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Modes of Structured Interplay in the Modeling of Digital Futures

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Conflict, competition, and cooperation are the three fundamental modes of creating future society. This article aims to show that these three categories can be meaningfully applied to an analysis of the social shaping of the new global mediascape and digital futures. It examines the rise of the Internet and its related technologies from a global and comparative perspective, paying particular attention to the role of key social actors and the changing modes of their interplay. It will then discuss the social consequences of current trends and point to the stakes of future development. The goal is thereby not to provide an exhaustive account of the creation of digital futures but to contribute to the orientation of questions for empirical research with normative relevance.

COMPETITION, CONFLICT, AND COOPERATION IN FUTURES RESEARCH

Futures studies owe as much to nineteenth and early twentieth century traditions of thought as any other sociological field. This is especially true when tracing the origins of how the principles of competition, conflict, and cooperation entered the field. Charles Darwin's evolution-theoretical concept of the 'survival of the fittest' and Adam Smith's notion of the 'invisible hand' of the market that could be entrusted with distributive and regulatory order functions came to inform the model of competition. Karl Marx's notion of inevitable class struggle was taken up and further developed by different strands of conflict theory. Emile Durkheim's notion of a modern society held together by organic integration and the collaboration of complementarily specialized social sectors lacked attention to conflict but it raised important questions about the conditions of possibility for social order and cooperation.

The field of futures studies, which began to boom in the 1960s and 1970s, shared its technological enthusiasm with the theorists of early industrialization. The wave of futures studies prepared in the 1960s was above all characterized by a belief in technology as savior. Books about the future in the year 2000 had become widely discussed

bestsellers (e.g., Bell, 1968; Jungk and Galtung, 1969; Kahn and Wiener, 1967). Most of these displayed an outspoken optimism based on technological progress and focused on the benefits of space age technologies and mass consumer goods (see the overview in Bell, 1997a). This optimism was given credence by experiences in daily life. Technological breakthroughs, such as the landing of an Apollo rocket and the first steps of a man on the moon, were televised to a global audience. Mass-produced technology, including the automobiles and an increasing plethora of household electronics, had become affordable to ever wider circles throughout the wealthier countries. It was hoped that the Green Revolution would feed the Third World, and technology was believed to trickle-down to all people on the planet.

Yet, this technological optimism was soon to give way to a more pessimistic perspective. A variety of heterogeneous factors led to this shift. The oil crisis of the early 1970s led to a world-wide recession. The consequences of this abrupt stoppage of growth were felt not only by motorists but by consumers world-wide. The welfare-states of the First World ran into a crisis of legitimacy. The historical compromise between capital and labor was put to a test as the cake for redistribution had slowed down its growth or even had stopped growing (Offe, 1987). The Report to the Club of Rome by Dennis Meadows and his collaborators expressed a strong warning about the *Limits of Growth* (Meadows *et al*., 1972) and became famous as it touched a chord of concern. An environmental movement began to emerge in an increasing number of industrialized countries criticizing the abuse of planetary resources. Other critics warned about the specter of a Third World War. The growing arsenals of nuclear weapons had resulted in thousandfold overkill capacities. Technology became seen as an imminent threat by the Cold War's peace movement. The Third World developed the Dependency School (Amin, 1977; Cardoso and Faletto, 1979; Frank, 1967), which argued that modernization theories and trickle-down assumptions of development were naïve and that Third World was positioned in a system of unequal terms of trade that did not allow any betterment for systemic reasons.

After the decline of futures studies during the later 1970s and 1980s, we see a re-emergence of futures research with yet more sophisticated methodologies, sharper methods, and a consciousness of time characterized by a fundamental contingency that is open to the horizon of the possible and the politically shapeable (Bell, 1997a, b; Boulding and Boulding, 1995).Contemporary social theory expressed this in its emphasis on the 'creativity of action' (Joas, 1996) and in the explicit inclusion of the factor 'human agency' (Emirbayer and Mische, 1998).

In an effort to summarize the work currently being undertaken within the field of futures research, one can distinguish four major approaches: (1) forecasts, especially those based on Delphi-Interviews with leading experts in research and development (e.g., Beck *et al*., 2000); (2) studies that employ scenario building techniques about possible and probable futures (e.g., Schulz, 1999, 2001d); (3) empirical research on the futures of the past or present, i.e., the images of futures prevalent during past moments of time (Bell, 1997a); the processes by which such past images of the future were constructed (Mannheim, 1936); and the efficacy of these visions for social change – this is what can be called the sociology of the imaginary (Castoriadis, 1991); and (4) normative or norm-analytical theorizing about preferable futures (Bell, 1997b), including theorizing on the relationship of values and futures, as will be attempted here.

