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The Internet – New Generation (DRAFT)

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Main Objectives of Talk/Paper

1. Review current trends in the growth and spread of the Internet.
2. Overview of expected growth in reach and access.
3. Describe selected novel or extended applications of the Internet.
4. Summarise basic reasons for its relentless growth, and broad appeal.
5. Consider its impact, appropriateness and benefit for countries on the threshold of hooking onto the Internet.

1. INTRODUCTION AND CURRENT SCENARIO

The Internet began as the ARPANET during the cold war in 1969. It was developed by the U.S. Department of Defense’s (DOD) in conjunction with a number of military contractors and universities to explore the possibility of a communication network that could survive a nuclear attack. It continued simply because the DOD, its contractors, and the universities found that it provided a very convenient way to communicate. Interaction till the late 80’s was largely confined to emails and file transfers between academic and research institutes.

The first Internet browser, MOSAIC became widely available in 1991/2. General access to the Internet is less than a decade old. The following points reflect to hitherto rapid growth of the Internet, and are indicative of future growth in access and usage.

- Global Online population is currently estimated to be between 170-200 million Web users worldwide. In 1993, 3 million people were connected to the Internet.
- 1 in 6 people accesses the Internet in North America and Europe.
- In 1993, there were 26,000 domain names in use. In 1999, there are 5 million web sites.
- 80 million Americans are connected and 64 Million are regular Internet users.

1. EXPECTED GROWTH – USAGE AND RATE

In this section we briefly review the expected growth in access to the Internet. This includes an overview of new trends and directions in which the Internet seems to be headed. A time frame of between 3-5 years is assumed. Anything beyond that would be far too speculative, as the scenario is subject to rapid changes and unexpected or novel developments.
2.1 Growth and Increase in Usage

First there can be no doubt that access to the Internet is going to increase, both in terms of depth and breadth. That is, more people will seek out and gain access to it while those who already have access will use it more often for a broader range of activities. Some facts that support these expectations:

- There are seven new people on the Internet every second. (Cisco Systems, Inc)
- By 2005 non-US Web users are forecast to comprise 700 million of the total one billion users.
- 82 percent of US college graduates will search for careers and employment information online in 1999.
- The U.S. ISP market will generate $15.1 billion in 1999, a 45% increase over 1997. In Europe, the ISP market generated $4.3 billion in 1998.
- There will be over 24.3 million Internet users in Latin America by 2003.

So what are people doing online? The following is a subset of all the activities for which the Internet is currently being used:

- exchanging ideas via email
- chatting online
- broadcasting opinions and debating
- buying and selling (everything)
- booking holidays
- comparing prices
- banking
- order custom designed cars
- looking for jobs
- making friends
- forming pressure groups
- accessing information
- visiting virtual galleries
- teaching and learning at a distance
- downloading music

The list can go and on, so to cut a long list short, it is fairly obvious that the Internet is capable of supporting a pretty wide range of human activities. So much so that what the Internet can and will not be used for would make a far shorter list. Apart from the broad spectrum of activities, the Internet supports a number of media for communication and interaction. The combination of ease of access and multi-media has led to novel developments (as described in more detail, below).

2.2 Pace of Growth

Apart from the spread and increase in number of online users, the pace of growth is also expected to increase. Judging from the past 12 months it would seem that there is no end in sight. In many ways the Internet itself is responsible for the frantic pace of growth and investment in IT sector (in the US in particular as indicated be some of the following statistics):

- 44% of U.S. companies are selling online; 36% more say they will do so by the end of 1999.
• Online retail business to reach $17 billion by 2001.
• Internet traffic is doubling every 100 days.
• In India, there is an immediate demand for 500,000 additional Internet connections.
• 47 million European households are expected to have Internet access by 2003. That would cover about half the population.
• In the US Information technology sectors are growing at double the rate of the overall economy and have jumped as a share of the economy from 6.4% in 1993 to 8.2% in 1998. (U.S. Department of Commerce).
• In 1965, high-tech’s share of business spending was 3%. In 1996, it was 45%. (U.S. Department of Commerce).
• Small and home offices spent $51.1 billion on high-tech goods in 1998.
• More than a million new jobs were created by the U.S. high-tech industry since 1993. (American Electronics Association)
• High-tech has driven more than a quarter of all economic growth since 1993. (U.S. Department of Commerce).
• In the US, software related economic activity to overtake the automobile industry (in terms of turnover).

