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Lessons learnt from the Internet. Hands off, hands on, or what role of public policy in Europe?

POVZETEK: The evolution of the Internet challenges traditional approaches of industrial and technology policy and seems to suggest a hands off policy. The cultural impact of the network, on the other hand, appears to call for some regulatory intervention into its future development. The article's first part briefly examines the role of U.S. public policy in the early stages of the Internet and then provides a critical assessment of institutional and policy factors in the EU which slowed down the Internet's diffusion on this side of the Atlantic. Only recently can we observe changes. Telecommunications liberalization and the emergence of market competition in this industry coincide with a new Internet policy that recognizes the infra-structural significance of this network for a European information society and the need to involve Internet users in order to exploit the potential of this network. Another look at the Internet's history in the article's second part unveils that the network evolved in a cultural context that was shaped by the communities of designers and users whose members were either scientists and engineers or belonged to the "computer hacker" community. The technical design of the initial Internet embedded, reflected and reinforced elements of this cultural mixture. The technical ease with which the Internet extended into many diverse cultural settings has provided incentives and exerted pressures towards cultural change, and it has triggered efforts to control the use of and the content which is communicated via the net. The resulting dynamics unfolded as a consequence of the interdependence of technical and cultural elements. The cultural effects are manifold: rather than a uniform mega-trend we observe cultural globalization, cultural pluralization and fragmentation and also cultural convergence. Thus restrictive political intervention to protect a specific national culture would be the wrong recipe.

KLJUČNE BESEDE: Internet, public policy, technology policy, culture, convergence

Introduction

More than other technologies, the Internet has challenged traditional patterns of policy-making vis-à-vis technology. The evolution and the career of the Internet clearly differ from other large technical systems with a high infra-structural significance. This requires re-thinking *technology policy and industrial policy* related to the technical infrastructure, which is the focus of the first part of this article. The global extension of the Internet provides new opportunities for commercial transactions, for communication and entertainment and for the political discourse – to mention only of few of these

opportunities. It at the same time brings about risks the prevention of which may necessitate new *regulatory policies* at the national level, possibly embedded in a transnational regulatory regime. Usually the regulatory needs of electronic commerce attract the highest attention of policy analysts. My focus – in the article's second part – will be on a different, non-commercial subject. I will examine the Internet's influence on culture and how regulatory policy may respond to it.

1. Industrial policy and technology policy

The telecommunications and information technology industry in Europe was traditionally promoted and controlled by national governments. Until recently, telecommunications, in particular telephone service provision was organized as a public monopoly (PTT) with a small number of private equipment manufacturers co-operating in a symbiotic relationship with the national PTT. Technical barriers to trade such as technical standards and regulations (Werle, 2001a) protected the home market from foreign competition. Government procurement of telecommunications equipment through the PTT was a means of technology policy. If private companies developed technical innovations and released them to compete with other products the government rather than the market selected the winner.

While telecommunications was a regulated industry in most parts of the world the information technology sector was unregulated. In the era of mainframe computers American manufacturers gained the world leadership and Europe struggled to catch up. Protectionism was combined with the promotion of a "national champion." One company or a couple of companies took advantage of all kinds of public support without, however, being able to establish themselves in the world market.

With the advent of the Internet the old strategies of industrial and technology policy in the information and communication technology industry have apparently become obsolete. But this does not mean that public policy does not matter anymore. A look at the Internet's evolution shows that it will in fact benefit from a policy that provides indirect enabling support rather than direct political guidance.

2. Evolution of the Internet and its present state in Europe

To assess the role played by politics we have to start with a brief look at the historical evolution of the Internet.[1] As is well known, the Internet started as ARPANET – a network that served research and, to a minor degree, military purposes in the USA. It was launched by the US Department of Defense's Advanced Research Projects Agency (ARPA). The pioneering Transmission Control Protocol/ Internet Protocol (TCP/IP) protocol stack, which facilitates the interconnection of heterogeneous networks in a way that allows them to be used as if they were one single network, was implemented in the ARPANET at the end of 1982. TCP/IP was a US military standard, but it was not classified and could be implemented free of charge by anybody who wanted to use it. In this sense TCP/IP was an open standard. Neither public nor private intellectual property rights on this standard were claimed.

In 1985, the U.S. National Science Foundation (NSF) became involved in research and education networking. The NSF initiated the NSFNET, a backbone network designed to provide both access to remote supercomputers and a test bed for experiments in data transmission and switching. Early on, the NSF officials responsible for the NSFNET also had in mind to create an encompassing multi-purpose research and education network. Rather than opting for one of the existing proprietary standards for computer networks the NSF chose TCP/IP to be implemented in the NSFNET. In doing so, the NSF created a niche in which TCP/IP was sheltered from market competition and could develop into a mature protocol stack that attracted the development of complementary software for a variety of applications.

With the advent of the World Wide Web (WWW) in the early 1990s, the research and education network exploded and started transforming itself into the commercially viable global Internet. Also in this case the non-proprietary, open nature of the basic protocol (HTTP) proved to be instrumental for the rapid diffusion of the WWW. In 1995, the NSF ceased operating the NSFNET. Today the Internet is owned and operated by private corporations, non-profit organizations and other collective entities.