The principles of competition, conflict, and cooperation play a role in all four of these approaches. Futuristic forecasts that draw on the expertise of scientists, engineers, economists, and other specialists accept implicitly their assumptions about

how more or less smooth current trends are expected to continue. Alternative scenarios might be constructed according to assumptions of successful cooperation between decisive actors, its conflictual breakdown, or some intermediate path. This has been done, for example, in an interdisciplinary study of the impact of the climate change on the Lower Weser region in Germany, in which indicators of social conflict, economic competition, and global cooperation were integrated into a regional econometric model for the generation of path-specific long-term future scenarios (Schulz, 1999, 2001d). The study of the futures of the past shows how certain expectations can, depending on context, serve as self-fulfilling prophecies or bring about just the opposite of the expected (cf. Bell, 1997a). Warnings about the cost of conflict can help to persuade the relevant actors to cooperate. Predictions about rising values in the stock market tend to contribute to increases in the stocks' value. Most recent normative theorizing tends to postulate cooperation as a necessary mechanism for the making of preferable futures (Bell, 1997b; Masini, 1999). The major exceptions are free market advocates, for whom competition is the only conceivable engine of innovation, growth, and progress. Yet, no matter how strongly market advocates embrace the notion of competition, it can function only on assumptions of cooperation with regard to market rules and institutional structures enforcing these rules.

However, a more detailed discussion of the role that the principles of competition, conflict, and cooperation play in all of the diverse strands of futures research would be beyond the scope of this chapter. I will therefore focus my discussion in an exemplary fashion on a – in my view – particularly salient aspect of the current future, i.e., the modeling of digital futures. A brief examination of fundamental empirical data will point to the theoretical and normative issues at stake.

UTOPIAS, DYSTOPIAS, AND BEYOND

The rising speed with which the New Information and Communication Technologies (NICT) are being introduced has inspired much euphoria among scholars and the larger public. Marshall McLuhan's famous notion of a 'global village' (McLuhan,1964) gained with the breakthroughs in digital technologies and the rise of the Internet renewed popularity. After the disillusionment with radio and television, which fostered war propaganda and mass culture industries more than global neighborliness, the Internet provided a new canvas for projecting hopes and seemed to offer the benefit of a true interactivity that the earlier electronic media had lacked. The number of people going online experienced growth rates so enormously high it appeared to observers as if it would be only a matter of a relatively short time until everyone could share the bounty of the Internet and become part of a global community.

The utopian hopes for computer-mediated global reconciliation evaporated in the course of events associated with September 11, 2001 and were replaced by dystopian views of an unavoidable 'clash of civilizations' (Huntington, 1996). The specter of cyber-terrorism was employed to justify new security measures. Critics warned of the NICT's repressive potential, pointing to a future of universal surveillance, not only by an Orwellian 'big brother' government but also by private corporations (Lyon, 2001; Sassen, 2000). On the other hand, business hopes for windfall gains from e-commerce shattered, at least temporarily, when the 'dot.com' bubble imploded and the limits of market expansion became apparent. NICT diffusion, which was once regarded almost as an automatism, turned out to be a much more complicated matter. I will return to the various aspects of these contradictory visions of alternative digital futures after a brief examination of empirical data on the global diffusion of NICT, which will also help to point to the theoretical and normative issues at stake.

THE DIFFUSION OF THE NEW INFORMATION AND COMMUNICATION TECHNOLOGIES IN GLOBAL AND COMPARATIVE PERSPECTIVE

By the end of 2004, the global cyberspace of the Internet was populated by more than 870 million users world-wide, according to estimates published by the International Telecommunication Union (ITU, 2005). More reliable than estimated user numbers are counts of Internet host computers.[1] A July 2005 count by Network Wizards put the figure for host computers world-wide at above 350 million (ITU, 2005). A quarter century ago, in August 1981, there were only 213 hosts, which were accessed by not more than a few thousand users (ITU, 1999; Zakon, 2002). According to a widely shared assumption, the price for Internet access is bound to decline with competitive mass production of the necessary hardware and, as a consequence, the number of the users was and is expected to continue its rapid rise. Current trends were and are seen as strongly suggesting that in a few years, Internet access will be just as common for the majority of people in the industrialized zones of the world as newspaper, radio, and television are today, while there may be at least a partial convergence of these media. Prognoses however that predicted constant annual growth rates of 100% for the early years of the new century (Odlyzko, 2001) have already proved wrong.

