THE ECONOMIC SPHERE OF INFLUENCE OF THE INTERNET AND PREDICTION ON ITS FUTURE GROWTH

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ABSTRACT

Increasingly and significantly, the Internet is becoming part of everyday's lives. Modern people rely on the Internet not only for work and business, but also for entertainment, communication, or education.

Reliable statistics from various sources show that the Internet population is growing rigorously around the world, and the average amount of time a user spends on the Net is also increasing.

This paper explores the Internet's economic sphere of influence based on statistics and user perception. It also tries to predict the future growth trends and possible business opportunities.

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PREFACE

Since its emergence in the early 1990's, the Internet business has been growing extremely fast. It has become part of modern lives as many people and businesses depend on the Net to deliver messages, provide information, achieve business goals, as well as for entertainment. Its penetration spreads from elementary school students to elderly of over 70 years old, who rely on the Net for different reasons, and happen to get benefits via different means. Due to its social and economical importance, it is worth studying and understanding more about this business, and try to see if one can make use of this high tech world either to improve live, or to make a fortune.

This paper takes a close look at the Internet Economy, including its statistics, sphere of influence, as well as its opportunities. Based on past and present data, it also attempts to analyze the development trend as well as to predict its future growth of the Cyber-business.

Towards the end of the paper, I have also included a section on Intranet for corporate network communication using Internet technology and its world-wide infrastructure. The topic 'Intranet' was introduced in mid-1995 and throughout in these 2 years, large and small vendors have created tens of thousands of ideas and hardware / software products for total solutions. As many medium to large size corporations are already

on their ways to explore or implement Intranet solutions, this extension of Internet is likely to be the market focus in the next 2 or 3 years. Many hardware and software vendors also count on the Intranet business for the majority of their revenue streams in the near future.

The major difficulty of writing this paper is the timeliness of information / statistics. The industry has been growing so fast that very often, by the time information is collected, it is about to be outdated. Furthermore, when getting the statistics, I decided not to post my own questionnaire but make use of existing figures provided by reputable research companies, who have invested a lot of time and effort in getting them. The reason is that, as the Internet population comes from users all over the world, it is impossible for me alone to conduct a research in such extensive context but within limited time and resources. If I only obtain information from people in HK, it will not reveal the overall picture adequately. Also, I cannot just post the questionnaire on the Net and have my analysis based on those figures as this kind of feedback does not cover people who are not Net users.

I would like to express my sincere thanks, first to my academic advisor, Dr C C Lee, who has given me a lot of valuable advice in writing this paper, and also to my interviewees who are all experts in telecommunications. They include: Mr Gilman Siu of Hong Kong Telecom, Mr Rex Yan of TMI (subsidiary of Telecom Italia), Ms Peggy Au-Yeung of Microsoft, an anonymous General Manager of a reputable ISP, many of my friends, colleagues. They have given me a lot of explanation, advice, perception as well as fore-sight on the Cyber business.

CHAPTER 1

WHAT PEOPLE DO IN THE INTERNET

Introduction

Statistics[2] show that as of the end of 1996, there were approximately 60,000 networks connected to the Internet, more than 7 million host computer systems connected and more than 50 million people world-wide who have email access to the Internet. Appendix 1 gives a full description of who is who in the HK Internet Community.

Undoubtedly, the Internet has changed our models of life. Nowadays, more and more businesses and individuals count on the Internet in their daily operations and activities. The extent and penetration vary, depending to what they want to achieve, and how the approaches are, but in any case, are growing.

What the Internet can do for Businesses

More and more organizations or parties set up their own web sites as well as extend the sites' coverage. The usefulness of the Internet depends directly on the products or services of each business. There are different benefits depending upon the type of the

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[2] Source : Ellsworth and Ellsworth. The New Internet Business Book. New York, USA. Wiley Press, 1996.

business, whether the company is a supplier, a distributor or a retailer, etc.. Here are some commonly found activities they do in the net:

Table 1-1. What the Internet can do for Businesses

Activity	Description
Promote a Company	A company sets up its home page to promote a its image, its details, its range of products and services, so to get known over the world. Very often, it also allows users to give feedback via email.
Distribute Messages	Distribute electronic publications, research papers, announcements, new laws and regulations (For example the Office of Telecommunications Authority (OFTA) in HK often poses its announcements, such as amendment of rules and regulations, recommendation, etc., on the Net.
Sell Products	Companies can sell products by charging customers' credit cards or via Cyber-cash. For example, companies such as florists, magazine publishers, etc. are accepting orders through the Internet.
Spread the latest news or ideas	People can use the Net as the place for announcements or discussion place. For example, 'Intranet' is a hot topic nowadays for corporate inter-branch communication, and many hardware / software vendors use the Net to promote new ideas / products and accept readers' opinions.
Create a Client Base	Finding new clients and new client bases is not always an easy task. It involves a careful market analysis, product marketing and consumer base testing. The Internet is a ready base of several million people from all walks of life. One can easily find new clients or

	customers from this massive group given that his presence on the Internet is known.
Analyze Products	Many users also do product analyses, comparisons, and report their findings on the Internet. Very often, one can find some parties who may be familiar with a product he is currently testing or about to purchase. Thus, he can get first hand reports on the information and opinions of such products.
Conduct Market Analysis	The large base of Internet users is a prime area for the distribution of surveys for an analysis of the market for a new product or service idea. These surveys can reach a great many people with little effort on the part of the surveyors. Once a product is already marketed, one can examine the level of satisfaction that users have received from the product.
Seek Expert Advice and Help	There are also a great many experts on the Internet who make their presence widely known and easily accessible. Very often one can get free advice and help with problems he might have from the same people who are paid highly for their consulting services to large organizations, and magazines and other periodicals.
Recruit Candidates / Employees	The Internet has many job lists and resumes online for prospective employers. New resumes are constantly posted to the appropriate groups to inform the availability of new skills.
Access Up-to-date Information	Accessing information over the Internet is much faster on most occasions than transmissions and transfers via fax or postal courier services. One can access information from countries around the world

	and make interactive connections to remote computer systems just about anywhere.
Disseminate Information Extensively	One can place documents on computers on the Internet and make them instantly accessible to millions of users. The popularity of access of the information is only limited by public awareness of its accessibility, and content. Hypertext documents provide an effective method to present information to subscribers or the general populace. Creating World Wide Web documents and registering a site with larger Web sites improves the distribution of the documents to a client base larger than the circulation of many major newspapers.
Convenient Communica-tion World-wide	Electronic Mail has proved to be an effective solution to the problem of telephone tag. Contacting others through email has provided a new method of communication which has both the speed of telephone conversations and still provides the semi-permanence of postal mail documents, spreadsheets, diagrams, etc. can be conveniently attached. Email can be sent from just about anywhere where there is an Internet service or access so businessmen or travelers on the go can keep in touch with up to the minute details of the office or site.
Transfer Documents Economically	Transferring on-line documents through the Internet takes a very short period of time and this saves a lot of money over postal or courier services which can also suffer late deliveries, loss or damage. If a document transfer fails on the Internet, one can always try again since the cost is minimal or even free. Most, if not all, Internet access providers do not charge by the raw number of bytes transferred across

	their link, unlike other commercial information services.
Communicate with Peers	Researchers and Business Executives alike have attested to the fact that a lot of their communications over the Internet are with others in their line of research or field of work. Communicating with peers allows people to share their ideas, problems and solutions amongst themselves. Quite often people find that others in their field have already tackled problems similar to their own. They can then get advice on their own situations and create a solution based upon this shared knowledge.
Explore New Business Opportunities	Many entrepreneurs are continuously on the look-out for new and innovative ideas as viable commercial ventures. Internet users are constantly coming out with such new ideas not only because of the research traditions of the Net but also because of the cooperative atmosphere that surrounds the Internet

What Individuals Can Achieve in the Net

More and more individuals are signing up for the Internet, either by themselves, or via their employers, education institutions, etc.. Furthermore, users are spending more and more time browsing or working on the net. Let's explore what activities they perform in the Cyber-space:

Table 1-2. What Individuals Can Achieve in the Internet

Activity	Description
Make Purchase	They can purchase goods and services from suppliers all over the

	world.
Achieve Personal Enrichment	Search for, retrieve, and read documents from all web sites in the world at minimal cost. One can also make use of these web sites to do market research, company analysis, etc., so to have a better understanding of what is happening around, not only in his own country, but anywhere in the world. For example, since March 1997, a very hot and controversial topic is being discussed all over the world, 'Cloning' (which means duplication of animals with exactly the same DNA via genetic engineering) and we can now find many web sites talking about this matter.
Communicate Conveniently via Email	Exchange email with any person / organization who has an email account (estimated to be more than 50 million as of the end of 1996[1]), with the option of attaching files of different format, e.g., spreadsheets, databases, CAD/CAM files, etc., or even multi-media ones (e.g., music, movie)
Download Software	Search for and retrieve shareware, freeware, commercial software (free or charged), e.g., Netscape, Chinese applications, etc..
Share Ideas with Others	Participate in discussion groups and chat clubs in various topics (estimated to be more than 30,000 different topics as of the end of 1996[2]) with people from all over the world, of different culture, different background, different economic and political

[1] Source : Ellsworth and Ellsworth. The New Internet Business Book. New York, USA. Wiley Press, 1996.

[2] From the handbook of 'The 3rd Asia-Pacific Telecomunications Roundtable, March 1997

	environment.
Post Questionnaires / Research	Do market research by posting questionnaires, which would lead to feedback from Internet users all over the world. The advantage of this approach is that one can get feedback from places all over the world.
Communicate Real-time with Others	Today, voice communication via 'Internet Phone' is a common topic as it is gradually becoming a very economical substitute for traditional long distance telephone communication[3] . Moreover, there are other real time communication applications, such as on-line games with multiple users, etc..
Surf at the Webs	Browse through the web pages of different organization, individuals, governments to aid market research.

[3] Though some countries / cities, e.g., HK, have restriction on real time international voice communications as it violates the license granted to the monopoly carrier as an exclusivity.

CHAPTER 2

INTERNET STATISTICS AND THE SOCIAL PERCEPTION ON IT

Introduction

The Internet represents the most viable and fertile test-bed for future global interactive systems. Many golden opportunities are readily leveraged off knowledge of how this evolving medium is and is not being utilized by whom. Given the *rapid rate of change* of Internet related technologies and its user base, examination of a snapshot of the user population and usage behavior, even if performed with the utmost attention, can be misleading. Behind the numbers that represent current users are trends and emerging traits which paint the real picture. With knowledge of past and current patterns, one can comfortably make decisions about the future and plan for how his company can benefit from the Cyber-space.

The World-wide Coverage

The following data are extracted from Ellsworth and Ellsworth. The New Internet Business Book. New York, USA. Wiley Press, 1996.

