CHAPTER II

2.0 GOVERNANCE IN CYBER SPACE

We are on the deep wave of social anxiety with tremendous advances in Internet and web-based Information and Communication Technologies (ICTs). The law enforcement agencies are under great stress of the detrimental effects of ICTs upon various aspects of law enforcement, security and social order. The Internet is frequently depicted as a kind of dark virtual domain inhabited by mixture of computer hackers, organized criminals, extremist, purveyors of pornographic images. Cyber criminals exploiting the cyber space, Information and Communication Technologies to achieve their end. The present world facing the challenges of the cyber criminals against legal systems critical national infrastructures and security agencies as a result of the use of the new Information and Communication Technologies by criminals. The International bodies have to take effective measures to govern cyber space and to tackle the emergent situation.

“Cyber space originated first in the age of stand above computers in 1950s and 1960s. The storage of data in electronic form setting of ‘0s’ and ‘1s’ was widely in used in 1960s. Over the last fifty years, the people of the developed world have begun to cross into a landscape unlike any which humanity has experienced before. It is a region without physical shape or form. It exists, like a standing wave in the vast web of our electronic communications systems. It consists of electron states, microwaves, magnetic fields, light pulses and thought itself” ....... William Gibson called this platonic realm ‘cyber space’, a name which has some currency among its’ present inhabitants”.

“In true sense of the term ‘cyber space’ it was developed through the successful and interactive networking of four computer centers in 1969-70 in the U.S. The IPTO under ARPA achieved this through some novel technological break-through like packet switching, Interface Message Processors and the appropriate software. “The Internet began in 1969 as ARPANET, and effort by the U.S., Department of Defense to enable defuse researchers at various sites across the country

to communicate and collaborate".  

"The internet is the latest advance in the ‘electronic revolution’, an admirable successor to the telegraph and the telephone. It too is a ‘technology of freedom’. Some see it as the ultimate tool of autonomy. But because of the Internets’ transformative power and its global reach, it presents unused challenges.

Architectures of control, those technologies like filters and rights management that attempt to tame the Net or protect property and privacy in cyberspace. These architectures can substitute for public policies, but some worry that this privatization of law can have detrimental consequences. Filtering, for example, can have a polarizing effect if it limits one’s exposure to different points of view.

Policies still matter of course and policies and laws are required to control the disorder of cyberspace. The optimal form of regulating Internet is self-regulation

2.1 WHAT IS CYBER SPACE?

This new world of digital technology presents difficulties for law-makers as well, largely because this world of information differs in some important ways from the world we have grown used to inhabiting. Cyberspace is an added new world, where our ordinary intuitions are not always reliable. It is also an area where legislation is not always easy to craft. The law (statutory or otherwise) providing answer to these problems or dealing with the information technology is often loosely referred to as the ‘Computer Laws’ or ‘Information Technology Laws’. 

“Cyberspace is a world in which every (digital) product carries with it the possibility of an almost magical speed, ease, and precision of replication. Cyberspace posses difficulties for those who understand something about copyright because, for the most part the status quo of the print world doesn’t carry over into the digital world". As noted, it is impossible to make any use of a copyrighted work in digital

form without also making a number of temporary codes suddenly; the right to control reconstruction of works would seem to encompass the right to control even reading and browsing protected works. The disconnect between the print and digital worlds, shows up as well in the argument that the first -sale rule doesn’t apply in the digital environment because in that world sending a work necessarily involves making a copy of it, not just redistributing that copy (which is strictly speaking, all that this rule allows. Disconnect is also evident in the more extensive use of licensing of digital works, rather than sales of copies, even to libraries. To the extent that these licenses restrict the degree to which the information can be shared with others, users can't look to first sale rights to share digital copies, as first sale rights accrue only to owners of copies, not to licenses.

In time territory may become familiar and easier means may be found to craft social and legal procedures for it, but for the moment, there is substantial challenge in learning law to cope with this odd new world.

2.1.1 WHAT IS THE INTERNET?

The word ‘Internet’ is a contraction between the words of international and networks. It is a vast worldwide network of powerful computer sensors which are constantly connected to each other via high-speed communication cables. All the information that is on the Internet is stored on one of these servers. When you connect to the Internet, you connect to just one of these computers, but it is able to give you access to all the files stored on the other servers. Internet connection is also called going on-line or dialing up.

