3 – What is the information society?

pyramids and networks

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3 – What is the Information Society? Pyramids and Networks

The term “information society” is currently the most common way to refer to the set of impacts and social consequences of new information and communication technologies. While it is useful as a concept that identifies a theme, it is not a theory or an explanatory framework for the dynamics of societies in the contemporary world. In a strict sense, the term is also incorrect, first because information is equally important in all societies, and second because information on its own has no value: its relevance depends on its insertion into a system of knowledge. In this sense, another widely-used term, “knowledge society”, is more appropriate, but once again the term overlooks the fact that all societies are based on knowledge. In practice the concept of a “knowledge society” refers to a particular type of knowledge -scientific knowledge- through which technological innovation, the principal vehicle for economic expansion in the contemporary world, is possible. From a sociological point of view, it is perhaps more appropriate to speak of capitalist societies of **consumption of technological goods**, that is, societies where communication, quality of life, and economic and social relations are mediated by technological artifacts (in the form of products and services) that incorporate scientific knowledge.

Since the processes associated with the “information society” are in their initial phases, many analysts confuse trends, extrapolations, and speculation with current reality. Certain argumentative exaggerations play an important role in expanding our field of perception and sensibility to new phenomenon. In spite of this, it is important, especially with regard to the use of scarce public resources, to focus as much on continuities as on discontinuities -on the new and the old- without carelessly extrapolating experiences from other contexts. We must remember that the world is not California (home of the information boom), and that each land has its own nutrients, farmers and crops.

The Internet at the Convergence of Social Transformations

The unilateral emphasis on the impact of the Internet can create a perception of a radical transformation dividing the new and old forms of social organization. But we cannot overlook the fact that the computer has been influencing society for several decades. Its influence was already discussed extensively in the seventies and eighties before the Internet. The Internet represents a new communication technology that adds to the long list of instruments of voice and image transmission such as telegraph, telephone, telex, radio, television, and fax that have changed communication in contemporary society.

Information technology, and its most widespread system, the Internet, is of enormous importance because it allows the convergence of two activities that are central to social life: the manipulation of knowledge and communication. Information technology allows the

storage, organization, and processing of an enormous amount of information in a small space and incredible speed. New communication technologies permit instantaneous voice, text, or image communication on a worldwide scale, constantly increasing the availability of information while decreasing communication costs.

These combined technologies working through a set of protocols (TCP/IP is the most common on the Internet) allow communication between computers. The Internet is a network of computer networks, all communicating in real time, making information instantaneously available anywhere on the planet. Thus, information and communication cease to be spatially localized and are transferred to “virtual space” (or cyberspace), allowing simultaneous contact between an infinite number of people using the memory of the computers participating in the network, independent of their physical location.

The Internet appeared in a period when capitalism was undergoing a deep change in its productive and social system. Internet acted as a catalyst and accelerator, but information technology did not cause most of these transformations, nor was it a condition for their appearance. By forgetting recent social and economic history, several authors have ended up with technological determinist interpretations. They glamorize the Internet and propose unrealistic visions of the social conditions in which information technology functions and the impact it has on people. In order to get a historical perspective it is worth mentioning, albeit in a summary form, these processes prior to the arrival of Internet:

1) The transformation, in the last decades, of the **service sector** in the dynamic core of the productive system. The capacity for technological innovation and the control of knowledge associated with it become the principal source of aggregate value, productivity gains and dynamism of the economy. Information technology was not the initiator of the so-called information society or knowledge-based society, but an accelerator or vector of a process that precedes it. The increasing importance of knowledge as the principal source of innovation and value creation in a constantly changing world transforms learning into an ongoing process, driven by the necessity to update and adapt professional skills to the requirements of new technological transformations.

By putting a large part of human knowledge in virtual space, facilitating the interchange and expression of ideas and developing online services in real time, the Internet allows people to break the barriers that in the past have limited access to and transmission of information. But the Internet is not a substitute for human capital, which is the product of large, long-term, investments. Nor does it substitute the laboratories, research centers, and corporate resources under which scientific knowledge is produced and transformed into technology, and finally into consumption products.

2) The increasing **“flexibilization” of the work process** and the production arrangements. This trend is associated in part to the processes described above, in particular to the value assigned to knowledge demanding greater autonomy and creativity in the chain of production and new models of business administration. It is also related to overall changes in the socio-political system, the relative decline of trade-unions, welfare benefits and labor rights. The

Internet, in some cases has been a tool for the advancement of new models of management and the flexibilization and decentralization of production and work.

3) The tendency known as **dematerialization of production** and the surge of the “new economy”. The idea of dematerialization of production describes a twofold process in which, a) added knowledge is the principal component in the value of the final product, while the relative costs of physical materials declines constantly, and b) the most dynamic goods and services in the economy are those that transmit or condense/incorporate information -as is the case with goods connected to the cultural industry, finances, medicines or genetically modified seeds. (The dematerialization of production, doesn't mean, however, as we will see at the end of the chapter, that material resources can be dismissed).

