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ORIGIN AND EVOLUTION OF INFORMATION TECHNOLOGY: INDIAN HISTORICAL PERSPECTIVE

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Abstract

The present study origin and evolution of IT necessitates the researcher of commerce the study with a brief analysis of origin and evolution that are related topic, on the bedrock of which the entire study in developed. Cyberspace has been originated and developed gradually, with the growth of science and technology. In nutshell, the study of cyberspace is not only confined within the limited framework of the information technology Act 2000. In order to study the legal mechanism that governs the information technology in so called cyberspace it is essential to study the cyberspace itself. The cyberspace not only differs in technological aspects from real world, but the social and legal environment in cyberspace is much different than that of real world. The legal system is developed on the footing; keeping, physical monetary, space and time constrain human being.

Key Word: Evolution of IT, Cyber Space, IT Act 2000, Physical Monetary

Introduction

The present study titled, "Origin and Evolution of Information Technology" necessitates the researcher to commence the study with a brief analysis of origin and evolution that are related to the topic, on the bedrock of which the entire study is developed. An endeavour is made in this chapter to highlight the origin and evolution of information technology. This part of the research

has emphasized the origin and evolution of information technology at national and international level and the process of its inculcation into common parlance. Further attempt has been made to analyse the various issues that are emerging due to its use and adaptation in day-to day practice.

Cyberspace has been originated and developed gradually, with the growth of science and technology. It first emerged on the scene in next half of last millennium but the development in last one and half decade is too fast to imagine. Notably, the use of the computers upto the mid of 90s decade has been used in most of the developed nations in most of the governmental offices recording of data, its storage, retrieval and dissemination. With its potential benefit of speedy calculations, comparative small size and place it required, and working ability through out the days, the automation process was taken boost up in the institutions and individuals directly concerned with speedy services, transactions were started using computers in their routine business. At the same time, banks, schools, multinational companies were also adopted the process of automation. This led to the development of effective mechanism of communication, data storage, transactions, and dissemination of information. Thus at the mid of 90s decade in last century, most of the developed nations were already had adapted computer technology. But this computer technology was confined to respective nations, as the respective national legal systems has restricted within their territorial boundaries.

With gradual passage of time, this technology across the national boundaries and started to appear in developing nations. It got its pace when the technology was being used for communication. Information and Communication Technologies (ICTs) today have virtual impacts on every aspect of society and every corner of the world in information or digital age fostering commerce, improving education and health care, and facilitating communications among all stakeholders.[1] Global computer-based communications cut across territorial borders, creating a new realm of human activity and undermining the feasibility-and legitimacy--of applying laws based on geographic boundaries. While these electronic communications play havoc with geographic boundaries, a new boundary, made up of the screens and passwords that separate the virtual world from the "real world" of atoms, emerges. This new boundary defines a distinct Cyberspace that needs and can create new law and legal institutions of its own.[2]

Initially, the electronic commerce was restricted to the respective developed nations, but globalization has added the transnational touch to the electronic commerce. However, as developed

nations were gradually and speedily switching over to paperless culture of transactions, communication, data storage and retrieval, dissemination of information generally called 'electronic commerce', and market economic across the globe had created the pressure for adaptation of this paper less culture.

Forceful demand for adaptation of alternative to paper based culture of commerce had been placed on international agenda and regional and international organization had started the movement for common agreement amongst the nations for recognition of electronic commerce. The United Nation was the pioneer proponent of the same and in 1984, UNCITRAL [United Nation Commission for International Trade Laws] had passed the resolution for developing a 'Model Law' for electronic commerce.

This ultimately, after several rounds, materialized in 1997 when it proposed a 'Model Law' for electronic commerce and recommended the member nations to give favourable consideration when and while bring legislations incidental thereto. Being India was also the party to the UNCITRAL, it has also been committed for the same recommendation. The Information Technology Act, 2000 was nothing but an outcome of this international commitment.[3]

Therefore, it should be noted down that Cyberspace has its own course of development. It spread over all the activities those are possible in Cyberspace. However, the 'Model Law' which had been proposed by UNCITRAL was a piece of draft with preposition to seek favourable recognition from member nations whenever they will either draft an legislation, or amend the existing piece of legislation on 'electronic commerce'.