The Internet is, therefore, is a virtual space in which uses send and receive e-mail, log in to remote computers (telnet), browse – databases information and send and receive programmes (ftp) contained in these computer.

2.1.2 HOW TO WORK?

Imagine, you had two computers in your house that were connected to each other with a cable. You could write a message on one and send it to the other over the cable. You could also use one computer to open a file on the other one. This is exactly how the Internet began way back in the late 1960s.

6. Supra 5, p. 49
Today's Internet works in the same way except that there are now millions of powerful computers called servers connected together via a dedicated communication network.

As an individual computer user, you connect to one of those server computers, then use it as your gateway to the rest of the Internet.

Although much of it runs over facilities provided by the telephone companies, the Internet operates using very different technical and business concepts than the telephone system. The telephone network operates in a connection-oriented mode in which an end-to-end path is established to support each telephone call. The facilities of the telephone network along the path are reserved for the duration of each specific call.

By contrast, the Internet is not a connection-oriented network. It is a packet-based network built on point-to-point links between special purposes computers known as routers. In the Internet all data, including special types of data such as digitized voice sessions, broken into small changes called packets. Each packet is normally no larger than 1,500 bytes so an individual data transmission can consist of many packets. The data packets in the Internet follow the format defined by the Internet protocol (IP) specifications, the basic transmission protocol for the Internet. All IP packets include IP addresses for the sender and the receiver of the packet. Packets travel through a series of routes as they progress from sender to receiver in IP networks. The destination IP address in each packet is used by the routers to determine what parts each packet should take on its way toward the receiver. Because the forwarding decision is made separately for each packet, the individual packets that make up single data transmission may travel different paths, through the network. For this reason, someone monitoring the Internet at an arbitrary point, even a point located between a sender and receiver, might not be able to collect all the packets that make up a complete message. As monitoring takes place closer to the end user's computer or the source of the transmission, the probability of collecting all of the packets of a given message increase.

There is no equivalent to the telephone system's admissions, Control process deployed in the current Internet (i.e. there is no busy signal). If the computers attached to the Internet try to send more traffic than the network can deal with some of the

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8 Supra 5, P. 10
packets are lost at the network congestion points. Transmission Control Protocol (TCP), which is used to carry most of the Internets' data and rides on top of IP, uses lost packets as a feedback mechanism to help determine the ideal with at which individual data streams can be carried over a network. TCP slows down whenever a packet starts being lost again. If there is too much traffic, all the data transmissions through the congested parts of the network slow down. In the case of voice or video traffic, this produces lower quality transmissions.\(^9\)

2.1.3 **THE USE OF THE NET**

There are two main uses of the Internet – transferring electronic mail (e-mail) from computer to computer, and digital publishing on the World Wide Web (WWW or web for short). Because the World Wide Web is the part of the Internet that one can see on his or her screen, people often use the terms ‘Web’ and ‘Internet’ interchangeable. But in fact the Web is only part of what the Internet has to offer.

2.1.4 **THE WORLD WIDE WEB (www)**

This is a unique service offered by the Internet. It is a huge collection of ‘pages’ containing text, graphics and other media, which one can view via his/her computers web browser. Anyone with an Internet connected computer can view web pages – no matter where the pages originate from or where the viewer is in the world.

Web pages are also connected by ‘links’. These are electronic connections between pages on the same or different web sites; usually on similar or related subjects. This makes information on the web more accessible.

The web is essentially a service that runs over the Internet. It was developed at the European particle physics Lab as a means of exchanging data about high energy physics among physicists scattered throughout the world. Tim Berners Lee, seeking to transmit images, data, and postscript files necessary for collaborative work in this field, developed a standard known as Hypertext Mark up Language (HTML). HTML supports a procedure whereby “flags” or triggers are attached to a word or phrase that links it to another document located anywhere on the Internet. The documents created by HTML can be in a multimedia format since they can include video, text, images and even sound. Documents belong to a web site that has a specific addresses, such as

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\(^9\) Supra 5 - P. 264
www.bc.edu. The last three letters represent a top-level domain (TLD) identification (for example, "edu" stands for education and "com" stands for a commercial enterprise), while the middle part of the name designates the actual site ("be" stands for Boston College).

