

Chapter 1

INTRODUCTION

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Technology is knowledge needed to run an organisation. The term technology can be described as all known ways of converting inputs into outputs and technological change as finding of new ways of combining inputs to make new products. In economic theory, technology can be defined as the combination of factors of production, which includes engineering design, plant construction and installation, industrial processes, training of managerial and technical personnel and marketing information (Manjit, 1995). In summary, technology can be extended from early stage of research to selling the final product. Economics of technology focuses on interactions between changes in various technologies and various kinds of economic changes. In other words, it encompasses the analysis of technological and economic change, focusing on technology (Granstrand, 1994). Today the importance of technology and its interactions with economy increase the need for economists to attend to it. The R&D activities induced by new technologies are a most powerful tool to allocate resources efficiently and economically. In addition, technical changes also seem to be difficult to be separated from economic changes.

Adam Smith wrote on the impact of technology 200 years ago. At that time economists considered technological change as exogenous. Hicks in his equilibrium theory in early 1930's recognised substitution of capital for labour as induced innovation. The word technology was first used by Schumpeter. He drew heavily on Marx (1884) for his 'Neue Kombinationen', which later the English term adapted by Germans: innovationen (Duller, 1992). The most influential writer on technological

change, Schumpeter (1976) created a framework to analyse and study the effects of technology on markets. In his view, innovation is the key force of economic progress and as the determinant of level of competition in the industries. Schumpeter proposes the idea of technology-led-growth (Cooper, 1994). According to him, the technology leads to economic growth, which can be considered as a new perspective in development strategy. Although technology can be commonly related to hardware, it has taken economists a long time to explain its contributions. Recent research on the economics of technology has emphasised the importance of technology especially to organisations in developing countries (Patel, 1983).

There is some evidence that technology, in its broadest sense, has a significant effect on the structure of organisations. Technology simplifies and reduces tasks needing manual skills and strength. The use of appropriate technology in properly planned systems can have dramatic effects on operations. Properly applied, it can increase productivity. Technology can also influence the way organisations interact with customers, suppliers and competitors.

Most information in organisation today are still in paper form and difficult to manage. As businesses begin to automate and evolve work processes, effective co-ordination of paper and other information becomes critical. Technological change in information addresses the ability to work with all available information to the organisation in the forms of papers, faxes, images, ASCII data or voice and other source of data, co-ordinate it through latest process automation solution available (Star, March 14, 1995). In summary, technology including IT alters the skills

requirement for individuals, it changes the job and the way they are done (Lucey, 1995).

1.1 INFORMATION FOR COMPETITIVE ADVANTAGE

Information is applied broadly in assistance of public administration, business management, banking and marketing, for scientific and technological research, statistical and numerical computation, medical diagnosis, monitoring purposes, industrial process control, education, libraries, other documentation services and plays important role in remote sensing and telecommunications (Unesco, 1980).

Different levels of management make different types of decisions and need different types of information. Information provided at one level, which is good information, could be poor information at another level. Information must be relevant to the purpose. Irrelevant information might lead to waste of time and confusion. Furthermore, information should be accurate enough for its purpose:

- a) At strategic level, senior managers in an organisation might be satisfied with figures to the nearest thousand, hundred thousand or even million ringgits.
- b) At tactical level, middle managers might be satisfied with figures rounded to nearest hundred or thousand. For example, revenue and cost figures are rounded to the nearest thousand.
- c) At operational level, supervisors and office workers need information that is accurate. For example, a cashier will do bank reconciliation to the exact cent. Day-to-day transactions usually indicate amounts to the exact cent, second and kilogram.

Information should have some value. The benefits obtainable from the information should exceed the cost of acquiring it. An item of information that leads to an actual increase in profit of RM100 is not worth if it cost RM150 to collect. For information to have value, it must be provided at the right time so that the decision making will result in reducing cost, eliminating losses, increasing sales and preventing frauds.