Table 2-1. The World-wide Coverage of Internet

1	Internet traffic measures at several trillions of bytes every month through some of the larger nationwide and worldwide backbones. These backbones interconnect many of the independent LANs and WANs belonging to University campuses, government sectors, network providers and commercial organizations alike.
2	The Internet is estimated to have about 50 million users. Its growth rate is predicted to be at 10% of its total base of users every month! Dr. Vinton Cerf, one of the creators of the TCP/IP protocols, has predicted that in 10 years, the Internet will have over a hundred million regular users.
3	The Internet is accessible from every state in the US and in most countries in Europe excepting several former Red Block countries. In Asia, most of the higher technology places such as Japan, Hong Kong, Korea, Singapore, Taiwan, and developing ones like India, Indonesia and Malaysia are already on the Internet. Australia and New Zealand are also sophisticated. In fact, even Scott's Base on Antarctica is on the Internet. Africa is the least connected continent on the Internet; only a few countries such as Zaire, Egypt and South Africa have connectivity. The US still ranks as the biggest user of the Internet but this is shifting as more countries in Europe and Asia pick up, diversifying market distribution.
4	According the Charles Catlett in the Internet Systems Handbook, the commercial sector of the Internet is by far the most rapidly growing area. Commercial organizations on the Internet have overtaken the research and educational sectors, and now forms nearly two-thirds of the entire population. The amount of traffic over some of the larger backbones is also staggering; for example, 11.225 Tera

	bytes (trillions of bytes) in the month of March 1994 traveled over the NSFNET. The number of bytes has increased on the NSFNET from a total of about 18.5 Tbytes (with an approximation for January & February 1991 for which statistics are not available) in 1991 to 79.385 Tbytes in 1993, a quadruple increase.

Survey on Internet User Statistics

The issue on Internet statistics figures such as user population is one of the most contentious ones. Since the set of affected personnel is infinite (which should include all of us in the world), different sample sizes and different questions asked may lead to inconsistent figures. Furthermore, the business has been growing so fast that by the time data is collected, they soon become outdated. Under these circumstances, the most reliable way seems to be to view the overall picture by making reference on timely statistics collected by reputable research companies, who have in fact spent a lot of time, effort, and other resources in collecting these data.

In October to November, 1996, the US organization, Graphic, Visualization & Usability Center (GVU) conducted its WWW User Survey, which was endorsed by the WWW Consortium. Here are the findings:

Demographics

Table 2-2. Demographics of Internet Users

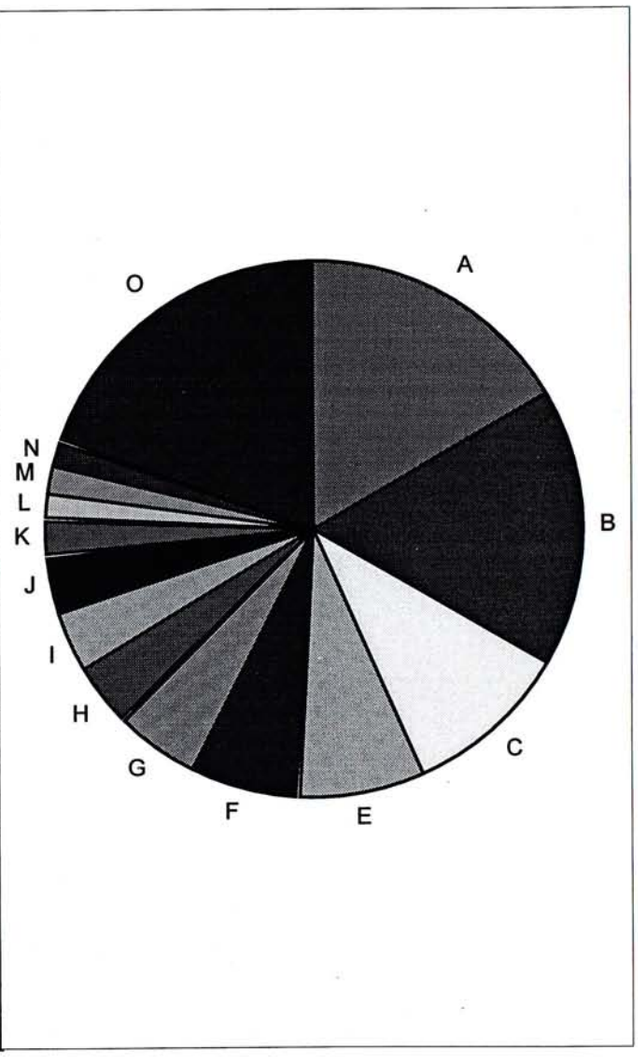
Parameter	Result
Age	Average age : 34.9. 1 out of 10 users were below the age of 16.

Gender Ratio	Female : 34.1%, Male : 68.6%. Women were slightly than men.
% of Users in US	82.7%
Marital Status	Married : 45.7%, Single : 36.7%, Other : not specified

Occupation

Table 2-3. Occupation of Internet Users

Primary Business Activity	Code	%
Education	A	16.7
Business services / Consulting	B	16.5
Computer - manufacturing, consulting, retailing	C	10.3
Manufacturing / Process industries	E	7.4
Government / military	F	6.8
Construction / Architecture / Engineering	G	4.7
Health care / Medical / Dental	H	4.2
Finance / Banking / Legal	I	3.5
Telecommunications	J	3.2
Aerospace	K	2.2
Transportation / Utilities	L	1.9
Insurance / Real Estate	M	1.6
Research & Development	N	1.3
Others	O	19.7
Total		100



Social and Cultural Impact

Table 2-4. Social and Cultural Impact to Internet Users

Issue	Finding
How willing were users to pay for web access ?	67% reported not willing to pay. (See Interpretation (a) below).
What did they feel about the dominance of the English language on the web ?	Among the interviewees, 59.2% agreed it would be more helpful than harmful. In fact, most Europeans found the web would help business, as well as unify languages and people.
What were users' changes since having access to the Net ?	46.1% found after having access to the Net, they were more connected to people who shared their interests. This provides evidence for the claim that the Internet is more than just an information source, it also builds new communities based on common interests, while breaking the geographical barrier.

Interpretation

(a) 67% of the respondents reported that they were not willing to pay fees for accessing web materials. Those who were unwilling to pay may stem from their perception of the value of the information currently available on the web and may change as people became used to high-quality professional sites. Alternatively, it may be a reflection that many users were already paying for access and may not be willing again for content access.

Data Privacy Concerns

Table 2-5. Data Privacy Concern to Internet Users

Issue	Finding
How often did people falsify online registration information ?	63.1% claimed they had never provided false information. 33.5% admitted falsifying information, and 3.4 % did not answer. Of those who provided false information, 33.5 % said they did it frequently. Also, the likelihood of falsifying information decreased with age.
Why did people not register at sites ?	75.1% said the procedures were not clear. Also, 70% felt that it was not worth the effort to reveal the requested information. Over 62% reported that did not trust the collecting site. (See Interpretation (b) below).

Interpretation

(b) While the foremost problem of terms and conditions of users could be easily rectified, the problem was not so straight forward. An equally difficult issue was building trust between entities. Efforts which attempted to help ensure the data privacy of standards may be able to help alleviate this lack of trust.

Purchasing, Security, and Vendors

Table 2-6. Purchasing, Security, and Vendors

Issue	Finding
What do people purchase / what kind of	Over 50% reported they buy computer software and hardware. (15.1% bought hardwre under US$50, 17.4%

charged information they get from the web ?	for hardware over 50, 29.1% for software under US$40, 20.8% for software over US$50.) Other popular items included: travelling arrangements, books, magazines, musical tapes, CDs, etc.. (See Interpretation (c) below)
How much had people spent in web purchase in the last 6 months and how much did they intend to do so ?	35.9% spent less than US$10 in web purchase. About 20% reported expenditure from US$10 to US$99. 29.5% reported over US$100. Users typically overestimated the amount they intended to spend, but in the end spent less than that.
Were people comfortable with sending credit card information over the web ?	This question asked users to state their agreement (5) / disagreement (1) on a 5 point scale about providing credit card information through the web. Compared with previous surveys, the trend was towards increased trust in the web for transactions, though security concerns were the primary reasons for not buying on the web (average point : 3.9). Providing credit card information through the web was considered riskier than giving over the phone (3.4 points), riskier than giving to an unknown store (3.1 points), and riskier than faxing to an off-line vendor (3.0).
What did users think of web vendors ?	This question asked users to rate the importance of vendor characteristics on a scale of 'unimportant (1) to 'important' (5). Users were then asked to compare web vendors against traditional vendors on a scale where higher numbers indicated preference for web vendors over

	traditional ones. All characteristics were rated important, with security being the most important (4.646 points), followed by reliability (4.641 points), quality of information provided (4.600 points), timely delivery (4.456 points), and ease of contacting (4.04 points). Other issues like ease of ordering, refunds, and cancellations, fell between 4.195 and 4.275 points. The characteristics at the bottom of a ranking were lowest price (4.119 points) and ease of payment process (4.043 points). Moreover, given that security was the major issue, users reflected a preference for traditional vendors (2.305 points) over web vendors. This was the weakest characteristic for web vendors, followed by easy refunds (2.873 points), reliability (2.809 points), ease of canceling orders (2.887 points), customer service (2.895 points), and ease of contacting (3.709 points). Web vendors who owed strengths over traditional vendors in the areas of ease of contacting (3.709 points), lowest prices (3.709 points), ease to order (3.614 points), and quality of information (3.461 points).

Interpretation

(c) As reported in the previous description of the primary uses of the web, shopping in the Net had been increasing, but the pace was slow, mainly due to non-confidence on data submitted by users.

Market Size of the Internet in Various Aspects

Here are some additional data extracted from Cyberatlas Inc., which are summaries of data collected from various reputable research institutes.

Internet Population

Table 2-7. Internet Population

Source	Date	Definition	No. of users under this category in US (Million)	Projected No. of Internet Users World-wide (Million) (*)
Louis Harris & Assoc	Nov-96	US Adult users	35.00	46.91
Int'l Data Corp	Oct-96	Web Users	31.40	42.09
FIND/SVP	Oct-96	US adult users who use any Internet services besides email	27.00	36.19
Mediamark Research Inc	Oct-96	Any Cyberspace usage (US)	27.00	36.19

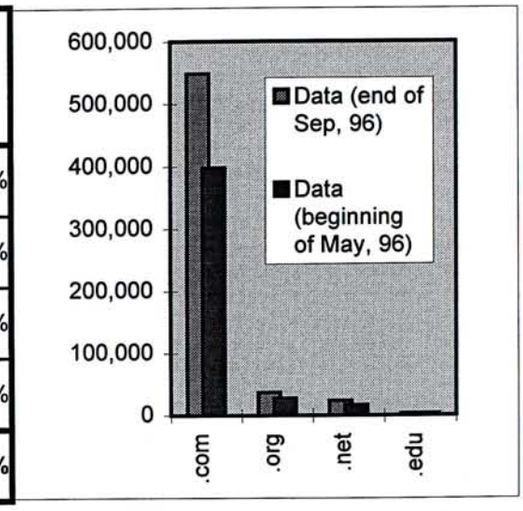
(*) Based on statistics on the previous chapter, US users = 82.9%, and one out of 10 users are children. The projected No of users world-wide = (No. of Adult users in US / 0.829) / 0.9.

Internet Domains World-wide

Data was as of the end of September, 1996. The total domain registrations in the world reached 611,860, with commercial domains jumping to 548,638. Non-US registration jumped drastically due to un-saturation. In HK, there were 6,590 registrations.