Net browsers such as Netscape’s Navigator or Microsoft’s Internet Explorer enable users to “explore” the web rather effortlessly. They are highly versatile navigational tools that enable users to access, display and print documents, they also give users the ability to link to another documents at any location on the web. Hyperlinks can create a maze of interconnected documents and web sites that can sometimes confuse users but also greatly expand opportunities for research and investigation.

Despite its brief history the World Wide Web itself has already become a vast, tangled network. Web sites now proliferate throughout cyberspace at schools and Universities, hospitals, corporations, and many other organizations. Even individuals and small businesses have established their own web pages. These web pages will undoubtedly be the vehicle for the acceleration of electronic commerce and many other network-based activities like education and fund raising web-based marketing is beginning to show significant results, and as a consequence and banners and commercial messages can now be found in almost every region of cyberspace. The plethora of web sites has created a density of information that can make it difficult for users to locate a particular site. As a result, search engines developed by companies like Yahoo and Goggle began to grow in popularity. These tools applied Boolean search techniques to indexes based on HTML documents so that users could navigate the web and locate the sites they wanted. But even search engines are sometimes ineffectual in the face of such voluminous data, sometimes returning too much or imprecise data. In addition, users are increasingly relying on the assistance of portals which are gateways or starting points on the web. These portals assist users in orienting themselves amid the Walter of sites available on the World Wide Web. Portals such as Yahoo provide an array of services that include search functionality, categorized content, chat rooms and access to “communities of interest”. The premise of portal technology is that users should have a central point of access for all of their web site surfing. Regardless of the difficulties users encounter trying to navigate their way through cyberspace, the web continues to gain in popularity. It is quickly becoming its own unique institution, taking the place of libraries, print catalogs and
even traditional news media for many users. It can be a rich source of research news and information and entertainment. As more and more users develop their own sites, the Web has helped to Spawn, a whole generation of online publishers and to generate innovative business models.\(^\text{10}\)

### 2.1.5 INTERNET ADDRESS

Every computer on the Internet has a unique Internet protocol (IP) address that consists of four series of three numbers ranging from 0 to 256 separated of periods. These numbers are important because they are required for communication from one computer to another. However, a string of up to twelve digits would be a cumbersome way to access sites, so the domain name system (DNS) was implemented in 1984. The DNS matches the numerical IP addresses of computer with text names in a manner similar to a telephone directory, which matches names with phone numbers. Each domain name is associated with a unique IP number when a text address is typed into a browser (such as Netscape Navigator) or sent as an e-mail message, the name is looked up (resolved) on a domain name server and the connection is made.

A domain name consists of a top-level domain name and a sub-domain name when the DNS was established; each country was assigned a country code as its top-level domain name. As an example, a site in England would have the top-level domain name “UK” and the sub-domain would be the specific site in United Kingdom such as “Amazon Co., UK”. In the United States other top-level domains include.com for commercial sites, .gov for government sites, .net for networks and .org for organizations. For example, www.ustreas.gov is the web site of the United Nations. In Great Britain, the top level commercial domain name is .Co (as in amazon.co.uk or dngt.co.uk for the London newspaper the Evening Standard). Domain names have a significant application in cyber law because conflicts often emerge between trademarks and domain names used, by a competing company.\(^\text{11}\)

### 2.1.6 LANGUAGE OF THE INTERNET

Since many scientists used mainframe and UNIX workstation computers, file format compatibility was a major challenge. Hypertext Markup Language (HTML) was

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\(^{10}\) Supra 3 - p. 28

was developed as a standard document format, as the way of exchanging such files. This means that HTML can be viewed on any brand of computer using any operating system, with a viewer, or browser\textsuperscript{12}.

2.2 **WHAT IS AN INFORMATION INFRASTRUCTURE?**

Although there is probably no concise, univocal definition of the Global Information Infrastructure (GII), it can be described in the most general terms as the synthesis of computer and, information technologies with telecommunications. We must be clear on the relationship between the GII and the Internet. The Internet is an amalgam of networks that are inter-operable thanks to the protocol known as TCP/IP. The internet is obviously a vital part of this information infrastructure, but the GII is a more expensive concept, including communications networks, content, computers, applications and people. The GII can also be viewed as the merging or coming together of many national information infrastructures into a seamless whole that facilitates global information flows.