Although the Internet can already be accessed in virtually every country of the world, the distribution of access is very uneven. Internet access in the financially weaker countries still continues to be largely restricted to educated urban elites. This is especially true for countries in Africa south of the Sahara and north of the Republic of South Africa. Latin America takes an intermediate position, as there are some countries with little infrastructure and others that are developing rapidly.

At the end of 2004, more than half of the world's estimated Internet users were based in North America and Europe, but only 7% in Latin America and, even fewer, only 2%, in all of Africa (ITU, 2005). A breakdown of the more reliable host counts shows a similar imbalance. At the end of 2004, an estimated 85%of the world's 265 million Internet host computers were in North America and Europe, but only 2.5 in Latin America and merely 0.16 in Africa, where most of them had been concentrated in the Republic of South Africa (ITU, 2005). The most recent user estimates published by ITU (2005) indicate that in the world-wide average there are 13.86 Internet users per 100 persons. The corresponding figures for the USA and Canada are 62 and 63%, for Europe 31.8, for Australia/Oceania 51.7, Asia 8.3, and Africa 2.6%. There are also great disparities within regions. In Latin America, for example the corresponding user figures range from 27.9 in Chile and 23.5 in Costa Rica down to 2.5 in Paraguay and 2.2 in Nicaragua, while the most populous countries, Brazil and Mexico, have averages of 12.1 and 13.4 respectively (ITU, 2005).

There is a plausible expectation that the share of less represented regions will rise as the penetration rates in North America and Europe approach saturation levels, yet these uneven distribution figures need to be kept in mind when discussing the rise of the Internet and the diffusion of the new information and telecommunication technologies. Only one third of the world's Internet users reside outside OECD countries, while of the world's broadband users, it is less than a fifth (Organisation for Economic Cooperation and Development (OECD), 2005). More striking yet is the imbalance when looking at the access opportunities in the poorest countries. As the OECD (2005) observed, the 45 least connected countries, together, have no more international connectivity than a single high-end user with a 100 mega bits per second broadband line in Japan. Yet the meaning of center and periphery does not neatly coincide with national borders, if it ever did.

Educated urban elites from currency-weak countries appear on the same side of the digital divide as the middle classes of post-industrial countries. Digital inequalities exist across and within countries.

A brief glimpse at the diffusion patterns of television sets can provide some indication of the ability to save up funds over long periods of time to acquire a popular but somewhat costly electronic device. Television sets are appliances that depend neither on a wired infrastructure nor on sophisticated skills for their use, and they have had several decades for their diffusion. While the average number of TV sets per 100 inhabitants is well above 80 in the USA, the equivalent figures in the Latin American countries mentioned above range from 14 to 32%. The diffusion rates for TV sets illustrate the limitations of market-driven distribution models insofar as they show that these electronic devices could be obtained by some part of the population but not by others and that the portion of the population that was able to acquire it is several times smaller than in the USA.

DIGITAL INEQUALITIES

Whereas much of the emerging sociology of cyberspace has focused on domestic aspects of leading OECD countries, this article advocates a global and comparative perspective that takes into account the experiences and conditions of both center and periphery. The restructuring of communicative relations is global, though not globally uniform. The trajectories of regulation, usage, and impact of the NICT vary widely between world regions, across and within countries. Current trends point to very unequal chances for participating in the emerging network structures and public spheres of incipient global civil society (Castells, 1996; Sassen, 1997; Schulz, 2001a; Wellman, 1999). The modes of NICT implementation and regulation at national and global levels have a decisive impact upon the distribution of access chances, access quality, and opportunities for usage.