The new economy is mostly related to “dematerialized” products and services, constituted by enterprises mainly in the fields of telecommunications, audiovisual, biotechnology and pharmaceuticals. The principal characteristic of these companies is that they are dependent on permanent technological innovation, which transforms knowledge into products and services. The market value of these enterprises, especially those which are mainly research oriented, is not related to current revenue levels, but based on the projections of their potential for future sales if the product/service they invent is adopted by the market. The new economy has transformed a considerable part of financial investment into venture capital, as it is carried out in under high-risk conditions in which expected potential gains may never materialize. Due to the quantity of new products associated with communication and computing, the Internet expanded the new economy enormously.

4) Deepening of the process of **individualization**, in the sense that there has been a reduction of outside references in standards and values of social conduct. Individual are less and less guided by traditional values, norms, institutions, and ideologies of modernity (such as patriotism, parties, work, family), bringing about a new form of reflexive individualism in which people must constantly negotiate social relations (for example with sons, daughters, and colleagues). By inserting the reflexive individual in a world of global information and increasing contacts with diverse social networks, information technology enhances individualism.

5) The proliferation of **transnational agents**. Since the 1970's multinational companies have been studied as agents acting on an international scale according to a strategic vision that is not delimited by national borders. In past decades, the number of these transnational agents has multiplied due to the growing internationalization of various groups, including companies, scientific and technological systems, religious groups, non-governmental organizations, and criminal and terrorist organizations. The Internet facilitated and accelerated the development of these transnational agents and networks.

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6) Finally, the **globalization of societies** and partial loss of symbolic significance of the nation, discussed at the beginning of this book. The processes of internationalization of financial flow, of international commerce, and of patent regimes, have limited the breadth of

action available to governments. Meanwhile, the Internet facilitated the globalization of social and cultural interactions, limiting state control over sources of information and education. Despite this, the state continues to be the principal actor in national and international politics. If the globalization of societies has limited government control, it has also increased the expectation that governments will ensure regulation and adequate distribution of wealth.

New Tendencies: The Impact of the Internet on the Perception of Reality

Information technology has had several impacts on knowledge and culture. The first, about which there is some consensus among researchers, is the unification of the perception of space–time at least in relation to all of the social dimensions that are based on the flow of information (in the form of text, voice, or image). In the human experience, the limited reach of physical senses, which require that individuals go from one place to another to reach another individual or object, determines the sense of distance as related to time. Mechanisms for sending information such as drums, smoke signals, mail, telegraph, telephone, and television, were the means developed by humans, to transmit information without going from one place to another. These tools brought a new dimension to the relationship between time and distance.

Now that voice, text, and images can be instantly transmitted, the association of space with time is disappearing, at least with relation to things that can be transmitted digitally. With the transmission of television images via satellite, televised events took place for the whole world at the same instant regardless of space or time. The Internet brought this revolution to a new level allowing an individual in any place on earth to be in immediate contact via a choice of voice, text, or images, with any other person on the planet. At the same time, it brought a large part of the collection of human knowledge and culture (at least those parts that can be transformed into digital format) to cyberspace, making it available for any user in any place.

The unification of space and time does not mean that temporality has disappeared. On the contrary, it represents the contraction, acceleration, and increased value of time brought about by the disappearance of space barriers.

A second issue, about which there is sometimes conceptual confusion, is **virtual reality**, defined as **a set of images and sensations produced electronically**. Virtual reality is often contrasted with reality, as though the virtual world were less real or authentic than the world of sensations or the world as we experienced it before these new technologies. This is a romantic vision of the past, of sensory experience, and social life. The world of humans is by nature virtual. Human beings relate to their world through culture, a set of abstract symbols that determine how things transmitted by the senses are perceived, understood, interpreted, and evaluated. Be it by way of the Bible, the Koran, or a science book, the only way to get beyond the finiteness of individual experience is through the world of meanings that organize and allow transcendence from the limited universe of our sensory world.

The third impact of the Internet, perhaps the most important, is the transformation of the human universe by the growing integration between machines and humans. This is an area about which little is known and two main schools of thought have developed. For some, the computer has the potential to mirror the human mind, allowing integration between the two in the future. For others, the distance between the human mind and artificial intelligence is unsurpassable because the human mind cannot be dissociated from the biological and cultural support that allows it to function.