The ambit of Cyberspace is vast touching almost all aspects of life but the 'Model Law' proposed by UNCITRAL and National legislation in the form of the Information Technology Act, 2000 has been primarily concerned for recognition to 'electronic commerce'. The 'electronic commerce' is one aspect of Cyberspace. The activities in Cyberspace ranges from commerce, communication, production and consumption of cyber material, information retrieval mechanism so on and so forth. Therefore, while analyzing the Information Technology Act, 2000, it should be bear in mind that the principle object, scope and approach of the Act is to facilitate the alternative paperless mechanism of commerce, by way of electronic networking. In addition, the Information

Technology Act, 2000 has also dealt with some of the criminal aspects which are being committed in Cyberspace though principle focus is on 'electronic commerce'.

In nutshell, the study of Cyberspace is not only confined within the limited framework of the Information Technology Act, 2000. The glancing gaze of the Information Technology Act, 2000 provides a preposition that how India has attempted to provided mechanism basically for authentication of electronic record, procedure for secure and reliable electronic record, data storage and retrieval mechanism, communication and dissemination of information and in furtherance, also tried to deal in the same legislative piece to deal with crime and contraventions which may affect these activities and incidental thereto. The present study has been focused upon the 'Legal and Regulatory Framework governing Information Technology1 and left the other issues of cyberspace untouched.

Historical perspectives of IT

In the late 20th century, computer has dawn on the scene to add electronic base technology virtually weathering away traditional geographical boundaries and barriers. Two World Wars fought in the last century has witnessed the use of machinery, which gradually increased dependence man on technology for accuracy and effective management mechanism. Initially dictate and sponsored by political giants, the scientific faculties were hurled their ingenious competence for technological inventories meant for destructive Utility weapons to surmount opponents.

However, with termination of Second World War, world seems to be marching towards peace and progress, (though under the shadow of cold war!) the ingenious competence of scientific faculties were imprisoned by forces of trade and industry to invade moneymaking marketing, (for e.g History of Internet evidenced its initial use for military establishments but latter on *common man able to access it).*[4] Hence after, being dictated and sponsored by financially viable forces, the development of technology obtained new dimensions and directions. Concomitantly emergence of Multi-nationals and their fiscal bearing apatite facilitated task of generalization and sociological transformation of technology. As an outcome, during last 50 years there has been gradual

transformation of technological inventions from privileged class to common man has been taken place.

The conceptual foundation for creation of the Internet was significantly developed by three individuals and technology by accurately predicting its future. *Vannevar Bush* wrote the first visionary description of the potential uses for information technology with his description of the "memex" automated library system. *Norbert Wiener* invented the field of Cybernetics, inspiring future researchers to focus on the use of technology to extend human capabilities. *The 1956 Dartmouth Artificial Intelligence conference* crystallized the concept that technology was improving at an exponential rate, and provided the first serious consideration of the consequences. *Marshall McLuhan* made the idea of a 'global village' interconnected by an electronic nervous system part of our popular culture.

In 1957, the Soviet Union launched the first satellite, Sputnik-l, triggering US President Dwight Eisenhower to create the *ARPA* agency to regain the technological lead in the arms race. ARPA appointed *J.C.R. Lickliderio* head the new *IPTO* organization with a mandate to further the research of the *SAGE* program and help protect the US against a space-based nuclear attack. Licklider evangelized within the IPTO about the potential benefits of a country-wide communications network, influencing his successors to hire *Lawrence Roberts* to implement his vision.

Roberts led development of the network, based on the new idea of packet switching discovered by *Paul Baran* at RAND, and a few years later by *Donald Davies* at the UK National Physical Laboratory. A special computer called an *Interface Message Processor* was developed to realize the design, and the *ARPANET* went live in early October, 1969. The first communications were between *Leonard Kleinrocks* research center at the University of California at Los Angeles, and" *Douglas Engelbarts* center at the Stanford Research Institute.

The first networking protocol used on the ARPANET was the *Network Control Program.* In 1983, it was replaced with the *TCP/IP* developed by *Robert Kahn*, *Vinton* Ce/f, and others, which quickly became the most widely used network protocol in the world. In 1990, the ARPANET was

retired and transferred to the *NSFNET*. The NSFNET was soon connected to the *CSNET*, which linked Universities around North America, and then to the *EUnet*, which connected research facilities in Europe. Thanks in part to the NSF's enlightened management, and fueled by the popularity of the web, the use of the Internet exploded after 1990, causing the US Government to transfer management to *independent organizations* starting in 1995.[5]

These developments paved the way for networking of computers, sharing of data, transfer, distribution, dissemination, storages and retrieval of information from the networking of computers. Initially, it formed only the static, offline world, however, gradually; the real time sharing and live communication was also seemed to be feasible in the networking. Thus, this computer networking was not only become the place for storage and retrieval of information, but it also shaped the parallel virtual world that is possible place for communication, in broader sense called 'Cyberspace'.