Studies of Internet access in the USA during the late 1990s pointed to a 'digital divide' along the lines of income, education, age, gender, and rural/urban (US Department of Commerce, 1995, 1998). According to more recent data however, these divides tend to disappear, except for the most disadvantaged parts of the population, including the poor and the disabled (US Department of Commerce, 2000). Yet digital inequalities are not only a matter of having or not having basic access, but also a qualitative issue that also has educational and socio-economic aspects, beyond technological aspects narrowly conceived. What one can do with access, depends on the bandwidth and speed, on navigational skills (Hargittai, 2001), and the capacities to process information critically and communicate effectively within multi-media environments. In addition, more and more commercial service sites require extra-payments for access. The expanding corporate intranets are password protected and off-limits to outsiders (Sassen, 1997). Whereas findings valid for the USA case might not be totally different from those for other post-industrial countries, these cannot be further generalized to cover the situation in the global South which seems to be strikingly different.

Why are digital inequalities a problem? Are there not more urgent concerns in countries in which basic needs for clean drinking water, nutrition, sanitation, shelter, health, and basic education are not met? Is not the diffusion of new technologies just a matter of the time it takes to trickle down to the latecomers? The problem we are witnessing is a widening of the gap between those who are well-off and those who are marginalized and excluded. Those who can connect to cyberspace can use it for their social, economic, and political benefit. Let me illustrate the potential importance of access to NICT for marginalized groups with two examples. In the perhaps most famous case, the Zapatista rebels in Chiapas gained world-wide attention

and mobilized unprecedented solidarity when their cause was relayed by supporters onto the Internet (see Schulz, 1998, 2001b, 2001c for more detailed discussions). Less known is the case of the *Unión Regional de Ejidos y Comunidades de la Costa Chica* (Regional Union of Communal Landowners and Communities of the Costa Chica, the URECHH), a regional association of indigenous communities on the Costa Chica in Oaxaca. The URECHH was able to overcome its problems with the intermediary buyer of its members' agricultural products after it located a fair trade buyer in Canada on the Internet with the help of *Servicios Profesionales de Apoyo al Desarollo Integral Indígena* (Professional Support Services for Integrated Indigenous Development (SEPRADI)), a Mexico City-based NGO. In both cases, access to global means of information and communication meant gaining political and economic strength, without which the prospect for an upgrading of conditions might not have improved in the same way.

The social distribution of formal and effective NICT access is largely the product of pronounced socio-economic inequality and at the same time a cause for further inequality. An elite of the well-connected and best-connected is emerging *vis-à-vis* a majority that has only insufficient access or no access at all. Those who are excluded from access are at a disadvantage relative to those who are connected. This is true both economically, because they cannot access profitable knowledge and useful contacts, and politically, because they cannot use these media for generating communicative power. Digital inequality, thus, is not an irrelevant 'luxury' kind of inequality. It is not only an additional dimension of social inequality but it increases the existing inequalities. The already marginalized parts of the population are exposed to the acute danger that digital marginalization will marginalize them even further. Having pointed to the stakes involved in the formation of the new global mediascape, I will now examine more closely the processes by which these are created.

THE SOCIAL SHAPING OF THE INTERNET

The theoretical perspective employed here rejects not only the resilient assumptions of technological determinism but also one-sided political-economic structuralism and outright voluntarism. To be sure, one-sided perspectives can have the heuristic merit of recognizing through exaggeration the significance of underappreciated factors. For example, White (1966) made the famous technological-determinist argument that feudal society was the result of the invention of the stirrup. In her view, the stirrup led to a dramatic increase in military power because it made fighting on horseback more effective. Mounted combat then required a new economy that could produce new weapons and specially trained fighters and war horses. This led in turn to a social reorganization and the rise of an aristocratic elite of mounted warriors. This historical reading has been criticized (Hilton and Sawyer, 1963). White's account is an innovative way of showing how technology can matter, but it is overly simplistic. The stirrup had come into use in many other places without causing a reorganization of society in the Frankian way. Innis (1951), and later McLuhan (1964), pointed out that all societies are profoundly shaped by the particular propensities of specific communication technologies. Ellul (1964) argued that in modernity, technology had taken over and turned humans into its servants. These types of arguments are enormously important not only for scientific discourse but also for the normative debate about what kinds of media technologies might have more preferable social implications. However, the problem with technological determinism, especially in its popular varieties, is that it lets technological change appear as a quasi-natural process that is

beyond the reach of public deliberation. One-sided economistic approaches fall into the same trap (see discussion in Elster, 1983). On the other hand, voluntaristic approaches underestimate the power of structures. The stories about genius inventors make for a popular genre but exaggerate the role of individuals (Hong, 2001; Weightman, 2003).