Table 2-8. Internet Domains World-wide *(Source: Internet Info)*

Domain type	Data (end of Sep, 96)	Data (beginning of May, 96)	Increase	Increase %
.com	548,638	397,690	150,948	37.96%
.org	36,808	27,358	9,450	34.54%
.net	23,539	16,027	7,512	46.87%
.edu	2,875	2,643	232	8.78%
Total	**611,860**	**443,718**	**168,142**	**37.89%**

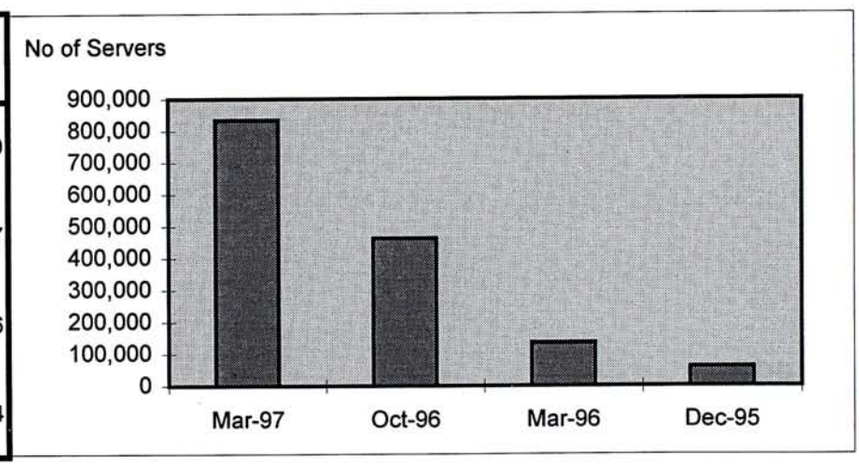


Web Servers World-wide

According to Netcraft Web Survey, there were 833,139 Internet servers world-wide as of the end of March, 1997.

Table 2-9. Web Servers World-wide (Source: Netcraft Web Survey)

Date	No of Servers
Mar-97	833,139
Oct-96	462,047
Mar-96	135,396
Dec-95	60,374



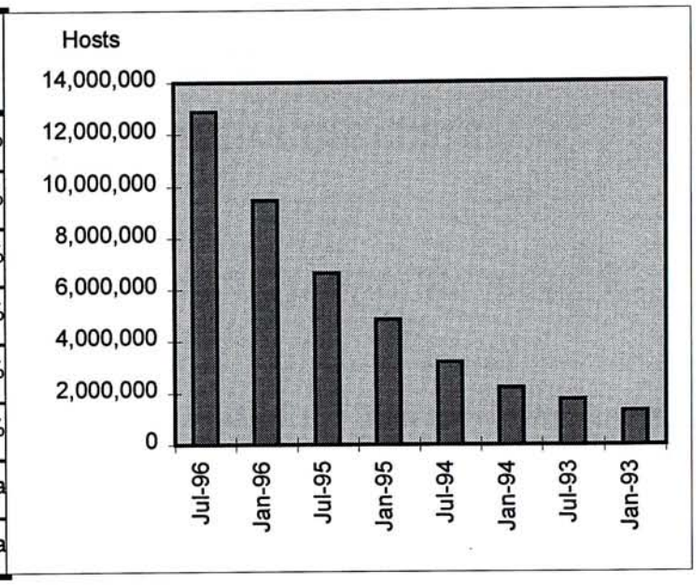
Internet Hosts World-wide

The research from CyberAtlas and Network Wizards, as of the` end of July, 1996, there were about 12.9 million hosts world-wide. The number of Internet hosts grew at

an annual rate of 94% (comparing the 1995 and 1996 figures). The 6-month growth, which declined from 43% to 36%, showed a slow down in the expansion pace.

Table 2-10. Internet Hosts World-wide (Source: CyberAtlas and Network Wizards)

Date	Hosts	6 month growth	Annual Growth
Jul-96	12,880,699	36%	94%
Jan-96	9,472,224	43%	95%
Jul-95	6,642,000	37%	107%
Jan-95	4,852,000	51%	119%
Jul-94	3,212,000	45%	81%
Jan-94	2,217,000	25%	69%
Jul-93	1,776,000	35%	n/a
Jan-93	1,313,000	n/a	n/a



CHAPTER 3

THE BUSINESS MODEL OF AN ISP
- THE BREAD AND BUTTER AS WELL AS THE COSTS

Introduction

The previous chapters have high-lighted the penetration of the Internet as well as its predicted fast growth. Let's see who are likely to be benefited. I had the pleasure to interview an anonymous General Manager of a leading ISP in HK, who explained to me the business model of the Cyber-space and where the revenues go. The following paragraphs describe in details.

An ISP's Revenues and Costs

Revenues

A typical ISP collects revenues from various streams:

Table 3-1. An ISP's Revenues

Major Income Sources	**Description**
User Subscription	Individual or corporate users pay an ISP monthly subscription fee. An individual user either pays a flat monthly rate for unlimited usage

	or a lower monthly fee with a variable charge related to the amount of time he logs on the Net. In HK, the monthly flat rate[1] varies from approximately HK$62 to HK$200. A corporate account package usually gives access to a number of staff, with a flat monthly rate or monthly rate plus a variable charge related to the total amount of time logged on. Some sophisticated companies subscribe dedicated lines connecting the IPS's network with their LANs (for faster response time and the elimination of individual modems). A typical 64kbps leased line costs approximately HK$5,000 per month.
Web Page Programming	Company A which wants to set up its web page usually outsources to the ISP to do so as the ISP has the expertise for this kind of professional programming as well as maintenance. The cost depends on how complicated the web page is and can be as low as HK$1,000 for simple configuration, and can go up to several hundreds of thousands of HK dollars or more.
Web Page Storage	Company A which wants to set up its web page may choose to store it at the ISP's server or its own server. Usually, simple home pages which contain a few screens and do not have complicated links are stored in the ISP's server, so to save the high cost of purchasing hardware and software, as well as maintenance fees. The typical cost is HK$1,000 per month for 5MB storage.
Providing Leased	In the case where a company has a complicated and long web page, it usually stores it at its own server, so to have more control and

[1] PNETS charge is not included here as it is collected by the FTNS operator, not the ISP.

Circuits to Connect Companies' Servers to an ISP's Network	facilitate maintenance. Some common examples are: web pages of Newspapers (which require update at any time during the day) and Financial Companies (which require update of prices from the company's host computer). A company with this kind of configuration requires a leased line to connect to its ISP and a typical 64kbps line costs HK$5,000 per month.
Consulation	ISPs also make money via consulting services, e.g., act as a System Integrator to help companies set up their own web servers, help them set up Intranet[1] connection with branches, etc..

Costs

The business of being an ISP incurs a lot of sunk costs as well as variable costs:

Table 3-2. An ISP's Costs

Cost	Description
Staff Salaries	As all companies do, an ISP has to pay for the salaries of all its staff. Salaries for sophisticated technical specialists, who are well educated and experienced, are fairly high nowadays. Also, as the peak time for Internet log on is mid-night, most ISPs hire customer service operators 24 hours a day, which incur considerable costs.
Office Maintenance	As all other companies do, an ISP has to pay office maintenance bills such as rent, utilities, office equipment, business registration / licenses, insurance, etc..

1 The details of Intranet will be discussed a later chapter.

Connection to the Local Internet Exchange and Overseas - Data Line and Membership Fee	A typical ISP has 2 different kinds of links - one to the local Internet Exchange (e.g., HK Internet Exchange), and the other to the overseas Internet Access Point (IAP). This involves fees like membership, line leasing costs, etc.. The higher the bandwidth, the higher the costs.
Marketing Communication	Typically, vast amount of money is spent on marketing communications, such as advertising, seminars, road shows, promotional programs, etc.. All of these are very costly.
Purchase of Hardware and Software	In order to set up the Internet server, an ISP has to invest a large amount of money on hardware and software, such as routers, multiplexers, hubs, switches, computer servers, cables, software applications, etc.. Not only do these cost a lot of money, but they are likely to depreciate and fade out in a few years (this is true for most high tech products).
Others	There are also a lot of other expenses which cannot all be categorized.

Is it Easy to Survive ?

As we can see, as ISPs have to face such high operating costs, although the Internet business is growing, it is not easy to make money. Currently, in HK, there are more than 50 ISPs (see Appendix 1), which all provide the same kind of core business, thus the market is close to *perfect competition*. Profit margin is lean (as we can see, individual users can enjoy unlimited access for as low as HK$62 per month.) and ISPs have to pay a lot of effort in order to remain at the competitive edge. Some are

already launching marketing programs, such as alliance with credit card companies, joint promotion with computer manufacturers, bundling with other telecommunications services (e.g., paging), etc..

CHAPTER 4

THE ECONOMIES OF INTERNET MARKETING AND ADVERTISING

Introduction

A rigorously emerging Cyber-business is to make money out of advertising. It is a promising area and there are still a lot of rooms to grow. One may have noticed that advertisements appear anywhere in the Internet world[1] - from web browsers (e.g., Netscape's home page) to search engines (e.g., Infoseek, Yahoo), and individual web sites. The advertising values of the 10 biggest advertising sites as of the 2nd quarter of 1996 has been illustrated as follows:

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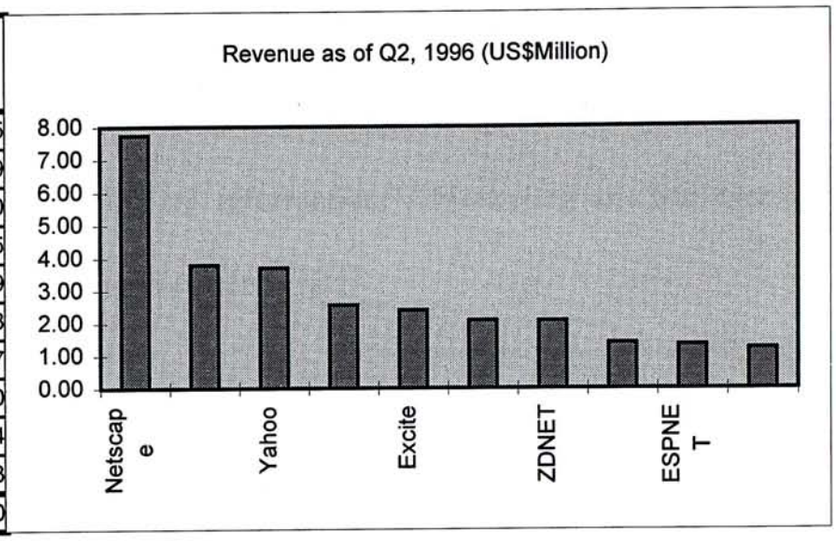
1 As a form of self discipline, the web pages of educational institutes, governments, military departments, etc. usually do not allow advertisements.

Table 4-1. Internet Advertising Statistics.

(Source : Business Week, September 23, 1996.)

