Economy

Recent developments in eCommerce and eTrading

The Informal Working Group on Financial Technology Infrastructure's Report of December 1997 recommended that "With worldwide growth in electronic commerce and electronic payments developed and pushed by the private sector, Hong Kong must take advantage of its superb telecommunications infrastructure to adapt technology toward the provision of superior services."

Since 1997, growth in eCommerce and eTrading (electronic commerce and transactions encompassing trading, payments, procurements, and all other components of the supply chain, etc.) has expanded beyond all expectations. The Gartner Group forecasts that, for the Asia Pacific region, business-to-business eCommerce will grow from US\$8b in 1999 to US\$280b in 2003 (about a 34-fold increase); and business-to-consumer eCommerce will grow from US\$5b in 1999 to US\$40b in 2003 (about a 7-fold increase) (Exhibits 2.2 & 2.3).

The emergence of the Internet has broken free the constraints of time, space and form, and spurred the explosion of eCommerce.

2. Embracing Market Challenges and Opportunities

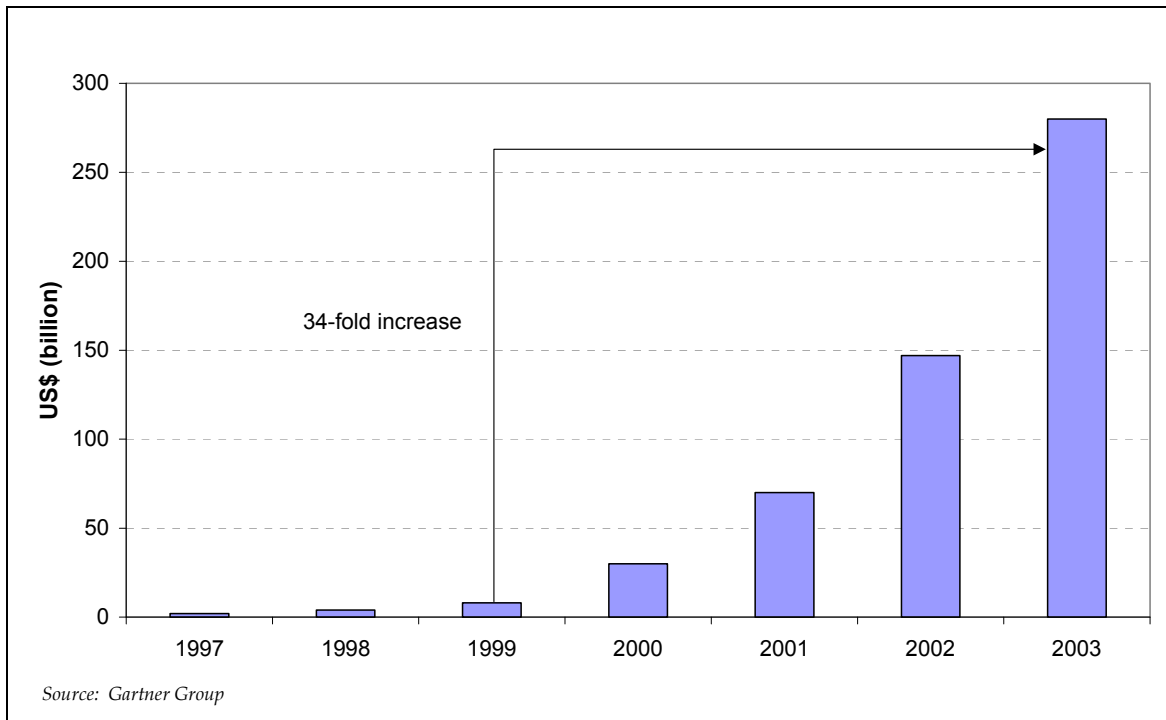


Exhibit 2.2 Business-to-business eCommerce in Asia Pacific

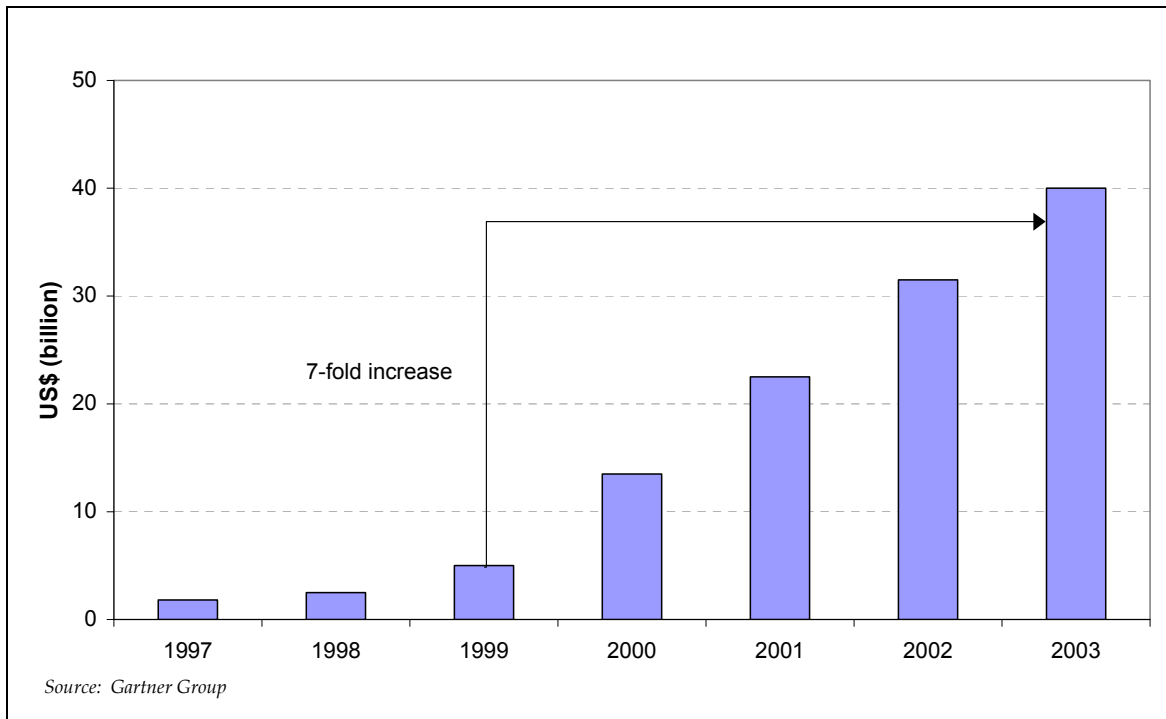


Exhibit 2.3 Business-to-consumer eCommerce in Asia Pacific

The Yankee Group forecasts that the number of Internet users in the Asia Pacific region will surpass 374 million by 2005, up from just over 39

2. Embracing Market Challenges and Opportunities

million in 1998 (almost a 10-fold increase). The Yankee Group also predicts that China will become the leading Asia Pacific nation in terms of Internet users in 2001, with about 40 million people online; and by 2005, China should surpass the United States in having the most users in the world.