These short-comings can be overcome through a more holistic approach that balances structure and agency and studies how social shaping processes are accomplished in the more or less conflictual, competitive, or cooperative interplay of social actors who are understood as being embedded in institutional and structural contexts, which in turn provide both limits and resources for creative action. This approach draws on technology studies by Latour (1987), Bijker (1995), MacKenzie and Wajcman (1999), and more generally the agency and structure balancing work of Giddens (1984). How NICT are shaped is thus seen as the outcome of a complex interplay of social forces. These forces include socio-economic structures, legal frameworks, political systems, cultural patterns, the options and constraints set by previous technologies and the agency locatable in a range of social actors with differential means of influence (cf. Kubicek *et al*., 1997 and Wilson and Kahin, 1997 for the USA and Europe; Herzog *et al*., 2002 and Schulz, 2001a for Latin America). The contextually embedded social actors involved in these more or less contentious shaping processes include, *inter alia*, transnational corporations with interests in software, hardware, and e-commerce, intergovernmental organizations and international treaty frameworks, political-administrative elites, domestic legal frameworks and courts of jurisdiction, domestic corporations and lobby groups, NGOs, users, consumers, and civil society initiatives, all with differential interests, resources, imaginary capacities, and strategies acting in changing contexts and constellations. Several partly overlapping phases can be analytically distinguished in the development of the Internet according to which social actors took the lead and in the type of interplay among actors.

Phase I (1970s–1980s)

The Internet's predecessor, the ARPAnet, was funded by the US Department of Defense in an effort to bolster the American lead in research and technology after the Soviet Union's successful launching of Sputnik had indicated that the Cold War opponent was catching up. The concepts of a redundancy of links and the transmission of messages in smaller, flexibly switched packets had been developed in the 1960s at RAND, a think-tank close to the Pentagon, as part of a plan to set up a decentralized communication infrastructure that could survive the breakdown of some of its nodes in the scenario of a nuclear attack (Baran, 1964). Although initially hesitant about the possibility of relinquishing control over their computers by linking them to others, computer scientists recognized the benefits of such a network rapidly and developed a thriving culture of cooperation among colleagues at distant campuses (Abbate, 1999). ARPAnet was eventually transformed into the NSFnet, with funding provided by the National Science Foundation. The conflict of the Cold War can thus been seen as having given impetus to the development of the Internet in its early phase. Yet, crucial within conflict was the principle of publicly funded cooperation among research scientists. Moreover, the state-led development of ARPAnet and NSFnet has to be seen also in connection with developments centered in the counter-culture of the Californian Silicon Valley.

Phase II (1970s–early 1990s)

Silicon Valley computer scientists envisioned decentralized personal computers as alternatives to the big mainframes that only resource-rich institutions could afford. Linking their computers via conventional phone-lines and

modems, they developed an open culture of free content sharing and collaborative work on software codes. The sociable uses of the net gave rise to increasingly far-flung 'virtual communities', such as those on the Whole Earth 'Lectronic Link, the electronic bulletin board system better known under its abbreviation as the WELL, which was founded in the Bay Area of San Francisco in 1985 by Stewart Brand and vividly described by Rheingold (1993). NGOs soon recognized the potential of these network technologies for their efforts to build linkages not only among activists across the USA but also abroad. The San Francisco-based Association for Progressive Communication (APC) spearheaded the outreach efforts to global civil society and played a pivotal role in setting up nodes in scores of countries around the world.

Phase III (mid-1990s to the present)

