

Introduction

The rapid expansion of the Internet as a major component of the knowledge-based society has been one of the more important economic, social and political developments of the past decades. It is commonly claimed that this “revolution” has been unplanned by any government and has flourished precisely because the Net and its users have been largely free of regulation by any government. Indeed, some enthusiasts have embraced the Net precisely because it empowers individuals and seem to threaten the power of governments. At the beginning of the 21st century, as the Internet is becoming more broadly diffused and as wireless technologies open yet further opportunities, the role of governments and governance issues are being reconsidered.

The Internet is a network that offers its users the ability to communicate on a decentralized basis, and to disseminate information about commercial and non-commercial activities throughout the world. The Internet provides researchers with a powerful tool for facilitating collaborative work around the globe, increasing research productivity and innovation in the process. The Internet is also proving to be a powerful engine of innovation. In particular, the Net has enabled programmers from around the world to develop “open-source” software –of which the LINUX operating system is the leading example¹. More broadly, the Internet has facilitated collaboration on

1. In 2000, 27% of servers in the world ran on LINUX, second only to Microsoft and increasing its market share, although the program still appeals overwhelmingly to technical users and thus has not made a significant dent in the market for personal computer operating systems.

other research endeavors, and has thus enhanced the rate of innovation around the world. For developing countries, the Internet speeds up technology transfer and thus holds the potential for contributing to high technology industrial development.

Since the mid-1990s, however, the Internet has come out of the labs and has been open to industrial and commercial applications. From a historical perspective, the diffusion of the Internet as a radical innovation seems actually quite rapid. Advances in its penetration and use since the mid-1990s have been quite remarkable, especially with respect to its global reach. At the time of writing, nearly 600 million people around the world are using the Internet, up from only 26 million in 1995. However, to date the development of pure Internet activities and business models has been slower than was anticipated at the end of the 1990s. Nevertheless, despite the turmoil into which the industries were thrown by the bursting of the IT bubble, demand for Internet services is still growing. Growth is observed both in advanced countries and in developing countries, where specific uses of Internet are being explored. Besides, the Internet is becoming the locus of convergence of different technologies and services. As a result, in the near future we will enter the age of ubiquitous networks, which will connect many more people and versatile non-PC as well as PC equipment through the Internet to broadband, mobile and always-on networks in a pervasive way. In relation with these geographical and technological developments, the greatest benefits of the Net still lie in the future, and should arise mainly from the way firms, public administrations and all sorts of organizations use the Net to transform their modes of operation². In turn, further expansion of the Internet and of the information society depends on the development of a relevant set of rules.

2. Such transformation in US businesses could produce substantial cost savings and generate annual productivity gains of 1/4 to 1/2% at the beginning of the 21st century (Robert E. Litan and Alice M. Rivlin, *Beyond The Dot.coms: The Economic Benefits of the Internet*, Brookings Institution Press, 2001).

1. The Internet Revolution: A New Technological Frontier

The emergence of cyberspace is not an unprecedented event. Like other major innovations, such as the telegraph or the radio, Internet has created a new technological frontier, where “rules are inherently ill defined³”. During the early stages of a technology, there is no real need for governance rules. Once technology comes out of the labs and begins to be an instrument of commercial revolution, researchers are no longer alone and entrepreneurs aim to profit from the new technology. These people see how the technology will transfer to a mass market and how to make profits from it. Speed is essential during this emerging phase, as is the ability to see beyond the confines of established business practice. In such periods of wild expansion, pioneers and entrepreneurs try to operate between the lines of existing laws and are decidedly libertarian. But as technology matures and markets widen, even the entrepreneurs realize the cost of anarchy and ask for rules. These rules may be set by the State or by private actors, as in the case for standards in particular. The State however is called upon to create a stable framework in which the market can develop and to enforce the rules.

In the case of the Internet, the State has actually played an important role from the very beginning, and one could argue that rules have been set quite rapidly in cyberspace. Firstly, it is important to underscore the fact that if the Internet’s present use for commercial purposes was unplanned, the technology was created through funding by the government of the United States (US) and then refined by public research in Europe. Secondly, one reason for the Internet’s rapid diffusion is that it has been built upon multiple, pre-existing, interoperable networks. This fact underscores a key role for policy: among other things, to ensure continued interoperability, within and between countries. The broader institutional and regulatory environment –notwithstanding libertarian claims about the

3. Debora Spar, *Ruling the Waves. Cycles of discovery, chaos, and wealth from the compass to the Internet*, Harcourt, 2001 [p. 4].