The exponential growth of eCommerce and eTrading enabled and facilitated by the Internet has brought fundamental and irreversible changes to how businesses are being conducted. The marketplace is no longer bounded by geography. Traditional franchises are under threat, as new players, especially small and medium sized enterprises, can start up electronically to compete with minimal investment. A new breed of customers, groomed in the sophistication of the information age and Internet, demand virtual channels for services.

Online trading in securities has witnessed explosive growth, especially in the United States. By the end of 1998, there were an estimated 7.3 million online brokerage accounts; and by mid-1999 this number reached the magnitude of 11 million. More than one-quarter of the trades in Nasdaq and NYSE are now channeled through the Web. In Europe, over 900,000 investors trade online. In Asia, trading in Korean equities has been stimulated by the emergence of nearly one million online accounts, compared with an estimated 100,000+ online accounts in Japan (Exhibits 2.4 & 2.5).

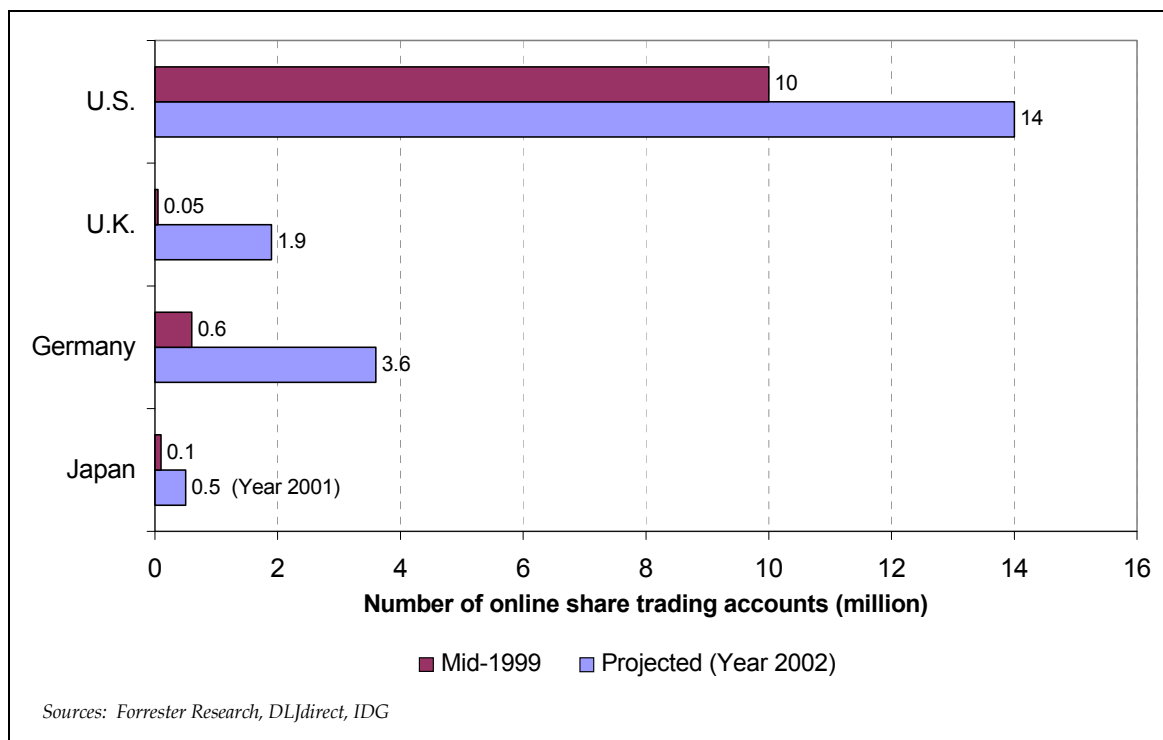


Exhibit 2.4 The trend of online share trading

Online Brokers	Year	No. of Online Trader	Average % of Trades Placed over the Phone	Average % of Trades Placed Online
Charles Schwab	1997	750	64%	36%
	1998	750	50%	50%
Ameritrade	1997	150	53.5%	46.5%
	1998	200	26%	74%
E-Trade	1997	175	18%	82%
	1998	200	11.3%	88.7%
Quick & Reilly	1997	50	3.5%	96.5%
	1998	100	3.5%	96.5%
DLJdirect	1997	120	8%	92%
	1998	180	12%	88%

Source: IDG

Exhibit 2.5 Online share trading vs traditional order placement

The rapid advance of eCommerce in recent years has also enabled the creation of a new breed of very powerful, low cost and highly competitive intermediaries, the Electronic Communications Networks (“ECNs”) in the securities market (e.g., Instinet, Island ECN, Archipelago, Primex, Tradepoint), and similar online networks in the derivatives market (e.g., BrokerTec, International Securities Exchange). These alternative markets have increasingly eroded significant trading volumes from the traditional markets. For example, by 1999, nine of the ECNs account for about 25% of the total equity trading volume in the U.S.

Facing up to these market challenges, exchanges and clearing houses in many financial centers (e.g., Amsterdam, Sydney, Frankfurt, Singapore) are taking or planning to take strategic steps to transform into customer-centric and market-driven commercial organizations. The NYSE and London Stock Exchange are also contemplating demutualization and the eventual listing of their exchanges. In addition, exchanges and clearing houses are establishing strategic alliances to better enable their development of cross-market products and to realize economies of scale on their technological investments. Examples of these alliances include the use of the NSC trading system by the GLOBEX Alliance of CME, MATIF, SIMEX and the recently joined Brazilian futures exchange BM&F; use of the Eurex system by DTB/SOFFEX, CBOT & HEX; as well as

2. Embracing Market Challenges and Opportunities

current merger discussions between Cedel and Deutsche Börse to form the European Clearing House ("ECH"), etc.

With one of the best telecommunications infrastructures in Asia, with over 130 Internet service providers, and with just under one million Internet users and fast-growing internet usage (Exhibit 2.6), Hong Kong stands ready to take advantage of the opportunities in eCommerce and eTrading.