Site	Revenue as of Q2, 1996 (US$Million)
Netscape	7.75
Infoseek	3.79
Yahoo	3.70
Lycos	2.55
Excite	2.39
CNET	2.08
ZDNET	2.07
Newspage	1.40
ESPNET	1.34
Webcrawler	1.23
Total	28.30



Service providers create very interesting web sites to attract web surfers' visits. These may be web sites of specific themes, such as sports cars, fashion, pets, golf, etc, so to attract targeted crowds. At the same time, they promote their web sites to other companies and charge them for advertising spaces. These advertisements may be simple text / pictures, or may contain links so that when a user clicks on the advertisement, he is redirected to the home page of the advertiser. Some good combinations are to have advertisements of tires and engine oil on the home page with the theme 'sports car', or to have advertisements of sportswear and sunglasses on the home page with the them 'golf'.

Furthermore, the Internet allows for a wealth of interactive marketing opportunities. These opportunities are even more expansive than its interactive predecessor, the telephone. While the sue of the telephone as a marketing tool is still active, the Internet's multi-media presentation abilities combined with its inexpensive cost

structure provide the ideal tool for direct and channel marketing of goods and services.

The Internet is a method of communication utilizing networked computers as the medium. A variety of different information transfer applications are used to facilitate the finding, viewing, and transfer of information. Marketing on the Net can incorporate a number of different applications.

Statistics on Web Advertising and Internet Shopping

The IAB (Internet Advertising Bureau) reported in the end of March, 1997 that Web advertising spending in 1996 was US$267 million. The fourth quarter alone accounted for US$109.5 million, which was a growth of 366% from the first quarter's $29.9 million. The fourth quarter's advertising revenue is well over US$400 million at an annualized rate. The IAB report would seem to be one of the more accurate advertising and spending reports available so far, since the report comes through big-six accounting firm Coopers & Lybrand, and was conducted by having sites anonymously submit their ad revenues to the study.

Nielsen Media Research and Commercenet's most recent survey (announced in the middle of March, 1997) finds that Internet shopping has increased. The strongest increase apparently comes from those who are using the Web to gather information about a product before making a purchase, rather than actually making a purchase on-line. A large majority of web users -- 73 % - spend some portion of their time online searching for information about a specific product or service. More than half of these users -- 53 % - have searched specifically when making a purchase decision. This is a significant increase over the findings in the Fall 1995 survey, when 55 % of all Web users used the Web for shopping and only 35 % prior to an actual purchase. Web shoppers still outnumber online purchasers. Of all Web users, 15 % -- or approximately 5.6 million people -- have used it to purchase a product or service online.

Internet Marketing

The Internet has begun to revolutionize marketing. The revolution will confound marketers, customers and governments trying to regulate and tax unprecedented global commerce. As the tools used on the Internet expand and the speed of data transmission accelerates, the Internet will become a marketing medium which offers customized interchange between sellers and buyers.

Use of the Internet is currently experimental, surrounded by excessive hype and hyperbola the actual utility of the medium has yet to be defined. Once the utility is known, traditional methods of marketing, including the print media, broadcasting, direct marketing, or even sales calls will be minimized as part of the media mix. The Internet's capacity for attractive and dynamic graphics, audio, text, video and interactive solutions will provide the basis for marketing-on-demand and sales.

The Internet is likely to bring about the end of distribution as it is structured today. Combined with rapid delivery systems of goods, the Internet will alter the needs for stocking distributors globally. The roles of distributors and resellers will be replaced by on-line demonstrations, services, and support provided directly by the manufacturer. Only value-added distributors will survive the next decade.

Distribution channels have started to be streamlined and some companies in the channel are already using the Internet as a user-friendly Electronic Data Interchange. Gradually, the Net is being used to support activities such as perpetual sales meetings,

on-line trade shows, end user research, as well as product review, updates and ordering, etc., in both the wholesale and retail sectors.

CHAPTER 5

THE ECONOMIC IMPACT OF THE INTERNET TO MODERN SOCIETY

Introduction

As the Internet business is growing and is becoming a 'commodity' of our everyday lives, what does it really mean for business leaders and government policy makers ? Is it a revolution that will alter the economic landscape, or is it just a technology fad, a playground for 'Cyber-space keeners' ? This chapter will investigate the followings:

Table 5-1. Major Impacts of the Internet

Issue	Description
Impact to other sectors of the society	As we can see that the Internet is having a broad economic impact and becoming an integral part of modern lives, we cannot neglect the impact it brings to other parts of the society, such as laws, copy-rights, community standards, commercial activities, trusted payment systems, accounting and auditing, and ethics.
Businesses	Some sectors, such as computers and electronic data processing, publishing, retail, information services, entertainment, and financial services, will be critically affected. By the year 2000, we should expect US$46 billion revenues will be created and managed on the Net. Other developed and developing regions, such as Hong Kong,

	Singapore, Australia, should also see growing figures.
Diversity	The Internet's broader impact will be a more subtle, widespread easing of communications. This trend will fundamentally change the way companies create and disseminate information.

Today's Internet Economy

The Internet economy in the early 1990's could only be described as a 'frontier' as more businesses were about to come. Today, its population is growing rapidly as more and more people are aware of its importance. However, trade in the net is relatively rare, government's participation and intervention is also insignificant, and people still have a lot of hesitation about the security of payment, which is via credit cards or Cyber-cash.

Despite the large number of people on the Net, its economic activity is nascent. In the US[1] , the largest sector, by far, is access provided by commercial on-line services, with some US$1.5 billion in revenues in 1995. Other parts of the economy include retail sales of US$250 million and content values and content revenues of US$90 million. Promising areas like business information services (similar to what information providers like Reuters, Telerate, Bloomberg are doing now), home banking, financial services (such as stock and foreign exchange trading), business-to-business sales of materials and components have almost nil revenues to date.

[1] Source : Modahl, Mary and MacQuiddy, Ruth. "The Forrester Report on Media and Technology Strategies", 1 September , 1996.

Actually, real practical economic development is hindered by:

Table 5-2. Factors Hindering Internet Development

Issue	Description
Lack of Government Control	Vices such as pornography, gambling, and money laundering can flourish, but real business cannot. Though Internet authorities such as the Internet Engineering Task Force (IETF), CERN, NCSA, and the Internet Society provide technology guidance, there is no social structure for the Net due to its global diversity. National governments are unable to enforce their laws, as jurisdiction is limited by geography, and there is not a single government which can take control over the net, since it is a society of all nations.
Unreliable Payment System	As described in the previous Chapter of Internet Statistics, most web users still hesitate to make purchases at web sites, mainly due to un-confidence in the payment system. Though it is the mission of many software houses and network providers to provide convenient and reliable payment solutions which include safety features such as 'data encryption', it is not easy at all. There exists many 'professional genius computer hackers' who are staring at these so called 'save transaction applications' and try to break them so to make money out of 'illegal transactions'.

Undoubtedly, in the next 5 years, the Internet will expand, driven by the spread of home PCs and consumers' desire to get connected. As this happens, the net's demographics, infrastructure, government bodies, monetary systems will evolve to support a level of business activities which had not been possible before. The following table shows some major issues[1] :

Table 5-3. Directions of Internet Development

Issue	Description
The Internet population will grow in diversify. The growth is estimated to be fivefold.	From about 50 million people in 1996, the net will become more international, better balanced between men and women, and more deeply penetrated into homes. Women and youth will sign on as the net evolves from a technology curio to a mainstream media for email exchange, education, and work-at-home. Participation from developed and developing countries, especially from Asia Pacific, will grow which dilutes the dominance of US users currently. Driving internalization will be European and Asian on-line services such as Europe On-line, Microsoft Network, as well as HKT-IMS in Hong Kong and Pacific Internet in Singapore. It will also penetrate into the lower income group as the cost of PCs and net subscription falls. Furthermore, less sophisticated users will participate as applications and web sites are become more user-friendly

[1] Source : Forrester Report Modahl, Mary and MacQuiddy, Ruth. "The Forrester Report on Media and Technology Strategies", 1 September , 1996.

	which, in turn, break the barriers to join.
Businesses and schools will connect people during the workday	By the year 2000, it is expected half of the university population in developed regions such as US, Hong Kong, will be wired, as well as over 10% of the working force. Accessing the Net will gradually become an essential part of everyday lives, as a lot of basic information, such as telephone directory, latest news, etc. can be conveniently retrieved from the Net.
The infrastructure will stabilize and access speed become faster	The key trends are faster connections, such as using leased lines and sophisticated technology like ISDN, Frame Relay packet switching. Even if household users dial up via modems, the modem speeds will increase from the current standard (28.8 kbps) to much higher ones.
Governance will come from multiple directions	First, national governments will move to halt illegal activities taking place on their soil, and will establish a mean of cooperating with those which span jurisdictions. Secondly, on-line services and Internet Access Providers will undertake a greater effort at self-governments. These businesses have nothing to gain from illegitimate uses of the Net. In Hong Kong, governing organizations such as the Hong Kong Internet Exchange (HKIX) will also put pressure on non-ethical uses of the net.

Structure of the Internet Economy

The growth of the Internet and the changes described above will change today's amorphous, Cyber-space world into one that has clearer structure and rules. Gradually, with the aid of government intervention (such as the Federal Communication Commission (FCC) in US or the Office of Telecommunications Authority (OFTA) in HK) and related bodies, the net will cease to be a place for hackers and 'phreaks' beyond the reach of laws, commerce, or community standards of decency. Instead, it will become a *basic communications tool* for everyone who is enthusiastic about the Net's services. As this happens, economic activities will flourish. Consumer markets for information and entertainment will develop alongside.

Furthermore, in the business side, there are basically 2 streams of business activities:

Table 5-4. Major Streams of Internet Business Activities

Activity	Description
Trade	The Internet will become an economy of trade. This will be further enhanced by renovation of the Electronic Data Interchange (EDI) System and its incorporation into the net, creating new trade among companies and consumers.
General Communication Tool	A much wider Internet sphere of influence that includes general communications such as marketing, customer support, or the dissemination of company information, which does not involve actual sales. This includes both inter-company communication and communication within corporations.

Who are Likely to Make Money ?

At the heart of the emerging economy are businesses which can *create revenue directly* from the Internet. This includes:

Table 5-5. Who are likely to Make Money out of the Cyber-space

Activity	Description
Companies which can deliver products electronically	For example, information publishing, entertainment, financial services, banking, on-line magazines and newspaper.
Companies which can execute transactions over the net	For some businesses, even though the products must be delivered physically, they can still make money out of the net. These include on-line ordering services which consumers know what the products are and do not desire to examine them before purchases. For example, ordering of commodities, like office supplies, groceries, flowers, compact disks, tickets, etc..
Infrastructure builders	All ISPs and users rely on their countries' fixed telecommunications network service (FTNS) operators or International Carriers to provide links to access the net. In Hong Kong, any of the 4 FTNS operators, Hong Kong Telecom, New T&T, New World Telephone and Hutchison Telecom can provide local access. Other Value-Added Service Providers like AT&T, British Telecom, Global One, etc. provide international access. Furthermore, other infrastructure

	builders such as software companies, router / hub / switch / equipment providers, computer vendors are likely to see a lot of opportunities since they provide all the equipment to build this world-wide infrastructure.
ISPs	The business model of an ISP has been described in a previous chapter. ISPs charge users for access as well as providing web site services, consultations, etc..
Software companies	As there are more and more Internet users and web site providers, it means great demand for innovative and efficient software applications. Industry giants like Microsoft, Netscape are competing rigorously on Internet software like browsers, email, etc.. Furthermore, other players like Novell, Sun, Oracle, etc., are also starring at different areas such as Web Programming Language, Databases, etc.. They all understand that the capability to grab the majority of market share means not only tremendous revenues, but also the ability to set industry standards for future application development, which in turn means revenue in the long run ! Furthermore, local software houses (which are, of course, in much smaller scales than Microsoft, Netscape, etc.) also see the room for profits as providers of customized Internet solutions, such as web page programming, to suit local needs.
Internet Advertisers	As described in the previous Chapter, Internet Advertising is a business with high potential, and many web site owners are

	starting to make money out of it.