The third phase is characterized by increased commercialization. It began with the introduction of graphical user interfaces, which lowered the threshold of skills required for using a computer and facilitated navigation on the rapidly expanding World Wide Web. The Hypertext Markup Language (HTML), which was crucial for the construction of the World Wide Web, was developed with public funding in the European research center, CERN, but private companies took the lead in developing a plethora of software applications and in providing access to the net. America Online (AOL) and other companies became the most popular access providers of the then privatized Internet for an exponentially increasing number of subscribers. The market for computers and software was soon dominated by IBM-compatible hardware and Microsoft's proprietary operating systems and applications.[2] As the number of users began to represent an ever growing consumer market, advertising companies invented new techniques of sending out electronic spam, integrating pop-up ads on popular web-sites, and collecting data profiles of users. The ability to freely exchange identical copies of digital content on the net alerted first the music and later also the film industry. Their lobby efforts led in the USA to the Digital Millennium Copyright Act (DMCA), which severely restricted the previous user rights to fair use of cultural content. Large-scale non-commercial peer-to-peer file-sharing networks (P2P) were more or less effectively shut down and replaced by profit-seeking content providers.[3] Corporations with vested interests in patents and copyrights had already exercised their influence on the Trade Round on Intellectual Property and Services (TRIPS) and model laws prepared by the World Intellectual Property Organization (WIPO) and the United Nations Commission on International Trade Law (UNCITRAL) (Sell, 2003; UNCITRAL, 1998), which in turn were to shape the legal definitions of the participating countries (Schulz, 2002). The world-wide computer networks are the technology behind the global trade in financial derivatives and the accelerated circulation of capital. In principle, they would allow a taxation of these flows, which could then be used to fund supranational agencies and cooperative initiatives; but there is no sufficient political will to do this.

The competition-based mode of development failed to solve the problems posed by digital inequalities and the needs of citizens for a global media infrastructure supportive of a democratic public sphere. The World Bank, the International Monetary Fund (IMF), and the OECD continue to push countries toward privatization and liberalization of their telecommunication sectors with the argument that competition brings down prices. But this is only true under the condition that strong state regulation is capable of creating and enforcing level playing fields. A private oligopoly that captures its regulatory agency is not necessarily performing any better than a well-run state provider. The main problem, however, in many poorer countries with a high degree of social

inequality is that the impoverished sectors are not of much interest to commercial providers if these are left unregulated. And it would neither solve the problem of how to access password-protected, subscription-only quality content nor of how to provide the education for turning passive consumers into active users.

In the absence of valid regulations for toxic waste, obsolete NICT garbage from the well-connected countries appears to be dumped under the rubric of recycling in the poorer countries, where it creates environmental health hazards. It thus appears that the unfettered market forces that prevent people at the margins of the digital world from sharing the benefits of the cyber-age expose them at the same time to its externalized cost. In a recent study, the Basel Action Network (BAN), a Seattle-based NGO, estimated that three quarters of the NICT products shipped to Nigeria for recycling are actually neither usable nor economically repairable and end up as unaccounted toxic waste, which is frequently discarded in poor shanty-towns (Puckett *et al*., 2005). This toxic waste regime is partly made possible by the fact that the United States has neither ratified the Basel Convention, which would make such practices illegal, nor implemented equivalent regulation.

Meanwhile hopes are being projected on the new round of technologies. Wireless services are currently experiencing a boom. The number of wireless phones has already surpassed the number of fixed phone lines. Although wireless connections are currently not as powerful as services via Digital Subscriber Lines (DSL) or cable, it can be expected that they will be improved and eventually replace wired technologies. This presents opportunities especially in countries with less developed fixed line infrastructures but sufficient individual purchasing power.

The development of a US$100 laptop computer could push up diffusion rates throughout the developing world and may help computer manufacturers expand beyond rapidly saturated markets. But it still leaves open the question of whether a US$100 laptop user in Sub-Saharan Africa will have the same kind of access to the Internet as a high-end user in New York or Tokyo. It also leaves out the question of whether the low-end user will be able to engage in the same information and communication multi-media activities as the high-end counterpart or whether he or she will be a second-class citizen in cyberspace while being told to just wait for the next new technology to trickle down and solve any problem then.

MODELING DIGITAL FUTURES

A new phase in the development of the Internet might have just started but its mode and outcome are quite uncertain. That the future NICT will offer more capabilities and more bandwidth supportive of audiovisual content is easy to imagine, as leading research institutions are already building with public funding Internet2 as a high-speed successor to the current Internet. The trends point to it being dominated by a mixture of commercial and USA security interests but there are also emerging counter-trends. The US Department of Homeland Security that was set up in the wake of the attacks on the World Trade Center in New York and the Pentagon in Washington seems bound to assume more and more control in the name of the war against terrorism. The Echelon system for the interception of international Internet communications through filters was already established prior to these attacks. Private companies are inventing ever new technologies for collecting data on consumers in a legal environment which does not provide effective protection. An anti-trust suit against Microsoft was discontinued by the federal administration but individual states continue the legal battle in the USA, and the European Union has advanced its own legal proceedings to curb what it perceives to be flagrant monopolistic business practices undermining fair market competition.