Finally, an ample bibliography already exists concerning the consequences of hypertext over intelligence and perception. Hypertext allows the development of reading written material in permanent connection and association to other texts, thereby allowing instant access from one text to another in a continuing spiral. It is different from “classic” text reading, which is undertaken in a linear fashion, from beginning to end. Some authors claim that the capacity to connect large amounts of information associated with diverse contents and networked material could cause losses in the intellectual culture of the “the age of books,” with its emphasis on deep reflection and conceptual development carried out in large part by isolated individuals. Others emphasize that the intellectual activity associated to hypertext takes place with more awareness of the collective character of all works, is less individualist, and more fluid.

New Tendencies: Information Technology and Social Structures

Since the Internet evolved into the most used means of distance communication (substituting mail and to a degree the telephone), naturally it is present and has permeated all social, economic, and political relations. But this does not mean that the Internet is capable of changing these relations. If the Internet, as we have shown, deepens existing trends in contemporary society, nothing, at present, indicates that it is capable of radical transformation of the social structure, system of stratification, or the norms and values of society. At the end of this chapter, we will return to the question of the impact of information technology on the political and legal dimensions of society, in particular the possibilities it opens to new forms of social control.

Electronic networks do not substitute face-to-face relations, which **continue to be the principal source of trust in human relations**. Internet opens possibilities to intensify interchanges and diversifies social networks but with the exception of marginal cases, generally of adolescents approaching adulthood who encounter an alternative world on the Internet, this has not been sufficient to substitute or modify the social ties that are established by direct coexistence.

One area where the Internet has had an important impact is in consolidating feelings of solidarity between members of immigrant communities (in many cases temporary and illegal workers) residing in developed countries. For these people, the Internet allows constant

contact by e-mail with family and is an ongoing source of news from their home countries, reinforcing their ties with their homelands. The Internet is also used to re-create effective ties as is the case with genealogists or old friends who have lost contact.

From the point of view of social agents and social movements, new technologies have produced a new kind of social actor, the hacker. Hackers are highly able programmers, mainly academic scientists and freelancers, who have launched a movement against commercial control of the Internet. The principal contribution of this group has been the open source movement, which develops software, generally with registered licenses, for which source code is publicly available. As we will see, the open source movement is a principal factor in the resistance to commercialization and private and state control of information that circulates on the Internet.

New Tendencies: Applications of the Internet

e-mail: Through the vehicle of e-mail the Internet offers a mechanism for sending messages and documents instantly causing the postal mail (as well as of the telegraph, fax, and telex) to practically disappear as a means of transmission of text, while to a certain extent substituting the telephone call. E-mail is the most common use of the Internet in terms of user time.

Increasingly, having an e-mail address is viewed as the equivalent of a residential address, a way that a person can be "located". The lack of an e-mail address will cause social isolation and in the future an e-mail address will be a basic condition of citizenship.

The ability to send messages instantly to an unlimited number of people anywhere on earth for the price of a local telephone call, without the need for material resources like paper or ink, has caused communication and the possibilities for interaction to multiply exponentially. Many of the messages that circulate would not be sent to if there were a financial cost or printing effort required. This generates a new problem, the "excess of communication," which requires an enormous time investment for taking in and generating communication.

The Internet has changed the rhythm of communication requiring greater speed and creating the expectation of immediate responses. However, the speed of human emotional and intellectual processing is not the speed of light.

e-research: The Internet has facilitated the process of accessing information enormously, a process which by traditional methods required great investments of time, energy, and resources. The Internet does not just store computerized cultural production, it is also a way of making the material publicly available. The Internet allows access to a growing collection of text, images, and sounds to which the public would not have access if material reproduction were necessary. The growth in the amount of material available through Web sites is exponential causing users to depend increasingly on research mechanisms to locate information of interest. While on the one hand the fact that anyone can put content on the

Internet represents a form of democratization of information, on the other hand it causes dependence on search engines that have the capacity to influence the priority level of texts for users.

Many search engines put sites that have paid to appear first at the top of search response lists. Even when this is not the case, they define priorities and classify material available on the Internet on a non-explicit basis. The enormous quantity of material available on the Internet makes room for companies specialized in processing and developing information as well as new, increasingly complex, search mechanisms.

It is possible to distinguish between the use of the Internet to get **information** and **knowledge**, or in technical terms, texts with high and low informational content. Low informational content refers to material that does not require any much intellectual training to understand and comprehend and is depleted after serving its immediate function. For example the name of a street, a pornographic image, a bank transaction, or online shopping, are all low-content information. High informational content material depends on the analytical ability of the user and has an impact on his or her further competences and intellectual abilities. As we will see, the prior intellectual ability of the user is a determining factor in the transformation of the Internet into a tool of cultural empowerment and social creativity.

e-science and technology: in addition to facilitating access to databases, virtual libraries, and all kinds of information, the Internet has enhanced two traditional characteristics of the fields of scientific research and technology: its functioning through networks and international contacts. Scientists and researchers are extremely open to the Internet and its possibilities for restructuring communication. The strengthening of international networks related to the interests of each researcher has contributed to the weakening of immediate social ties based on local faculty life

The ability to circulate scientific work on the Internet allows new possibilities for scientific publication in electronic periodicals without printing costs. This has contributed to academic debate concerning the regulation of these publications (whether they should follow the same editorial norms as printed publications) as well as disputes concerning intellectual rights.

e-production: as discussed earlier, information technology did not globalize the economy itself, but it accelerated communication between and within companies enormously, independent of the location of any given employee, increasing the speed and quantity of informational interchanges. The Internet allows companies to keep track of inventories, market trends, and relations with providers and clients online, reducing the time of production, distribution, and consumption cycle.