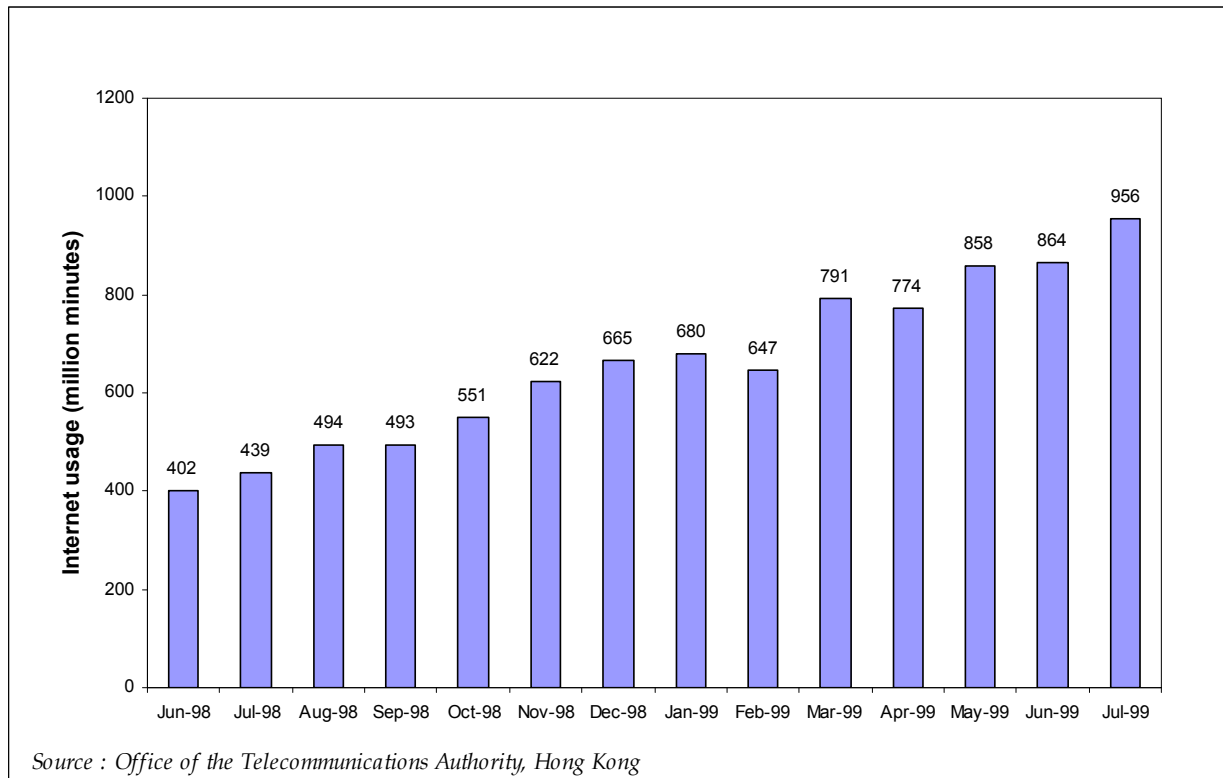


Exhibit 2.6 Internet usage in Hong Kong

In 1992-1993, the Stock Exchange of Hong Kong installed its modern Automated Order Matching and Execution System (AMS). The Central Clearing and Settlement System (CCASS) was launched during this period by Hong Kong Securities Clearing Company Ltd. to help reduce risk and improve the efficiency of securities settlement. At the end of 1996, Hong Kong installed one of the most modern large-value payment systems in the world - the Real-Time Gross Settlement system (RTGS). The Stock Exchange has already developed a new generation of securities trading system (AMS/3) for implementation in 2000, while the Hong Kong Futures Exchange intends to migrate from the open out-cry market to a full electronic trading system as soon as possible. In addition, the

2. Embracing Market Challenges and Opportunities

Government has embarked on the journey of the “Digital 21” strategy and the Electronic Service Delivery initiative.

Despite these strengths and achievements, Hong Kong cannot afford to become complacent. Many economies in Asia and the Pacific have also embarked on the journey to build or upgrade their infrastructures, based on modern and eCommerce enabled technology. The China's National Automated Payment System (CNAPS), the Korean Information Highway, the Malaysian Multimedia Super Corridor (MSC), and SingaporeONE are examples of responses to the challenges outlined above.

CHAPTER THREE

VISION FOR SUCCESS

As eCommerce and eTrading are becoming inevitable and irreversible trends, enhancing its financial infrastructure to enable economy-wide transactions is a prerequisite for Hong Kong to sustain its competitiveness and maintain its position as one of the leading financial centers in Asia and in the world (Exhibit 3.1).

The vision of an eEconomy that Hong Kong should embrace should be that of an infrastructure that will allow local and global market participants to access the full spectrum of financial products and services, which are interconnected by an open, robust, secure, scalable and high performance network. Within this infrastructure, transactions are processed electronically and straight-through (i.e., without human intervention and rework), and electronic documents (e.g., contract notes) are readily accepted. This infrastructure will not only provide market participants with a wider choice of products and faster and better services, but also allow transactions to be executed securely at lower cost and with reduced risks. Such an infrastructure can be termed “eFrastructure”.

Hong Kong should embrace an infrastructure that will allow local and global market participants to access the full spectrum of financial products and services, on an open, robust, secure, scalable and high performance network.

Bearing this vision in mind, SCEFI has observed the following guiding principles in defining Hong Kong’s target financial infrastructure (i.e., the “eFrastructure”):

- Achieving risk management excellence,
- Maximizing the possibility of straight-through processing (STP),
- Ensuring instantaneous finality and legal certainty of transactions,
- Complying with international standards and suitable best practices,
- Seeking strategic partnerships with leading financial centers, and
- Embracing open and web-enabled technology for universal connectivity and continuous innovation.

Based on these principles, Hong Kong can aspire to be the following:

- One of the leading clearing and settlement centers in the Asian time zone,
- A center of excellence for risk management and a liquidity center in Asia,
- Asia’s portal for strategic links with global markets, and

- A center of excellence for financial infrastructure.

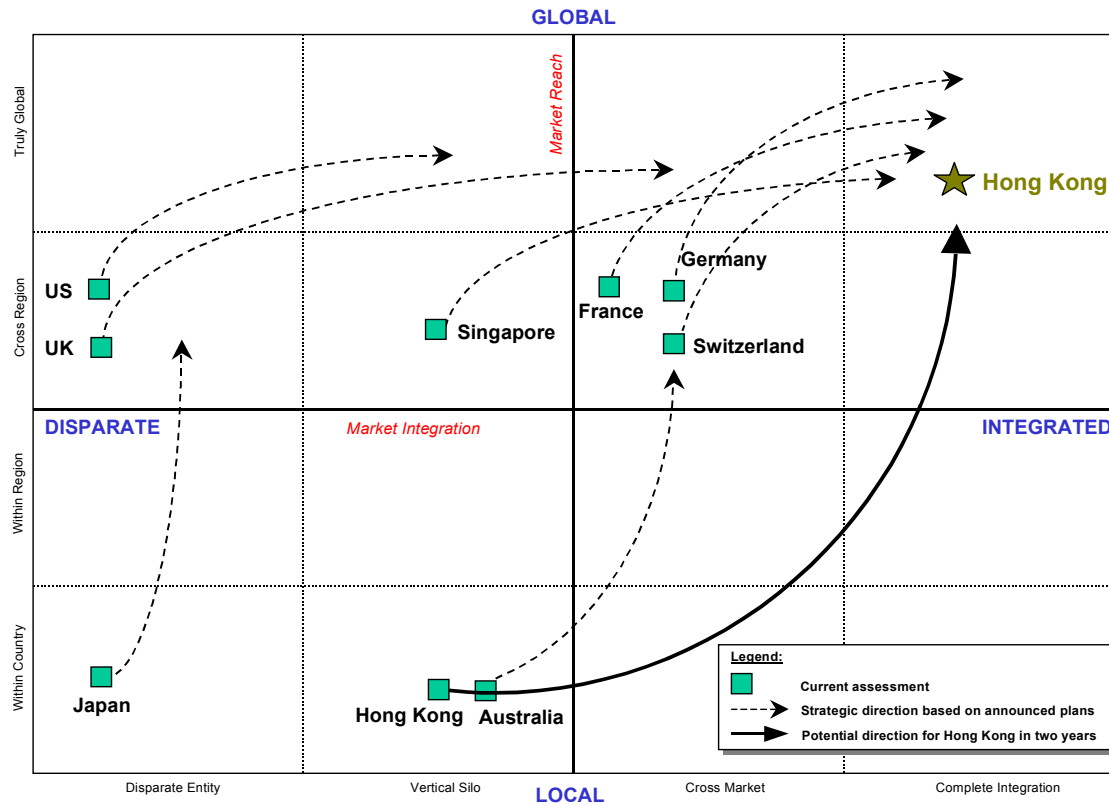


Exhibit 3.1 Hong Kong's strategic positioning

In upgrading its financial infrastructure, Hong Kong will not only enhance its position as a premier international financial center, but will also consolidate its status as the main fund-raising and risk management center for the rapidly growing economy of Mainland China.