To put the above highlights into perspective recall that the Internet reached maturity less than five years ago. In the North America, Europe and parts of Asia-Pacific its general awareness did not come about till about 3 to 4 years. And even in countries where access to it is a rarity awareness of the concept of Internet is very high. Less than three years ago access to the Internet in India was generally not available. One reason being that it is rarely out of the news, which in turn is indicative of its rapid growth.

One of main reason for the increase in pace in that novel applications and ideas are extending the boundaries of Internet utilisation. Ecommerce being the latest and the most well know. However, as described in the next section even more revolutionary applications are in the pipeline. As might be expected they are being designed by and to cater for users in the US and to lesser extent in the Europe.

2. WHERE IS THE INTERNET HEADED? THE ENCROACHING INTERNET

Till now the Internet has been more or less confined to PC based usage and services. With hindsight these seems to be passing phase. Increasingly it is going to have a variety of devices hooked on it. Already it is changing as illustrated by the following examples:

1- Internet on the Go. Recently, it became possible to receive emails on mobile phones. Further, Nokia has just released mobile handsets that can receive Internet pages and support video conferencing. Unimobile a recently set up company will enable ANY mobile user to
access all forms of Internet based communication (email, voicemail) on their mobile phones ANYWHERE in the world (without having to register with a local mobile operator). Incidentally this concept was developed by a group of young Indian in their early twenties who access to the Internet had been till now limited and fragmentary.

2- Total Connection. Internet connected houses (or other buildings). A handheld control device (eg mobile phone) can be used to manage household climate eg, turn on heating while on a skiing holiday. It will soon be possible to manage utilities microwaves are connected to food company Websites to enable them to control and monitor cooking/heating of ready made meals. How about automatic placement of orders by a rubbish disposal unit that orders replacements as it senses empty containers and discarded wrapping? The list of possibility is endless.

3- Control and navigation. For example, a combined map and a guide for almost any location in the world. A vast improvement on city maps on CD already available for car navigation. The Internet delivers up to the minute accuracy and desired level of detail.

4- Search Agents. Designed to deal with unprecedented amount of information. Intelligent and adaptive search agents can seek out information or web pages to fulfill predefined specifications (eg, topic of interest, people, locations, bargains, etc). These could have an ability to learn from experience (or observing user interaction on the Internet).

5- Virtual Reality. The Internet can support a range of virtual environment. Data from various locations can be combined to provide a cohesive and comprehensive virtual set up.

6- Information. Though a given it is worth reiterating the power of the Internet to enable fast, easy and cheap access to a prodigious amount of information. Microsoft recently announced a website containing satellite survey of more or less the entire globe. If printed this information would require 20,000 volumes of 500 pages each – imagine the expense apart from the cumbersome nature of the printed format. The source of information was another website of satellite pictures taken by Russian satellites. This was combined with similar information from a US agency, and reformulated to iron out distortion. The accuracy of the picture enables the use to distinguish cars on roads.

Each of the above, represents a revolutionary reconceptualisation of the Internet. The Internet is being transformed into a general-purpose conduit of information analogous to a water or gas pipeline or an electricity grid, except it can also be virtual (wireless) and is highly flexible and adaptable. How the information gets in, where and how it is stored and how it is accessed or modified is up to the users to define (and for the nay sayers to worry about). It can support any activity requiring the
combination of information and communication technology. When considering the possibilities it is
difficult to avoid superlative and hyperbole.

In the next section we review some of the basic reasons for the impact, growth and potential of the
Internet.

4. WHY IS THE INTERNET A WINNER

In terms of telecommunication infrastructure is very cost effective, easy to access and use and highly
flexible. Some of the main reasons being that:

1- It can piggyback on existing telephone system infrastructure (as well as that of TV cables and
electricity grid).
2- The latest wireless technologies are further helping to extend its reach (especially in areas
where there is no existing telecommunication infrastructure).
3- The capacity of data transmission much higher when compared to analogue transmissions.
   Also it can be much richer (multi-media).
4- Same line or network can support many links (and/or tasks).
5- Access is easy with user-friendly and resilient browsers and related software technology,
   such as Java based platform independent applications.
6- Participant entry level is relatively low in terms of access and establishing a presence.