The impacts of information technology on the productive system are varied. In the first place, it has created an enormous market for information technology products, from communication infrastructure to computers, equipment, and software. Second, it opens up the possibility of new products and services that can be transmitted via the Internet. Third, it

has allowed revolutionary changes in systems of knowledge management and communication within companies. Fourth, the different forms of e-commerce (the principal forms are B2B - business to business, B2C - business to consumer, C2C - consumer to consumer, and B2G - business to government) revolutionized selling and buying. Fifth, the electronic auctions of B2B, B2G, and C2C have reduced transaction costs enormously while B2C and B2G modified logistics and the supply chain among businesses while increasing the speed and reducing the costs of transactions. Finally, services that were previously carried out by employees serving clients can be transferred, as is the case of automatic teller machines and Internet banking as a substitute for the teller, or secretarial services, which are now in large part carried out by each employee, or with the reduced importance of the sales staff in commerce between businesses.

The tendency to maintain the flow of exchanges to a minimum has had a particular impact on the financial sector, one of the sectors that, due to strictly informational nature of money, has come closest to the elimination of time. As time can never be eliminated, the financial sector has always been characterized by the fact that many lucrative opportunities depend on the ability to arrive first. Today this translates to an advantage that is counted sometimes in terms of seconds.

e-employment: The Internet allows all information to be encountered in virtual space. Because all information can be accessed in virtual space, the necessity to use of physical space has diminished and contact between the employee and the employer has become independent of their location, allowing increased productivity and making the structure of businesses more flexible. Transmission of messages by Internet has changed labor practices in the service sectors where information is circulated via e-mail permitting more agile communication, documentation, and control.

The Internet, when combined with cellular telephones, allows employees to be reached wherever they are. The consequences of this have been calamitous, increasing the amount of work that is performed outside normal work hours and in practice, destroying the notion of work hours, weekends, vacations, and the distinction between work and the private sphere. The rhythm of electronic communication enters into conflict with the biological and emotional rhythms of people, and this conflict leads to growth of social problems and ills. The current symptoms of such ills are the epidemic of stress and depression caused by the difficulty of keeping up with the rhythm of things and that sooner or later will result in demands for new regulations in the world of work. Eventually, worker's rights will need to include the **right to remain unplugged** outside of work hours. If we do not move in this direction in the near future, humanity will have to reinvent one of the principal contributions of the Bible: the right to a day of rest.

e-education: the capacity to analyze, bring together, and make use of information is a central component of professional competence for the majority of economic activities in the contemporary world. In principle, the Internet and education seemed to mutually reinforce one another, but in practice the relationship between them is quite complex. The junction of education and information technology has two axes: the transmission of specific educational

contents, and education oriented to further development of the capacity to use information technology in an autonomous way.

The use of the Internet to develop specific competence or knowledge (language education, extension courses, professional courses, and courses in diverse areas including higher education) is widespread today. A growing number of companies, and practically every university in the developed world and many developing countries have multimedia production facilities and/or distance education courses. Educational CDs, which in many cases require only computers and not access to the Internet-, represent an important segment of the education market.

Although there is still very little long-term comparative data concerning the effects of the Internet on adult education, several international and governmental institutions have compiled reports attempting to evaluate the impact of the Internet on education. They indicate positive results in the area of second language instruction, training for the business sector, higher education, and teacher education. Private industry and universities have been functioning in all of these well-established markets, which have been little affected by the recent crisis in the new economy.

At school level, aside from special cases such as children with special needs, the impact of the Internet on education appears to be ambiguous. There is a shortage of long-term and comparative studies for clearly identifying the contribution of the Internet in elementary schools. Case studies indicate that teacher training continues to be a fundamental element in the educational system and that the Internet can be used as a complement, but not as a substitute, for the function of teaching. The principal differential in terms of individual performance in school, aside from social context and family background, continues to be the teacher's qualification level. Through the words (and emotions) of teachers, children develop intellectual instruments that allow them to advance their reasoning capabilities and analytical autonomy that are so fundamental in the Internet age, where the availability of an unlimited quantity of information can be practically as paralyzing as the lack of information.