The eFrastructure of Hong Kong will include four components (Exhibit 3.2):

- (1) A single clearing arrangement for better risk management,
- (2) End-to-end straight-through processing for improved cost-effectiveness,
- (3) A scripless securities market for enhanced efficiency and legal certainty, and
- (4) An open, robust current and scalable technology structure for local and remote connectivity and high performance.

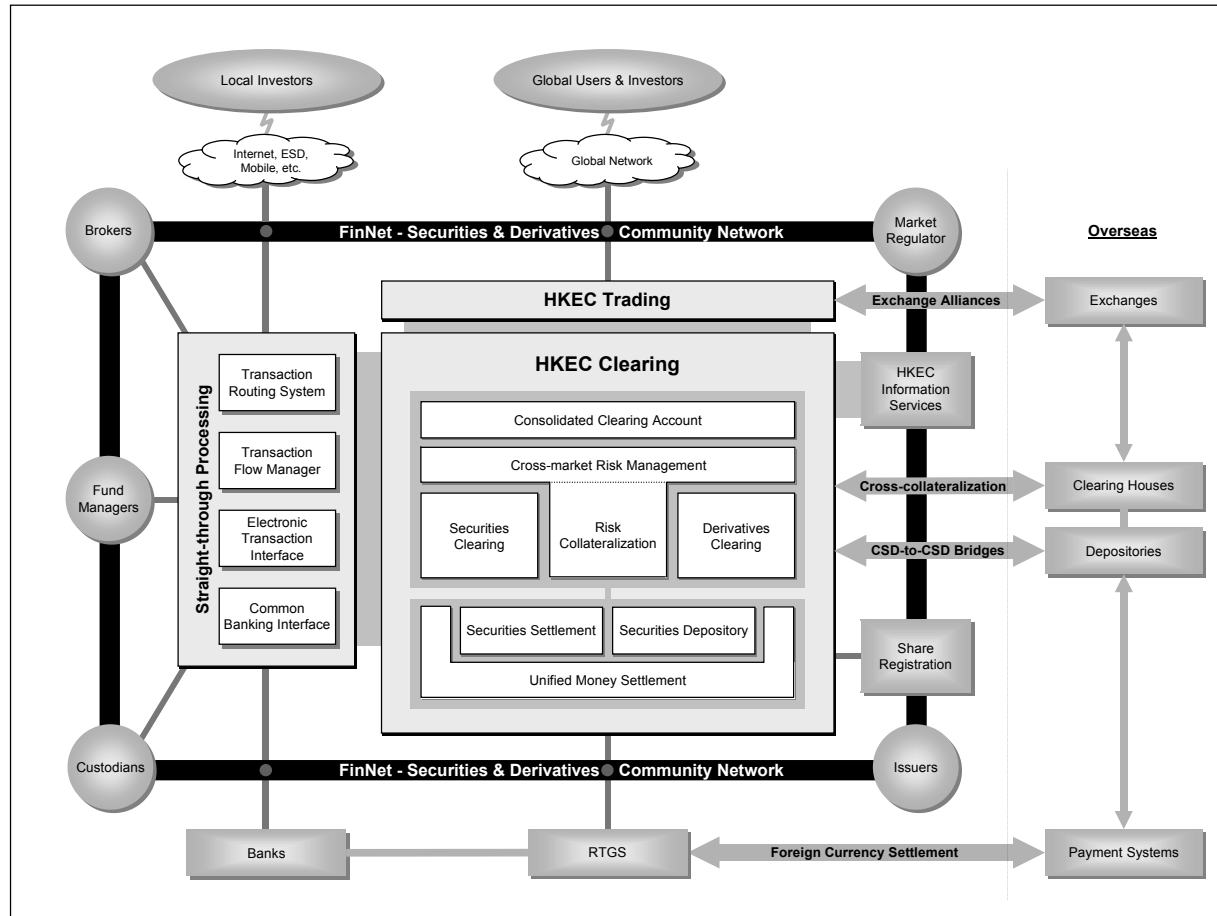


Exhibit 3.2 eInfrastructure: the target financial infrastructure for Hong Kong

CHAPTER FOUR

THE eFRASTRUCTURE

This chapter describes Hong Kong's eFrastructure (i.e., the target financial infrastructure) in terms of the proposed single clearing arrangement, straight-through processing, scripless securities market, and technology structure.

Achieving a single clearing arrangement

A single clearing arrangement for the securities and derivatives markets is the foundation for Hong Kong to achieve risk management excellence – an attribute that is vital for attracting global investors to the Hong Kong market. Increasingly, investors will migrate to those markets that guarantee the finality of trade settlement, provide prudent and transparent practices for risk management to best international standards and improve their liquidity across markets and products. The increasing trend of demutualization and merger of exchanges and clearing houses globally is indicative of this market imperative.

The vision of an integrated clearing arrangement will have to satisfy the following best practices and international standards:

- Consolidated clearing account structure,
- Real-time position creation and management,
- Unified money settlement through interbank RTGS,
- Portfolio-based risk management, and
- Synchronized processing of the consolidated clearing operations.

If the RTGS is augmented to cover foreign currency payment settlements and extends its operating hours in the future, it will substantially help to prepare the clearing house for 24-hour DvP with global multi-currency settlement.

The eFrastructure will incorporate these best practices and standards as building blocks. A single clearing arrangement will provide the following key benefits to Hong Kong:

- Improve risk management (of systemic risks) for market participants, exchanges, clearing houses, and regulatory authorities by providing a holistic view of risks across markets, products and users,
- Simplify and improve the efficiency of money settlement. Reduce the settlement and liquidity risks by clearing through the interbank RTGS, and
- Allow more efficient use of capital and liquidity through unified money settlement, cross-margining and cross-collateralization.

This report recommends that Hong Kong should set up a common derivatives clearing platform first and then re-assess worldwide developments before merging the securities and derivatives clearing platforms. In the near term, consolidated account reporting on risk positions of clearing participants is recommended to provide quick-win improvements to cross-market risk management.