Internet being free from government— has also been and will continue to be important in influencing the pace and direction of Internet penetration. Indeed, not only did governmental policy initially supply the seed money for the construction of the Internet, but its rapid diffusion in the US was heavily influenced by the breakup of AT & T's telephone monopoly a decade earlier. By promoting competition in the long-distance telecommunications business, the breakup provided strong market-based incentives for telecommunications competitors to purchase and lay the fiber optic network that has become the "backbone" of the Internet. In short, government policy has both helped to create the Internet and to nurture its rapid diffusion. In this respect, government is no less important here than in other fields marked by major technological breakthroughs. More generally, and contrary to what the cyberlibertarians have been arguing since the 1990s, digital technologies have not severed the historical links between market and state.

Some of the policy issues that have been most debated are not new or specific to the Internet. This is the case in particular for competition policy and property rights. The problems raised by taxation of cyber activities may be considered more specific. Immaterial and transnational activities nevertheless raise a number of difficult problems for regulators. Not all policy issues relating to the Internet can or should be resolved globally, though. Here we consider several which are likely in any case to be resolved in one way or another at the national level.

The papers presented in this volume analyze the role of governance issues in the future development of the Internet and the digital economy. The authors focus on governance issues, but also analyze the underlying technological and economic evolutions. Two papers in particular consider the prospective evolution of Internet uses and the development of ubiquitous networks. These papers were discussed at a meeting in Paris in January 2002 under the auspices of the Tokyo Club Foundation for Global Studies, which brought together repre-

representatives of the five participating research institutes and discussants. The five institutes have then been working on a joint policy statement, which is included as a concluding part of the book and which presents the main policy recommendations from the Tokyo Club.

2. Governance Issues

2.1. Competition Policy in the Digital Economy

There are two conflicting views about the impact of the Internet on the nature of competition. On the one hand, the Internet reduces the costs of entering new markets and should thus intensify competitive pressures on existing firms. On the other hand, the Internet also reduces search and transaction costs for buyers, which reduces profit margins, thus discouraging entry. In addition, so-called “dot.com” firms have discovered that while it may be easy to enter the markets on the Internet, it is still difficult and expensive to get oneself noticed. So the barriers to entry in the Internet environment may not be lowered after all.

There are additional features of the “Internet economy” that have antitrust implications as well. Most important are the “network effects” associated with some high-technology markets, which may make it naturally efficient for them to be dominated by a single firm, or at most two or three firms. A further complication for competition policy arises in markets characterized by rapid technological change. The prosecution and adjudication of antitrust offenses inevitably involves delay, often much more time than is involved in a new product cycle. By the time antitrust authorities may be able to punish a firm in the high-tech market for an antitrust offense, the market may have changed so much that any penalty can do little to undo the adverse impact of the offense.

In his chapter on competition policy, Hans Schedl explores in detail the consequences of this innate tendency towards size and concentration in Internet economics. This tendency is

made more preoccupying by the fact that it is combined with the existence of dominant players and new possibilities to restrain competition via tying and bundling (or foreclosure). E-commerce entails other effects on competition: by using new –and according to offline regulation illegal– forms of advertising, or by potentially impairing the consumers’ position via appropriation, use and proliferation of personal data and definition of venue. The chapter explores this set of issues, including antitrust, fair trade and consumer protection

Hans Schedl then reviews recent papers and decisions regarding technical uncertainties. Some of the issues cited above have already been matters of dispute: potential collusion, exclusive tying to exchanges, bundling of demand, tying or bundling of software to a dominant operating system, virtually illegal advertising, changes in privacy policy and exchanges of personal data. Some cases are still being discussed, *e.g.* access to broadband or limits on the proliferation of personal data in the US, and some have been regulated by law, *e.g.* electronic communication and privacy in the European Union (EU).

The chapter finally reviews the systemic problems, *i.e.* the principles for the designation of the applicable jurisdiction and differences in law and legal practice. This will be the core question of the third section. Even though several US and Canadian court decisions have already tried to establish principles for the designation of venue related to the Internet, a number of uncertainties remain, as the principles still show potential misdirection.