It is getting easier access and use and cheaper by the day. Rapid advances in telecommunication
(wireless and satellite in particular) technologies, cheaper hardware and even more brilliant software
applications are the three main reasons.

Apart from the technological reasons of its relentless success the Internet is also a winner because
above all it is capable of delivering information. Not only is it instantaneous and reliable but also when
one wants it – and increasingly WHERE and HOW one wants it.

In many ways the Internet represent a qualitative shift in communication of information analogous to
the advent of writing (and printing). Little refection is necessary to conceptualise the fundamental
impact of the invention of writing/printing on almost every facet of human development. Similarly the
Internet in particular and ITC in general is going deeply affect contemporary human society. No
aspect of our current behaviour and mode of operations, be it social, cultural, economic, educational,
intellectual or political, is going to remain untouched. The following two serve as representative, albeit
brief examples of the impact of the Internet.

1- Ecommerce - 56 percent of U.S. companies will sell their products online by 2000, up from 24
   (Internet Advertising Bureau).
Gains in efficiency and higher standards of service are immense. Not a hyperbole to suggest that the very nature of trade and commerce will be radically different. Not to mention huge numbers of new services (Netopia – website development on the hoof; I was in business within two days).

- The global e-commerce market is expected to reach $1.2 trillion by 2001.

2- Education – On demand, tailor made, non-restrictive in terms of time and space. Wider access and multi-layered. Profound effect on nature and notion of education; learning to learn and learning for fun can have equal emphasis as learning for gain. Learning by doing.

Structure and organisation of knowledge. For example, books are serial – hence the concept of narrative; cognitive studies have shown that this is not necessarily the natural or intuitive way of transferring or receiving knowledge. Non-textual media for communication.

- English will not be understood by growing number of non-English Web users – currently 35% of all users online access not non-English Websites.

3. South Asia and Asia Pacific Perspective on the Internet

Away from North America and a handful of European countries there is a general perception that the Internet is not really part of their society or culture. In South Asia and Asia Pacific Regions, apart from Japan, Hong Kong and Singapore, the Internet remains an alien concept and experience. While a sizable proportion of people may have heard of it, most remain unaware of its defining characteristics and very few actually grasp its potential. This lack of understanding and hands on experience (particularly among the political and social elite) has too frequently resulted in misconceptions that have served to impede the spread of the Internet.

Such misconceptions ought not to be dismissed as harmless follies (that they are) but as serious threats to the future economic development and social and cultural fabric of many Asian countries. In many cases there are number of social, political and cultural issues that need to be addressed in order to enable widespread access to the Internet. In particular, key telecommunication infrastructure needs to be put in place or opened up to Internet Service Providers (ISP); policies have to be crafted or changed in accordance with Internet usage; and, content and applications need to be developed to cater for specific requirements of a country, community or cultural grouping. The rest of this section addresses and evaluates some of these points in greater detail.

5.1 Telecommunication infrastructure

1- Minimal telecommunication infrastructure is necessary but need not be prohibitively expensive.

Basic technology in itself is relatively simple. All too often a lack of grasp of this is the reason why it ends up being so expensive. As already mentioned existing infrastructure in many cases would suffice, and where necessary judiciously planned upgradation can be cost effective.
2- As far as basic infrastructure is concerned lack of resources is lesser problem than a slothful and/or ignorant bureaucracy (often coupled with a negligent and complacent telecom monopoly/authority). Take the case of an Indian company (Midas) producing low priced wireless communication solutions which China is buying but which it is finding impossible to sell to the Indian Department of Telecommunication (which operates the entire Indian telephone system barring mobile telephony).

3- Associated skills and expertise required to establish and maintain the telecom infrastructure are often a larger part of the overall expense. But this need not be the case. Buying them (in guise of management or IT consultants) from abroad is what renders them expensive. Overall planning should allocate resources for education and (re)training to nurture and impart the necessary skills (which in all fairness are not really that esoteric).