Users of an organisation's information can be internal or external. Internal users of information include board of directors, divisional general managers, divisional heads, departmental heads, section leaders and workers. Internal users can also be classified by function i.e. marketing, finance, administration, production, technical and personnel. External users of information include the organisation's bankers that need to take decisions on the amount they are prepared to lend, the government or Inland Revenue Department require information for the purpose of taxation, the organisation's suppliers and customers to decide whether to trade or not and so forth.

In an organisation, information is required in decision making, planning, controlling, recording transaction and as performance measurement. The entire decision making process can be viewed as the acquisition and processing of information. Information is required to assess whether there is some deviation from planning, once the plan is implemented. Information is also required in measuring overall performance of organisation to enable comparison against costs, revenues, volumes and profitability.

1.2 INFORMATION TECHNOLOGY

Information technology (IT) can be defined as the combination of computers, telecommunications and information resources. Information technology is the technology which supports activities involving the creation, storage, manipulation and communication of information, together with their related methods, management and application (French, 1996). The UNESCO definition of this term is the 'scientific, technological and engineering disciplines and the management techniques used in information handling and processing, their applications; computer and their interaction with men and machines, and associated social, economic and cultural matters'. The established technologies, such as telephone, telex, television and computers, have been developed in recent years so that their functions can be integrated and they may be combined together into information technology systems. Today, the most challenging task an organisation has to face is to manage the technology and it has been more challenging with the IT-based services.

Lately, developments have taken place in the economy in restructuring economy, globalisation of market, expansion in trade and capital flows and increased in information activities. These economic changes have been largely driven by advances in IT. As the economy moves into liberalisation, IT plays an important role to spearhead the development of each sector in the economy (Parker, 1996). Today's corporate leaders are issuing a series of challenges to manage IT in finding new ways of processing information that empower employees, choose right hardware and software, and cost of developing and maintaining systems. These directives have become particularly pertinent to all sectors that face new competitive pressures at a

global level. An operation with outdated computer systems is fast becoming a recipe for failure (New Strait Times, Feb 16, 1995).

It would be appropriate to begin this study by asking the need to study information technology and find out the reasons for importance given in research on information technology. Earlier in developing countries information technology has seldom been the target for careful and comprehensive development planning. Lately, information technology has begun to receive attention from economist and it plays a crucial role as an active partner in economic development. For both developed and developing countries, issues regarding information technology require serious consideration. Economists realise that information technology related issue is not an insignificant part of the economic activity. A paper by Asian Economic Bulletin revealed that there is an urgent need for a deeper understanding of the contribution of information technology to the development process. For long-term development, developing countries such as Malaysia need to expand its information technology capability as has been noted by the Seventh Malaysian Plan (1996-2000).

Firms in an industry must always assess existing IT capability in order to move ahead with IT in terms of competitive and organisational opportunities. The main aim here is to identify how, when and where IT is needed and the impact of IT on business processes, business growth and economic growth. There are three ways Information Technology can effect an industry

- a) Change the nature of product
- b) Accelerate the distribution process
- c) Create efficiency in product cycle

Life today is controlled by technology. Technology simplifies human work and changes our life style to create a new civilisation. This rapid and excessive change can be categorised as a revolution. Almost every day we are exposed to new technologies. The world today is facing a new revolution called the informational revolution. As the earlier industrial revolution has created machines to take over man's work, informational revolution today, reveals technological inventions to collect, produce and distribute information.

But what is the real effect of this revolution to human civilisation. To get a deep understanding of this fact, we need to analyse the history of machine invention or tools used in gathering and spreading information. The first tool that is acquainted with information technology is telephone, which was invented by Alexander Graham Bell. It enables faster communication that leads to faster decision making and action done, no matter where a person is.

Unlike telephone, which is individual, radio is used to spread information orally as mass media. In Sarawak, radio is used to announce the death of a family member to their relatives in rural area. The audience can acquire information through running commentary on the radio. Television has increased the function of radio through the supply of pictured information. Audience acquires information directly from the spot. People can see the Bosnians' suffering, Gulf War in Iraq, Information about share in BSKL and debate in the Parliament directly as if they are there. Television and radio are the most important information transmissible channel in almost every house in Malaysia.