New technology tends to transform the role of the teacher by subverting his or her function. If they offer a great potential for supporting classroom activities, when they are used to substitute the role of the teacher they limit the creative application of his or her pedagogic experience and interaction with students. In practice, some interactive educational software excluded teachers from their pedagogical functions.

In addition to personal relationship between teacher and student, there is no substitute (at least not in the near future) for paper and pencil, both because of its importance in the development of writing skills and for the value of paper as the best means of storing information and work compiled by students and making this work available for school teachers and parents review.

Since the introduction of the Internet in education is still experimental, it should be carried out gradually, backed by the experiences of pilot programs and **as part of** the (much needed

in most countries) general reorganization of the teaching system. For example, three-dimensional computer images are an excellent tool for facilitating comprehension of things like the human body, the subatomic world, or geology. But using these tools to develop children's complex reasoning will require further advances and redefinition of the role of the teacher and curricula. This type of instructional practice is still its initial stages and the instruments that are used still need improving. Since most multimedia products tend to standardize education, they move away from the requirements for individualization and adaptation to the necessities of each student, especially at the school level.

At the secondary and university level, excessive emphasis on the importance of the Internet as a source of information and ideas can have damaging consequences. There are indications that students have substituted reading and writing efforts with the Internet searches for texts that can be adapted to meet their assignments. Rather than being used as a starting point, Internet searches have been transformed into arrival point, leaving behind the practices of sustained reading and reflection. The excessive emphasis on the computer screen and on multimedia educational tools risks compromising the pedagogic necessity for developing intellectual discipline needed reading a book and or the patience necessary to develop creative ideas.

The indiscriminate introduction of computers and Internet can have negative effects on education especially when teachers lack adequate training in computer and Internet use. Massive investments in teacher training will be necessary to avoid gaps between the knowledge of teachers and students in relation to technology use. .

.The introduction of computers as teaching instruments should be preceded by teacher education programs designed not only to prepare teachers in purely operational terms, but also to offer them a more general understanding of the environment in which computers and the Internet function as research tools that can advance student ability to pose questions rather than simply finding means and not an end. **Education supported by information technology** should not be confused with **information technology education**, an urgent necessity in all school systems. Information technology education requires the creation of mandatory courses designed to prepare students in the use and evaluation of information technology instruments, from their technical basics and uses to considerations of the challenges they create for society

e-culture: A growing part of humanity's cultural heritage is available on the Internet. It is already possible to visit in the web a large number of museums, historical archives, and libraries. These collections comprise a large part of the great works of literature, at least those works that are in the public domain. These materials can be obtained on the Internet usually without cost. In the future every new musical work, films, and literary works will be available via the Internet.

e-government: the impact of the Internet on political life can be divided into three levels: **e-governance** refers to the use of the Internet for increasing efficacy, quality, efficiency, transparency, and enforcement of the actions and services of the government and public

institutions; **e-government** includes a set of new instruments that allow greater and different types of citizen participation in government decisions; **e-politics** refers to the impact of the Internet on the social structure and the political organization of society.

E-governance includes the use of the Internet for: 1) publicizing all activities of the government including budgets and public spending, allowing greater transparency and public monitoring; 2) improving the quality of administrative services by increasing their speed and outreach; 3) offering service online, including government documents, health and education service requests, bill payments, and tax declarations; 4) the electronic transmission of public bids and auctions.

E-government includes electronic voting, the possibility of interacting with public institutions, and regulating activity associated with the Internet - development of legislation concerning commercial activities, security and individual privacy rights – as well as all measures designed to ensure universal access to the Internet.

Prognostics about the impact of the Internet on politics must not overlook the fact that there is a long analytical tradition relating the way that politics is made with the dominant means of communication. Mass society has been associated with radio and in some cases even ascribed to it, in the same way that television has promoted the “spectacle society”. Today several social scientists relate Internet to a new political model, through the strengthening of civil society networks disassociated from, or marginally connected to, the state.

Though past results do not permit predictions for the future, we must not forget that many socialists regarded the radio era as the advent of a new era of popular participation. We lack sufficient evidence for confirming theories regarding the impact of the Internet on politics. Currently, there are two co-existing and opposite interpretations of its consequences: some analysts believe that we are about to experience a radical social transformation from representative democracy to referendum democracy, while for others new forms of virtual contact could destroy the basis for face to face interaction that allows the construction of public space and will increase the capacity of control over the population by the state (see the box at the end of the chapter).

e-health: The Internet has facilitated work in the areas of monitoring and controlling epidemics, reorganizing health-care systems and patient relations, and allowing access to medical information by laymen (a trend that is frequently criticized for producing erroneous or counterproductive information). In the area of health, information technology is particularly promising despite its limited impact at the moment. There have already been several successful experiments in tele-medicine including diagnosis, distance surgery, medical teleconferences, and tele-monitoring. The majority of these experiments are still in the pilot stages.