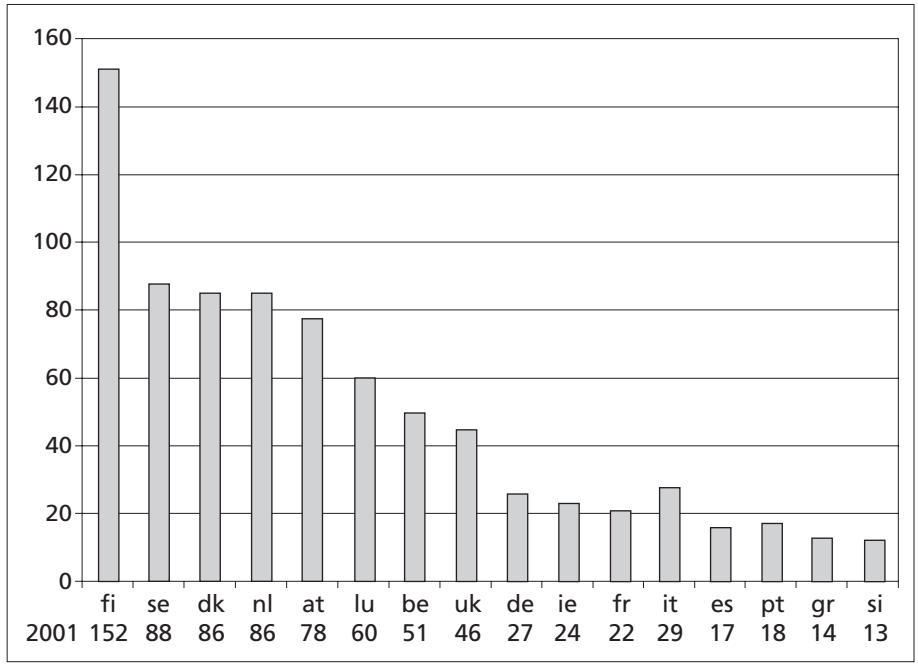

Diagram 1: Internet Hosts per 1,000 Inhabitants – January 2001

In summary, historically the Internet appears to be well described as what *The Economist* magazine in July 1995 called "the accidental superhighway." In its early stages the Internet was promoted and funded, but not designed, by the U.S. government. In this sense, the Internet is a product of U.S. science and technology policy. However,

at no point in time did some kind of master-plan exist to guide the Internet's evolution. At the time the Internet took off in the U.S. it was not a well-known phenomenon in Europe. Today, some seven years later, the network of networks is well established in the member states of the European Union (some 13,7 million hosts in January 2001). However, the absolute number of hosts as well as the density of hosts per country (Diagram 1) varies considerably in different parts of Europe. The number of hosts per 1,000 inhabitants is much lower in Southern than in Northern Europe.[2]

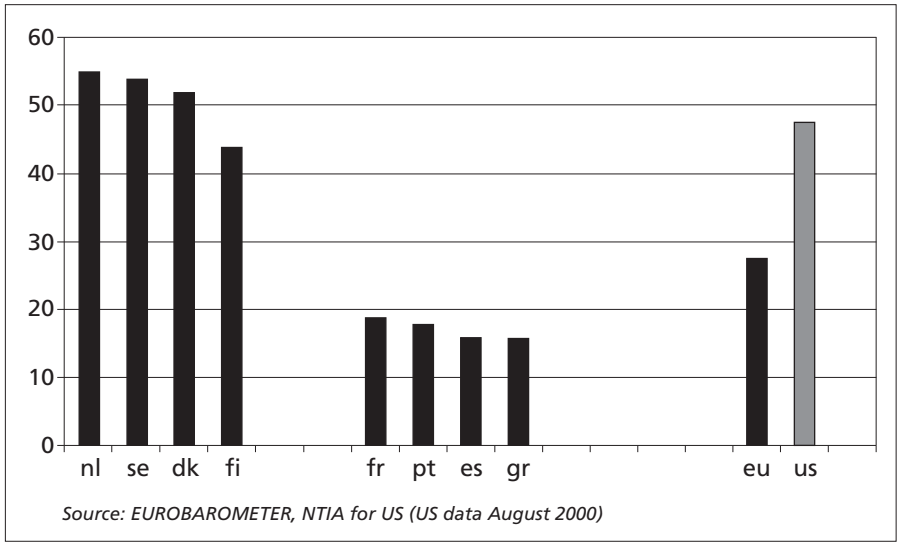

Diagram 2: Internet Penetration in EU and US Homes (%) – October 2000

We find a similar picture if we look at the percentage of households with Internet access (Diagram 2). Again the Scandinavian member states of the EU and the Netherlands have the highest penetration rates. A report for the European Commission argues that "cultural differences, language barriers, income levels and the general lack of IT infrastructure (such as PCs)" account for the imbalances in Europe. It is also emphasized that "Europe is generally behind North America in Internet development" (Fischer & Lorenz, 2000: 6-8). Only 28 % in the European Union, but 48 % of the Americans have Internet access. Although the gap between Europe and the USA is narrowing Europe still lags behind. The reasons for this delay date back to inadequate strategic political action and a lack of appropriate incentives in the 1980s and early 1990s.