Even though the market potential sounds promissory, it doesn't guarantee profits for *all* companies which enter into these businesses. The market is so competitive that whichever sector of the Internet business they choose, they are likely to face a lot rivals, and only the best ones will succeed.

How Companies' Core Businesses will be Affected

As a result of the growth of the Internet, many industries must prepare for a redefinition of the business models. The Internet will challenge their structure and alter their competitive landscape as it generates:

Table 5-6. How Companies' Core Businesses will be Affected

Issue	Description
New products and services	Companies in the core will see new businesses emerge which use some of their present skill sets., but with value-added Internet knowhow. For example, on-line magazines such as Time Warners, Peoples in the US, and the Next Media Magazine in Hong Kong. The retail sector such as supermarkets also face the challenge, and as a result, market players such as the Wellcome Store in Hong Kong are starting to offer on-line orders.
Unexpected Competition	Very often, new entrants and sudden collision of companies which now find that it is inevitable for them to compete with one another. For example, Information Service Providers like Reuters used to

	find their core business being distinguished from Newspapers (in fact, they provide information for newspapers) as the former give instantaneous information whereas the later is only updated once a day. However, growth of the Cyber-space has caused Newspapers to have presence on-line - thus, providing information which can be updated anytime (i.e., instantaneous information !). As a result, Information Service Providers lose their competitiveness as they now face unexpected challenges. Generally speaking, the neat divisions that once separated on-line providers from daily newspapers, weekly magazines, wire services, and business information have vaporized.
Tougher Customer Service Requirements	Consumers are becoming spoiled. Keen competition among ISPs has improved service quality, thus increased consumers' demand of services. They all desire fast response to inquiries and access to complete information. For example, American Express is trying to distinguish itself by exploring the possibility of allowing users to view statements immediately after transactions - a mission critical and demanding task, especially during rush hours.
Intellectual Property	Though it is technically feasible for music, movies, entertainment programs and software to be delivered on-line, manufacturers may not welcome this as they become worried about the copy-rights of these distributions - how they can collect money from Internet distribution instead of having the programs copied by anyone without authority.

Distribution Conflicts and Confidentiality of Transaction Information	Some information and transactions are not open to the public. For example, though technically stocks can be traded and advice can be given on the Internet, that undermines the full-service brokers. The Internet lays established players open to new competitors which have no worries about disrupting the status quo.
Technology know-how as a key differentiator	Not only is this true for the infrastructure business, but it also applies for other businesses like retail, trading, and electronic service providers. Companies which master the media will be at advantageous positions as they can take payment and process orders faster, will offer more useful services, and will engage their content readers more completely than companies which lag. Thus, if the lagging companies do not pick up and join the Cyber space, they will be left behind more significantly.
Higher bandwidth and storage space requirement	Companies try to make their web sites more attractive by inserting dynamic pictures, or even songs. Not only do these occupy large hard disk space at Servers, but will require high bandwidth for transmission. In order not to take so much downloading time (otherwise, users will be impatient to wait), they require connection with higher bandwidth (e.g., above 64kbps) or even Broadband ISDN (1.544 Mbps) ! Dial-up users also try to save time by using high speed modems (the current standard is 28.8 kbps, growing from 14.4 kbps 2 years ago, and this number is ever-increasing).

Impact on the Core Economy

(The findings of this section are based on supporting figures from : Modahl, Mary and MacQuiddy, Ruth. "The Forrester Report on Media and Technology Strategies", 1 September , 1996.)

Market analysis shows that revenues from the Internet amounting to some US$45.8 billion by 2000 will be directly attributable to Internet activities - a twentyfold increase over the US$2.2 billion generated in 1995. The changes will begin to be felt by the turn of the century. The Internet's most intense activity will be focused on:

Table 5-7. Internet's Impact on the Core Economy

Category	**Amount (US$ billion)**	**Description**
Financial Services	46.2	Self-service oriented consumers will manage US$29.9 billion of mutual fund assets and US$16.3 billion in deposits on-line - but only a tiny fraction of the US$5.1 trillion held in mutual funds, banks, and savings institutions. Corporations need to do this with extreme caution, such as keeping payments on private networks.
On-line Trade	21.9	It is estimated that US$6.9 million will come from retail - only a paltry compared with the overall US retail sales of US$2.1 trillion. This reflects the expectation that on-line shopping will remain as a relatively crippled area due to limitations of the

		medium as well as people's hesitation of making payment on-line. The remainder of the revenue, US$15 million, will dcome from the migration of the old EDI systems to the Internet as a means of lowering costs and widening coverage. It is expected that 5% of the $300 billion now traded electronically on the EDI systems will move to the Internet by this millennium.
Infrastructure	14.2	Revenues from hardware, software, communications charges, Internet access, and subscription will grow as consumers and businesses connect. The companies involved are hardware vendors like Cisco, Newbridge, computer manufacturers like IBM, Sun, software companies like Microsoft, as well as telephone/data network providers like Hong Kong Telecom, AT&T, MCI.
Business Contents	6.9	Much of the information now supplied on paper or through proprietary networks such as Telerate, Reuters, and Dow Jones News will be moved to the Internet as a means of expanding user base and geographical coverage.
Consumer Contents	2.8	About US$2.1 billion will come from advertisers interested in advertising in the net if their target customers fall into the major Internet user group -

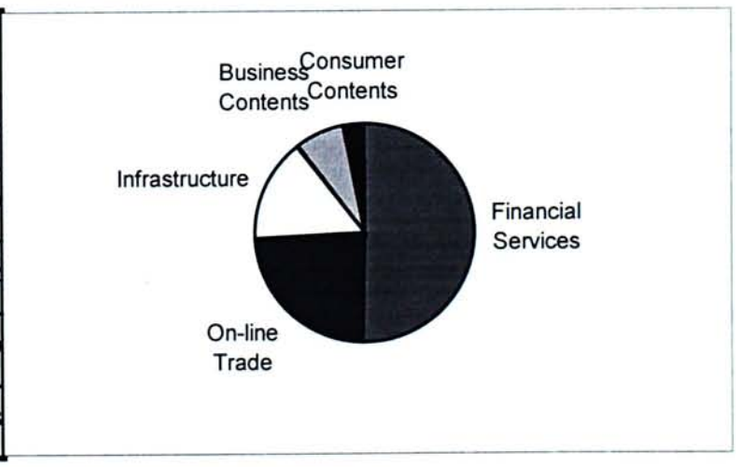
		educated, medium to high income adults of 18 to 55 years old, dominated by males. The other US$0.7 billion comes from subscription and fees paid by on-line providers for exclusive rights.

Furthermore, many organizations will still use the net to promote themselves by setting up home pages. Though this will not generate revenues directly, it will play a significant role in marketing the company and its products. Many readers will in fact purchase from the companies after understanding them more via the web sites. Thus, this generates income indirectly and is difficult to be measured. The next chapter will talk about this matter.

The following Pie Chart illustrates the projected revenue break-down.

Table 5-8. Projected Revenues of Internet Related Business

Category	Amount US$ billion
Financial Services	46.2
On-line Trade	21.9
Infrastructure	14.2
Business Contents	6.9
Consumer Contents	2.8



CHAPTER 6

INFLUENCE OF THE INTERNET

- PRESENT AND PREDICTION FOR THE FUTURE

Introduction

In the previous section, it has been highlighted how the Internet's core will grab the headlines, but the sphere of influence is beyond this scope. It will in fact create more widespread changes. Many people have overlooked this quite side of the Internet - its potential to improve business practices, enhance communications, as well as smoothen both internal and external operations of a company.

In the modern society, a company is to be affected by the Internet if it needs to perform at least one of the following three tasks::

- *Convey messages* - whether it is with its customers, share holders, parent companies or subsidiaries, its industry, or the public media.
- *Answer customer enquiries*.
- *Communicate internally* - whether it is between departments or divisions, along the distribution chain, locally or overseas.

Thus, this in fact means almost every company !

How Companies will be Affected

While the impact of the core Internet economy can be measured by the revenues it drives, its effects to the society as a whole is not negligible. The 'sphere' contains millions of unvalued interactions. For example, we cannot measure the value of an email which talks about a sales lead, or a customer browsing on the net about the details of a new car and purchases from the manufacturer afterwards. The values of these events can only be realized off-line in the physical economy.

In spite of these limitations, some firms would move themselves aggressively into the sphere. Probably, companies which well to the top-income quartile of the population should treat appearance in the Internet a must, as also those companies which sell information-rich products, so as those manufacturers and dealers which would like to attract buyers nation-wide and overseas. Actually, nearly all of the largest companies in the economy, as well as almost half of the medium-large-size ones (of 100 employees or above) will fall into this category. That is why nowadays, when people are talking about a company and would like to learn more about it, they frequently ask 'Do they have a home page ?'

Predictions for the Near Future (1 or 2 years)

Here are some of the findings based on New York Time's interview with Mr Bill Gates, CEO of Microsoft Corp., in the end of 1996, as well as my interview with Mr Gilman Siu, Business Development Manager of Hong Kong Telecom CSL, in January 1997:

Table 6-1. Predictions of the Internet Business in the Near Future

Issue	Discussion
Backlash	A backlash against the Internet will develop in the press because of many wild promises which have been made about the net. Many of them are too demanding and need to be supported by various progress such as infrastructure development, technology platform, equipment which involves vast capital, etc., and thus won't be fulfilled in the near future.
Security and privacy issues	People will scour the Internet for security and privacy problems and find a small number that will be heavily touted. However, the scrutiny and publicity will be healthy signs because they mean encouragement of safeguards and policy debates, as well as caution about the use of electronic funds.
Advertising	Advertising revenue on the Internet will soar a bit. The reason is that more and more companies are creating web sites which give opportunities for advertisements. Thus, they face a lot of competition which not only drives prices down, but dilute market shares. Companies developing advertiser-supported contents for the web will be disappointed when only about a quarter of the total advertisement revenues they anticipate actually materialize.
Growth in importance / awareness	Despite these setbacks, the Internet will continue to grow in importance. By the end of 1997, many people will recognize the historic dimensions of this global interactive network which becomes a part of peoples' everyday lives.