4- Apart from its relatively low cost, the technology is not particularly sophisticated nor does it require a highly versatile and skilled workforce to make use of it. Once in place, relatively low level of skills training is necessary for development of basic application and Websites. An added benefit is that much of skills and expertise can be gained via the Internet, some simply by using it! Truly this is one technology where even the smallest player can make an impact as long as their contribution is worth the while of other users of the Internet.

5- Above all when confronted with the issue of resource required for basic infrastructure the decision making body or organisation would do well to also consider the cost of not providing widespread access to the Internet. In the long run it is going to cost a lot less than avoiding or limiting the Internet. Just as in the long run high levels illiteracy have proved to be expensive. Given current development not investing in required Telecom infrastructure is bound to be a false economy.

6- It is not a luxury; just as there is a need for all weather roads, urban public transport airports, hospitals etc, there is a need for the Internet. Worse still, latecomers may be faced with a prohibitively high entry cost – establishing a viable presence on the Internet is going to be less easy as time goes by. Late comers may have to settle for what is already in place or on offer rather than actively contribute to it.

7- Also explore novel ways of financing the infrastructure. For instance large telecom companies increasingly regard infrastructure investment as seed capital which they are willing to spend in anticipation of reaping the benefit from Internet traffic, content and service that it is likely to generate.

8- An associated telecommunication technology and/or infrastructure related problem is that of bandwidth limitation. Will the euphoric and relentless expansion of the Internet come to shuddering halt once the traffic exceed the network capacity? Such an extreme outcome is highly unlikely. While it is true that a lack of sufficient bandwidth can slow down or impede Internet access, the technology required to overcome such obstacles is already available and it is not prohibitively expensive (and as with much else connected with the IT and the Internet it is getting progressively cheaper). Nor does this potential problem alter the fact that many of the basic benefits of the Internet remain accessible via existing (low cost) telecommunication
systems. Piecemeal upgrading to meet heavier or more sophisticated usage is a viable option and one being pursued in the US and Europe.

5.2 Language, Content and Values
1- Currently the Internet is heavily biased towards English. This does not mean that non-English speakers can benefit only if they learn or know the language. No, creating content in non-European languages or software designed to handle them is not difficult and does not require significantly different technology. Internet itself can be of help – see how others do it. Get free guidance and advice. Get fast feedback. Easy to adapt and update.

2- In any case even hidebound American firms are bound to take into account the fact that business users on the Web are three times more likely to purchase when addressed in their native language.

Apart from the language, the Internet has largely been developed by and North Americans and to a lesser extent, Europeans. It therefore does reflect their cultural and social values, which is grounds for legitimate fear that the Internet is a threat to Non-American cultures. But this need not necessarily be so and the problem is not going to be resolved by ignoring or frustrating the advent of the Internet. To have any hope of defeating the threat you need to join it. Got to get into the driving seat and stay there (Japan, Hong Kong and to a lesser extent Singapore and Malaysia). Be part of the process and help contribute towards its growth and development.

9- A more proactive approach designed to assimilate good practices or sensitive modification of existing material or application would be more productive. For example, within Europe, by doing so the Netherlands have gained and maintained a position of dominance on the Internet far beyond it economic or cultural clout. In the long run this approach has more to recommend itself than that adapted by the French – one of studied avoidance of all things American coupled with reinventing everything such that only those with a thorough understanding of French language and culture would be able to appreciate.

10- Only with a positive attitude and full comprehension would the laggards secure a fair deal – exploitation would occur only because of ignorance or myopia. Shunning the Internet because of its potential threat to their culture is more likely to ensure precisely that outcome, and hence an abrogation of responsibility.

11- A fundamental point is that the Internet is a multi-purpose tool. Nobody has or can restrict access to it or monopolise its usage. A lack of imagination and creativity are probably the only constraints on its use or application (assuming of course minimal software skills and modest computing resources).

12- In particular the Internet can be utilised for more positive outcomes such as maintaining and even sustaining cultural cohesion and linguistic survival. For instance, a Diaspora can keep in touch with its roots no matter how geographically scattered its members may be.