The GII, then is a complex collection of systems that integrates several basic components:

1. Communications networks or the conducts through which information is transmitted (e.g., telephone, cellular, wireless, satellite, and cable networks).
2. Information equipment and appliances; this category includes computer workstations, televisions, and telephones.
3. Information resources or the content that flows through these conducts. This information exists in many different media and in many diverse locations, such as government agencies, libraries and so forth.
4. Software applications that allow users to view and manipulate data. This category includes low-level protocols (such as TCP/IP) and interfaces (or browsers) that allow for interconnectivity and interoperation between the networks.
5. People, primarily in the private sector, who create the information, construct applications, and ultimately use this system\textsuperscript{13}.

\textsuperscript{12} Supra 11 - p. 4

“Information infrastructures such as the traditional telecommunications system have been around for a long time, but we are now combining previously independent systems into this vast global network. And that network continues to rapidly expand with many new nodes and diverse information resources. Also, this infrastructures capacities have been transformed by the simple power of digitization, the capacity to represent any form of information, including music and video, as bits, that is, as 1s and 0s. As Negroponte (1995) writes, “The information superhighway is about the global movement of weightless, bits at the speed of light”. Like all media, the Internet has its limitations, but it can connect more people to information and to one another faster and cheaper than any of its predecessors. And herein lies the seeds of its remarkable transformative power. Simple applications like e-mail and web have already revolutionized the way humans communicate and conduct business.

But despite its glorious success, we must be vigilant about the Nets’ future. Open competition and open access, will be essential for preserving the GII’s vitality as a breeding ground for new applications, services, and products that will create worldwide consumer value. It is important to underscore that this global information infrastructure has become an innovative force thanks to a regime of self-regulation and no regulation, and to the extent that a tendency to over-regulate and balkanize the Net gains momentum, innovation and creativity could be adversely reflected.

2.2.1 THE BENEFITS AND PERILS OF GLOBAL CONNECTIVITY

The enduring social and political impact of this evolving GII seems beyond dispute. It is re-energizing the economies of many countries, like Ireland, and ushering in a new area of “globalization”. Globalization is a fuzzy term, but it can best be defined as the integration of world economic markets; that is, the fusion of separate national markets into a single market place. It recognizes the value of cooperation as economic interconnections are continuing to increase among countries around the world and it tends to confirm the predominance of free-market capitalism while globalization is viewed with a wary eye of some countries, there is no doubt that it is yielding many salutary effects in most sectors of the global economy. According to Friedman (1999), “because globalization has brought down many of the walls that limit the movement and reach of people, and because it has simultaneously

\[14\] Supra 3  p. 3
wired the world into networks, it gives more power to individuals to influence both markets and nation-states, than at any time in history. It also lowers the cost of entry into different media; thanks to the Internet, it is easy to become a journalist or an investigative reporter with a global reach. The phenomenon could well subject governments and corporations to even greater scrutiny. In some countries, like Malaysia, some of the most objective and insightful reporting comes from a market shift web site, www.malaysiakini.com.

All of this leads may to conclude that the global information infrastructure with the Internet at its core is a “democratic” technology; that is, a technology with embedded democratic values. The U.S. Supreme Court has described the Net as a “Vast democratic form” that is open to all comers.” We might even say that the Internet is a realization of Justice Holmes’s Vision in Abrams v. United States. Of a society that supports “free trade in ideas”. If this is so, if the greatest virtue of the Net is its promotion of democratic values and a free exchange of ideas, then this “democratic technology” has the potential to change the international political landscape and to undermine authoritarian, non-democratic regimes.

The Nets’ democratizing tendencies, such as its capacity to foster the emergence of “new voices” and to decentralize the production and redistribution of information, are not inherent in its architecture. To some extent the Internet is as malleable as any piece of software. Its open and neutral architectures are not a given; the Net has no fixed nature that reflexively supports democratic values or any other set of values. Its protocols can be changed to make the distribution of information more constrained, and new laws can be formulated or old ones re codified to stifle the creative efforts of those “new voices”. There is also no guarantee that the Internet will remain a universal, global technology or that some of these new voices will not be obstructed by filters and other software designed to block the flow of certain kinds of information. The insistence that jurisdictional laws be honored in cyberspace and the

16. Supra 3, p. 4
introduction of new applications such as geo-location software are examples of how computer code (software) and law can be used to transform the very nature of cyberspace. The GII will only promote democratic values and faster creativity if our laws and the technology allow it to do so. Thus, any claim that the GII is "democratic" must be qualified by an awareness that its democratizing tendencies could easily be altered.