The emergence of IT

It is difficult to describe, in connection to 'information technology', what exactly the word 'Information' stands for. Though the word 'information' has been define by the IT Act, 20006 as, ***"Information includes data, text, images, sound, voice, codes, computer programs, software and databases or micro film or computer generated micro fiche".***[6]However, the definition meant for the purpose of the Act for settling legal disputes and listed out various forms of information. The said list is only illustrative but not exhaustive. In general parlance, information means any sensible and useful data that might differ from person to person. Even in the Information Technology age, general notion of information connotes the some knowledgeable data regarding particular things.

Since from invention, gradual multiple application of Cyber Technology for various purpose in the area of scientific activities, information, communication, Electronic Data Interchange, and economic transactions had paved a way for developing/sharing data (as an alternative to the paper based data storage/sharing system) and documents in electronic form. Latter on, when the transactions were carried out, data interchange had been taking place, initially, at national and international level via Internet Networking. Incidentally, legal issues were started to emerge. The basic legal issue was **"recognition of electronic data"** because in paper-based society, the then legal system had recognized only paper-based material for the purpose of validation of legal transactions within the courtrooms, only paper-base material had evidential value.

Unequal pace of development of Technology

Definitely, and to some extent, the developed giants recognized the emerging demands of technology & responded quickly to make legal system compatible. The efforts had been started to set up legislative prescription and judicial mechanism to resolve the legal issues emerged within. However, when the use of Cyber-technology in transnational transactions was increased, the comparative differences of various national legal systems on the Cyber-technology gradually felt to be made compatible by giving recognition to "electronic data".

However, vast disparity *among* the magnitude of development of Technology in the different corner of the world, and division of world (and the legal systems to combat technology) into national fragments again pose a complex problem for legal recognition of Technology. So far the developed countries are concerned, their legislative machineries are enough compatible to come forward with respective legislation. However, ever-growing use of "electronic data" beyond national boundaries required a comprehensive act to deal transnational disputes.

Speaking with example, present legal system of our nation is developed & based on traditional paper based culture, and more specifically some of the legal provisions, which prescribed norms to the paper, based transactions. Just take an example of 'Signature'. At present, many legal provisions assume the existence of paper based records and documents and records, which should bear signatures. The Law of Evidence is traditionally based upon paper based records and oral testimony. Since electronic commerce eliminates the need for paper-based transactions, hence to facilitate e-commerce, the need for legal changes have become an urgent necessity. International trade through the medium of e-commerce is growing rapidly in the recent few years and many countries have switched over from traditional paper based commerce to e-commerce.[7] Thus to be remain relevant with technological transformation in the transaction culture it is expected that legal system should also respond with the same pace to remain relevant to changing scenario. And even, the IT Act, 2000 has enacted with an objectives of facilitating e-commerce, still some of the transactions and acts are strictly paper-based and out of the purview of the IT Act, 2000.[8]

Late recognition of IT

Despite invention and increasing use of computer technology, legal machineries realized its impact and importance quite late. During its experimental phase, and even latter on its commercial

phase, information Technology via interconnected computers and its effect on the human society was neither seriously considered nor any preventive and curative strategies were developed within the legal system. It was quite late in late 90s, the legal recognition of this new form of technology had given evidential value by developed countries, but most of the underdeveloped countries have still to wake up. With globalization, national boundaries were started to vanishing away in requiring a compelling need of legal recognition of technology across the border, specially by developed nations. Thus, due to commotion in advanced countries, it is later when legal issues had started to raise with alarming magnitude, the different corner of the world felt the necessity of recognition of computer technology.

Legal recognition of IT - Challenges

In order to understand the challenges that information technology pose to the legal system, it is essential to understand the difference lies between virtual and real world. Virtual world created by electrons and bytes may emitted the few characteristics of real world, but it does not resemble with it. It displays such an environment where human being experience a living atmosphere, but it remain totally imitation created with the helps of electrons and bytes. Therefore, it is essential to under the virtual world and real world dichotomy to understand the legal challenges exist in electronic networking.