2.1 Obstacles to the diffusion of the Internet in Europe

Trying to detect why the Internet has had difficulties in Europe, we find evidence that the reasons were definitely *not a lack of inventiveness*. Among the pioneering technical inventions which facilitated the evolution of the Internet were packet switching, the TCP/IP protocol stack and what we today call the World Wide Web (WWW). As one can see in Diagram 3 all these innovations were invented or co-invented in Europe.

But they were not taken up and developed further on this side of the Atlantic (cf. Abbate, 1999; Berners-Lee and Fischetti, 1999; Norberg and O'Neill, 1996).

Diagram 3: Pioneering Inventions in Computer Networking

	Europe	USA
Packet Switching *First half of the 1960s*	**Donald Davis** National Phisical laboratory, United Kingdom	**Paul Baran** RAND Corporation
Datagram Technology (TCP/IP) *First half of the 1970s*	**Louis Pouzin/ Hubert Zimmerman** Cyclade project, France	**Vinton Cerf/Robert Kahn** Advanced Research Project Agency (ARPA)
World Wide Web (WWW) *Early 1990s*	**Tim Berners-Lee/ Robert Cailliau** European Particle Physics	**Marc Andreessen** National Center for Super-computer Applications (NCSA) Later: NETSCAPE Corporation

While Paul Baran's ideas concerning *Packet switching* became one of the technical foundations of the Internet's forerunner ARPANET, Donald Davies' proposals to base a new network on packet switching was rejected by the British General Post Office, which at the time was the monopoly operator of the British public telephone network. Davies' own organization, the NPL, did not have the resources and the authority to build such a network.

Long before the datagram transmission and routing technology *TCP/IP* was employed in the ARPANET, a similar technology was used in an experimental network project in France called Cyclades. Funded by the French government and invented by Louis Pouzin and Hubert Zimmerman, Cyclades had been explicitly designed to facilitate internetworking. TCP/IP reflects the design of Cyclades. Pouzin and Zimmerman struggled to convince France Telecom, the French public (monopoly) telecommunications carrier, to employ datagram transmission in the public data network. However, France Telecom and most other European telephone administrations (PTT) opted for another, a connection-oriented, technology.

Finally, the foundation of the *World Wide Web* (WWW), the Hypertext Transfer Protocol (HTTP), was laid by Tim Berners-Lee and Robert Cailliau at CERN, the European Particle Physics Laboratory, in 1990. CERN made the software available on the Internet but did not regard it as lying within its responsibility to promote further development of this technology towards broader usage or even commercial viability. In 1993 the basic ideas were taken up by the National Center for Supercomputer Applications (NCSA) at the University of Illinois, which obviously had no problem integrating WWW-related activities into its work program although they had not much in common with supercomputer applications. Marc Andreessen and his colleagues with the NCSA developed a web browser called Mosaic. In 1994, Andreessen left the NCSA to set up his own company Netscape.

2.1.1. Telecommunications monopolies

The first two examples indicate that the institutional opportunity structure of European telecommunications was unfavorable to these kinds of innovations at the time they were invented. The British General Post Office and France Telecom enjoyed a monopoly status. Both organizations may have had good reasons to opt for another technology but their monopoly position left no room for other organizations to take up the innovations and develop them into attractive software products.

2.1.2 Failed standards policy

Technical standards played a strategic role in the area of public data networks and in the European computer industry. The central focus was on OSI standards. OSI, the Open Systems Interconnection Reference Model, was adopted as an international standard in 1984. OSI's seven-layer protocol architecture was meant to provide a reference system for defining inter-networking protocols and application software similar to TCP/IP and complementary protocols. It was the product of an engineering program that was organized mainly in Europe. OSI was to realize the vision of a seamless global network (Schmidt and Werle, 1998). But European computer vendors, European governments and, in particular, the Commission of the EU saw the OSI program also as an instrument of industrial policy to protect the European manufacturers from US competition. OSI was specifically intended to arrest the widespread deployment of IBM's SNA network standard in Europe.

In the second half of the 1980s, also the US government officially declared that it would switch to OSI with regard to its procurement policy. But it also accepted other standards as long as OSI products were not available. Many European governments in contrast were so strictly committed to OSI that they did not tolerate, let alone fund any "deviant" activity including TCP/IP related research and development. However, the hopes focusing on OSI were disappointed because it took extremely long until OSI products appeared on the market – too late for OSI to be regarded as a serious competitor to TCP/IP. Thus the strong political commitment to OSI is another crucial factor accounting for the fact that Europe is significantly behind the USA in Internet diffusion and usage. Hands off standardization policy would have been the more appropriate European political strategy.

2.1.3 Nationally fragmented industrial policy

Another obstacle to the diffusion of the Internet and comparable network technologies was the national fragmentation of industrial policy throughout Europe. One of the most spectacular examples of parochial policy can be found in an area where telecommunications, data processing and TV broadcasting overlapped. It focused on what was called "interactive videotex" in the terminology of the International Telecommunication Union (ITU). In the late 1970s and the early 1980s, almost simultaneously, telecommunications operators in the United Kingdom, France and Germany, as well as in the USA, Canada, Japan and a few other countries, planned and heavily promoted an information service for the public with a potential for professional

application. Some functions were similar to the Internet – though at the time, of course, not as sophisticated. The system was called Prestel in the UK, Bildschirmtext in Germany and Télétel/Minitel in France.

