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Economic Aspects Of The Information Revolution -
The Singapore Experience

By

Chia Choon Wei
ECONOMIC ASPECTS OF THE
INFORMATION REVOLUTION -
THE SINGAPORE EXPERIENCE

TELECOMMUNICATION, INFORMATION AND DEVELOPMENT

Telecommunications have become a basic prerequisite of modern civilisation and play an increasingly important role in the development of our economy and activity of our daily lives. The telecommunication services such as telephony, telegraphy, telex and data transmission are regarded as essential infrastructure to the national economic developments of our country. It is also obvious that the control of information coincides with the dominant powerful countries as information to buy information is often the information to be bought itself.

Telecommunications provide the means for fast and accurate transfer of information. They have made it easier to link markets and business establishments at different locations, facilitating the growth of nation-wide and multi-national industries and promoting industrial efficiency by making possible closer coordination of activities. Telecommunications also link up the world into one single homogeneous unit where information on the economic, political and social environment can be collected and analysed and transformed into valuable tools for strategic planning and charting the future direction of the country. It also allows man-in-the-street the varied and multi-farious capabilities of the computers, computer-oriented facilities and services. The development of our economic system and of telecommunications go hand in hand as economic development creates a demand for more and better telecommunications while the availability of better, reliable, and faster telecommunications in turn makes it possible to develop the growth of efficient industrial and commercial organisations that depend more and more heavily on good and reliable communications. The provision of telecommunication links within and between Singapore and other countries speed up the information seeking process at the touch of a button.

The application of technologies combining telecommunications and computer complements and adds power to each other to the widening of the role of telecommunications as a link for information transfer. The computer makes it possible to process the data required to operate and manage the large-scale of enterprises that are needed in a growing economy. Such information that are systematically generated and collected can be evaluated and integrated into the decision-making process thereby giving more confidence in the final decision made. This will help to minimise risk based on the guessing game. Such computer oriented information is useful to enterprises such as banks and financial institutions.
It is the possession of information and the ability to transform them into policies that one improves his relative strength vis-à-vis his competitors which in turn helps to ensure a better chance of success and survival.

THE ECONOMY OF SINGAPORE

General

Singapore is a regional centre for finance, trade and communication. It has also emphasized that our longer-term strategy is to be an information and knowledge centre providing services and also to embark on value-added services and products. About 85% of the Gross Domestic Product (GDP) comes from the manufacturing (M), International trade (IT), financial & business (F&B), and transport and communications (T&C) sectors.

Table 1: Percentage Contribution of M, IT, F&B and T&C to GDP 1980–1983.

<table>
<thead>
<tr>
<th>Year</th>
<th>% of M, IT, F&amp;B, and T&amp;C of GDP (at 1968 market prices)</th>
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<tr>
<td>1980</td>
<td>84.8%</td>
</tr>
<tr>
<td>1981</td>
<td>85.9%</td>
</tr>
<tr>
<td>1982</td>
<td>84.8%</td>
</tr>
<tr>
<td>1983</td>
<td>84.1%</td>
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The manufacturing sector is now geared more towards the skill-intensive technology such as biotechnology, computers, electronic goods and other information goods. The pattern of our export trade has now been directed to exports of services instead of our traditional manufacturers export. A recent study on world trade places Singapore the 16th biggest in the world and the 2nd biggest among developing countries as exporters of services. The financial and business sector continues to act as the incentive for the hubbing of Singapore as an information communication centre in the region and one of such centres in the world.

Supporting this healthy contribution to the GDP is Singapore’s sophisticated infrastructure of telecommunication networks and facilities which has enabled retrieval, processing and transmission of information possible at the touch of a button. This timely conveyance of the latest and accurate information that has become very crucial for decision making in this dynamic and information hungry world has given our Singapore businessmen an economic advantage over their counterparts elsewhere.
Labour Force

The successful implementation of our family planning programme since the mid-sixties has drastically reduced the potential work force for the near future. Since 1980 the population growth rate averages at about 1.2% per annum. This small supply of labour and together with low unemployment rate of average 4.07% for the past 10 years is expected to create a bottleneck in our search for progress. This shortage is crucial to the M, IT, F&B and T&C sectors as they in total employ about 70% of the total work force.

Table 2: Percentage of total employment by the M, IT, F&B and T&C sectors.