Virtual world v. Real world dichotomy

In order to study the legal mechanism that governs the information technology in so called 'Cyberspace' it is essential to study the 'Cyberspace' itself. However, 'Cyberspace' is itself appeared to be a misnomer term. It neither clarifies its contents nor defines its nature. Online environments have come to be popularly described as "cyberspace." The term "cyberspace" was first coined in 1984 by novelist William Gibson to describe the virtual space created by the interconnection of computers. [9] The word 'Cyberspace' was first used in 1984 by a novelist in his famous science fiction called 'Neuromancer'. He simply visualized the fictitious world generated through electrons. Everything was in electronic form, capable to be aired in wireless world, able to move through wired network, share emotions without any constrain of time, speed, space and size. However, the Cyberspace which we experience today is much different in its contents and context. Similarly, entirely different words are being used to describe the visual world such as, internet, Cyberworld,

techno-world, information technology, electronic technology, digital technology so on and so forth. Most of the times, these words are being used synonymously, which evident the existence of prevailing misconceptions about it. A more vivid depiction, suggesting some of the features that make legal issues applicable to it more difficult, describes cyberspace as:

> ".....[a world] onto which every computer screen is a window, actual geographic distance is irrelevant. Objects seen or heard are neither physical nor, necessarily, representations of physical objects, but are rather in form, character, and action made up of data, of pure information. This information is derived ... primarily from the immense traffic of symbolic information, images, sounds and people that constitute human enterprise in science, art, business and culture. [10]..."

Cyberspace can be termed'as the virtual world created by the sum total of interconnected computers forming networking by digital technology and sharing data, transferring contents, and able to create virtual environment experienced to be resembled with real world. It include online and offline world. Thus it is wider terminology than internet which only consist online world. The word electronic technology though to some extend can be equated with Cyberspace. But Cyberspace is organic sum of virtual world, and electronic technology is generally referred for the devices run on or operated with the help of electronic technology.

The same is true with regard to techno-world which can simply be inferred as world of technology. The information technology connotes the technology use for dissemination, distribution, retrieval or storage for information. As the present technology has its linguistical base in zeros and ones [digital 0 & 1] which in sum called digital technology. However, digital technology is not synonyms of Cyberspace. Digital technology is scientific word whereas by word Cyberspace we connote such world which is having living essence within itself. In Cyberspace, maximum things are at par with real world. Here people interact with each other, emote their feelings, share information, store data, search opportunities and entertain themselves.

Therefore, whenever the world Cyberspace is being used in common parlance, it referred to parallel virtual world having fiction of reality. The inventor of this word, William Gibson, has also used it first time to denote the space which appears to be real, but in reality, merely fictitious creation of science and technology. Generally, Cyberworld is also generally used, which to some extend, in the same sense used to denote the world created by minute participles referred as

electrons.

Apart from this, the question still remained unanswered. What exactly the Cyberspace is and how it is different than real world? How has it come into existence? What are the historical perspectives? Why it has been felt necessary to control and regulate the Cyberspace? These questions need serious attention and analytical appreciation.

Some of the basic differences are still lies between real and virtual world. The Cyberspace sense to be real, but in reality, it is only a kind of an imitation. Ultimately it is electrons which are moving through wired or wireless medium. Even though the chatting rooms set a living environment, and people are able to emote at the same level as they emote in real life, the difference lies that both the environment cannot be compared at par. In Cyberspace, people exist not in real sense. They enter into Cyberspace through networking from their respective terminal which is attached to entire networking either through wired or wireless medium. Therefore, even though they are moving across the network, their physical presence still remains at the place in front of their respective terminal.

This set the further basic difference between Cyberspace and real world. As the person cannot remain physically present into the Cyberspace, but able to do all those activities which are possible therein, law cannot attribute anything which are essentially attributed to the person being able to do physically. Thus, one can be prosecuted legally in Cyberspace for cheating, fraud, cruelty, cyber-stalking, outraging modesty of women, defamation, pornography or even cyber terrorism, but cannot be held liable for murder, rape, physical assault, public tranquility, affray or similar kind of cyber delinquency which can be committed only by remaining physically present at the scene. Thus the difference of real presence and virtually presence still lies with Cyberspace.

On the other hand, as Cyberspace consists off networking and imitative world created by electrons, it set several possibilities which electronic possessed within itself. Today, communication in Cyberspace has speed of electrons, potentiality of storing data within a compact space, and able to move with the electronic speed. Therefore, the constrain lies with real world with regard to time, space and size do not at lies in Cyberspace.

In Cyberspace time is not a constrained. One can remain present around the clock. The automotive set machines can work on behalf of human being. The best example of being remaining online for 24 hours is of modern banking system. Goes the days, when one was required to stand in

the queues waiting for his turn in front of teller's counter. The teller had fixed working hours and if customer would late by 5 minutes, no-body used to entertain him. But today it is possible to withdraw the money at any hours of a day, be it at mid-night or late hours of night. The time is not remained constrain in the Cyberspace.