One service that has been developed in many advanced countries is the so-called health card, a card that allows access to patient medical histories regardless of location. The health card facilitates remote health services and medical research. If the confidentiality of these

databases is not protected it will be possible for insurance companies and employers in possession of this information to develop discriminatory insurance and employment policies.

e-crime, e-terrorism, and e-war: Finally, we can't forget the potential of information technology to be used for falsification, theft, and destruction by criminal and terrorists networks and by a new type of criminal, the **kracker**, who specializes in breaking the security systems of networks and sites with destructive goals. As we will see, drug trafficking gangs in Brazil use cellular telephones to control their organizations from prison. **Crime and terror have been, so far, much more effective at making use of new information technologies than most of the security systems of the national states.** This is particularly dramatic in less developed countries.

One of the principal impacts of information technology on human destiny is the transformation of the art of war, thanks to new satellite systems and remotely guided missiles that combine, with increasing efficacy, information, communication, and destructive power.

Copyrights: the Private Sector vs. Public Goods

To the extent that scientific knowledge, information, and culture that can be transmitted by Internet and play central role in economic life, they have become sources of social conflicts concerning the most appropriate forms of social regulation. Information, knowledge, and culture can be seen as merchandise and sources of profit or as public goods that should benefit from state intervention to ensure effective universal access for the population. These social conflicts on the appropriation of the Internet revolve, in particular, around the theme of intellectual property.

Public debate over what can be patented started in the 1980's related to developments in biotechnology. Historically, the concept of the patent was founded on the distinction between invention and discovery. While the former could be patented, as it was associated with the creation of something new that does not exist in nature or in the public domain, discovery refers to knowledge of something pre-existing in nature or society, as is the case with scientific knowledge, which cannot be patented. The objective of patenting was to ensure that new knowledge would not be transformed into industrial secrets. As an incentive for inventors to put their inventions in the public domain, they were insured a monopoly of use or royalties from third parties for a certain limited period of time. With biotechnology, the separation between discovery and invention was called into question, with attempts to patent knowledge concerning the utility or function of certain genes, giving the patent holders the rights to charge royalties to anyone using this knowledge to develop new products. Thus science was colonized by industry and the knowledge that it produced started to lose its universality and free communication character which is among its chief historical characteristics.

The Internet has allowed the transformation of activities that were traditionally considered crafts such as teaching classes, organizing courses, conferences, and developing pedagogic material, into commodities. Institutions and companies regard their staffs as producers of patentable material transforming work that used to belong to the nonprofit category into income generating activity. In doing so they have modified the scientific ethos of pedagogy. In the United States, in particular, demands for copyright payments by third party users of any text, image or minor innovation, even for marginal or tangential uses, has become a mania with potential paralyzing impact on creativity.

All creative efforts are collective activity as the absorption and re-expression of many varied influences sustain them both consciously and unconsciously. If it were necessary to consider possible copyright violations each time a person gave a class, produced a literary work, or performed a surgical intervention, society would run the risk of repressing creativity and turning activities that have traditionally been playful and with strong collective ethos, into mechanical acts based in individual desire for personal advantage.

In the field intellectual production copyrights were originally used to protect editors and later authors of all types of artistic and intellectual works. In the European tradition, copyrights protect the author. In the United States, copyrights can be transferred in their entirety to the companies. Recently, copyrights of all literary and artistic property were standardized worldwide from 50 to 70 years after author death and 95 years after publication or 125 years after creation in cases where a company has acquired the rights of a work.

Copyright law has always included articles that accept fair use, including the reproduction of work for educational research and for personal use. With the widespread use of photocopiers editors were already questioning fair use. Later, with the introduction of Internet, the copyright problem was reopened because of the possibility of placing almost any written, musical, or visual work on a website at practically no cost short-circuiting the owners of copyrights. Various sites specialized in music and later films made recently released music available for free on the Internet. Recording companies responded by demanding the closure of the sites in court. Though the companies won in the courtroom, the near impossibility of eliminating these sites have caused them to seek out new commercial models for the use of Internet and, sometimes, unorthodox solutions such as computer virus attack.

The Internet has raised new questions regarding of the definition of fair use in the cyberspace context. Should permission or payment be required for non-commercial use of information and material made available on the Internet to anyone with access to a Web browser or search engine? Should the browser or search engine receive payment? Internet companies and holders of copyrights expect that in the future they will be able to require payment from each user for any downloaded information. To gain control over Internet users many pressure the hardware industry to include mechanisms that control and monitor each user's action. In addition to raising serious concerns regarding personal privacy, such systems would practically privatize the Internet.