There are also signs of an alternative future development of the Internet driven by the principle of cooperation. This model is supportive of the vision that the global mediascape belongs to a global community and that there should be a social right for communication. Parallel to the 2003 Geneva World Summit on Information Society (WSIS), NGOs organized their World Forum on Communication Rights, in which they affirmed the social right for communication and demanded a more equitable framework for global communication. On a practical level, a non-proprietary operating system has been developed under the name of Linux by a network of computer programmers who embrace the cooperative values and share a commitment to an open source code that can be freely used by anyone. Brazil, Peru, and Venezuela are among the countries most strongly promoting the use of Linux, though Microsoft has threatened costly law suits, claiming that Linux would violate copyrights. As a result, the city of Munich, Germany felt it necessary to put its Linux program on hold. The International Telecommunication Union (ITU), which had been largely on the sidelines of the Internet's development, published the results of a web survey on the question: 'Should Cyberspace be declared a resource to be shared by all?' Of the 1250 online respondents 94.2% voted 'yes', and 5.78% 'no' (ITU, 2004). The percentage of 'no' votes was higher in better connected world regions than in the less well connected ones. Although the survey does not qualify as strongly representative, it does indicate a new level of awareness within the ITU.

Whether the future Internet will follow the path of a 'Future I' dominated by commercial and national security values and the modes of competition and conflict, or the path of a 'Future II' inspired by an alternative agenda based on the social right to communicate in the mode of cooperation, is up to the actors who are getting involved in the process of its social shaping.

CONCLUSION

This chapter has argued that conflict, competition, and cooperation are the fundamental modes of creating future society. It traced these three categories from the beginning of the sociological discipline in the nineteenth and early twentieth centuries and demonstrated their applicability in an analysis of the social shaping of the NICT, focusing especially on the Internet.

The values and cooperative mode of Californian computer engineers and researchers had a profound impact on the shaping of computer networks. Their libertarian convictions and practices translated into horizontal networking, free sharing of ideas, and cooperative interaction. The Internet's predecessor, the ARPAnet, was able to flourish largely due to funding provided by the Pentagon with its aim of bolstering the technological lead against the Cold War adversary. The later privatization of what was to become known as the Internet led entrepreneurs to compete with one another over clients and customers, resulting, among others things, in the invention of email-spam and spam-blocking software and in the battles between file-sharing software and record companies. Not only does the computer code, narrowly conceived, matter in the shaping of digital futures, but also the legal code, as established by law-makers and interpreted and applied by courts. Whether the values of citizens should have been given higher regard than the values of record labels appears to have been debated only in circles too small to exercise any great pressure on the USA policy makers who voted on the Digital Millennium Copyright Act.

However, views that look only at developments in OECD countries are too limited. When taking a more global perspective, we come to acknowledge that it is only a small fraction of the world's population that has access to the new digital media. What values are behind such an unequal distribution of human goods? How does it come about that

the digital futures are primarily framed in terms of marketable property rights and not in a language of human rights to access information and communication? How are images of digital futures imagined, by whom, and with what implications for broader concerns such as social equality and democratic efficacy?

Applying the concepts of conflict, competition, and cooperation as heuristic devices to an analysis of how the NICT are being shaped, contributes not only to overcoming resilient assumptions of technological determinism but also helps to open the horizon for broader empirical and normative debates and for the imagination of alternative futures. In this chapter, the contrast between alternative trajectories was used to indicate what is at stake in the shaping of the technological preconditions of social communication.

NICT exclusion is not merely another dimension of social inequality; it increases existing inequalities. The already marginalized parts of the population are exposed to the acute danger that digital marginalization pushes them even further to the edge. This presents a major barrier to democratic inclusion and global social equity. In the absence of broader access policies, the new digital inequalities are exacerbating the existing social inequalities within and across countries.

What is the solution? Waiting for a trickle-down of NICT is certainly not enough. That would only deepen the existing inequalities during the diffusion period because those who can make effective use of NICT have a relative advantage over those who cannot, thus diminishing the chances for any leap-frogging. Moreover, when considering how quickly the development of new hard- and software makes older versions obsolete, continuous investment seems to be required more than in the case of technologies with early maturity and relatively negligible subsequent refinements that do not undermine their interoperability.