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
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<tbody>
<tr>
<td>1980</td>
<td>70.0%</td>
</tr>
<tr>
<td>1981</td>
<td>71.2%</td>
</tr>
<tr>
<td>1982</td>
<td>71.0%</td>
</tr>
<tr>
<td>1983</td>
<td>70.0%</td>
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The deliberate policy of disassociating ourselves with the low wage countries, usually the less developed countries, acts as an incentive for industries to search for better and cheaper way of doing the same job but with less workers. The wages of our average workers has been increasing rapidly in the past couple of years through the NWC recommendations. The scarcity of our labour supply, the high wage rate of the workers and the repatriation of foreign workers will therefore not only induce employers to automate, mechanise and computerise, but also to raise the skills and productivity of the labour force. Thus in future those mundane, labour-intensive and unproductive jobs will have to be phased out and be replaced by machines.

Singapore as an information distribution centre

With the advent of the information technology, Singapore has become an information and distribution centre in this region. Since early 1980s, the Asian Wall Street Journal, the International Herald Tribune and the Economist are printed and distributed locally. This has enabled us to receive news almost if not simultaneously as the other financial centres in the world. Information contained in these publications are often authoritative and are given serious consideration by the business elites in their daily operation activities.
The Role of Telecoms

Having briefly noted the significant importance of telecommunication facilities and services in helping to shrink the size of the world in terms of the availability and the speed of obtaining information it is now necessary to discuss those services provided by Telecoms in making this possible. We will first highlight some of the existing services and finally the new services that will greatly transform and prepare us for the imminent emergence of the Information Age.

Push-Button Telephone

With the achievement of 100% push-button telephone since 1983, the public is now able to have direct access to computers by means of the push-button telephones. The push-button telephones enable one to make international calls directly without having to go through the operators. Direct international calls are also cheaper to make and it is more convenient. Through the push-button telephones, simple transactions can be remotely directed by members of the public. Examples of such applications are the Telebank and Phonebank. This electronic fund transfer allows efficient, reliable, large-capacity, high-speed and cheap telecommunication and computer systems to dramatically change the mode of payments from being largely paper-oriented to largely a cashless society.

Telex

This fast and accurate on-the-spot communication in printed form enables transmission of information at the speed of a phone with the detail of a letter. Communication is now also possible between telex terminals and other communicating terminals, such as word processors, over the telex network making the telex service still attractive in spite of some of the latest competitive technology. To enhance the telex service, a teletex service, which operates at an average transmission speed of over 40 times faster than that of telex will be introduced next year.

Telefax

Telefax is a facsimile service which allows one to send and receive exact replica of copies or documents instantly, be they in words, pictures, graphs, drawings, plans or scripts in any languages to and from overseas/locally speedily thereby eliminating the transport cost and time and also saving in labour cost. The Telefax is the forerunner of the electronic mail targeted to be introduced in the near future.
Telepac

Telepac is a remote computer access service for terminal-to-computer and computer-to-computer communication via an exchange. Whatever area of business you are in whether finance, education or services, you can now have immediate access to vast amounts of research or technical information, experiment results, portfolios, reports and statistics that is available worldwide. This service enables those who need the most up-to-date information instantaneously at the touch of a button and for overseas companies who need access to their corporate computers for data retrieval or processing. This has helped the business community to dispense with costly and complicated filing systems since one can lay their hands on the very latest information electronically. On the other hand, if you are a database information provider or a computer time sharing company, you can host your computers here in Singapore. This is possible as Telepac provides the means from which you may sell your computer resources via remote access to your local and overseas customers/end users. Currently, this service is available from Singapore to over 200 computer vendors in Belgium, Canada, France, West Germany, Switzerland, UK and USA.

Travelnet

This is a computerised network for travel reservations. This service gives travel agents direct access from their terminal equipment to the reservation computers of a large number of airlines. Direct access to airline reservation computers means that travel agent can check availability of airline seats, make reservations and flight information in seconds. Since one has all the information at one's fingertips, one does not need to go through the laborious process of calling the airline offices and working out itineraries and fares. Also, with Travelnet it dispenses with having to have one terminal to one airline and therefore there is a saving in cost and it is easier to operate with one set of instructions. In this way, there is an increase in efficiency and productivity and also it provides new business opportunities.