In contrast with the efforts in the other countries, the French undertaking with an extremely high degree of concerted political and industrial action turned out to be a success at the national level. Télétel, however, never developed into a transnational or global system. The other European systems did not even take off within their national confines. Each country followed the strategy of exporting its own system to other countries while keeping the national market closed (Schneider et al., 1991). In an open European market without telecommunications monopolies, interactive videotex might have developed into a successful European service with national variants on a common technical platform. In terms of the market, Télétel demonstrated early on that European consumers were prepared to buy information and transaction services on screen. Before the Internet started to gain ground in France the Télétel system had more than six million private and business subscribers and had created many new jobs, directly and indirectly.

2.2 Breaking institutional barriers

The inherited telecommunications regime posed serious obstacles to the diffusion of the Internet. Since 1987 the European Commission has been pushing to *deregulate* and *liberalize telecommunications*. Only in 1998 have the markets for telecommunications services and networks been opened to competition in most of the member states of the EU. As a result, in countries such as Germany the rates have gone down dramatically, in particular for long-distance and international telephony.
On the side of the EU Commission, telecommunications policy was also driven by *industrial policy concerns*. A common market without any internal barriers to trade was to enhance competitiveness of large European firms (Schneider and Werle, 1990). Also publicly funded technology programs such as ESPRIT (European Strategic Programme for Research and Development in Information Technology, 1984) and RACE (Research and Development in Advanced Communications Technologies in Europe, 1987) were to promote both communication and information technology and collaboration of European business firms in these areas. But in effect the European technology programs of the 1980s mainly created a *technology push without an equivalent user-driven demand pull*.

In the early 1990s, therefore, the Commission tried to gear its policy to a model, which one can call the *old Information Society Approach*. Emphasis was put on the society's need for an efficient and internationally competitive telecommunications infrastructure, the provision of which was regarded as the responsibility of the public sector. It has found an expression in the TEN (Trans-European Networks) program, which originally included an ambitious investment plan, particularly for peripheral regions, but later was cut back to a number of voluntary agreements among member states of the EU. This approach was criticized because its attempt to align the projects to market demand and to involve users often only occurred after the projects were launched (McKnight and Neumann, 1995). More often than not the critical remarks

explicitly referred European policy makers to the *Internet*, which for a long time – perhaps too long a time – remained in the background as a kind of *hidden agenda* without a visible European commitment to this network. However, with the old Information Society Approach the Commission managed to convince corporations and governments to abandon national egotism and parochial policy and to help establish a supranational liberal telecommunications regime.

2.3 Towards European Internet policy

The European Summit in Lisbon in March 2000 endorsed the Commission's *e*Europe proposal which aims at "bringing every citizen, home and school, every business and administration into the digital age and online" (COM (99) 687). At last with this endorsement a period came to an end which was characterized by considerable passive ignorance of and initially even active resistance to the Internet and the underlying TCP/IP protocol technology. The EU realized the growing significance of this network and the Internet was acknowledged to be the *principal infrastructure* for electronic communications (COM (98) 111).

The recent effort to establish a .eu Internet Top-Level Domain (TLD) complementary to the national TLDs is more than just a symbolic action. It is to signal Europe's presence in a network whose technical specifications, functions and services have to a considerable degree been shaped by the users and by small firms – a striking difference to the traditional telecommunications networks.[3] From this angle the .eu-effort relates to other *activities geared at increasing user involvement*, such as the Information Society Technologies (IST) program, which provides funds for research, development and demonstration projects towards a "User-friendly information society".[4]

A series of regulatory actions aimed at enabling or accelerating electronic commerce fits into this picture. They include digital signature, encryption, intellectual property and privacy issues. None of these regulatory problems is trivial, and it is also an open question whether EU-regulation, self-regulation, public-private co-regulation or no regulation at all turns out to be most appropriate. Adequate answers require a broader participation of those involved in the provision and use of the Internet. This involvement is growing. We observe that in the EU an Internet policy domain is evolving which may provide appropriate collective responses to the "regulatory needs" of electronic commerce and other Internet areas including those which touch upon cultural values. This development is to be supported. The stability and leverage of a European Internet policy domain will grow first and foremost to the extent that barriers to *access to the Internet* are removed.

There can be no doubt that the high cost of Internet usage is still a significant barrier to access. Most effective in terms of cost reduction has been the deregulation and liberalization of telecommunications in Europe. Meanwhile some access providers offer Internet users flat rates instead of charging for time. If Internet usage is to be increased within a relatively short period of time and if a "digital divide" in Europe is to be avoided, the EU as well as national public policy will also have to address other barriers to entry to the Internet such as computer illiteracy and lack of public access to the network in peripheral regions. In the USA we find a series of public and private initiatives

to promote Internet access. They aim at connecting all schools and libraries to the Internet and providing training and technical support. Some of the American efforts are copied others are debated by the Europeans. They embody elements of a *new Information Society Approach* which is not only passively open to the Internet but actively takes up the needs, preferences and interests articulated by the actors in the European Internet policy domain. In the new approach the user plays a more prominent and active role than in the earlier European efforts.

2.4 Lessons to be learnt concerning industrial policy and technology policy

The analysis of the development of the Internet leads to several policy recommendations concerning technology policy and industrial policy.