However radio and television are just one way interaction whereas telephone can only present information orally. Now, the combination of radio, television and telephone usage have been increased as one of the information channelling medium. On the other hand, document and pictorial or graphical information is able to present to the other party through facsimile. Immediate information sending can be done with no more postal delay problem. However these three media are unable to process data. Man's ability is still required in the processing work and differences in their ability create problem. Computer was then invented to solve these problems. It can process, save, publish text information, sound, and picture needed immediately.

The invention of information technology will continue and be more sophisticated in the future as information plays an important role in human life. Recent share details enable a person to buy and sell shares effectively. Details regarding recent account balance position can help bank suppress million ringgit loss caused by overdraft as happened in Bank Simpanan Nasional Branch in Kota tinggi in 1993 which was not linked with online computer.

The importance and role of information and information technology cannot be denied. Large companies are willing to allocate a large budget for IT as they believe can attract more customers through it. This large investment is due to their confidence in IT's role. IT's first role in the business world is as a business enabler. The most visible example is the airlines company. Without IT, ticket booking, flight schedule, pilot's timetable, worker's timetable and food booking could not be planned effectively. Most airline companies own 2 computers i.e. one for routine daily

operation and one more as a substitute in case of damage or emergency. The computer has to operate 24 hours a day, 7 days a week because no work can be done without them.

IT's second role is as business enhancer. IT helps to perform additional functions that could not be achieved before. This extra service can help companies to attract more customers and to raise the company's image. Bank's Automatic Teller Machine is a good example. With it, bank's dealing can be carried out after office hours and during holidays. Now, customers can withdraw, deposit and exchange money anytime without queuing up at the counter. For the banks, this extra service doesn't require additional workers and overtime. Now knowing this, customers are not pleased to open account in banks that do not offer ATM service. As this teller machine is connected to the bank's main computer, it has to operate all day long. So, withdrawal, deposit and updating can be done immediately no matter where the transaction is done. This enables the bank to check the balance before every transaction to avoid fraud.

IT is also known as a means to raise the quality of production and service. In the production industry, IT's role is to make sure that products are produced at the fixed time and to control the quality of products. Programmed microprocessor-based machine can help to overcome the inconsistent manpower and quality problems. A uniform procedure in every division of the company can be achieved with the computer system such as Computer Finance System and this can lessen bureaucracy and processing time.

IT has also become a 'competition tool' in business deals. The difference can be observed between companies that have proper computer systems and companies without computer systems. Work can be done faster and service can be increased in companies that own complete computerised systems. This can help to attract more customers and increase company's total profit.

This is the effect of IT in business; technology that connects computers, communication linkages and other equipment/machine for collecting, producing, processing, storing managing, manufacturing and information spreading purposes.

1.3 THE ROLE OF IT

IT plays an important role in the development of Malaysian economy as large investments are made in this industry. In the past, IT only focused on automating routine operations. Now it is extended to other areas such as productivity improvement, product development, corporate planning, risk management and market analysis (Bank Negara, 1996)

1.3.1 Efficiency and productivity.

IT is used as one of the tools to enhance productivity. Increase in labour productivity can be linked with the usage of IT. IT increases productivity by improving the flow of work and decreasing the time used to do a particular job.

1.3.2 Reduce cost

IT can minimise cost by reducing labour cost, e.g. with production control system. Furthermore, IT can reduce manufacturing costs by efficient work schedule, e.g. better monitoring of raw materials usage to reduce wastage.

1.3.3 Decision making

IT can enhance decision making. Advancement of IT and improvement in communication has led to easy storage and retrieval of information that contribute to the effective and faster decision making.

1.3.4 Networking

Transaction through network is expected to expand in the future. The Internet has become an effective tool to ensure the flow of information from manufacturer to end-users and vice versa. Electronic commerce i.e. doing business via information network or Internet is expected to grow in coming years. Currently in Malaysia Jaring and Telekom provide Internet services.

1.3.5 Product differentiation

IT can be used to design new products speedily using Computer Aided Design (CAD). Computer Aided Manufacturing (CAM) able to customise product to a customer's particular specification, making a unique product or product which appears different from that of the competitors.