An open national and international public discussion should seek to identify answers that allow payments for content producers while ensuring the open and public service character of the Internet and preserving personal privacy. One proposed solution is a fee-based system, collecting from users and distributing among visited sites according to a publicly controlled system. The transformation of cyberspace into a public regulated global space is one of the great challenges to the new forms an international governance capable of managing technological systems with impacts beyond the limits of national frontiers.

Open Source vs. Commercial Programs

The creators of the Internet left the source code of their work in the public domain allowing any person to develop compatible programs without paying for copyrights. Since the beginning of the Internet a group of researchers and hackers have worked to keep source codes for computer programs in the public domain. This movement seeks to confront the growing oligopolization of source codes within the software industry such as the best-known Microsoft case. These movements created the Open source Standard, certifying that the source code is available without cost to individual users.

The most important product of the open source movement is the Linux operating system. The use of Linux is widespread within large companies, institutions, universities, and governments. These groups generally use large computers with sufficient human resources for providing technical support to users. For individuals and small businesses without technical knowledge, commercial software has the advantage of easy installation and technical support. Although its use continues to be small, there are an increasing number of companies that specialize in providing technical support for open source programs.

Discussion concerning open source software often revolves around economic themes, particularly in developing countries where open source software use is viewed as a way to reduce expenses. The existence of open source software has, in fact, pressured the industry to reduce prices. But the central question raised by the open source movement is fundamentally political. The original architecture of the Internet facilitated communication rather than identification of the user and the content being transmitted. Both companies and governments have since developed tools aimed at identifying users and their movements. For companies, monitoring users each time they access the Internet is the only way to ensure payments of copyrights while also accumulating information regarding the consumer profile of Internet users. For governments, access to and storage of information transmitted in cyberspace is seen as a necessary component of vigilance over activities that could affect national security, causing many countries to restrict or prohibit the use of cryptographic systems by private parties, to regulate the commercialization of advanced deciphering systems, and to oblige service providers to store all e-mail for certain period of time.

The existence and ongoing development of alternative open source programs is among the fundamental conditions -together with adequate copyright laws- for limiting the capacity of

the corporate sector to subordinate the Internet to the logic of their interests. For the large majority of users, commercial programs and hardware are black boxes. Most users lack a notion of the information that they transmit when they use the Internet. Efforts to clarify the questions raised by the Internet in terms of public freedom are needed to assess the legal boundary concerning the power of the state and the corporate sectors to interfere, monitor, extract and use information from Internet navigators. And open discussion should define the role of the Internet as a public good, including the rights of companies to collect returns on their investments and of the state concerns with public security. Both are legitimate rights but they must be developed within a democratic system of regulation.

New and Old: Pyramids and Networks

The interactive and open character of the Internet has caused many authors of to view the Internet as a source for a new paradigm of social organization in which the central category is the **social network**, a system of communication comprised of interconnected nodes that are fluid and constantly changing form. In this model, each social actor participates in different networks each one depending on one another within relations that may be asymmetric or hierarchical but within which all parts are interdependent without a defined center. The network would subvert the hierarchical and rigid social structures of industrial capitalism, which in contrast are characterized by vertical systems of communication with well-defined structures of power.

The 20th century dominant metaphor for describing society was that of a **structure** taking the form of a **pyramid**. Metaphors concerning pyramids and structures are associated with concepts of cause and effect from physics or with the functioning of the central organs of the human body. The notion of networks was borrowed from studies on the functioning of the nervous system and artificial intelligence.

From the pyramidal perspective, society is organized with a small top representing the most rich and powerful and with workers at the base, while some sectors of the population are in the middle. In another metaphor of social organization, societies had a center and a periphery, companies divided themselves between employers and employees, while the political structure was based on dominant and dominated groups. In this model, interaction and communication between the different levels was underplayed. In fact, social participation and communication was always present through political parties, social movements and public opinion. In enterprises workers responded with unions or factory commissions. Finally if the distribution of resources stratified society, social mobility presented a more flexible reality. Even highly centralized totalitarian states depended on networks for keeping informed and controlling society.

With the insight of the current world it is obvious that the pyramid metaphor was unilateral. Rather than viewing the metaphor of the network as a radical break between the present and the past, we should consider how networks have always been a central part of human society.

In fact the importance of communication and information has been a central part of discussions concerning the nature of capitalism since the work of Adam Smith. Not only the markets but also democracy has all the characteristics of a network, where participation in the circulation of information is central for its functioning.

The danger of a unilateral emphasis on the role of networks is that we move from a partial metaphor of structures and pyramids to another equally insufficient metaphor. Virtual networks multiply and change the functioning of vertical organizations but they come a long way from making those structures disappear. In the same way that the unification of space and time has not eliminated time, the creation of virtual networks has not eliminated the material nature of the world and the importance of the centers of political and economic decision-making and control of power and economic resources. The principal source of technological innovation in telecommunications continues to be investments in research connected to the military sector, a highly centralized and pyramidal structure.

