

Technology and Stock Markets

A Telecommunications
InfoTechnology Forum
background briefing paper

for the TIF roundtable
22nd July 1996
The Mandarin Oriental Hotel, Hong
Kong
quotation should attribute the TIF
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Part 1: Technology and Finance Capital

Confidence is vital to the success of a financial centre. 'My word is my bond' was never a water-tight basis for financial trading, but it went a long way towards establishing the reputation of the world's major centres. So is technology just a building block or is it a new foundation? Are the world's leading bourses entrenching their superiority by adopting electronic trading systems, or are they reacting to a fear that with modern information technology and the Internet, who needs a physical stock exchange? And who needs the

intermediary brokerages or their commissions? Is the technology making the whole process more transparent for the medium and small trader? Is it making the job of the securities exchange regulators easier to monitor unusual share and stock price movements and trace the history of transactions, or is it opening new opportunities for rigging markets? Does computerized stock trading lead to more efficient markets, or to over-shooting and destabilization?

Exchange Technology

Since the oil-price hike of the 1970s which gave rise to a vast pool of petro-dollars and petro-currencies such as 'Eurodollars', the world of banking and finance has never looked back. The need to reinvest liabilities as assets and deposits as loans gave rise to a new era of finance capital. Everyone from countries borrowing too much, to consumers spending too much on their credit cards, stimulated a period of deceptively low real rates of interest which in turn stimulated markets for financial assets and capital. Derivatives of all kinds popped up, and so did Mrs Thatcher who, not inclined to do anything in half-measures, ignited a 'Big Bang' in the City of London's financial markets.

Between them, that is profligation spurred on by petro-dollars and Mrs Thatcher's bang, the world of finance really did become a World. The added ingredient during the 1980s was privatization, which came just in time to counter the depressing effects of the inevitable Debt Crisis. It heralded the prolonged period of structural readjustments which characterize modern international corporations, giving rise to such fads and fashions as 're-engineering', 'downsizing', management buy-outs, flotations, mergers and acquisitions, etc., etc. Stock markets came into their own.

These very sectors are leaders and drivers of telecommunications, data file transfer, computer networking. Information technologies offer stock markets opportunities to reduce their costs, speed transactions, enlarge their audience, increase their turnover. They also offer competitors possible entry points. IPOs via the Internet is one portent. In this increasingly competitive and increasingly regional and soon global market, bourses are looking for ways to share costs and 'grow the pie' by sharing markets, and at the same time fend off encroachment by rivals and intruders. Within each stock market there are, too, many competing interests between large and small brokerages, between domestic and foreign, between traders, intermediaries and clients. Technologies are not neutral under such circumstances. They benefit some and disadvantage others. Part 2 below just scraps the surface of some of these developments.

Part 2: Europe and the United States

Europe

What logic was it that drove the London Stock Exchange onto the horns of a dilemma in the 1980s by opting for an over-engineered system called Taurus? This settlement system, involving 300 man-years, became Europe's biggest software development and white elephant. It cost a fortune to build and several reputations to scrap. SEAQ, the London Stock Exchange Automated Quotation screen-based system, replaced Taurus and SEAQ-

International specifically serves European cross-border share dealing with settlements arranged in the country of origin. For several years the upgrading of SEAQ has been under discussion to give other exchanges in Europe a share in what is an emerging pan-European wholesale market. An alternative view is to scrap SEAQ and buy an off-the-shelf system such as NASDAQ.

From Brussels Europe is organizing the listing of blue chip European Equities on all twelve member exchanges, and a pan-European Index designed for the derivatives market. But EU states are split between the liberalizers, including Britain, Germany and the Netherlands, and the 'Club Med' group, including France, Italy, Spain and Belgium, who wish to protect their domestic exchange markets by insisting on instant publication of trades, suitable for order driven markets but not for global trading systems. A draft EC directive giving stockbrokers who are recognized by one country a passport to trade in others came unstuck. However, in light of what looms over Europe's financial markets in future - a single market, one central bank and a common currency - member bourses are toying with projects to link exchange information systems through Euroquote, a 5-year old company owned by the official stock exchanges and which is in search of role. Each exchange is steaming ahead with internal reforms to help win market share.