1.3.6 Investment

To make investments, investors require information. IT can provide relevant, reliable and clear indicators of the market conditions. These will ease the investors planning as well as reduce cost. Moreover, the investors are able to take opportunity of the market at the right time.

1.3.7 Performance advantage

Efficient stock control system e.g. the just-in-time system makes an organisation more dependent on efficient suppliers, resulting in its stopping trading with less efficient companies which hamper its own ability to deliver.

1.3.8 Generate new product/service

IT is used as a tool to introduce new products or innovations. It also plays an important role to expand markets. An example in the financial services sector is the automatic teller machine (ATM).

1.3.9 Focus

IT is a powerful tool in identifying groups of consumers whose needs are not satisfied. By using sales data to identify customer preference and spot unusual trends, organisation can be very responsive. This can be done by using IT to analyse and do market research with statistical information.

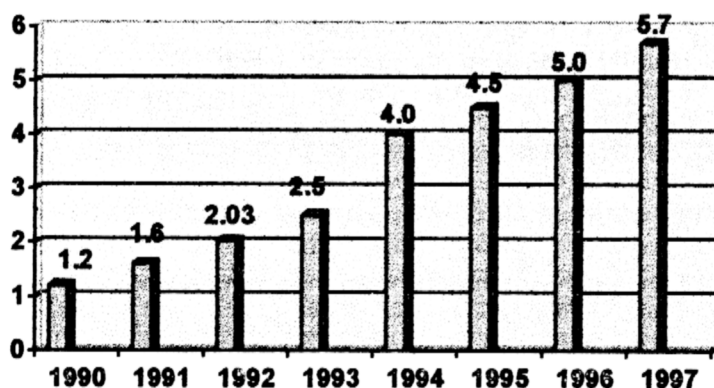
1.4 IT IN MALAYSIA

The central theme of Malaysia's national efforts in IT can be best described as striving towards an information-rich society and the creation of new opportunities. The Government as a major user of IT and the custodian of the national interest, has a key role in ensuring that its own use of IT would contribute to the enhancement of productivity and quality of public services. With the help of National IT Council, the long term goals of the government include (Star, August 16, 1994):

- Developing the economy.
- Developing R & D infrastructure.
- Supporting the information infrastructure by improving telecommunications and data services.
- Encouraging the habit of gaining and using knowledge among Malaysians.
- Creating a fair society by providing access to information resources.

Total computer expenditure in Malaysia was about RM2.03 billion for 1992, an increase of about 27% from 1991. While this is more than RM100 per capita expenditure, which is high by developing country standards, it is only about a quarter of that in NIC's such as Singapore, and one fifteenth the figure in developed countries like Japan and United States (Star, August 16, 1994). Comparatively, in 1994 the computer industry grew 20 percent or RM4 billion. A study by The Association of Computer Industry Malaysia (Pikom) since 1990 shows that multinationals especially those in banking, manufacturing, finance, accounting and government bodies are increasingly showing their interest in developing computer usage. The five year study revealed that the development of computerisation includes personal computer (PC), software, workstations, PC peripherals, data communications, mainframe, minicomputer, software and services, hardware maintenance and human resource development (Berita Harian, March 2, 1994). The Pikom chairman, Shaifubahrin Salleh said Malaysia's IT industry grew at 23% this year and might see a decline in growth to about 15% next year (Star, October 15, 1997).

Figure 1-1: The development of computer industry revenue in Malaysia
(in billion ringgit)



Note: The figure for 1997 is based on projected value

In terms of IT expenditure by sector, the banking sector shows the highest expenditure, 27% of the total expenditure in 1995. The manufacturing sector recorded the second highest, about 13% of total expenditure in 1995. The expenditures for other sectors are shown in table 1-1.