1. The Internet was promoted and funded but not designed by the U.S. government. Large technical systems such as the Internet cannot be put in place solely by governments or companies.
2. Governments should neither pick the winners in a technology race – what should be left to the market – nor should they block the diffusion of a competing technology.
3. The TCP/IP protocol stack developed in a niche where it was sheltered from market selection for many years. This suggests that it may be beneficial to create and protect niches in order to keep options for technological development open and prevent premature "lock in" of incumbent technologies.
4. Public support for research on variant technologies and a continued widening of technical options is to concentrate on the development and further enhancement of technical infrastructures rather than specific technology based services.
5. No single technical solution will be universally optimal. Particularly for software based technologies such as the Internet the involvement of the heterogeneous user community remains a vitally important source of innovation. Governments are well advised to support user involvement.

3. Regulating the Internet?

Regulatory policy concerning the Internet addresses diverse policy areas. In the EU, for instance, a series of regulatory actions aim at enabling or accelerating electronic commerce. They include, as already mentioned, digital signature, encryption, intellectual property and privacy issues. I am going to focus on those regulatory issues which in a very general sense are linked to the content transmitted via the net and which are triggered by the global extension of the Internet.[5] It is often argued that the Internet affects social values and norms and shapes culture. While the early Internet was very much a U.S. American network it has recently achieved a "critical mass" of users in many countries (Diagram 1 and 2 above). As a result local cultures in different regions of the world have come into closer contact with one another and with the culture being attributed to and carried by the Internet. The cultural consequences of the Internet's globalization may or may not stimulate regulatory action by national or local governments.

The hopes and fears concerning the Internet's impacts are tempered by the acknowledgement that they – for the time being – focus on the technology's potential rather than its actual usage. The contingent nature of the Internet suggests that (at least some) people have a choice when using the net whether they want to block out information and values that do not "fit" with their own beliefs and norms or whether they want to experience these "foreign cultures" (cf. Shapiro, 1999). The window of opportunity for such a choice narrows to the extent that the Internet matures. Particular features of the systems' software components or of certain conventions among network users become "locked-in." But neither the technological nor the socio-cultural features which the system has assumed at a certain point of time determine its future development. Given these reservations, technology does shape culture, which is to be understood here as a set of collective social values and norms and the respective individual value commitments and moral evaluations.

3.1 The early Internet culture

The Internet has developed into virtually the only public global computer network open to corporate and private use. The original engineering concepts underlying this network of networks were, as was already mentioned above (section 2.1.), invented in projects funded and coordinated by ARPA. ARPANET linked the nodes of a distributed, university-based community of research contractors engaged on ARPA's programs. It was a research rather than a military network and it provided as much a test-bed for experiments in data switching and transmission as it facilitated communication among the research community.

The TCP/IP protocol stack as the central interconnection standard provided a uniform addressing scheme and transparent transmission of packets of data between the end nodes, but left all other network functionality to be implemented in these nodes and not in the infrastructure of the network. The in this respect "stupid" network, as the Internet has been called recently, has departed radically from legacy networks of voice and data communication (Isenberg, 1997). No single network operator controls the network of networks which in an important sense constitutes an "unmanaged" system. In 1982/83, TCP/IP became the official standard of ARPANET.

Another piece of history of technology has to be added in order to gain an adequate understanding of the early Internet culture. It relates to the Unix portable operating system which was invented in the Bell Labs of the U.S. telephone giant AT&T and developed further by computer scientists at Berkeley University. Here it was modified (in the early 1980s) to be used for computer networking, and the protocol stack TCP/IP was built on top of it. Unix was free "open source" software developed collaboratively outside the commercial world. At the time open source software was the domain of "hackers" – computer enthusiasts for whom programming is an expression of identity (Holtgrewe and Werle, 2001). The central normative orientations of hacker culture are the freedom of information and knowledge, universal accessibility of technology, and a commitment to technological excellence and aesthetics ("elegant" code).

With the "fusion" of TCP/IP and Unix the community of scientists and engineers,

most of them involved in research and development in universities and public and private research and development organizations, intermingled with the hackers. This created a cultural ambience that together with the heterogeneous technical context resulted in a specific technical architecture and a corresponding set of cultural values which are sketched in Diagram 4 (Werle, 2001c).

Diagram 4: Correspondence of Internet and culture

Elements of the tehnical arhitecture	Corresponding cultural values
• Decentralized network structures	• Individualism, freedom, self-responsibility
• Minimal central coordination	• Mistrust towards bureaucracies and hierarchies
• Tehnical autonomy of networks soft integration	• Respect for autonomy and heterogeneity
• Open source software, public domain software	• Creativity, cooperation, active participation
• Great variety of tehnical options	• Innovativeness

On the technical side we have a decentralized network structure requiring minimal central coordination. The technical autonomy of each single network has remained unaffected. Central parts of the Internet are based on open source and public domain software. The transparent "end to end" nature of the Internet provides for a great variety of technical options. The technical structure corresponds with cultural values such as individualism, freedom and self responsibility and attitudes of mistrust towards bureaucracies and hierarchies. Autonomy and heterogeneity are as highly respected as are the norms of creativity, cooperation and participation which are seen to promote innovativeness.