United States

During the past decade, there has been a substantial increase in the trading of NYSE stocks in marketplaces other than the NYSE. Trading of NYSE-listed securities has increased in the over-the-counter (OCT) market, proprietary systems (PTS), foreign markets (for example London and Japan), and non-intermediated markets where investors trade directly with each other. The dramatic change has been caused by advances in technology and intensified competition, both domestically and globally. Information technology has greatly reduced the costs of providing trading services, and it has facilitated the entry of new competitors into the market. Many NYSE's new competitors are employing trading systems that are very different from the continuous auction market used by the NYSE. For example, NASDAQ is running on a screen-based quote system, proprietary trading systems enable stockholders to trade directly and internet trading systems also pose some threat to the floor-based exchanges as well as brokerage firms.

Part 3: Automation in the Stock Exchange of Hong Kong

Before an automated trading system was introduced to the Stock Exchange of Hong Kong in November 1993, the trading system was primarily a computer-assisted semi-automatic quotation system which comprised an information dissemination system and a trading system. Floor traders input orders without the order quantity into the system which would display the broker numbers under each of the two best bid/ask prices. The information of the orders input were disseminated to other floor traders and investors outside the floor through the Exchange Teletext System. With this information displayed on the Teletext screen, floor traders were able to contact their counterparts to negotiate for deals by internal telephone calls or face-to-face bargaining. Once a transaction was struck, the trading details were then

disseminated to floor traders and investors. Clearing and settlement was done by the physical delivery of shares and back-office paperwork. At that time, computers were used extensively for order routing and information dissemination, but not for trading.

On 1 November 1993, a new computerized trading system called Automatic Order Matching and Execution System (AMS) was introduced. Basically AMS is an order-driven system whereby share trading originates from the order of a client, in the form of either a market order or a limit order. Traders submit “messages” through terminals to a central computer. These messages consists of various kinds of order information as well as a personal identifier. Orders are then written to an “electronic order book” and displayed in price/time priority. Transactions automatically occur when the price of the best offer to buy is equal to or greater than the best offer to sell. Instead of simply routing orders and providing market information, automated systems are used to execute and confirm trades, handle clearing and settlement, and even perform surveillance functions; in essence, the system has become the market.

The key factors fueling the rapid rise in the use of automation by SEHK can be summarized as follows. First, intense competition from off-exchange and other exchanges in the region causes the exchange to rely on technology to reduce costs, improve trading efficiency and increase the capacity. In order to maintain Hong Kong as a financial hub in the region, transaction costs are kept low to attract and retain foreign capital. Second, growing complexity of trading catalyses technological advances. As long as trades were not electronically recorded, it was not possible for investors to short sell in Hong Kong. With the emergence of derivatives market like options and futures, automated and real-time trading is the only way to manage these high-risk transactions effectively.

In addition, new regulations adopted by the Securities and Futures Commission as well as guidelines issued by the Group of 30 (G30) place a premium on the efficient trading and timely clearing and settlement offered by electronic exchanges. Automated trading also enables exchanges to improve their surveillance functions. As transparency facilitates investors protection by making it easier for clients to monitor brokers and promotes liquidity, automation allows suspicious transactions and other illegal activity to be more easily identified.

Since early 1994 SEHK has been working on the AMS Second Terminal Development Project, and the system was finally launched on 25 January 1996. The second terminal is an additional terminal installed in the Exchange Members’ offices. The second terminal has the following advantages to users:

- The Members’ trading capacity will be raised since orders will be able to be input to both on-floor and off-floor terminals simultaneously, doubling the maximum 200 outstanding orders per membership seat allowed;

- Trading efficiency will be increased when orders are entered in the Members' offices, thereby eliminating the need for telephone communication between the dealer in the office and the floor trader;
- The second terminal uses digital broadcasting technology which will provide much faster and better information dissemination services without geographical constraints.

In sum, technology elevates the stock exchange in every aspect. Prices and quotations are reported via dedicated communications systems. Computers make and implement trading decisions while dedicated exchange, broker, and dealer computer systems organize trades automatically. Electronic order routing systems allow traders to route their orders to whatever trading environment they believe will serve their specific needs. Traders no longer need to be physically present on the exchange floor. However, technological inertia, the vested interest of broker/dealer intermediaries and the very complexity of trading itself will impede the adoption of automation in stock exchange. Also, automation reduces the need to use broker/dealer intermediaries and increases the transparency that may work against the interest of intermediaries. This may require the regulator to monitor the adoption of advanced technologies and overcome the impediments in the future.