Tax	Various attempts will be made to try to tax the Internet. However, these efforts are unlikely to succeed if they single out the Internet rather than also taxing other forms of the communication equitably, because web site experts will find their ways of doing business while escaping from the tax constraints. Furthermore, as the Internet belongs to the world rather than a particular country, it is difficult to impose tax laws and regulations as they different from country to country significantly.
Effects on FTNS Operators	The rate schemes used to pay for telecommunications will change dramatically for some countries, including US and HK. Regulators will end the current practice that forces phone companies to undercharge for local service and overcharge for long-distance services. However, the case in US (and Canada) will be different from that in HK, as they start from 2 different extremes and will go towards a common direction. In US (and Canada), once an individual has paid for the fixed cost of a local telephone line, the PTT does not charge for any variable costs for dial-up connection to the Internet. But the case in HK is different. The PTT (Can be Hong Kong Telecom or any of the three 2nd tier PTTs, namely New T&T, New World Telephone, or Hutchison Telecom) charges the ISP (which is in fact charged to the consumer) HK$2.52 per hour for dial-up Internet access. This is called the 'PNETS' (Public Non-Exclusive Telecommunications Service) charge. This cost has gone down from HK$5.40 per hour in 1995 to the current charge, and is likely to be further decreased as a

	result of competition among the 4 PTTs as well as the high demand for connection (thus going towards the pricing model of 'low margin, high sales volume'). On the other hand, US PTTs like Bell South, Bell Atlantic will suffer from over-occupancy of phone lines as people keep computer modems connected hour-after-hour. In order to eliminate unnecessary waste of bandwidth due to 'idle connections' (which means the line is connected but the user is not using the service), PTTs are considering to post some costs to the users which shall be directly related to the hours they occupy the phone lines for Internet connection. This, it turn, is going to simulate the Hong Kong model, but are likely to charge lower than Hong Kong's current PNETS charge, because charging too high will discourage useful connections which will hinder the growth of the net's popularity.
Lower Long Distance Telephone Charges	This will be a result of 2 facts. Firstly, the FCC or OFTA will tend to end the current practice that forces phone companies to undercharge for local service and overcharge for long-distance service. With the subsidy of the PNETS charges, local carriers do not need to be supported by long-distance carriers (or at least, in the first stage, the supported amount will be decreased). This relief of supporting fund will eventually be revealed in the lowering of long distance phone charges. Secondly, long distance carriers face the competition from Internet Phone, a widely used piece of software which allow real time duplex voice communications between two parties from different countries. The bad news to long distance carriers (and good news to

	consumers) is that this is free (apart from the regular access charges to the net)! Thus, if the long distance carriers charge too high, they will accelerate the pace which people go towards this application as a substitution of long-distance phone calls.
Electronic Mail	Most corporations will employ electronic mail systems by the end of 1997, and employees will typically send or receive email several times a day. Corporate cultures will continue to rapidly adapt to this advantage of communicating and exchanging useful files with others anywhere in the world, which is so convenient and almost cost-less. In my personal experience, in the past six months, I have come across, at least once every week, the request of sending files via Internet email to employees of different companies both locally and in other countries. This is a typical sign of how the net is affecting a company's daily operations.
Networking / Computing	The boundaries among PCs, networking computers and TVs will become less clearly defined, as today's PCs are becoming more and more powerful, and models such as the Pentium Pro are capable of delivering multi-media services as well as act as network servers with competent performance. Furthermore, there will be a trend of network computing which means people no longer rely on their hard disks in their daily work, because they save most of their files in the network ! For example, many Internet subscribers like to store their emails in the server rather than their hard disks, because many of them actually own two PCs - one at work and one at home, and documents saved in the

	server can be accessed regardless of which PC they are using.

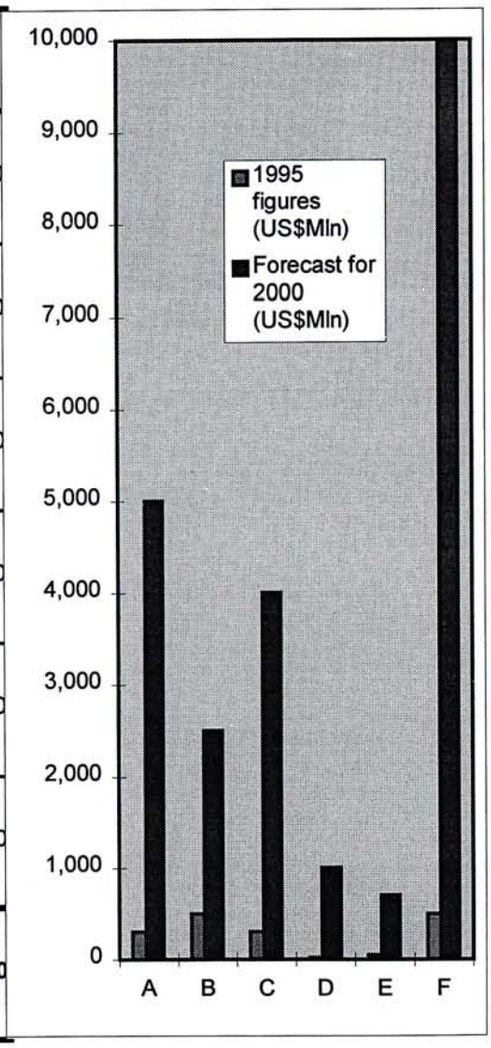
Forecast for the Year 2000

Hambrecht & Quist forecasts that by the Year 2000, the total world-wide market value of Internet will amount to US$23 billion, 14 times that in 1995, with the following breakdown:

Table 6-2. Forecast of Internet Market Value for the Year 2000

*(Source: **Hambrecht & Quist**)*

Forecast by Market Segment	Code	1995 figures (US$Mln)	Forecast for 2000 (US$Mln)
ISPs	A	300	5,000
Hardware - Routers, modems, computer hardware, etc	B	500	2,500
Software - Server applications, browsers, applications, etc	C	300	4,000
Enabling services - Electronic commerce, directory services, web tracking, etc.	D	20	1,000
Expertise - Consultations, system integration, etc..	E	50	700
Contents and activities - On-line entertainment, information service, shopping, etc..	F	500	10,000
TOTAL		**1,670**	**23,200**

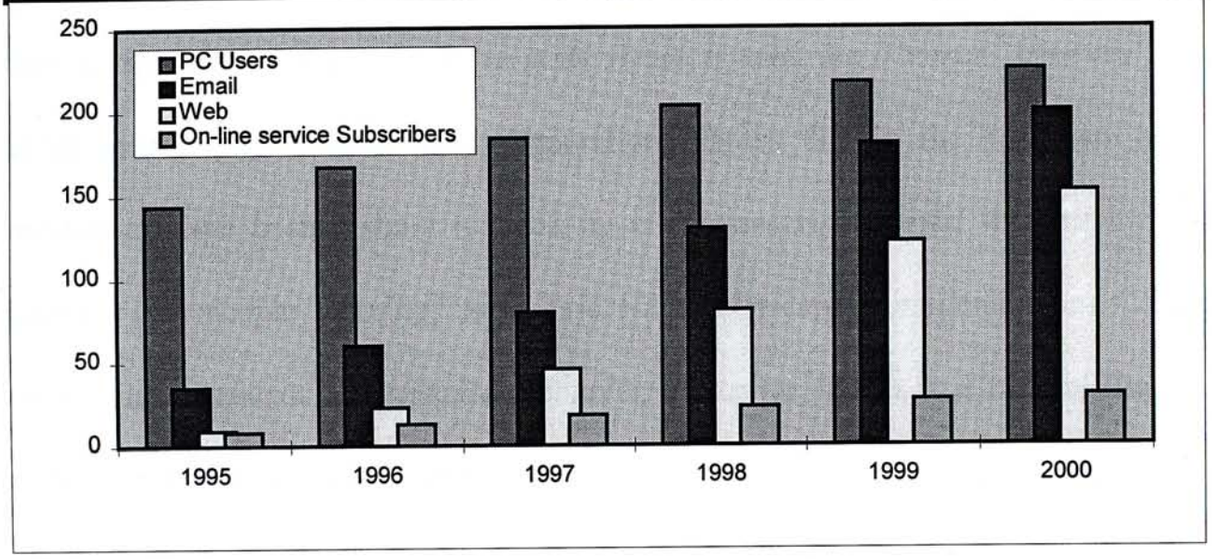


Morgan Stanley predicts that the total number of world-wide Internet users by the Year 2000 will be: 200 million including those email-only users, and 152 millions excluding email-only users. The break-down is as follows:

Table 6-3. Forecast of Internet Penetration for the Year 2000

(Source: Morgan Stanley)

(Millions)	1995	1996	1997	1998	1999	2000
PC Users	144	167	184	203	217	225
Email	35	60	80	130	180	200
Web	9	23	46	81	122	152
On-line service Subscribers	8	13	18	23	27	30



CHAPTER 7

AN EMERGING BUSINESS OF INTERNET EXTENSION - INTRANET

Introduction

Just as the Internet is exploding, so is its virtual cousin, the *Intranet*. A survey[1] of a cross section of 25 major U.S. corporations shows that in the past two years, businesses have been rushing to hook up employees *via internal Web sites*. "The Internet gets people thinking," says Eric Hahn, Netscape Communications Corp.'s senior vice president of enterprise technology. "As we can track a Federal Express package over the Net, why can't we track a fleet of management systems internally on the same technology?'" *Netscape, the leading provider of intranet Web sites, says the majority of its 1996 and 1997 income will be from Intranet-related business.*

In my study of this 'business of corporate focus in the near future', I had the pleasure to interview Mr Rex Yan, System Engineer of TMI Ltd (Subsidiary of Telecom Italia) who gave me in-depth explanation as well as professional recommendation.

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1 Source : "Upside Survey." Upside Magazine, San Mateo, California, USA, March, 1997.

The Relationship and Difference between Internet and Intranet

The term 'Intranet' began to be used in mid-1995 by vendors of networking products to refer to the use *inside private organizations* of technologies designed for computer communications between or among organizations. In other words, *an Intranet is a private computer network based on the data communication standards of the public Internet, taking advantage of the extensive coverage of the Internet backbone world-wide..*

The difference between Internet and Intranet lies in:

- The scope of access
- The way the technologies are used to communicate
- The goals of the communicating parties.

The Internet is global in scope, carried over public telecommunications channels and *open to everyone* with no predisposition to content. As described in previous sections, it serves as research tool, advertising medium, information provider, etc.. On the other hand, *an Intranet is strictly limited in scope - it is limited on purpose as Private Network Managers only want an Intranet to be accessed by closed-user groups.* It may connect a work-group, a department, an entire corporation, or a corporation with its partners, but it serves as a well-defined and bounded user community. Intranet packets are typically carried over *private networks*, whether local or wide-area, though they can travel on the open Internet as well. The content of Intranet traffic is subject to the information needs of its user community, and can often be specified in advance.

The Internet solves a number of thorny networking problems - unique global addressing, name look-up, and reliable message delivery, relevant to both private and public communications. When combined with the standards developed for the www, Internet *technology answers long-standing business computing needs*, by providing a means of platform-independent document distribution and forms processing.

Intranets filter unauthorized external access via *Firewall* - which is the generic name for one of the most frequently used ways of *protecting one network from another 'untrusted network' or unauthorized access*. The actual mechanism whereby this is accomplished varies widely, but in principle, the firewall can be thought of as a pair of mechanisms: one which exists to *block* traffic, and the other which exists to *permit* traffic.