Aside from its current ability to facilitate a free trade in ideas there are many other positive attributes associated with a robust and dynamic GII. It can provide unlimited and asynchronous access to public services and to a plethora of cultural, commercial, and educational opportunities.

The diffusion of network technologies also expands cultural openness and transparency. Through the World Wide Web, for example, we can learn about other countries and their citizens in a more immediate and direct fashion. Knowledge about other cultures that happens through the immediacy of Internet communication can help to deconstruct cultural barriers and prejudices. This can create a sense of proximity to diverse people throughout the world. Once again, this may not be a welcome development for repressive or authoritarian regimes, since they will find it truth from their citizens or to dissemble the authentic features of other democratic cultures. This wired world then holds out much promise for every country and for every individual fortunate enough to be "connected".

Information technology (IT), however, does offer some hope in this otherwise bleak picture, since it can neutralize the disadvantages of geography.

Poorly located countries that do not have an advantage in manufacturing and exporting physical goods might be able to develop some advantage in creating virtual IT-based products (such as software) or services (marketing). Information technology could be one way to help to close this widening chase and connect marginalized societies to the global economy. Change of this magnitude, of course will take a concerned and cooperative effort. Sachs (2000) suggests that a "first step would be a promise by international high-tech firms to increase their technological cooperation with developing countries" 19. The internet can provide universal access to information and communications resources and this can become the foundation of economic growth even for improvised countries, since in this world economy information is the

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most basic raw material. The Indian city Bangalore, for example, has become a center for software development. Its citizens have acquired computer programming skills and now write programs for U.S. and European companies, which are indifferent to the location of their software developers.

The digital divide may have certain advantages, connection to a global information infrastructure can interfere with a country's unique traditions. Telecommunications and information systems are vital components of a country's critical infrastructure, and their destruction would have a devastating impact on national security or national economic viability. The vulnerability of those systems seems beyond question but most governments have not been proactive in dealing with the threat of a possible cyber attack. Yet the more dependent we are on the network the more likely an act of sabotage will unleash global chaos. One of the challenges of coordinating security at this level is that the critical infrastructure is usually owned and controlled by the private sector, while responsibility for public safety belongs primarily to the government.

Even if a national government is able to deal with this issue and develop a comprehensive security scheme, there is no guarantee that other nations will do the same. This will mean that there are “weak links” in the chain of secure connectivity and they expose the entire network to a disabling attack. The sovereign powers that constitute the GII have an obligation to keep their national systems safe, secure, and up to date so that the whole network will remain truly secure, but how can the global community deal with those weak links?

The epic struggle between freedom and control in cyberspace, which has greatly accelerated during the last several years, will probably last for some time and could possibly lead to a more fragmented infrastructure with many virtual borders and information checkpoints. Unless counties like the United States resist this effort and embrace a universal and frictionless infrastructure, it is difficult to envision the forces of freedom eventually winning this battle.

2.3 Electronic mail

More commonly known as e-mail, electronic mail is the primary means of communicating over the Internet. E-mail can be text-only, or can include attached

\textsuperscript{20} Supra 3, p. 4-10
files — such as sounds or images. It is extremely fast, transferring information almost instantaneously.  

2.3.1 WHAT IS e-mail?

Electronic mail (e-mail for short) is the system that allows you to send a message from one computer to another over the Internet. For many people e-mail is the most important aspect of the Internet. We can use it to transmit a message to any computer in a matter of seconds for the cost of a local telephone call. You need only be connected to the Internet for as long as it takes to send and receive your messages.