Enabling straight-through processing

Processing inefficiencies generate risks and increase costs. Straight-through Processing (“STP”) involves electronically capturing and processing financial transactions in one pass, from the point of first “deal” to final settlement and confirmation. Current practices involve costly multiple data re-entry from paper documents and other sources that are susceptible to errors, discrepancies, delays and possible fraud.

Key obstacles for implementing STP in Hong Kong were identified by various studies and reviews by the ISITC, HKSIG and Thomson ESG. They include, inter alia:

- Lack of connectivity (and compatibility) among market participants,
- Inadequate deployment of best practice procedures among industry participants (e.g., different timing and procedures for trade confirmation and amendments),
- Lack of standards for determining what data should be communicated,
- Lack of timeliness and completeness of settlement instructions to custodians,
- Varying standards from country to country (e.g., tolerance limits),

- Inaccessibility or unavailability of standing settlement instructions,
- Manual pre-matching processes, and
- Lack of support for efficient use of consistent static data (e.g., standing delivery instructions).

In order for Hong Kong to strengthen its competitiveness in an increasingly global securities marketplace, it is imperative that it continue to focus on eliminating inefficiencies (e.g., reworked transactions and failed deliveries) that increase costs and risks.

Building the financial infrastructure that would maximize STP should help address the above obstacles and strengthen Hong Kong's competitiveness. STP requires:

- A robust financial infrastructure that links the main exchanges and clearing houses together, including direct computer linkage with the payment system,
- Cooperation with the regulatory and tax authorities in ensuring that electronic data/documents and electronic signatures are legally acceptable,
- Uniform computer protocols and message standards that are in compliance with best international standards, and
- Cooperation between the different market participants and users to ensure that common practices are established and followed.

Recognizing that STP is an inevitability for cost-efficiency reasons alone, a Global Straight Through Processing Association ("GSTPA") has been established by various global market players to create the infrastructure and standards to enable STP to be implemented across markets. The objectives of GSTPA are to improve and accelerate the flow of information between industry players, increase settlement efficiency, lower risks and enable inter-connectivity. A request for proposal has already been sent out for the specifications of the GSTPA technical platform in mid-1999, and the implementation would be carried out in stages beginning in 2000. Global best practices suggest a move towards settlement on T+1 by 2002 and STP is a prerequisite for this objective. As an international financial center, Hong Kong must prepare for this global initiative.

SCEFI commissioned SWIFT to conduct an STP audit of the savings that could be achieved if Hong Kong's securities sector maximizes STP. SWIFT estimates that the cost (from payroll alone) of non-STP associated

with SWIFT messaging is approximately US\$600 million globally per annum. Current Hong Kong's SWIFT STP rates of 40-45% are comparable with those of Singapore, but are below those of Australia and Japan. Based upon a limited STP audit of users in Hong Kong, SWIFT estimates that the Hong Kong financial market could save between US\$15-20 million (from payroll alone) per year by attaining 80% STP rates. Since SWIFT accounts for an estimated one-half of securities settlement instructions messaging in Hong Kong, the true savings, including rent and other overheads, could be as much as double that (to US\$30-40 million or HK\$234-312 million annually).

This report recommends that by maximizing STP, Hong Kong's competitiveness can be enhanced in terms of operation efficiency, accuracy and cost reduction, as well as in the capacity of handling higher transaction throughput. The building blocks for enabling STP in the eFrastructure that operates under a scripless securities environment would include the following:

- User-friendly, open Transactions Flow Manager ("TFM"), that would pre-match transactions to reduce settlement failure, particularly through linkages with overseas TFMs,
- Online Transactions Routing System ("TRS") that provides consumers with cost-efficient and guaranteed transactions management and input through multiple channels,
- Uniform Electronic Transaction Interface ("ETI"), with internationally accepted communication standards for cross-market transactions. These include the adoption of standards such as International Securities Identification Number (ISIN) for financial products, Bank Identifier Code (BIC) for financial institutions, and International Organization for Standardization (ISO) message standards, such as ISO 15022, for financial transaction messages, etc.,
- Clearing houses direct access to the interbank RTGS payment system, to reduce payment and settlement risks,
- Common Banking Interface ("CBI"), allowing a standard and secure interface for processing banking transactions between different clearing parties,
- CSD-to-CSD bridges (multiple bilateral links), in order for Hong Kong to improve its connectivity to custodians and central securities depositories ("CSDs") both regionally and internationally, with the most convenient, secure and efficient linkages, and

- Electronic and instantaneous share registration, through dematerialization and eventual provision of efficient share registration on a global competitive basis.

Realizing a scripless securities market

A scripless securities market provides the enabling environment for STP, eliminates the risks associated with paper scrip, reduces the cost of ownership transfer and enhances the processing efficiency of securities transactions. To transform into a scripless market, Hong Kong should migrate in phases to full dematerialization by:

- Dematerializing new issues,
- Immobilizing existing issues, encouraging conversion of physical scrip into electronic records, and dematerializing to the extent feasible,
- Adopting Global Certificates for issues of companies domiciled overseas where physical scrip is mandatory under law, without any scrip issued to investors, and
- Adopting electronic contract notes in trading.

The building blocks for achieving a scripless securities market in the eFrastructure include the following:

- Electronic and instantaneous update of registrars' Registers of Members,
- CSD-to-registrars electronic links,
- Investor participation in the CSD for direct settlement,
- Upgrading of the systems and services of both the CSD and registrars to accommodate the requirements of scripless securities market, and
- Appropriate updates to the current legal and regulatory framework and adoption of globally accepted standards for electronic transactions.

The enactment of the Electronic Transactions Bill will provide legal standing and protection to electronic documents (e.g., contract notes, instruments of transfers), records (e.g., Registers of Members), and signatures. This legislation is a necessary first step towards a scripless market.

Through STP, the scripless securities market structure will also provide significant opportunity for efficiency improvement and cost reduction for

non-trade activities, such as eIPO and corporate actions. Transforming into a scripless market environment is a dramatic change. Adequate market communication is necessary in order to help ensure market participants understand and gain confidence in the changes.

Building a robust technology structure

To compete and prosper, Hong Kong's eFrastructure must be anchored on technologies and architectures that are open, robust, secure, current, scalable and supportive of continuous innovation. Such technologies help to remove barriers to entry and makes it easier and more convenient for anyone to participate in the market from anywhere at anytime. A single clearing arrangement, an STP operating environment and a scripless securities market will not become a reality without such world-class technology structure in place.

The vision of a robust technology structure for Hong Kong's eFrastructure will encompass the following best practices and international standards:

- Support unified and open access for trading and clearing of securities and derivatives,
- Provide an integrated platform for risk management and STP for all markets and products,
- Enable connectivity and interoperability with standard interactive and message-based interfaces,
- Adopt best-of-breed approach or use proven solutions provided by leading players, and
- Provide a unified, secure, high performance and high resilient network, enabling both local and remote open access.