13- Given that currently over 50% of the online community originates from outside the US, it is unlikely that the Internet will result in bland homogenisation of global culture. These non-US based users are already making an impact. A far more positive take on the growth of the Internet
that it enable those with little resources to make their presence felt. Certainly the average American is far more likely to learn about non-American culture or values from surfing the Internet than via the education system or by reading the average US newspaper.

5.3 Security Legal Issues and Access Restriction,

1- One consequence of the reach and utility of the Internet is that geographical and national boundaries tend to be less of a barrier. As already stressed the Internet has no national or regional allegiance. Nor is it located anywhere in particular—though user concentration varies it is essentially equally distributed around the globe. For Internet users this translates into a sense of immediacy and closeness of contact. Access to information or communication with other users is not affected by physical, political or cultural difference. The advantages of this are obvious while any perceived drawbacks need a critical analysis.

2- Any discussion on the pros and cons of the Internet is bound to touch upon issues related to security and access restriction to certain material. It is true that the Internet enable unrestricted access to information, which may be deemed as unpalatable or unacceptable to a particular community or elite. Putting aside the overall merit of censorship on information or restriction of freedom of expression, it would be unwise therefore to thwart the advent of the Internet itself. For example, no matter how repugnant the idea of pornography or explicit discussion on sexual practices and preference, it would be counter-productive to control it by restricting access and use of the Internet.

3- A more sensible and viable course would be one similar to that taken by Singapore, which aims to restrict access to specific sites (containing pornographic material) that it does not wish its citizen to view. Similarly in the US, parents can install software designed to restrict access to Internet sites deemed to be unsuitable for their children.

4- Alternatively, Internet user’s activity can be monitored, particularly in cases where a more general control on information is desired. The Chinese authorities have attempted this to check unrestricted access to politically unacceptable or unpalatable information. However, given the all-pervasiveness and widespread availability of such material it has not been easy. In fact, its relative success has been largely due to the fact that the majority of Internet users prefer to access pages or site in Chinese (Mandarin) which are more or less exclusively provided by Chinese authorities or government translators (and/or censors). Instead of waging a losing battle perhaps authoritarian regimes ought to re-evaluate the notion and viability of restriction on what their subjects see, read, say or think.

5- Widespread access to the Internet will have to be accompanied by laws and statues to deal will huge variety of social and economic activity. For instance existing laws need to be updated to encompass Internet based commercial and financial transactions, have competency over electronic contracts and deal and extend the reach of intellectual property and copyright on Internet based material. Due to rapid development in the Internet even the US is barely keeping pace in this respect. For anyone else there is no need to wait till the Internet achieves a more significant presence within his or her jurisdiction. Enacting such laws help establish a stake in the...
what is eventually going to be global process of harmonisation of laws and regulations related to
the Internet. In their absence one may end be sidelined as others take the initiative. Already the
US (and OECD) have assumed de facto global say on tax on Internet based commerce and
trade. Their agreement to allow such activity a tax free status is unlikely to be challenged by
countries such as India or China (if and when they get around to considering such issues). And
such occurrences are going to increase.

6- As far as national security is concerned most governments can intercept emails and censure web
content and application as deemed fit. In addition the US government wishes to restrict use of
encryption to a particular method which it has the capacity to decipher. This attempt is widely
opposed by American Internet users. It is worth noting that if the US government succeeds in this
attempt, it will be in a position to decode all encrypted Internet traffic.

7- Inevitably the Internet does tend to empower users because it enables fast, easy access to
information (often from sources other than those officially sanctioned). Governments,
administrations and organisations whose authority and status significantly depends on a docile,
ignorant and subjugated polity are bound to find the Internet an awkward development (just as
they do a free press or political opposition). Maybe rather than being treated as a potential threat
this ought to prompt the powers that be to reform by accommodating a multiplicity of views and
opinions.

8- Where there is a political will and genuine desire it can result in a better standard of services and
information – particularly by government and state owned companies. The Internet can be
exploited to deliver better governance to the people. Apart from increased efficiency it can help
bring about greater transparency in the administrative process. It has the potential to empower
the users/electorates.