Networks and structures have always been interlinked. National governments have always known about the importance of the means of communication for unifying and controlling national space. While companies today have more flexible processes, power structures continue to play a central role. The centers of power concentrate political, cultural, and economic resources imposing unequal distribution of decisions and communication flow. If the Internet indeed has the effect of weakening territorial trends, by allowing interchanges on a global scale, big cities continue to be important not despite but because of their material nature, their human resources and their infrastructures.

As we have shown earlier, networks (represented by private users) and pyramids (represented by the states and by corporations) continue to confront one another within the web. While large companies connected to the information technology industry promote the broadest interpretations of copyrights, individuals and voluntary groups developed free software. Government security services try to control the communication and information of each citizen while organized groups of society work to limit these powers and strengthen privacy rights.

The impact of the Internet is **bi-directional**. On one hand it expands the possibilities for social action, for worldwide public opinion, and for activism among decentralized social movements; on the other hand it also allows new forms of social control and fosters anti-democratic organizations. These are transnational **operational networks**, with a highly **centralized** organization, thanks to new possibilities of control and command that do not require a fixed location in space. Confronting these international networks of organized crime and terrorist groups while maintaining a respect for democratic liberties will require a deep reformulation of security systems at a national and international level.

The view of a world of participatory global networks functioning apart from the government and corporate sector power structures of global society is an illusion because it offers only a partial vision of social reality. It is also problematic because it can cause us to overlook new problems in global society and to abandon the dialog with organizations (states and large

companies) that continue to be decisive in the leadership of contemporary society. The great intellectual challenge at the beginning of this century is to invent new interactions between pyramids and networks enhancing the democratic dimensions of new technologies.

Box D - The Two Faces of Information Technology: Freedom and Control

The debates concerning the impact of the Internet on political life are polarized between those who believe that the Internet is a liberating instrument and those who see it as a mechanism for the destruction of public space and for the control of citizens by governments and the corporate sector.

The optimistic vision combines disparate views. For some the Internet allows increased citizen participation in government decisions by way of a system of ongoing consultation allowing day-to-day referendums on diverse themes. For others, the Internet enhances democracy radically, creating a new public space in which civil society organizes itself separately from the state.

The pessimistic perspective includes those who consider the Internet as a threat to face-to-face relations, the only source of communication capable of generating solid and stable groups with historic memory (rather than the a-temporal world of the Internet), and capable of sustaining public life and constant political action. By creating a world of virtual relations the Internet facilitates the growing control of governments and of corporations over citizens, destroying privacy and freedom.

The diverse positions concerning predictions of the impact of the Internet indicate real potentials that, depending on the outcomes of social conflict, could someday become dominant. In practice both the strengthening of democratic life and the weakening of privacy and freedom through the control of information can be encountered today. Databases that centralize information from genetic codes to medical histories, laws that require service providers to keep copies of all e-mails, cameras that film activities in workplaces, streets, and stores, tracking systems for Internet users, credit cards that record details on all purchases, electronic toll booths, cellular telephones with cameras and GPS systems, new systems of biometric recognition, and in the future microchip implants with medical or other functions, converge in destroying the notion of privacy and together comprise an enormous potential for social control and the destruction of freedom.

The global village runs the risk of reproducing the aspects of traditional villages that made them into places of control and social oppression and where anonymity and the feeling of freedom were impossible. The growing impossibility of lying (as an individual choice) has a destructive potential for human sociability, as we know it. Though lying can be used to hide crimes, it is also an instrument of the oppressed and a fundamental recourse of human freedom.

The dependency of society on networks of electronic communication for the proper functioning of practically any service creates an enormous risk of paralysis and destruction on a global scale in case of successful attack on the system. Processes that make humanity vulnerable have always been a part of the interactions between the diverse groups of people made possible by the encounters of societies. When people lived in isolation they did not

have access to others' technological and social innovations, but they were also protected from diseases, epidemics, and new problems that are parts of the homogenization of productive, social, and political systems. With globalization, epidemics travel by airplane and an electronic virus at the speed of light. The homogenization of crops is now on a worldwide scale, advances in medicine save life but can have a neutralizing effect on the natural selection mechanisms of the species, and new technologies impacts on all of humanity and the planet rather than local people and ecosystems.

New technologies have increased individual security at the price of putting basic modern democratic institutions at risk by constructing a fragile system of life dependent on technology and vulnerable to attacks whose prevention could lead to totalitarian practices of social control. Perhaps there is a "law" of human history indicating that every new technological instruments that increases the capacity to control nature and society itself, increases the potential of destroying the environments and society while simultaneously promising improvements in quality of life and renewing the hope of a better world.