These technical and cultural elements have their early roots in the era of ARPANET and open source Unix. They developed further and were strengthened after the National Science Foundation launched its TCP/IP based NSFNET – the backbone of the early American research and education Internet. The technical architecture of the Internet made it comparatively easy to connect ever more networks to the Internet which in its early years first of all attracted other research and education networks. Among these networks was the well known Unix (UUCP) based USENET. As a system of newsgroups (bulletin boards), USENET was originally designed to provide a forum for Unix users to discuss their problems and to assist each other in using this operating system. Very soon it grew into a platform for a broad variety of newsgroups including anti-authoritarian student groups and hacker communities (Hauben and Hauben, 1997). USENET relied on self-organization and also on self-restraint. Many USENET rules and norms gave rise to the informal code of conduct for Internet users sometimes referred to as *Netiquette*. It includes rules such as "never disturb the flow of information" and "every user has the right to say anything and to ignore anything." Such rules can be viewed as natural extensions of fundamental values of American society, such as freedom of speech and free flow of information which will be addressed in the next section.

The Internet's history shows that it evolved in a cultural context that was shaped by the communities of designers and users whose members were scientists and engineers. Their enthusiasms for unrestricted exploration and experimentation fused with the political milieu of anti-authoritarianism of the computer hacker communities that emerged in the context of open source software development. The technical design of the initial Internet embedded, reflected and reinforced these cultural elements.

3.2 Towards a global Internet and a global culture?

It was the technical architecture of the early Internet, the openness and connectivity it provided, combined with its cultural attractiveness that spawned its growth. The technical ease with which the Internet's reach could be extended into many diverse cultural settings provided incentives and exerted pressures towards cultural change. This has been realized and debated for some time. Early on the tendency has prevailed to regard the increasing globalization of the Internet and in particular its global commercial use as a threat to local cultural diversity and a driving force towards establishing a mono-cultural world.[6] It has triggered – as a counter-reaction – efforts to control the use of the Internet and the content which is communicated via the net. I will not go into details concerning the control of the Internet but rather concentrate on the question whether the dynamics that unfolded as a consequence of the interdependence of technology and culture have resulted in some kind of cultural mega-trend, being a trend towards either cultural globalization, or cultural convergence or cultural pluralization.

3.2.1 Cultural globalization

As the Internet has developed into a global network it may sound like a truism that it will potentially trigger cultural globalization. Individuals embedded in a local culture, indeed, come into contact with new cultural elements when they enter the Internet as users. They are afforded the opportunity to remain a member of their original cultural groups and at the same time share the cultural values of the Internet. These values will be global to the extent that the Internet is global if they are shared by the majority of users. The technical features of the Internet create great tolerance for diversity. But without adherence to the kinds of quasi-universal values represented by the cultural elements included in Diagram 4 (above) and to the norms of the *Netiquette*, it might be difficult to communicate, interact and associate in the open and relatively unregulated *cyberspace*. The globalized culture of the Internet is the insulated culture of cyberspace which allows "freedom without anarchy, control without government, consensus without power" (Lessig, 1999: 4).

More often than not observers talk about this culture of cyberspace as a culture of the past which has never more than marginally affected "real world" culture. The "Netizen culture", it is argued, has contributed in a very significant way to the growth of the Internet, but it represents no more than a historical chapter in its development. With the Internet's diversification all kinds of social groups and commercial firms have entered the network which has changed the character of cyberspace. If there has ever been a

homogeneous, cohesive and collegial Internet community it does not exist or at least does not prevail anymore (cf. Gattiker 2001). But these changes have not done away with the Internet's fundamental characteristics such as decentralization, user involvement, openness and self-organization and the corresponding elements of a culture of cyberspace. The cultural foundation of cyberspace which evolved at the time when the Internet was a research and education network appears as an "old cultural layer" but it has not (yet) disappeared (Helmers, Hoffmann and Hofmann, 1998: chapter 1). The cultural values are shared and upheld by the Internet pioneers and by many technical people in the Internet Engineering Task Force (IETF) which comprises a couple of thousand volunteers developing technical standards and guiding the technical development of the Internet. In 1995, when the Internet backbone was decommissioned by the National Science Foundation and "privatized" and when it became obvious that the Internet would develop into a global network the IETF issued a memo including "Netiquette Guidelines" to help new users to become familiar with the Internet culture. It is acknowledged in this memo that "in the past, the population of people using the Internet had 'grown up' with the Internet, were technically minded, and understood the nature of the transport and the protocols" while "today, the community of Internet users includes people who are new to the environment. These 'Newbies' are unfamiliar with the culture." They would not need to know about transport and protocols but were to be brought into the Internet culture quickly; and the memo offers a minimum set of behaviors which is recommended (Hambridge, 1995, RFC 1855).

The appearance of formal instructions such as the "Netiquette Guidelines" indicates that it has become increasingly difficult to keep the culture of cyberspace alive let alone convincing the majority of Internet users to share this culture (cf. Leib and Werle, 1998). Thus, it appears to be highly unlikely that a globalization of the culture of cyberspace will be a dominant cultural trend.