In Cyberspace, space is also not constrained. Cyberspace is not having any geographical limitations. Therefore artificial geographical boundaries hardly demarcate in to Cyberspace. Once any computer is being got connected, the connectivity persists within that networking and one can move freely through the networking without any limitations.

This is probably most serious problems for legal systems as all the legal system across the world are having domestic application and national four walls. The legal system applies and operates within a definite territorial area with several limitations. Thus Cyberspace can provide potential to a person to commit a delinquency beyond the borders which may attract jurisdiction of more than one national legal systems. As national legal Systems have effective application within its territorial boundaries, and hardly operatives beyond national borders, the national legal system become handicap for such trans-national criminality.

Again, Cyberspace pose no'constrain of space. Therefore, one can occupy as much space as he wants. The space in Cyberspace is not having proportionate equation with economy. The few lines of software programme are costlier than hardware. The entire library of books can be put into compact discs. Again a million dollar establishment can be operated from single room with the help of few human resources. Therefore, Cyberspace has modified the entire equation of time, space & money.

In Cyberspace, location of the person is immaterial. In real world, location of the person may create physical constrain for anyone, however, in Cyberspace, one can remain present at several places at a time. Unlike in real world, actual personality does not happened to be in Cyberspace. Therefore, presence of a person at more than one place at a time is not impossible and even not surprising.

Conclusion

The Cyberspace not only differs in technological aspects from real world, but the social and legal environment in Cyberspace is much different than that of real world. Apart from the

differences cited above, the Cyberspace also differs in its social and legal content and context from real world. Its intangible nature and different level of interactive mechanism it lies on totally different footing. The strength of Cyberspace lies on its capacity of production and consumption of information. There is complete shift from tangible to intangible stuff in Cyberspace. This intangible asset having potential economical value associated with it generated a kind of different characters features in digital world. Chief among these characteristics is the major shift that has occurred in terms of wherein lies the value and resources of society. By and large today, in every industrial country and many developing countries, the values that define the wealth of a society are shifting from the tangible marketplace to the intangible realm of cyberspace and digital systems. We have moved and are continuing to move from a world culture dominated by a focus on atoms (tangibles) to one that focuses on *bits* of information (intangibles). [11]

This demarcation between real world and Cyberspace on these grounds has posed problems for legal systems across the world to deal with the problems arising within and out of Cyberspace. The legal system is developed on the footing keeping physical, monetary, space and time constrain of human being. For example, legal system always presumes that a person can'not remain present at two places at a time. However, this rule hardly stands good in Cyberspace.

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[1] Ajmal Edappagath, Cyber-Laws and Enforcement, an article available at http://www.imarid.ernet.in/egov/ifip/nov2003/articlel.htm visited on 17.12.2008

[2] David G. Post & David R. Johnson, Law And Borders-The Rise of Law in Cyberspace, 48 Stanford Law Review 1367 (1996).

[3] See, the preamble to the Information Technology Act, 2000.

[4] See for history of Internet see ACLU v. Reno 929 F. Supp. 824 (E.D. **Pa.** 1996), See also Leiner et. Al, A Brief History of the Internet, The Internet Society (available at www.isoc.org/Internet-history/brief/html.');

[5] The history of Internet & its use http://www.livinginternet.eom/i/ii_summary.htm. For more details pleas see, Ryder Rodney D., Guide to Cyber Laws, Wadhawa and Company Nagpur, 2nd Edn, pg. 15

[6] See Section 2(v) of the IT Act, 2000.

[7] Satya Prasad T.V.R., Law Relating to Information Technology (Cyber Laws), Asia Law House, Hayderabad. 1st Edn. Pg. 1

[8] Section 1 (4) of the Information Technology Act, 2000 speaking about, 'Nothing in this Act shall apply..... Keeps some of the paper-based transactions out of the purview of this act.

[9] See Robert Dunne, "Deterring Unauthorized Access to Computers: Controlling Behavior in Cyberspace Through a Contract Law Paradigm," 35 Jurimetrics 1 (1994).

[10] Uncapherm, "Trouble in Cyberspace," Humanist 5, 9 (Sept.-Oct. 1991).

[11] Joseph B. White, "The Company We'll Keep." Wall St. J., Jan. 1, 2000, at B36 ("[HJaving a lot of physical assets now doesn't make you an important company. [In] the future, corporations will define more of their value by intangibles - the creativity of their designers, [the] proficiency of their software architecture, [the] knowledge of marketers, [and] even the strength of their culture.").