9- Political considerations and outlook will have to alter before the fullest potential benefits of the
Internet can be realised. All concerned will need to come to terms with the technology that is not
going to go away or easy to control in terms of it impact on so many different facets of society.
Ideally it should be utilised to improve the quality of life of as many people as possible but that
may require a radical shift in our collective frame of mind - including possible re-appraisal of the
concept of national and national security, individual freedom of action, speech and thought,
cultural norms and value systems, etc).

Skills Training and Education

1- The Internet is a product of a combination of computing, software and communication
technologies. It does not however, follow that users need to be highly skilled. They certainly do
not need to understand the technology, just as the average car driver does not need to
comprehend what happens under the bonnet in order to drive it. Basic training (which can part of
formal school education) would be sufficient to impart the required skills for operating a computer
and using a browser.

2- General IT and computer literacy is a must and not so difficult. The Internet itself can help with
this effort – computer based training. Don't have to reinvent successful teaching methods and
increase the reach (anytime, anywhere, etc). Even those without any formal schooling and with a poor literacy can be trained to use the Internet, and benefit from it provided the content is in suitable (non-textual) format.

3- Basic website development skills may require a little more training effort. To use and exploit the power of Internet one does not need to be nuclear or a rocket scientist – average high/secondary school education augmented by vocational training ought to suffice. Imagination and creativity will be more significant determiners of Internet usage.

4- More sophisticated and complex application development, as well as building and maintaining telecommunication infrastructure requires at least degree level qualifications. Currently there is a shortage of certain skills but is a temporary problem and project supply is set to increase. Outside the US and Europe more and more students are electing to pursue further education in IT. Nevertheless this "problem" is here to stay and will get worse. Best to plan ahead.

5- Hence those who can ought to do their utmost to increase the availability of suitable courses. Increasing the number of IT graduates is a good idea but not the sole answer to the problem. In particular they should encourage and support distance learning over the Internet, thus leverage existing skills. Distance learning is obvious but not so interactive learning and collaborative learning. Introduce computers in school curriculum – like maths it cannot be neglected. Maybe extensive use of the Internet may necessitate a radical rethink of the entire concept of formal education.

Information Overload

1- Information overload is already a problem but the Internet cannot be faulted for this. Cognitive processing may turn out to be the most serious limitation to the growing popularity of the Internet.

2- Better and more intelligent search engines may help in relieving this problem. At the very least they can ensure that users do not have to shift through a huge quantity of irrelevant information in order to seek out the useful bits.

3- Other solutions designed to reduce the burden are bound to be developed. For instance different modes of interaction may speed up information uptake. Communication value of the information could also be enhanced such that same amount of information would take less effort or processing to comprehend. More non-textual visual or animated format can boost information intake. Younger users increasingly express a preference for multi-media and animated format.

4- Better organisation of knowledge is can also help in reducing information overload. It can also ensure that navigation a website is not bewildering or even counterproductive (in that it impairs users existing comprehension of the subject matter).

5- Improved speed of transmission can also help which significantly depends on website design. Browsing attention span is inversely proportional to ease of downloading a page – the longer it takes, the higher the likelihood of clicking on another hyperlink or opening another browser window.

Mukesh J Patel
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6- Perhaps people will just have to train themselves to be moderate – avoid behaving like kids less loose in a candy store. Navigating through Websites need not be so bewildering if one avoided indiscriminate browsing.

7- Also note that a number of most popular use of the Internet such as shopping, browsing and gambling does not require dealing with inordinate amounts of information.

Finally....

1- The Internet will not lead to a utopia nor is it a panacea for all problems. 100% literacy does not mean everyone reads literature; some prefer to read pulp. Similarly don’t expect the impossible of the Internet.

2- The Internet is not dirt cheap but a lot less expensive than not having it. Aim to provide robust, reliable, and cheap access to telecom infrastructure. Void grand gestures and grandiose schemes. To be IT savvy does not require cyber or info cities or showpiece muscular transmission links.

3- The Internet represents an advance on writing and printing technologies, as similarly is going to prove difficult (if not impossible) to control or restrict. Best leave it up to the user to decide how he/she is going to utilise it. And be prepared for a radical shift in ones mental/cultural framework.
CREATING STRONG MEDIA ORGANIZATIONS IN THE NEW INFORMATION AGE

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