3.2.2 Cultural convergence

The notion of cultural convergence refers to a "real world" cultural phenomenon and not to the culture of cyberspace. It suggests that the Internet promotes a specific "real world" culture towards which other cultures converge. We have observed such tendencies in the few decades that television has been pervasive worldwide – promulgating a set of homogeneous norms of popular culture in many regions of the world. With the Internet the suggestion of cultural convergence is often associated with a reduction of local diversity and the emergence of a global mono-culture. It carries the specter of cultural hegemony – the concern of many that the architecture and software of the Internet so strongly reflects the language, values, and interests of the United States that other cultures will be either disadvantaged or displaced as this network exerts an ever-increasing influence not only on the language of commerce and discourse, but also on community life, business style, education, and entertainment. Those who hold this view point to the fact that the Internet originated in the United States and is deeply entrenched in the U.S. culture. Although the Internet is currently growing faster among non-native English speakers than in the English speaking world still 70 percent or more

of all Internet content is in English (Frieden, 2000). The predominance of English, the preoccupation of most providers with the U.S. political climate and also parts of the traditional culture of cyberspace all are seen to contribute to this cultural hegemony.

In fact, when one group or nation comprises a significant, even dominant fraction of the users, then the hardware and software and the preponderance of the information available on the network are likely to reflect the interests and culture of that group. The language used on web sites is clearly one measure of the extent of this kind of dominance. A very large fraction of all web sites use English even if the providers are located in non-English speaking countries. There is some evidence that English as the language of the early Internet benefited from the "first mover advantage" of significant content in English which encouraged non-English speakers to use English language web sites (Gandal and Shapiro, 2001). To the extent that language accounts for the hegemony of U.S. culture this hegemony has emerged in processes similar to bandwagon effects in high-technology markets and it has not been imposed.

In a world of networked communication, language takes on an importance even greater than that in broadcast or entertainment media because it affects not only how well one can understand what is said or written, but also how effectively one can communicate. Thus the requirement that one communicate in an unfamiliar language can be regarded as, effectively, a restriction on freedom of speech. The English language in that sense exerts soft pressure on those who have difficulties with foreign languages to bear the burden of learning English. Those who raise the issue of cultural hegemony point out that the problem could go even deeper. With English speakers dominating the network population, market considerations dictate that a large fraction of the software written for use in conjunction with networks will also be developed in English. At present, for example, it is estimated that American companies develop about 80% of packaged software. Thus English is not only the language of communication but also that of programming.

With the prevalence of one language and culture driving both the creation of and the market for operating systems, databases, digital music, advertising, and the range of Internet services, the content available on the Internet will primarily reflect that one culture. To the extent that the Internet, through its efficiency and ubiquity, begins to dominate the social and intellectual life of a nation, this would be tantamount to cultural hegemony. If bandwagon effects and technological path dependence reinforce this pattern, the hegemony could be long lasting and to a certain degree convergence on U.S. culture appears to be inevitable.

The question then is, will convergence turn out to be the cultural mega-trend or does the Internet represent a technology that is sufficiently flexible to be re-constructed and modified in a way to adequately serve the values of non-English speaking societies, and are "minority cultures" stable enough to resist hegemonic pressure.

3.2.3 Cultural pluralization

Cultural change is evolutionary change. Often it is unintended, and it usually cannot be imposed politically. Although the U.S. culture dominates the Internet users can be exposed to very different cultures. The exposure is an inherent component of the broad

range of activities and information exchanges that occur through the Internet. To a great extent, the "foreign" cultures are experienced rather than merely observed. One does not need to accept these new values or outlooks in their entirety, but to the extent that they appear unfamiliar or "foreign" they create awareness of one's own cultural embeddedness. This awareness in a Durkheimian sense reflects and underpins rather than replaces local cultural values. Meeting with an unfamiliar culture may also give way to a more nuanced and relative perspective. Furthermore, space for new, culturally localized content is virtually unlimited; it can and will be added as the penetration of the Internet continues. Taken together these developments may trigger cultural plurality.

Moreover, the use of the Internet can help to preserve and transmit language and culture of people who migrated from the less developed to the developed world. In a *de facto* sense, language zones have already evolved in many parts of the developed world (cf. Gandal and Shapiro, 2001). Most German, French, and Japanese computer and Internet users can conduct most of their day to day activities in their native languages. Also some content providers have already translated information for local usage. Similar developments can be observed with the language of cultural minorities. The Internet has made it rather easy to maintain close connections across long distances which supports cultural diversity. As the locality as a cultural glue has lost significance many territorially scattered cultural minorities reach a "critical mass" of interaction and transaction partners via the Internet which helps to establish cultural identity and preserve plurality (cf. Markus, 1987). Technical developments foster these different forms of cultural differentiation. Service providers offer customized access and search capabilities which help users to focus their attention on content which they prefer and screen out senders and content which do not conform to their value commitments. Cultural minorities can protect themselves from being exposed to a hegemonic culture by setting up "intranets" sheltered by electronic "firewalls" from the rest of the Internet.

I have argued that cultural change is evolutionary in nature and usually cannot be imposed by political means. If, however, cultural values, in particular values of the political culture, are grounded in a country's legal system some political or judicial action may be required to alter these values. There are various instances suggesting that the expansion of the Internet has brought about external political pressure towards changing legal rules with a high normative or cultural significance. But in many cases countries unwilling to compromise fundamental values withstood these pressures. Take for example free speech and the tension concerning the interpretation of this value between the United States and Germany, two culturally comparatively similar countries.