Access and access quality are only the most basic issues in the establishment of new global communication relations. The ways in which NICT can be used depends on aspects of national and international policy, such as privacy, censorship, surveillance, taxability of economic transactions, consumer protection, rights to information and communication, administrative transparency, intellectual property rights or privileges, regulatory control, standard-setting authority, and dispute resolution procedures.

The course and mode of the diffusion and shaping of NICT is not an historical 'automatism'. Social actors are not just passively impacted by new technology. They can, rather, impact the way these are implemented to the extent of their active appropriation and involvement in regulatory processes. As studies critical of technological determinism suggest, technology is a product of its 'social shaping', a process dynamically determined by technicians, developers, corporations, inter-governmental organizations, national legislators, lobby groups, users and consumers, which interact within specific socio-economic, legal-administrative, cultural and political environments. Some actors appear to have more influence than others. The question now is whether NICT will be shaped more by corporate interests or by actors in civil society in the North and in the South?

The power of consumers operates according to the binary code of buying or not buying. The power of users rests on the creative use of a given technology. NGOs, such as the San Francisco-based, globally active Association for Progressive Communication (APC) or the Mexican LaNeta, boosted the use of computer-mediated communication among grassroots actors through the provision of network access and technical expertise. The transnational supporters of the Zapatistas with Internet-savvy pioneered global cyber-activism, disseminating alternative information, linking activists, and mobilizing campaigns around the world. Yet, these types of activities might not impact those other aspects of the shaping processes that

take place in closed-door negotiations. Without doubt, it is important to set up practical projects that provide marginalized communities with NICT access, but it seems that the resources of NGOs, especially in the Global South, are far too limited to fundamentally alter deep inequalities. Perhaps most crucially lacking are actors in civil society who diffuse critical knowledge about the stakes of legal regulatory issues, conceive of democratic alternatives, and mobilize to exert pressure on governments to use national policy leverage and push for more equitable international treaties.

The dangers of digital marginalization and socio-technological misdevelopments are acute. Similar to the extent to which decisions during the early periods of the establishment of a new medium tended in the past to have a fundamental impact on its subsequent trajectory, today's social decisions about NICT are setting the tracks for future developments that might be even more difficult to adjust at later stages. The mode according to which NICT are being regulated has a decisive impact upon the distribution of access chances, the distribution of access quality and the opportunities for effective usage. The technological pre-conditions of social communication are too important for the actors of civil society to leave the arena to others.

The rapid pace of NICT development and its social shaping presents social research with urgent challenges. More research on the emerging new global mediascapes is needed to enable relevant actors to identify shapeable policy aspects and make better choices. Research about the roles of conflict, competition, and cooperation as analytically distinct modes of the structured interplay that shapes NICT can help in modeling digital futures which are more desirable than the alternatives pointed to by current trends.

NOTES

1 Strictly speaking a host computer is not the same as a server. A server is a computer program that waits to be contacted by a client program and then exchanges information with the client, while a host is a computer on which one or more servers are running. Yet, *pars pro toto*, host computers on which the server software of a local computer network runs are often referred to in short-hand as servers.

2 From the viewpoint of Microsoft Corporation, the market for operating systems is characterized by competition. Anyone could just write a new code for an operating system and compete with Microsoft's Windows. The US Justice Department under Clinton and Judge Jackson, who oversaw the Justice Department's lawsuit against Microsoft, saw it differently. In their view, Microsoft had assumed a dominating position in the market for operating systems and abused their market power to prevent smaller players from even entering into competition over other software applications by keeping crucial parts of the operating system code secret and by bundling its platform with other applications.

3 Napster, once the most famous P2P network, was shut down in July 2001 after an injunction by the United States Ninth Circuit Court and went into bankruptcy during the following year. In October 2003, Napster was re-launched as a commercial online music provider, then competing with Apple's iTunes store, which was opened six months earlier. After Napster's decline, KaZaA rose in popularity. It was seen then as less vulnerable than Napster because it had no centralized server. Yet in September 2005 an Australian court ordered KaZaA to install filters that would prevent the exchange of copyrighted materials. While KaZaA has lost in popularity to P2P rivals such as BitTorrent, eDonkey, and Gnutella, it seems likely that any P2P networks will be pursued in similar ways as Napster and KaZaA once they have grown to a size significant to commercial interests.

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