2.4 THE INTERNET'S CURRENT ARCHITECTURE

The history and general design of the Internet tells us a great deal about its present functionality and how it all works. As we have seen there is actually little physical substance to the Internet. There are a few dedicated computers at key connection junctions, but "like a parasite, the Internet uses the multibillion dollar telephone networks as its hosts and lets them carry most of the cost." Data are still transferred by means of the basic network protocol, TCP/IP, which allows for complete interoperability on the Internet so that computers can communicate with one another even if they have different operating systems or applications software. TCP/IP therefore, makes the network virtually transparent to end users, no matter what system they are using, and it allows the internet to function as a single, unified network. TCP/IP consists of two pieces. The Internet protocol establishes a unique numeric address (four numbers ranging from 0 to 255 separated by decimal points) for each system connected to the Internet IP is a means of labeling data, so that they can be sent to the proper destination in the most efficient way possible. The second piece, the transmission control protocol enables network communications over the Internet. The data are broken into pieces called packets with the first part of each packet containing the address where it should go. The packets are then sent by a router; that is, a server on the Internet that keeps track of Internet addresses packets may be sent through several different computers until they reach their ultimate

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21 Supra 7, p. 11  
22 Supra 7, p. 28  
destination. Once all the packets arrive the message or data will be reconstructed based on the sequence numbers in the headers to each packet.

On top of this lower layer of the Internet, which functions like its plumbing, we find the application layer. At this level there has been a proliferation of many other protocols, such as File Transfer protocol (FTP) for transferring data files, Hyper Text Transfer protocol (HTTP) for reading and publishing hypertext documents, and Simple Mail Transport Protocol (SMTP) for electronic mail.

The Internets’ current architecture makes possible some important attributes that have some relevance for cyber governance and deserve to be highlighted. To begin with, the Internet is asynchronous: Unlike telephone communication there is no need for coordination between the sender and recipient of a message. An e-mail message, for example, can be sent to a mailbox that can be accessed at any time by its owner. Second the Internet permits many-to many communications on a global scale: Many users can interact with many other users throughout the world through electronic mail, bulletin boards, web sites, another vehicles. Unlike traditional media such as newspapers, the Net is interactive, since those users can speak back. Third, the Internet is a distributed network relying on packet-based technology. As we have seen it is a naturally decentralized environment. There is no center to the Internet, no central several or single controlling authority since information can travel from one location to another without being transmitted through a central hub. This gives users more control over the flow of information. And because it is a packet-based network, it is more difficult to locate and obstruct that information. The Internet is also highly scalable; that is, it is not directly affected when new computer links are added or deleted. Hence, it allows for much more flexible expansion of contraction than many other proprietary network technologies. Its basic architecture encourages universal access and participation.

Finally, the Internet’s most destructive feature is its open architecture. It is designed to maximize interoperability to be completely independent of software programs, hardware platforms, and other technologies. Its flexible communications protocols, for example, enable ARPANET to connect to thousands of local area networks (LANs).

The biggest wildcard in the Net future is the growth of high-speed broad-band connections and the corresponding need to scale up the network. So it can handle the
faster connections and the increase in data.  

2.4.1 REGULATING THE INTERNET

(a) The Libertarian Ethic

Since the Internet's great surge in popularity, much has been written about whether and how it should be regulated. Should we continue to support a philosophy of "bands off" the Internet lest we deposit this special place, or is it time for greater reliance on federal and state regulations?

The Internet's unique decentralized structure tends to defy centralized regulations. There is no central server that can be easily contained there are many nodes on multiple networks each transmitting and receiving data. The Nets' vast global reach, which transcends the jurisdiction of national governments, poses formidable problems for those governments that seek to impose laws on cyberspace activity. The possibilities for regulatory arbitrage are enormous. As Johnson and Post (1997) have observed, "The rise of an electronic medium that disregards geographical boundaries throws the law into disarray by creating an entirely new phenomena that need to become subject of clear legal rules but that cannot be governed satisfactorily, by any current territorially based sovereign".

This simple creed that the Internet is "unregulable" and will continue to thrive only if it remains unfettered by government regulations represent the core principle of cyberspace libertarianism. The world of cyberspace began as a libertarian utopia, the domain of academics and researchers, free of cumbersome rules and regulations imposed by the government. In the view of most cyberspace libertarians the Net should stay that way.

In an essay in wired, Jonathan Katz (1997) portrayed the emergence of a new "digital nation". He described the Internet and its community of users as a separate entity, careful to point out that this is not a political utility that should be subject to rules and regulations.

The ultimate autonomy of Internet is sometimes abused and social injury is the result. The central insight of Larry Lessig (1999b) is that the "code is the law", that is, in Cyber space software architectures can have a greater regulatory impact than formal regulations. One is wary of most code-based solutions to correct the social having in cyberspace, but we will contend that code should have a significant role to

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24 Supra 3, p. 29-31
play in a responsible scheme of Internet regulation.