In France, the ParisBourse plans to consolidate the securities and derivatives systems onto an integrated platform - Clearing 21. In Germany, Deutsche Börse plans to launch a unified trading access window and interface for Eurex and Xetra by late 1999. CBOT is planning to use the Eurex solution. SIMEX and CME share the same derivatives trading system with MATIF. In the United Kingdom, the LSE is in discussion with Deutsche Börse in setting up a trading link and clearing platform. Technology investments are proliferating in every major market.

Hong Kong should also embrace the global perspective and development trends in developing its eFrastructure. The technology structure of the eFrastructure will include the following four building blocks (Exhibit 4.1):

To compete and prosper, Hong Kong's eFrastructure must be anchored on technologies and architectures that are open, robust, secure, current, scalable and supportive of continuous innovation.

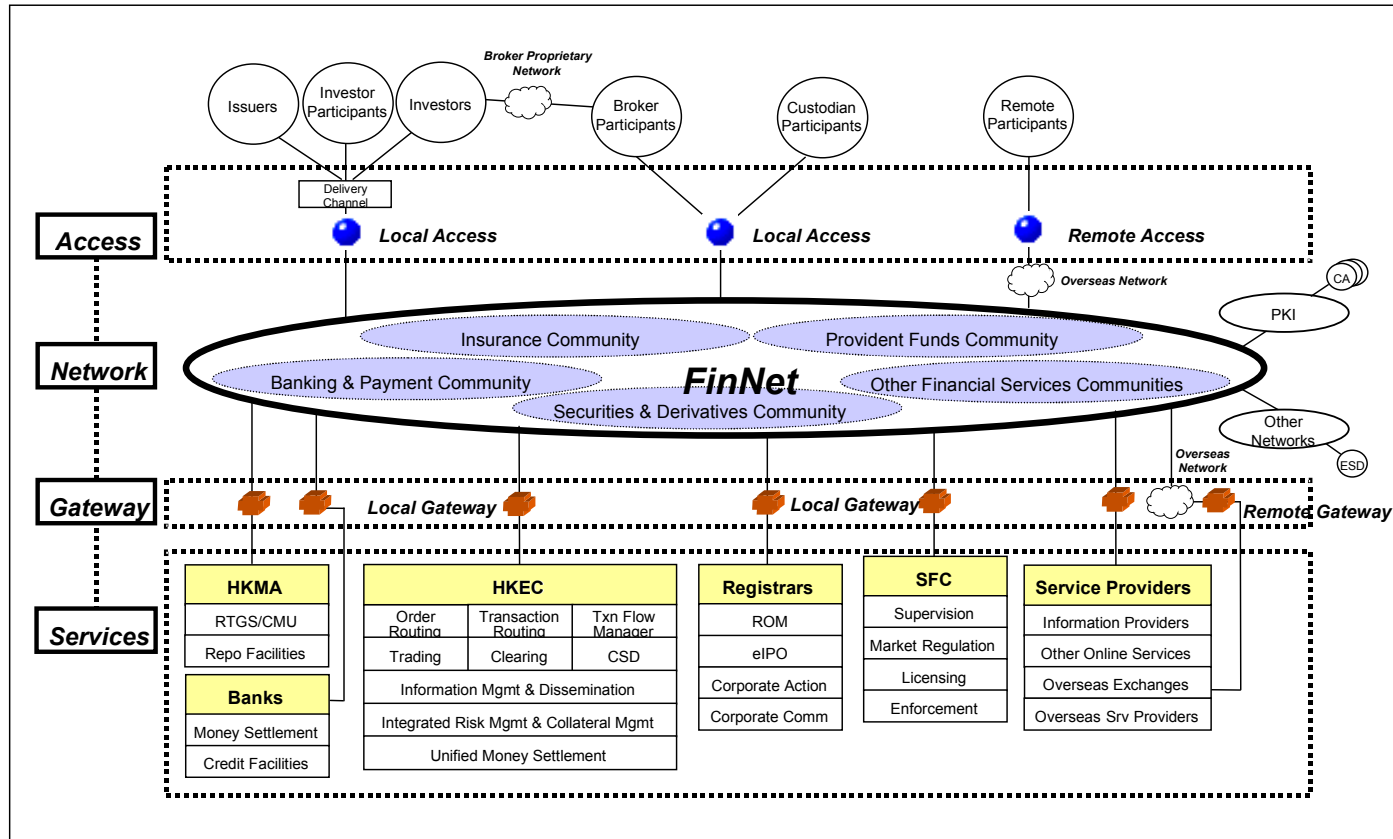


Exhibit 4.1 The technology structure of Hong Kong's eFrastructure

- Access, which is the entry point to the financial infrastructure via local or remote connections and which must be simple, open, secure and affordable,
- Network, which is the information conduit connecting market participants and service providers,
- Gateway, which is the entrance to the service components of the financial infrastructure. Together with the access building block, the gateway provides the interactive and message-based connections between market participants and service providers, and
- Services, which refer to the application solutions of the service providers. To the extent feasible and practical, solutions used or provided by global leaders should be considered and employed.

In 1997, the IWG on Financial Technology Infrastructure provided a vision for Hong Kong's future financial network infrastructure (Exhibit 4.2).

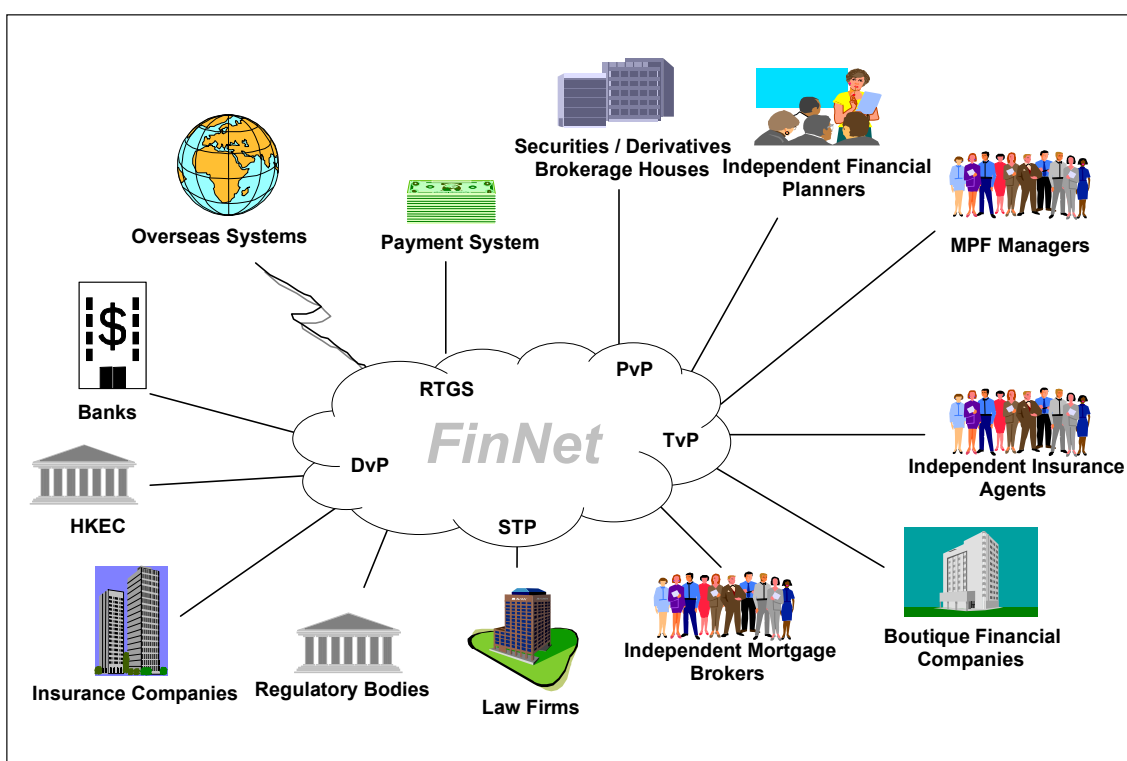


Exhibit 4.2 The vision of FinNet

This report recommends the implementation of “FinNet”, as conceived by the IWG study, as the network backbone of the technology structure of Hong Kong’s eFrastructure.