For both countries, freedom of speech is an important value, so important that it is protected explicitly by the First Amendment to the U.S. Constitution and by Article 5 of the German Basic Law. The First Amendment has been interpreted very broadly by the U.S. courts. They give the value of free speech more weight than essentially any other value. Free speech also covers so called hate speech defined as the willful, public expression or promotion of hatred towards any segment of society distinguished by specific characteristics such as color, race, religion or ethnic origin. Attempts in the United States to legally proscribe hate speech have invariably failed, struck down by

the Supreme Court. Even though the U.S. is "clearly outside the international mainstream in the area of free speech" legal changes to restrict free speech are not likely to happen any time soon (Biegel, 2001: 351). Moreover, given the current dominance of the U.S. culture in the Internet other nations are forced to reconsider their own more restrictive rules and may adapt them to the U.S. norms.

In contrast with the United States the German legal system generally penalizes hate speech. But the Internet which facilitates easy cross border communication has made it possible that pamphlets using hate speech can be transmitted from an American source to Germany and circulated there. German prosecutors have no leverage to take action against U.S. sources of hate speech. This adds to the difficulties every government already faces "at home" as to where the most practical point is to control and intervene into Internet communication. Despite these considerable difficulties governments do not completely lose control (cf. Lessig, 1999; Shapiro, 1999). This holds also true for the German government which is unwilling to compromise hate speech legislation.

With the laws in the United States and Germany as different as they are in this case, and with the strong consensus and deep, principled conviction that exists in each country for its own law concerning free speech, it is easy to see that the differences will inevitably lead and have already lead to conflicts. A fundamental dimension of these conflicts relates to the question how much government intervention is needed given the availability to users of technical means to screen out and shelter themselves from content which they want to avoid. Filtering technology such as the Platform for Internet Content Selection (PICS) developed by the World Wide Web Consortium which provides a kind of content labeling infrastructure for the Internet enables users to selectively block content. PICS relies on content rating and labeling by Internet Content Providers, third parties such as government agencies or directly by the users (Resnick and Miller, 1996; <http://www.w3.org/PICS/>). This solution is compatible with the American political culture of preferring (industry) self-regulation to government regulation and with the old Internet culture and its strong reliance on self-determination of individuals who have the necessary technical expertise to protect themselves from harmful content in the net. As filtering technologies usually do not eliminate content from the Internet but only control access to or diffusion of content in the net they are, in principle, also compatible with cultural pluralism.

Technology, in this case, appears to be neutral with respect to cultural developments. Thus, it is unlikely that the principles of free speech will converge towards the U.S. culture and also the pressure to harmonize laws concerning hate speech remains low. Cultural pluralism will be preserved.

3.3. Towards soft regulation

The analysis of the effects of the Internet on culture concentrated on rather general aspects. This rules out to provide substantive policy recommendations. A few rather formal suggestions, however, follow from the foregoing. They point into the direction of enabling rather than restrictive regulation.

1. The Internet is only one among a variety of electronic communication media, including TV, which affect culture. If policy makers believe that regulatory action is necessary they should define what outcomes are desirable and undesirable and regulate all media and not just the Internet.
2. Governments should seek to reinforce the self-coordinating and self-regulating dynamics of the Internet. But it is also required to accommodate new forms of hybrid public-private international regulatory regimes, in particular for small countries because they do not have the capacity to control significant fractions of the global Internet.
3. Besides a certain tendency towards cultural convergence the Internet also facilitates cultural heterogeneity and pluralism. If governments want to preserve national cultural values, they are well advised to promote access to the Internet through removing barriers to entry, such as educational, financial and regulatory obstacles.
4. Accessibility in terms of affordability, usability and ubiquity of the Internet will encourage "minorities" to establish their communities in the Internet and reinforce their value identity. Thus, universal access and not universal governmental control will be the best way to prevent global convergence towards cultural uniformity.

Notes

1. This section is based on Werle, 2001b and on David and Werle, 2000. For more information about the author's Internet related research, please visit < http://www.mpi-fg-koeln.mpg.de/internet/>.
2. Slovenia was added in Diagram 1. It is not (yet) a member of the EU.
3. Recent developments in the area of backbone and service provision indicate that similar to the electronic media and the telecommunications industry big Internet players have emerged. We observe a process of "consolidation", which started before the "new economy" bubble imploded. The likely consequences and public policy implications are discussed under the heading "Balkanization" and "the end of End-to-End" (cf Frieden, 1998; Kende, 2000; Clark and Blumenthal, 2000; CSTB, 2001; David, 2001; Lessig, 2001).
4. The IST program (1998–2002) is part of the Fifth Framework Programme. It has an initial budget of 3.6 billion EURO. See <http://www.cordis.lu/ist/home.html>
5. This analysis is based on background material and a report on "Global Networks and Local Values" commissioned and put together by an American German committee of experts from different disciplines under the auspices of the US National Research Council (NRC) and its Computer Science and Telecommunications Board (CSTB) (Committee, 2002; Engel and Keller (eds.), 2000a; 2000b). The author is a member of the committee.
6. However, these propositions must be seen as an attractive starting point to stimulate the discussions and not as the result of the debates. See, for example, the report of an international "Working Group on Content and Cultural Values" (Kleeman, 1999) or chapter 4 of the report of the European "Forum Information Society" (Forum, 2001) and also as an early contribution CSTB, 1994.

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