2.4.2 THE FUTURE OF THE NET

The architecture of cyberspace could conceivably be under a major transformation in the next few years. In particular, there is a danger that the net can change from an open and borderless environment to one where there are tighter controls and an abundance of virtual fences. Moreover, as the Internet continues to become more commercialized, there will be enormous pressures for new protocols that conflict with its original design principle.

The Net has many positive attributes, such as its ability to facilitate free trade in ideas and its potential for the expression of civil rights. But there are social harms and negative by-products as well. Unwanted and offending forms of speech like spam and hate speech privacy erosion, fragile protections for intellectual property and so on. The challenge is to deal with these social harms reasonably and efficiently without impairing the integrity of the Net and without strangling it in oppressive regulations. It has become a vast repository of valuable information and a provider of instant communication. More important, it has decentralized the process of creativity and innovation. The decentralization is especially important in an economy where creativity and innovation have become the new elixirs of economic growth. According to Mandel and Hof (2001), the internet has the potential “to boost the rate of innovation by increasing speed at which ideas spread between companies, within economies, and across countries”.

The U.S. Supreme Court observed that the Internet has created a new marketplace of ideas. Finally, that marketplace of ideas has breadth and depth because of the Nets’ global reach. It is a universal medium that transcends physical boundaries.

In order to preserve this unique environment, we must be careful not to overwhelm the Net with regulations or yield to the impulses of local sovereignties. More specifically, we must safeguard the intellectual commons and eschew intellectual property protection that is too strong or too inclusive. If we enclose “ideas” by interfering with their diffusion of law or by code, the Nets capacity to spur

26 Supra 3, p. 42-43
27 United States of America v. Microsoft, 82.
innovation will be greatly impaired. Excessive enclosure can also lead to dissipation of creativity or to its concentration in the hands of a select group of content providers. We must avoid cumbersome content regulations that would interfere with the Nets’ great capacity to promote and circulate new ideas. Finally, the Net must remain a global universal medium. There would be something tragic about a fragmented Net that become mired in virtual borders and online restrictions where the net effect is that everybody is really not connected to everybody else. If we want to preserve a universal and global Net, we must guard against problematic changes in architecture of enforcement of laws that depart from this basic vision.

According to Clark and Blumenthal (2000) these values constitute the Internet “philosophical”, and they suggest that the end-to-end arguments “fostered that philosophy because they unable freedom to innovate, Install new software at will, and run applications of the using choice”28. But it is becoming increasingly difficult to sustain increasingly difficult to sustain this simple philosophy, which often clashes with economic and social realities.

The social and moral problems of cyberspace, such as pornography and spam, should not simply be ignored. They should be addressed prudentially and with sensitivity to human rights and moral values. There is a way to responsibility handle these problems without fatally undermining the most attractive qualities of the Net.

The option is to put an emphasis on the use of technologies or code as a means for dealing with those by-products. These technologies would be implemented “downstream” by individuals and organizations seeking to protect themselves from untrustworthy endpoints elsewhere on the network. If the technologies are designed and implemented responsibly, they can contain some of the social harms in cyberspace without the need for an extensive regime of government regulations. Like all solutions, this one is imperfect. The ethical self-regulation is at least a path work exploring and may be optimal solution that maximizes social welfare. In this context self-regulation implies not only self-discipline but self-determination allowing users and organizations to decide what is harmful and to take remedial action with the assistance of code, such as filters and firewalls”29

29 Supra 2, p. 42-44
2.5 THE INTERNET REVOLUTION IN INDIA

In India the information processing technology started with a printing press in Goa in 1556. The press was imported from Portugal. In 1780, the first weekly newspaper of India and also of South Asia named “Bengal Gazette” was published from Calcutta by James Augustus Hicky. During the 18th and 19th century AD India could not actively participate in the Industrial Revolution for historic reasons. In 1881 Telephone Service was started in Madras, Calcutta and Bombay but Bangalore telephone industry was established in 1948.

The Industrial Age in India came late in 19th century while it was under the British Rule. As a part of British Empire India got in touch with technological developments of the welfare countries in selected areas like Railway (1853) Telegraphic communications (1850s) Telephone (1880) and others. “Some milestones in India telecom operatings 1913, First automatic exchange at Simla with a capacity of 700 lines and 400 had working connecting. In 1948 Indian Telephone Industry set up at Bangalore”. Thus gradually by 1940s the Information processing and communication network in India reached a matured stage capable to enter the cyber era.