The Intranet Causes Information Access to be Faster, Better, and More Economical

From an economics point of view, the *quality of decisions* translates directly into material success, or else failure. Even in a non-commercial environment, decision quality determines organization effectiveness. But people can only make decisions as good as the information available to them. Information systems have strong value because *organizational effectiveness* is very much a function of the quality of information to which people have access.

The 'internal web' of the Intranet brings distinct benefits regarding information access. These can generally be classified into 3 categories:

Table 7-1. Major Benefits of the Intranet

Category	Explanation
A Universal Platform	Webs provide a common platform for finding, retrieving, viewing, and updating a variety of information assets, including numeric data in relational databases and documents made up of structure text, images, and even multimedia objects like audio and motion pictures.
A Unified View	Webs help organize information by presenting diverse data types in a standard style. In a web browser, the gamut of traditional business communications - reports, articles, memoranda, tables, etc., takes on a common look and feel. In addition to supporting rapid decision making, familiar standards can refine the learning curve for new applications.
A Lingua Franca	Web technology builds flexible and universally accepted standards. As a consequence, *Intranets can access information residing in existing systems without high-cost programming.* This leverages one's current network investment - an advantage over proprietary technologies which often require wholesale replacement of in-place tools and are too heavily dependent on the monopoly / oligopoly hardware software vendors.

Why do Corporations use Intranets as their Means Inter-branch Communications ?

Simply speaking, Intranet will benefit corporate communications in the following sense:

- Lower Costs
- Save Time.

An Intranet can cut down the time employees spend on routine communication tasks. *The potential payoff for companies is tremendous, and the Intranet may ultimately get the credit for a technologically driven workplace revolution*, similar to what Novell has done in the past for the LAN evolution. Not only can employees now access data and customer information that was once buried in scattered documents, but this emerging environment is prompting global collaboration. Employees will be able to work more independently and creatively, challenging managers' traditional authority.

Intranets are already saving companies millions of dollars in paper and distribution costs. Several companies, including Federal Express and the banking conglomerate, Wells Fargo, hope to do away with paper. Wells Fargo spends about US$240,000 annually on employee handbooks alone, money that it could save by putting the same information on its Intranet.[1]

Among the trends identified, although it is steadily losing ground to Microsoft in the consumer Internet arena, Netscape is currently the overwhelming Web browser choice for the Intranet.

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1 Source : "Upside Survey." Upside Magazine, San Mateo, California, USA, March, 1997.

Technology companies have the most sophisticated and widespread Intranets, offering detailed data retrieval, collaboration tools, personalized customer profiles and links to the Internet. *Investing in the Intranet, they feel, is as fundamental as supplying employees with a telephone.*

Many non-technical companies of small sizes are still struggling with the basics, such as how to build a Web around a highly decentralized computer system. Executives for such companies are reluctant to pour money into an internal Web sites until the technology shakes out. These companies, as usual, only emerge in the later phase of the technological revolution - when joining the crowd is almost a must.

Intranet for Low Cost International Communication

Traditionally, a corporation with branches all over the world and has the needs to set up its international private network has to install *International* Private Dedicated Circuits (IPLCs) from international carriers of each country, which is rather costly.[1] Now, as a substitution, it can set up Intranet -, what it needs to do is to lease *Local Circuits* from the local ISP of each country, and install appropriate software / hardware including Firewall[2] , Routers, etc.. Generally, the cost is only 10 to 20%[3] of that of the traditional setup.

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[1] The cost varies depends on the bandwidth and where the locations are. According to TMI's information, a typical 64kbps link between HK and India costs approximately US$22,500 a month.

[2] The cost of Firewall starts from US$1,000, and can be as high as hundreds of thousands of US dollars. This depends on the no. of users, level of security, type of hardware used, etc..

[3] Recommended by TMI.

However, the Intranet also has its downsides. The most important ones have been summarized below:

Table 7-2. The downsides of the Intranet

Issue	Explanation
No connection guarantee	The response time depends on the capacity of the Internet backbone, and cannot be guaranteed. If anywhere during the connection is busy or the server is down, the corporate has to suffer from low traffic speed or even disconnection.
Initial cost	The cost of installing Firewall and related hardware / software can be saved if the corporation uses the traditional IPLC setup.
Data security	Though protected by Firewall, some corporations are still not totally confidence and worry about computer hackers who can still break in. They would only consider Intranet for general communication, such as internal email or general file transfer. When it comes to important data transfer and transactions, they still rely on the private networks.

Putting the Data Warehouse on the Intranet

Corporations recognize that information placed in the hands of decision makers is a *powerful tool*. To meet the decision maker's nearly insatiable appetite for data, data is being extracted from operational systems and placed in data warehouses. The data warehouse contains historical data by key business dimensions. At the same time, corporations are becoming aware of the compelling economics of Internet communications. Private corporate Intranets are the fastest growing segment of the

web server market. Intranets manage unstructured information - text, image and audio data types - as HTML documents. More importantly, the Intranet introduces a new level of *collaborative information sharing*.

Data warehouse should be considered structured data content for the enterprise Intranet, essentially adding the data warehouse to the Intranet. In this way, *the Intranet forms the basis for an Enterprise Information Infrastructure*. There are three important advantages:

- *Intranet Economics*
- *Information Integration*
- *User Collaboration*

Case Study: The Intranet Slashing the Cost of Business

(Extracted from the Newsletter of International Data Corporation (IDC), from Mr Ian Campbell Director of IDC, April 1997)

Bottom Line: The preliminary results from IDC's return on investment study of Netscape Intranets found the typical (Return on Investment) ROI well over 1000%--far higher than usually found with any technology investment. Adding to the benefit, with payback periods ranging from six to twelve weeks, the cost of an Intranet is quickly recovered--making the risk associated with an Intranet project low. The results to date clearly show that for any company, not just those already contemplating an Intranet, the best strategy is to begin an Intranet deployment today. The sooner an

Intranet becomes a core component of the corporate technology infrastructure, the sooner the company can reap the benefits.

The Intranet promises to fundamentally change the way workers communicate to a degree not experienced since the telephone. To quantify this impact, International Data Corporation has undertaken a study of Netscape customers to measure the return on investment (ROI) from a corporate Intranet. Internet technology used within secure bounds as an Intranet offers many advantages, most notably ease-of-use and communication to any hardware platform that supports a Web browser. While most people interviewed during the study felt using an Intranet to support their application was a clear benefit to their company, what is surprising is just how significant the ROI from an Intranet can be. When IDC investigated the returns, the typical company achieved an ROI well above 1000%--far higher than usually received from a technology investment.

Even more significant than the high ROI; companies in the study are recovering the cost of an Intranet within six to twelve weeks, making the risk of not recovering the money spent on an Intranet extremely low.

Calculating the ROI

- *Costs.* When IDC investigated the costs associated with an Intranet, the cost of hardware and software was far less significant than the cost of personnel. Personnel costs fell into two distinct categories: the one-time cost of application development, and the ongoing costs associated with supporting the system and

maintaining a steady flow of information content. Still looking at costs, the ease-of-use of a browser has translated into a low cost of training. The typical application roll-out plans for outside trainers and time lost in training classes as a nececessary part of a rollout plan. In sharp contrast, intranet implementations are experiencing minimal training expenses. This savings is particularly valuable when deploying to a broad number of people, to remote workers, or to high-level management, typical areas where training costs can be expensive.

- Savings - On the savings side of the ROI equation, IDC found the Intranet providing quantifiable benefits in areas such as reducing the use of paper or supporting ISO 9000 initiatives.
- However the greatest area of savings is in increased productivity. For every company profiled so far, having immediate access to information through an Intranet made employees more productive. Where possible, IDC calculated the actual impact of time saved on the profitability of the company. When this was not directly possible, IDC quantified the savings in time per employee and then corrected that amount to calculate increased productivity. While an average increase in productivity of 10 minutes a day might not seem like much, project this across 4,000 employees and a company can experience a measurable gain in productivity that can impact the income statement.

Trend

Deploying and Doing: Looking at trends, IDC found three themes that continued to emerge.

- First, on the client side, companies that have heterogeneous environments view the use of a browser as a universal client a real benefit in reduced administration, lower cost, and ease-of-use. In companies where the browser was already deployed, creating a new Intranet-based application required development only on the server. For these companies, deploying a new application required nothing more than e-mail to the entire company with the URL. One comment put it succinctly: "In the morning ten people were testing it, by the afternoon 4000 people could use it!"
- Second, many interviewees spoke about finally experiencing the true promise of openness; that is, the confidence that software can be freely substituted if need be. More than once an interviewee commented that one benefit of Netscape browsers and servers was the freedom to replace them at any time. Not that companies are replacing software, just the opposite is true, this confidence has lead to an aggressive attitude towards applications. For many companies contemplating an application development project, the Intranet has replaced the old process of defining and deciding with deploying and doing.
- Lastly, companies were often surprised at the rapid growth of department-level web initiatives. The barriers to deploying a web server are turning out to be far lower than companies initially expected. In these companies, departments are creating and managing their own web servers.

The Changing Role of the Information Systems Group

As the Intranet gains prominence in an organization, the role of the Information Systems organization becomes more critical to its success. As IS moved from the

centralized to the decentralized computing infrastructure it evolved from a management to a service focus. The Intranet is offering a new set of challenges that causes the IS team to make another evolutionary step. That is, *from service provider to coach.*

CHAPTER 8

CONCLUSION

The Economic Sphere of Influence of the Internet

The previous chapters have illustrated the economies of the Internet world in various aspects : What it can do, its coverage in terms of width (the areas of business and everyday lives which are affected) and depth (how intensively these are affected), its recent statistics, its expansion, the opportunities and threats it has brought to different kinds of business, as well as prediction on its near future growth based on present user acceptance, expectations, and development trend.

As the Internet changes the way business is done, corporations won't need to have as many resources on hand as they do now. Companies of all sizes can then focus their core competencies, and leave other tasks to specialists at outside companies.

As the boundaries which separate companies become less important, employees will readily get advice and share ideas or information with colleagues in outside companies. For example, an engineer who used to consult with an in-house graphic designer can now work just as closely with outside specialists - via the Internet. This means a lot of time and redundancy (such as traveling) could be saved.

Since the need for physical proximity between companies will become much less important, many kinds of businesses will have the potential client base than ever before. By the same token, a company may find itself facing many more competitors, not from the same city, but from around the world. The increased competition will accelerate the trend towards specialization as companies, eager to position themselves, define themselves increasingly by what they do rather than by where they are.

Furthermore, many opportunities will arise for small businesses to embrace the new possibilities afforded by the Internet. One example is the emergence of many network magazines. Traditionally, publishing magazines is a large scale business as it meant investment in paper, printing machines, transportation teams, etc.. Now, with the availability of web pages, one can easily set up a magazine at a web site - where the investment can be as low as a few US thousand dollars. All one needs to do is to write good articles and put them on the Net ! By then, advertising revenues and / or user subscription fees will then flow in.