The concept of FinNet is a secure, open, scalable and high performance community network built to interconnect all financial institutions including securities, derivatives, banking, insurance and all other licensed financial entities in Hong Kong, to effect STP and ultimately real-time financial transactions such as delivery versus payment.

The implementation of FinNet is best achieved by a partnership of the public and private sectors. This partnership will provide the needed commitment, support and governance that will help ensure the success of FinNet's implementation and its wide acceptance by the public.

Hong Kong is not the only market that recognizes the need to build such a robust network infrastructure. Based on the same objective, New York City attempted to build a "city net" in 1997. London initiated the "PORT" project in the same year. Many economies in Asia, such as Korea, Malaysia and Singapore, have included such undertaking as part of their national information infrastructure initiatives ("NIIs"). In a related development, after the IWG study, Hong Kong Monetary Authority ("HKMA") built a network linking all licensed banks for electronic submission of secure and confidential regulatory returns.

This report recommends that Hong Kong should build on the vision of FinNet by setting up a securities and derivatives community network ("SDNet"). This new network will provide a framework of standards and the thrust for progressive convergence of the larger financial services network ("FinNet") in Hong Kong. It would offer far more value than that of a purely physical network infrastructure.

The systems and services of the SDNet would:

- Allow users to have two modes of access - a browser-based workstation interface and an API or ISO-compliant message-based interface - to link up with their own systems,
- Adopt TCP/IP as the standard message transport protocol, and
- Allow users to connect to the SDNet via various network access methods including ISDN, dial-up and others if called for.

In Hong Kong, Frame Relay combined with fiber optic technology has been found to be reliable, of high performance and with low error rates. In addition, the current exchanges in Hong Kong have adopted Frame Relay for their trading networks. It is proposed that the SDNet could adopt Frame Relay for its physical backbone. As a quick-win initiative, electronic filing for intermediaries to the SFC could be implemented as one of the first SDNet services.

FinNet, based on a partnership of the public and private sectors, interconnects all financial institutions and licensed financial entities in Hong Kong to effect STP and real-time financial transactions such as delivery versus payment.

This report recommends the setting up of a securities and derivatives community network ("SDNet"). SDNet will provide a framework of standards and the thrust for progressive convergence of the larger financial services network ("FinNet") in Hong Kong.

Fine-tuning the legal and regulatory framework

Hong Kong has a sound and established legal and regulatory framework that is market friendly and well recognized internationally. The rule of law and prudential regulation have provided the necessary protection and ensured fairness to all market participants, operators and other stakeholders. Global investors' confidence in the market is well assured.

The eFrastructure calls for changes in the current business practices and relationships among various stakeholders. For example, market participants would be permitted to participate across markets, contract notes would become electronic, and legal certainty would be granted upon settlement of transfers in the CSD, etc.

Appropriate updates, therefore, need to be made to Hong Kong's legal and regulatory framework to enable these changes. The key legal and regulatory changes required are summarized as follows:

- To set up a single clearing arrangement, relevant legislation and exchange rules need to be amended to permit cross-market participation and to be consistent with the rules on the issuance of trading rights. The merged clearing house needs to be recognized by the SFC and the legal structure for cross-market risk management needs to be established,
- To achieve straight-through processing, new contractual relationships among the STP counterparties need to be established. Enactment of the Electronic Transactions Bill will provide legal standing and protection to electronic documents and signatures and pre-agreed collection arrangements need to be made with the Inland Revenue Department and registrars on the collection of stamp duty on off-exchange transfers, and
- To transform into a scripless securities market, the Companies Ordinance needs to be amended to accommodate the dematerialization of shares. Legislative changes by overseas authorities are envisaged for dematerializing issues of companies incorporated overseas. The mechanics as well as the legislation of the new arrangements to facilitate and protect the creation, holding, transfer and exercise of security interests (in particular equitable interests) in scripless issues will have to be worked out.

As implementing legislative changes to achieve a dematerialized system is likely to take time, the following interim measures, which would not require legislative changes but changes to the Listing Rules of the Stock

Exchange and CCASS Rules, may be considered with a view to creating greater efficiency in the marketplace: (i) compulsory use of CCASS deposited Global Certificates for new issuers (with, possibly, withdrawal from CCASS being allowed), and (ii) for existing listed issuers, measures to encourage more shares to be deposited into CCASS and not subsequently withdrawn (e.g., not accepting at brokers' level street name certificates for settlement purposes or imposing a time period before they can be so used).

The role of registrars will become more important in a scripless market environment as legal ownership of shares (without physical scrip) will be reflected in the electronic Registers of Members kept by the registrars. The registrars need to upgrade their systems in order to accommodate the requirements of the new market structure. Price and service competition among the registrars are essential to help ensure the new environment would not impose unnecessary costs on the market.

The Government and the SFC will have important roles to play in driving and expediting the appropriate updating of the legal and regulatory framework. For example, the Government will be instrumental in driving the early enactment of the Electronic Transactions Bill, the amendment of the Companies Ordinance to accommodate dematerialization of issues, introducing any necessary statutory provisions in order to clearly recognize and protect property rights in scripless issues, making arrangements for stamp duty collection on electronic registration of transfers and the simplification of stamp duty calculations. The SFC will also play a crucial role in sanctioning the setting up of the single clearing arrangement, the new roles of the CSD and new registration model and in facilitating the dematerialization discussions with overseas authorities.

Other than the benefits of risk reduction and increase in operation efficiency, regulatory cost savings are also expected as a result of setting up a single clearing arrangement, achieving STP and transforming into a scripless securities market.

CHAPTER FIVE

JOURNEY TO THE FUTURE

To realize its vision to excel in Asia and in the world, Hong Kong must now begin its journey to build its eFrastructure. The guiding principles that underpin the recommended initiatives are as follows:

- Implement Quick Wins wherever appropriate,
- Set up the right foundation before building the ultimate infrastructure,
- Realize value en-route by delivering results in phases, as appropriate,
- Leverage best-of-breed or best-of-fit solutions, or use proven solutions from leading global players, and
- Remain alert to market dynamics and make adjustments as necessary.