Table 1-1: IT Expenditure By Sector, 1990 and 1995

Sector	1990		1995	
	RM million	%	RM million	%
Architectural, Engineering & Construction	-	-	152	4.0
Banking & Finance	507	39.0	1026	27.0
Distributive Trade	91	7.0	304	8.0
Education & Research	52	4.0	114	3.0
Government	156	12.0	380	10.0
Plantation & Mining	26	2.0	76	2.0
Manufacturing	78	6.0	494	13.0
Oil & Gas	234	18.0	380	10.0
Transportation	39	3.0	114	3.0
Utilities	39	3.0	266	7.0
Home & Personal	-	-	76	2.0
Others	78	6.0	418	11.0
Total	1300	100.0	3800	100.0

Source: PIKOM in Malaysia (1995)

In terms of export Malaysia is in the sixth rank behind Japan, the United States, the European Union, Singapore and Korea. In 1995, Malaysia recorded RM82.1 billion (US\$32.84 billion) of exports compared to the total worldwide export amounting to RM 1.088 trillion. On the other hand, Malaysia is in the fifth rank in world's imports. Malaysia contributes RM 55.55 billion (US\$22.22 billion) to import in 1995 compared to RM1.021 trillion (US\$408.65 billion) of total world trade for the year. Thus, Malaysia accounts for nearly five percent of total IT trade in the world in 1995 (Star, April 22, 1997). Leading global IT trade in terms of exports and imports respectively are shown in table 1-2 and 1-3.

Table 1-2: Leading exporters of IT products in 1995

No	Country	Amount (RM billion)
1	Japan	266.5
2	United States	245.0
3	European Union 15	143.0
4	Singapore	103.0
5	Korea	83.0
6	Malaysia	82.0
7	Taiwan	71.7
8	China	36.3
9	Mexico	29.2
10	Canada	28.9
Total		1080.0

Source: World Trade Organisation

Table 1-3: Leading importers of IT products in 1995

No	Country	Amount (RM billion)
1	United States	350.00
2	European Union	262.00
3	Japan	94.20
4	Singapore	61.80
5	Malaysia	55.55
6	Canada	49.50
7	Taiwan	41.30
8	Korea	41.20
9	China	35.80
10	Hong Kong	30.20
Total		1020.00

Source: World Trade Organisation

1.5 OBJECTIVE OF THE STUDY

This study will be undertaken with several aims, ostensibly to seek answers to the following questions concerning Malaysia's financial sector development with special reference to the role of information technology in banking sector:

- ◆ Business-Process Re-engineering in banking activities.
- ◆ The present capability and usage of IT in banking.
- ◆ To what extent IT is exploited in banking in core business and support services.

1.6 SCOPE

The coverage of financial institutions is very wide i.e. commercial banks, merchant banks, finance companies, savings institutions and financial intermediaries. Therefore, to narrow down the subject, the study only covers three major financial institutions, namely, commercial banks, merchant banks and finance companies. As commercial banks constitute about 2/3 of Malaysia's financial resources, greater emphasis is given to them in this study.

1.7 METHODOLOGY

This study will give an overview of information technology in Malaysia. It will also focus on issues and problems related to information technology in the Malaysian banking sector. The role of information technology in the banking sector i.e. IT features to assist the core functions and support functions are studied in detail.

The role of information technology is studied using primary data from a small interview conducted and personal observation in local banks. Secondary data used are mainly from Bank Negara Annual report, Association of Bank Malaysia (ABM) reports, Banks and Finance Companies annual reports, The Association of Computer Industry Malaysia (Pikom) reports and Malaysian National IT Council reports. A small survey was conducted to provide an insight on the level of information technology used by banks.

1.8 ORGANIZATION OF THE STUDY

The importance of technology and information technology capability in developing countries like Malaysia is discussed in chapter one. A brief review of objectives, scope and methodology is included.

Chapter two will present a detailed literature review and an in-depth look at information technology development.

Chapter three focuses on the financial sector in Malaysia, specifically on the history, structure and present status, information technology policies, development strategies, central bank role and related issues.

The role of Business Process Re-engineering in banking sector will be discussed in chapter four.

Chapter five will explore the extent of IT usage in banking services. Summary of the findings and implications of the study will also be included in this chapter.

Chapter six gives government policies, tools for information age, steps needed and future developments.