Real challenges will face some companies that ignore the trends for too long. Companies from almost all business sectors, small and large, will soon find that having presence on the Net is a must. For example, consultants, agents, etc., will reap rewards for using up-to-date business practices that attract customers and clients. Even for businesses like restaurants, textile, which are among the least computer-technology sensitive ones, will find advantages from using the Net. It won't be long before an appreciable share of people who regularly patronize restaurants will use the

Net to scan menus, make reservations, or even or food. It is a new world which unifies people and innovate business.

Intranet - Business with Prosperous Future

As explained earlier, Intranet is an extension of the Internet which is going to be the focus of software and hardware vendors' business plans in the coming few years. The main benefits it brings to businesses are:

- Improves efficiency in information flow
- Increases Return on Investment (ROI)
- Enhances corporation network communication infrastructure by providing low cost and easy-to-implement national and international LAN-to-LAN data communications.

Furthermore, due to the success of Intranet, a further extension, *Extranet*, also emerges. The basic configuration and technology of Extranet are the same as Internet, but Extranet also allows companies to communicate with their partners and customers wherever needed. This is made feasible by special configuration of the Firewall which authorizes access within closed user groups.

Not only does the Extranet demonstrate the benefits of Intranet, but it also helps companies build stronger ties with partners, thus increase the efficiency of information flow - These features have never been made available via traditional private networks !

APPENDIX 1

WHO IS WHO IN HONG KONG'S INTERNET COMMUNITY

Introduction

In order to understand more thoroughly the impact of the Internet and to more accurately predict the future, it is worthwhile to strengthen our foundation and study the network configuration of the Internet Community (or called the *Cyber Space*). We shall proceed with a study of the Cyber Space in Hong Kong, and induce the concept to other countries, as the structures in other countries, whether they are in Asia, Eurpoe, Australia, etc., are simlar.

Who is Who and What Do They Do ?

Figure A-1 shows the 'Cyber Map' of the Hong Kong Internet Community[1] as of the end of February, 1997. Please note the following explanation and important remarks:

- *Office of Telecommunications Authority (OFTA).* OFTA is a government department which monitors and governs the Internet world, and ensures no illegal activity is going on in the Net. It also regulates charges such as PNETS (Public Non-Exclusive Telecommunications Services). (See description below).
- *Internet Service Provider (ISP).* An ISP provides Internet services to customers. Domestic consumers log on to the Internet by dialing in to the ISP via modems,

[1] "Cyber Map" ComputerWorld (Hong Kong), 13 March 1997, p.13.

whereas corporate users log on either via modem dial-in or via dedicated line access (a leased line connecting the corporation's Local Area Network (LAN) to the ISP, 24 hours a day). An ISP in HK usually has at least two links, one to the Hong Kong Internet Exchange (HKIX), and the other one to an overseas Internet Access Point (IAP). These links can be direct or indirect (usually, smaller local ISPs go for indirect links). 'Indirect link' means ISP-A is first connected to a larger ISP-B, and rides on ISP-B's link to connect to HKIX / the overseas IAP.

- *Internet Access Point (IAP).* This can be a larger overseas 'Internet Exchange Point' or a larger overseas ISP. Some examples are UUNET and MAE-West. Due to US's dominance in the Internet world, most IAPs are eventually connected to US (may be via several layers in the pyrmaid, e.g., they may be first connected to Japan, but a larger IAP in Japan will collect traffic from several channels and then redirect to US. Similarly, some IAPs have subsidiaries in HK, e.g., UUNET (HK), for the purpose of collecting traffic from several ISPs in HK, and then connect to its US mother company via larger bandwidth (for the benefits of the Economies of Scale). These overseas IAPs, in turn, have their computer networks connected together (again, may be via several layers in the pyramid). Thus, the overall picture is that all Internet networks in the world are connected together !
- *Hong Kong Internet Exchange (HKIX).* Run by the Chinese University of HK, the HKIX is a clearing house for Internet messages within HK. As mentioned previously, as all ISPs in HK are connected to the HKIX, if the user of ISP 'A' wants to send message to the user of ISP 'B', the message can be cleared in HK, instead of going overseas. Without the HKIX, the message has to go to ISP-A's IAP overseas, then several layers up, and then several layers down to ISP-B's IAP,

and finally to ISP'B. Thus, the HKIX serves the role of handling local traffic in order to avoid unnecessary waste of bandwidth. Furthermore, the HKIX is responsible for some administration work, such as registering the domain names of web sites in HK. For example, if company ABC sets up a home page and wants to give it a name of 'http://www. Abc.com.hk', it has check with HKIX that this name has not been used before, and has to register with HKIX. Similarly, names with suffix '.sg' is governed by the Singapore Internet Exchange body, '.ca' is governed by the Canada body, etc., and names without the final suffix, e.g., 'http://www.xyz.com', are governed by the US body.

- *Public Non-Exclusive Telecommunications Services 'PNETS'.* Some users may have noted that although most ISPs offer 'unlimited usage' monthly packages, they in turn require customers to pay PNETS charges of HK$2.52 per hour for logging on to the Internet. It sounds contradictory, doesn't it ? The reason is that the *PNETS charges are not payable to the ISPs, but to the Fixed Telephone Network Service (FTNS) operator.* (It can be one of the four FTNS operators in HK, namely HK Telecom, New T & T, New World Telephone, or Hutchison Telecom). As part of OFTA's interconnection rules, the FTNS operator which provides leased lines to the ISP shall collect fund from the ISP according to the amount of time Internet is connected, and the rate is currently HK$2.52 per hour. The ISP, thus, imposes this charge to the consumer.

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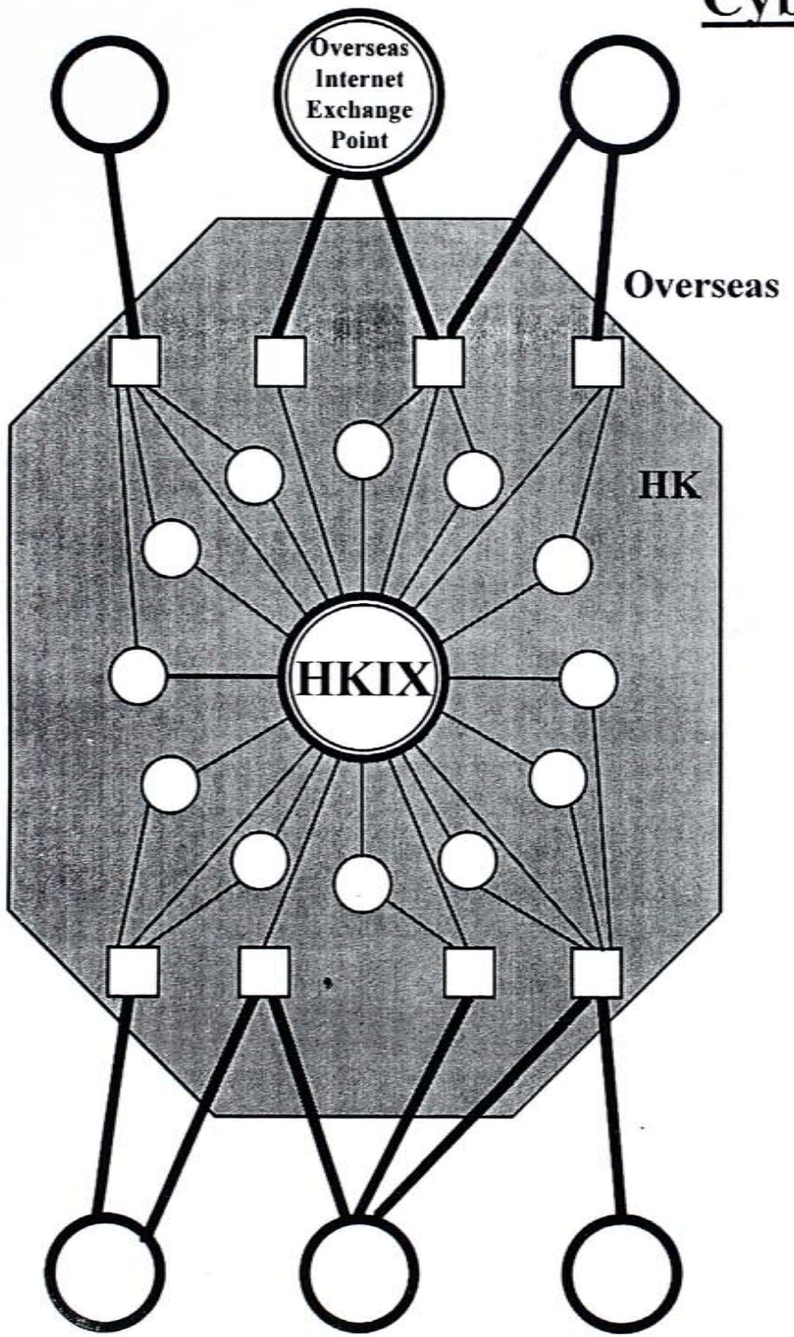
Figure A-1:

Cyber Map - Hong Kong's Internet Community

(Source: "Cyber Map." ComputerWold (Hong Kong). 13 March 1997)



Explanation

Detailed Description	Examples
An ISP which has its own international circuit(s) to connect to overseas.	There are about 15 of them in HK, including Uunet(HK), Asia Online, Star, AT&T (HK), HKT-IMS, HKT-NetPlus, Compuserve, HK Global-1, GlobalNet, IBM, I-Wave, Global Link, Supernet, Internet Access, and Linkage Online
A smaller ISP which does not have its own international circuit(s). It has to connect to other local ISP(s) with international circuits via local line(s), and access to overseas indirectly.	There are more than 40 of them in HK. Typical ones in HK include: HK Net, HKIGS, Sing Tao, Vision Online, ABC, Jitong, Cyber Express, Speednet, HK Link, AsiaCom, Chevalier, TigerNet, DataInternet, etc.
An Overseas Internet Access Point (IAP). It collects traffic from ISPs in HK via international line(s). An overseas IAP is eventually connected to an Overseas Internet Exchange.	Some ISPs in HK are first connected to overseas IAPs in the region, such as KDD (Japan), IBM (Australia), and are connected to US indirectly via them. Other ISPs are directly connected to IAPs in the US. Typical IAPs in the US include: MCI, Uunet, etc.
Overseas Internet Exchange. It collects and exchanges traffic from different IAPs.	Most of the world's largest Internet Exchange Points are in the US, such as MAE-West, MAE East, etc.
Hong Kong Internet Exchange (HKIX). All ISPs in HK, small and large, are connected to HKIX via local lines. If traffic is to be routed from one ISP in HK to another, it will be managed via HKIX.	N/A
A local leased circuit. It is used for (1) connected an ISP in HK to HKIX, and (2) connecting an ISP in HK which does not have its own international link to one which has.	Typical speed range: 64kbps to T1(1.544 Mbps) or E1 (2 048 Mbps). Some ISPs with extremely high traffic, such as HKT-NetPlus, and HKT-IMS, are connected to HKIX via T3 (45 Mbps).
An international circuit. It is used by an ISP to connect to overseas.	Typical speed range: 64kbps to T1(1.544 Mbps) or E1 (2 048 Mbps).

Note: For the purpose of diversification:

- An ISP in HK may be connected to more than one Overseas IAP.
- An ISP in HK without international circuit(s) may be connected to more than one ISP in HK with international circuit(s).