A robust and open financial infrastructure that allows continuous improvements and innovations will stand the test of time and sustain long term competitiveness.

The recommended eFrastructure building initiatives include:

- Quick wins that can be undertaken immediately and implemented quickly. These include the implementation of: (a) consolidated account reporting, (b) electronic filing to the SFC for intermediaries via the setting up of FinNet, and (c) appropriate improvements to risk management that require only minor changes to business policies, practices, or systems.
- Core enhancements to the financial infrastructure to be implemented within two years. These include: (a) the building of the securities and derivatives community network (SDNet), (b) upgrading the securities clearing system to open architecture ready and performing high priority business enhancements (such as multi-currency clearing/settlement and comprehensive investor participation capability), (c) implementing the building blocks for setting up a single clearing arrangement, (d) establishing the building blocks for enabling straight-through processing, (e) consolidating derivatives clearing systems onto a single platform, and (f) updating the legislation and regulatory framework, upgrading CSD and registrars' systems, and converting to a scripless securities market.
- During implementation of the core enhancements and at the end of the two years, re-assess the readiness for implementing initiatives such as: (a) integrating all exchange and clearing house

networks into SDNet, (b) unifying access to trading and clearing for the securities and derivatives markets, and (c) further upgrading the securities clearing system with proven solutions from leading players.

The speed in realizing value is imperative to Hong Kong's sustained competitiveness. Subject to the business priorities of the relevant parties, a preliminary timeline of two years for implementing the core enhancements is recommended. The timeline is aggressive, but achievable. To help ensure success in building the eFrastructure, the following key factors are required:

- Leadership commitment and determination,
- Government and SFC support,
- Continuous learning from the market,
- Strategic partnerships with global players,
- Proper management of the enhancement program,
- Availability of needed skills and resources,
- Effective market communications, and
- Complementary business strategy.

Time is of the essence. Competitors are already on the move to strengthen themselves. Hong Kong should be bold to act now and embark on the journey of building its eFrastructure.

ACKNOWLEDGEMENTS

This report has been prepared with the input, advice and assistance from the members of SCEFI and its User and Technology Working Groups and the consulting work of Andersen Consulting and Consultancy Associates Limited. Besides making extensive reference to global trends, international standards, and relevant best practices, SCEFI has also called upon experts from Euroclear, Federation of Share Registrars Ltd., Global Straight Through Processing Association (GSTPA), Hong Kong Securities Industry Group (HKSIG), HSI Services Ltd., IBM, Industry Standardization for Institutional Trade Communication (ISITC), Pan Asia Securities Lending Association (PASLA), the Society for Worldwide Interbank Financial Telecommunication (SWIFT), and Thomson ESG to contribute on the latest developments in their field.

The Chairman is indebted and would like to express gratitude to all members of SCEFI, UWG, TWG, the executive directors and staff of the SFC, the Financial Services Bureau, as well as the experts mentioned above for their hard work, constructive input and invaluable contributions to this study.

A. SCEFI TERMS OF REFERENCE

With the objective of enhancing the competitiveness of Hong Kong as an international financial centre in terms of risk mitigation, increased efficiency and cost reduction, and in respect of any proposals to this end affecting the financial infrastructure of Hong Kong, including but not limited to -

- (a) the setting up of a single clearing arrangement for both stocks, futures and options;
- (b) the enhancement of the financial technology architecture to facilitate straight-through processing of transactions across the financial markets; and
- (c) the move towards a secure, scripless securities market, using robust networks;

the Steering Committee is to -

- (a) identify and examine the key issues involved in implementing the proposals, including those relating to information delivery, transaction, clearing, settlement and custody as appropriate, having regard to the views of parties concerned. Specifically, they may include -
 - (i) study, review and examine the impact of recent developments in technology on the financial infrastructure in the securities and futures industry of Hong Kong;
 - (ii) examine the risk inherent in multiple clearing systems and the risk management methodology and procedures of the existing clearing systems in Hong Kong and to consider ways to improve the management of such risk;
 - (iii) review the technology available for clearing and settlement services and examine how unified or co-ordinated technology will enhance risk management, operational efficiency, system integrity and security, inter-operability, scalability and technology upgrade;
 - (iv) examine procedures and cross-margining issues for the provision of services that are user friendly, taken into account the issues of surveillance and transparency;
 - (v) examine linkage with the Real Time Gross Settlement payment system to facilitate transaction, clearing,

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- settlement and payment for the existing exchanges and alternative trading systems;
- (b) draw up action plans (including specific implementation plans for technological and institutional arrangements) to take forward the proposals taking into account current market factors and relevant experience overseas; and
 - (c) make recommendations to the Financial Secretary before 15 September 1999.

B. MEMBERS OF SCEFI AND WORKING GROUPS

Steering Committee on the Enhancement of the Financial Infrastructure in Hong Kong ("SCEFI")

Chairman

Securities and Futures Commission

Mr. Andrew Sheng Chairman

Members

Financial Services Bureau

Government of the Hong Kong Special Administrative Region

Mrs. Rebecca Lai Deputy Secretary for Financial Services

Ms. Vivian Lau Principal Assistant Secretary for Financial Services

Information Technology and Broadcasting Bureau

Government of the Hong Kong Special Administrative Region

Mr. Alan Siu Principal Assistant Secretary

Hong Kong Monetary Authority

Mr. Peter Pang Executive Director
Monetary Policy & Markets Department

The Stock Exchange of Hong Kong Ltd.

Mr. Alec Tsui Chief Executive

Hong Kong Futures Exchange Ltd.

Mr. Randy Gilmore Chief Executive (March 99 – August 99)

Mr. William Grossman Acting Chief Executive (September 99)

Hong Kong Securities Clearing Company Ltd.

Mr. Stewart Shing Chief Executive and Director

Hong Kong Information Technology Federation Ltd.

Mr. Anthony Au President

Securities and Futures Commission

Mr. David White	Executive Director Supervision of Markets (March 99)
Mr. Mark Dickens	Executive Director Supervision of Markets (from April 99)
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Commission Consultant

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SCEFI - User Working Group

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Securities and Futures Commission

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Mr. Kelvin Lee Director
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Mr. Rico Leung Chief Operations Officer

Hong Kong Stockbrokers Association Ltd.

Mr. Dannis J. H. Lee Chairman (April 99 – August 99)

The Hong Kong Association of Banks

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Hong Kong Federation of Insurers

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Mr. John Williamson	Executive Director
Mr. Vic Tham	Vice President

Merrill Lynch (Asia Pacific) Limited

Mr. James Walker	Director of Operations
Mr. Lyle Williams	Vice President Head of Asia Settlement

Goldman Sachs Asia LLC

Mr. Glenn Wardle	Executer Director & Manager Equity Operations
Mr. John Zee	Executive Director Equity Operations

ABN AMRO Asia Ltd.

Mr. Tim Boyce	Managing Director and Group Finance Director
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BOC International Holdings Ltd.

Mr. Tak-Hing Tai	Managing Director
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