2.2. Intellectual Property Rights and Innovation in the Digital Economy

It is conventional wisdom that innovators need intellectual property rights (IPRs) in order to have incentives to develop new products and services. Otherwise, if the gains to be made from it were easily appropriated, there would be less innovation. But intellectual property rights can be too strong: if the

monopoly power they confer is excessive in relation to the benefits of the innovation they may generate. In her chapter, Frédérique Sachwald argues that the strengthening of IPRs in the context of the emerging knowledge-based economy may generate such situations of excessive protection. She discusses the role of the broader context of globalization and innovation-based competition, which generates an increasing demand from firms for protection of knowledge, before focusing on ICTs (Information and Communication Technologies) and the Internet.

The expansion of patentability of software and business methods may be taken as an illustration of the controversial tendency to strengthen IPRs. Historically, software was deemed unpatentable because computer programs were considered to be abstract formulas. This explains why software was initially protected by copyright and could only be patented when it was part of technical processes. In the US, as companies started to sell more standardized products on larger markets, they asked for legal protection. Congress explicitly extended copyright protection to computer programs in 1980. During the 1980s, the United States Patent and Trademark Office (USPTO) and Courts granted a larger number of software patents which were claimed to include physical effects. In Europe, software is still not patentable *as such*, but at the end of the 1990s, decisions somewhat eroded the position of the European Patent Office, which has come closer to that of the US. Advocates of the open source software movement in Europe argue that such an evolution towards software patentability would threaten innovation.

Beyond the case of software, the chapter reviews recent studies, which underscore the cumulateness of innovation processes, especially in high tech industries. Innovation is often sequential and improvements on an original innovation may be extremely valuable. Moreover, innovations from different firms are also often complementary. Whenever an invention is understood as contributing to further invention potential,

strong patents might hinder rather than enhance technical advances. The question of whether a patent should be granted and of how strong it should be then no longer turns on the traditional static trade-off. The argument is rather about whether the long-term effect on inventing is positive or negative. In such a perspective, broad patents may be particularly harmful if firms find it difficult to reach licensing or cross-licensing agreements⁴.

Over the past two decades, the strengthening of IPRs has been part of a new approach which emphasizes the role of incentives, both for firms and for individual researchers, as part of innovation policy. Intellectual property rights belong to the nexus of institutions aimed at promoting innovation and the diffusion of knowledge, but in order to be legitimate and efficient, they have to strike the right balance between incentives and access. Institutions are sticky and have historically lagged behind technological change. The recent evolution of IPRs has on the contrary been quite swift and one may wonder whether it does not constitute a case of *institutional overshooting*, in particular in information technologies. If IPRs are perceived as too strong and antithetical to fundamental values such as access to information or to healthcare, their legitimacy may be challenged, which in turn would be detrimental to *sustainable innovation*.

2.3. Taxation and E-Commerce

The spread of the Internet opens an important new medium for commercial transactions. In his chapter, Barry Bosworth argues that, while e-commerce will raise important challenges for the effective administration and collection of taxes, the changes are ones of degree, rather than ones requiring a complete restructuring of the tax system and international tax treaties. For the value-added tax, the new problems

4. This conclusion is also emphasized by Gallini and Scotchmer (2002) based on their review of the theoretical literature.

are largely limited to the sale of services over the Internet to consumers, a category of sales that is currently of minor importance. It is a greater threat to the sales tax system of the US because there is no system of border taxes between the individual states.

The growth of the Internet does highlight the increased difficulties in resolving the question of what constitutes a business presence in a country for purposes of collecting income taxes. But, this is a more general problem that arises in the context of an increasingly global economic system. In some cases, individuals and firms can conduct business with residents of a tax jurisdiction without the need for a physical presence. Overall, Barry Bosworth considers that increased economic integration, as represented by the Internet, will put a premium on greater cooperation and standardization among tax jurisdictions.