In India the age of electronic computer does not lag much behind American and European counterparts perhaps only a decade or so. One First generation electronic computer was in operation in India from 1955. This huge electronic machine HEC-2M with 1 K memory was imported from United Kingdom. The Wireless radio Station was started in 1940s and radio receiving sets were in wide use, since then the small crystal receivers were also used to supplement the big radio sets made of electronic valves. The technical community in India developed much interest in electronics technology and acquired both theoretical and practical knowledge in the discipline in 1930.

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The first important stage of electronics technology was vacuum tubes or valves used as devices in various electronic equipments. The wireless transmission & receiving sets were used in India since 1920 and 1930s. During the world War-II the electronic equipments related to radio technology were widely used, maintained and assembled in India. Jack Killy (6-1923) the famous inventor of IC Chips (1958) was a radio engineer in army unit, passed in N.E. India during world War-II. The team of Jack Killy started a laboratory in the army camp to repair the then portable radio systems weighing about 60 pounds, “the engineers in Killy’s unit set up a lab. In a dusty pup tent. They sent corporal Killy down to Calcutta to buy old radio ports on the Hack market”32. Therefore, India developed its expertise in computer and communication technology and entered the cyber age.

2.6 India and Super computer

India has surprisingly broken into the Top Ten in a much-fancied twice – yearly list of the fastest super computers in the world marking a giant leap in its push towards becoming a global IT power.

A cluster platform at Pune’s Computational Research Laboratories (CRL), a Tata Subsidiary, has been ranked fourth in the widely anticipated TOP 500 list released at an international conference on high performance computing in Reno, Nevada. It is the first time that India has figured in the Top 100 let alone top ten of the super computing list. The list, which is usually dominated by the United States, is also notable this time because it has five new entrants in the Top Ten, with supercomputers in Germany and Sweden up there with India.

The fourth-ranking super computer in India is a Hewlett-Packard Cluster Platform 3000 BL 460 C System CRL has integrated this system with its own innovative routing technology and to achieve a 117.9 Teraflop or trillions of calculations per second33.


2.6.1 Statistics of success

Some of the interesting statistics released by the National Association of Software and Service Companies (NASSCOM) are given below. This gives a fair idea of the growth of internet culture in India. It is a fact that the growth and spread of Internet has become an important yardstick for measuring the growth and strength of any economy.

<table>
<thead>
<tr>
<th>IT Incidence</th>
<th>Level on 31 March 2000</th>
<th>Target 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of PCs</td>
<td>4.3 million</td>
<td>20 million</td>
</tr>
<tr>
<td>Internet Subscribers</td>
<td>0.77 million</td>
<td>3.5 million</td>
</tr>
<tr>
<td>Internet Users</td>
<td>3.2 million</td>
<td>100 million</td>
</tr>
<tr>
<td>Cable TV Subscribers</td>
<td>37 million</td>
<td>70 million</td>
</tr>
<tr>
<td>Fixed phones</td>
<td>26 million</td>
<td>125 million</td>
</tr>
<tr>
<td>Television sets</td>
<td>75 million</td>
<td>225 million</td>
</tr>
</tbody>
</table>

Source: NASSCOM

<table>
<thead>
<tr>
<th>Growth of Internet</th>
<th>Internet Connections (in million)</th>
<th>Users (in million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 31, 2001</td>
<td>1.6</td>
<td>5.0</td>
</tr>
<tr>
<td>March 31, 2002</td>
<td>4.6</td>
<td>10</td>
</tr>
<tr>
<td>March 31, 2003</td>
<td>8.0</td>
<td>18</td>
</tr>
<tr>
<td>December 31, 2003</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NASSCOM
Concluding Comments:

This Chapter discussed on Cyberspace and main elements, the Internet, Information infrastructure, e-mail and problems of hacking over exploitation of cyberspace. The global information society is at risk. A key problem is that most of the information infrastructure programmes emphasized economic opportunities and neglect social impacts. A democratic participation of the public in the design and development of the information infrastructure should be encouraged. Social and legal impacts of the different initiatives have to be assessed in advance and have to be periodically reviewed. High standards for security and network reliability have to be required.