Telebox

This service is very similar to the "in" and "out" trays in our present day office but the beauty of it is that you can send and retrieve your mail any time and anywhere unlike the conventional office mail system. This flexibility allows for unhindered flow of information at the touch of a button as you can leave your message in his mailbox for him even when he is not there to receive it. One great advantage of this service is that it cuts down on the enormous amount of papers, memos etc. needed for conventional office communications.

Telebox also provides a cost-effective means to embark on office automation with little capital outlay. This service is
highly desirable for any business with multiple outlets and requiring comprehensive internal and external communications, such as the banks, Departmental shops and the multi-national corporations.

Radio Paging

This is an island-wide automatic contact service to alert those whose work or leisure takes them away from direct telephone contact, that someone is trying to reach them. With this service anyone who needs the convenience and freedom to move about and yet needs to be reached is now possible. The distinct advantages are that it:

(a) gives you the assurance that you need never be out of touch.

(b) helps you to locate people who are on the move, the right person at the right time.

(c) allows you to set whole new standards of efficiency and increase productivity through fast and efficient communications. Companies with salesmen or service personnel on the move will find this service improves their competitive position and allows them to be more responsive to their customers' needs.

NEW SERVICES PLANNED TO BE INTRODUCED

Telemetering, Tele-alarm and Telecontrol

Telemetering, a remote reading of utility meters (water, electricity and gas), helps to eliminate the mundane and labour-intensive work of meter reading and processing especially in an environment where labour is scarce and costly. It also allows these people to be trained for other more challenging and productive jobs.

Telecontrol such as remote switching of household appliances is now being developed. Such systems would incorporate remote fire and security surveillance and remote monitoring, control and switching of plant, equipment and machinery. It is conceivable that working under dangerous environment can be replaced with telecontrol systems. Thus, the potential saving in lost property and lives due to fire, money and time is real and significant.

Teleview

This is an interactive system for disseminating and retrieving either local or oversea computer-based information using the existing public telephone network for communication and the home television set for display. With the Teleview service, the user will be able to access from the comfort of his home or office,
information on stocks and shares, entertainment, shopping guides etc. cheaply and readily from his TV set at the touch of a button. In the longer time it is envisaged that Teleview will be developed into a two-way fully interactive service allowing not only retrieval of information but to input and juggle these information to suit ones specifications. This will encourage the proliferation of related information service industry. Software packaging telesoftware and teleprocessing services will be a common sight and possibly it will develop into a major contributor to the further growth and development of Singapore.

**ISDN**

Telecoms is working towards the Integrated Services Digital Network (ISDN) which is based on the evolution of digital Transmission and switching Technology. This is a single network for voice, message and data and possibly video, where now separate networks exist. This will lead to a single multipurpose customer interface in each home. Then in the home there will be a number of information sockets (in the living room, the bedroom, the study) to which one can connect the digital telephone, the data terminal, the Teleview terminal and the facsimile machine. The customer interface will replace the separate lines you would need if you had a telephone, a computer terminal and a TV set for Teleview. The aim of new ISDN services is to offer the user new services with increased convenience and quality. Increased convenience means one access to all services over a universal interface, one directory number for all communication services.

**Office Automation**

Office work generally involves information collection processing, analysis, transmission and filing. With the use of more and more powerful computers with increased memory the tasks involved will become easier and faster. Not only will intra-office communication improve but with new telecommunication services inter-office communication will also be more productive.

Office automation is not only information handling and filing within the office. Office automation is also information retrieval from databases not necessarily on one's own computer but public databases. There may be times when programs need to be downloaded from the main computer to one's PC. With high speed data transmission systems linking countries the office is connected to the world. Information becomes a resource not only of a country but of a region, accessible by phone or by desk-top computer. Thus the development of office automation and local area networks aided by powerful digital telecommunication networks will have great impact on the office of the future. Telecoms supports the office automation revolution in its development of the Integrated Services Digital Network.
Conclusion

It is important to stress that information and communication technologies plays a complementary role in that stored information requires an efficient medium for its transmission and a communication medium would be useless without information flowing through it. This "marriage" has changed the entire fabric of our society, the way we work and live. Telecoms' philosophy is and has always been to exploit and apply the newest and latest telecommunication technologies in its contribution to the economic development of Singapore and achieving the national goal of building Singapore into an information and knowledge centre. Telecoms is pursuing construction of an advanced information communication network in recognition of the central importance of a telecommunications infrastructure in a vital post-industrial information based economy and society.