3. Global Diffusion of Internet and the Emergence of Ubiquitous Networks

3.1. The Diffusion of Internet to Developing Countries

The digital divide –the North/South gap in access to or use of ICTs– is correlated with national income, level of education and political and civil liberties. Like the gap in income and education, the digital divide is measured by per capita figures, numbers of phone lines or Internet users, and, according to these national averages, the gap is widening. In this chapter Brigitte Granville and Carol Scott-Leonard argue that the diffusion of the Internet to developing countries is difficult to encompass by per capita measures. The mapping of ICTs, for example, shows that a comparison of urban centers, such as Mexico City and Singapore, is more useful as an indicator of diffusion. For countries where poverty is pervasive, even though the digital divide persists, technologies fostered by Internet exchange of data and know-how do help growth. The example Granville and Leonard use to illustrate the benefits of

the digital revolution is the spread of science-based production in the developing world. Even though export revenues for such countries are small, spillovers from multinational enterprise activities, as in pharmaceuticals, can be large.

Science-based industries are the fastest growing sector in the global knowledge economy, and through the university elites upon which they draw, they provide new opportunities in developing countries. This chapter explains how the Internet can be a major instrument in taking advantage of these opportunities. Among science-based industries, pharmaceutical production (both off-patent and generics), in particular, will affect the economy through the knowledge base. The total impact of pharmaceutical production on GDP is small, less than 1%. Brigitte Granville and Carol Scott-Leonard argue that it nevertheless delivers long-term benefits in entrepreneurship and exports. It also powerfully affects welfare through low-cost drug availability.

3.2. Digital Convergence and the Regulatory Framework

It is commonly agreed that the future of the Internet is the so-called “broadband” Internet service, or the use of coaxial cable, upgraded telephone lines (DSL), or satellite services to connect users to the Internet at much higher speeds than is possible through conventional telephone circuits. Broadband is now widely available to businesses in many countries through fiber optic cable hookups. It is only beginning, however, to penetrate residential markets. In his chapter, Takeshi Shinohara discusses the regulatory issues that affect the access to broadband. He also explores the broader issue of the convergence of computer technology and communication technology. In particular, he outlines the development of ubiquitous networks as a fundamental change in the communication paradigm.

Because there are network effects associated with broadband—in particular, the more people who have broadband connections the greater will be the incentives for content providers (such as

videos) to produce such content— some have argued that it is appropriate for governments to subsidize broadband access. Others argue that if competition among broadband providers can be sustained effectively, this will bring down broadband service charges, and this is the best way to promote broadband use.

Access by competing telecommunications providers to the “local loop” monopoly remains a sensitive issue in a number of countries. The US enacted legislation in 1996 designed to facilitate such competition, but has found it difficult to implement. Local loop competition has proved more effective in the United Kingdom (UK), where in some areas, cable television systems have become effective competitors to the local telephone monopoly. But elsewhere in Europe, the situation is much like that in the US, with the monopoly provider still dominating local access. The chapter discusses the situation in the different countries, including the US, Japan and European countries. It also deals more broadly with the governance issues that impact on the development of ubiquitous networks. A major issue here is the importance of having various industries participate in the policy-making process. Takeshi Shinohara also suggests that convergence will promote antitrust as a major regulatory framework, instead of sector-specific laws.

Joint Policy Statement

As a conclusion to its contribution on the evolution of the nexus of interactions between technological, economic and regulatory issues, the Tokyo Club has prepared a joint policy statement. The statement is based partly on the papers included in this volume, which were prepared for the Tokyo Club meeting held in Paris in January 2002, and partly on discussions among the authors and discussants attending that meeting⁵. Although the researchers may differ on the particulars of certain of these questions, they broadly agree with the reasoning and principles of this Statement.

5. A list of the participants is included as an appendix.

The main objective of the statement is to outline a number of general principles and guidelines for policy, based on the conviction that the Internet will not continue to thrive as a source for public good without the appropriate policy environment. The experience so far suggests that there is no need for a set of specific “virtual regulations”, but rather that efforts should be made to incorporate the Internet within the existing institutional framework, which has proved quite adaptable, as shown in the different chapters of this book. The statement also identifies the policy questions that should be resolved at the global, or at least the multinational level. These include questions relating to the appropriate jurisdiction(s) for setting rules governing use of the Internet for commercial and other purposes, taxation of cross-border sales completed via the Internet (especially those involving services), and issues relating to governance of the Internet in the future. Other policy issues the Internet has raised could also benefit from multinational resolution, but failing that, should be resolved at the national level.

Frédérique Sachwald
October 2002