

Chapter 13

Challenges to Intellectual Property Rights from Information and Communication Technologies, Nanotechnologies and Microelectronics

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ABSTRACT

Information and communication technologies, nanotechnologies and microelectronics are progressively challenging the current state of intellectual property rights. This is related to the economic features underlying these technologies. The directions of changes in intellectual property rights are found to require further coping with the overall chain of innovation and with the uncertainty that can be embedded in the new trends of technological development.

INTRODUCTION

This chapter addresses the challenges of advanced technologies to Intellectual Property Rights (IPRs). These institutional arrangements have been changing with the new trends and complexities implied by scientific and technological transformations. These changes include the scale of

operations at which research is pursued, the large number of partners and the diversified interests at different stages of production, diffusion and valuation of outputs. These transformations increase the likelihood of potential conflicts around IPRs. Besides that, the IPRs system is compelled to cope with the enlargement of the number of stakeholders and the entry of new countries into the race. Developing economies urge the IPRs to adapt to

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their needs. Furthermore, the uncertainties related to advanced technologies at both production and use have been also expanded and shared through global and specific vehicles. Overall, IPRs are now facing further challenges imposed by the new trends and advances in Information and Communication Technologies (ICTs), nanotechnologies and microelectronics.

The above issues are addressed through three sections. The first one looks at the current trends in innovation and technologies (ICTs, nanotechnologies and microelectronics) while the second focuses on the economic foundations of the challenges to IPRs. The last section addresses the challenging features linked with each set of new technologies.

The approach used in this chapter is mainly based on the analysis of series of publications from the social science literature with a focus on economics. The trends in advanced technologies were estimated for major developed countries through regression analysis.

CURRENT TRENDS IN INNOVATION AND NEW ADVANCED TECHNOLOGIES

This section contributes to exploring the new trends in innovation, and the factors behind its increasing complexity and pace.

The Enlargement of the Number of Stakeholders

In general, the growth in patents can be perceived as a proxy for R&D (Research and Development) activities and innovation. The number of applications in OECD (Organization of Economic Cooperation and Development) patent offices increased by 40% between 1992 and 2002. This is a doubling of the number of applications at the European and U.S. Patent Offices (EPO and USPTO) with a 15% increase at the Japanese

Patent Office (JPO) (OECD, 2004). These figures point clearly to the accelerating pace of contemporary innovation activity. This accelerating pace is clearly depicted in Figure 1¹ as well since the total number of patents displays an increasing trend between 1999 and 2005.

The innovation activity is not only confined within the academic sphere nor dependent only on individual efforts. A multitude of new actors are reshaping the innovation activity and accelerating its rate. Innovation has become the most important driver of competitiveness as it grants the lead time advantages necessary to cope with diminishing product lifecycle (Williams, 2005). For instance, between 1990 and 2001 industry-financed R&D in the OECD region rose 51% in real terms or from 1.31% to 1.48% of GDP (Mairesse & Mohnen, 2003).

New entrants to the innovation activity consist of small and medium-sized enterprises (SMEs) that are playing an increasingly role and reducing the traditional supremacy of large firms on R&D activities. This trend has been supported by the increasing flow of venture capital funding towards new technology-based firms (Gans et al., 2002).

The Internet has undeniably facilitated the information flow with respect to new technologies. It has reduced communication costs and made it difficult to opt for secrecy as the dominant corporate strategy. Such a change has contributed to forging more collaborative innovation processes that now involve a larger number of actors (public/private) with inter-linkages among them (OECD, 2004). Additional factors are forcing innovation agents to work in greater collaboration mainly, the growing technological complexity of products and processes, rapid technological change, intensified competition, and higher costs and risks associated with innovation. While the largest share of R&D expenditure is devoted to the firm's core competencies, complementary technologies and processes are acquired from other firms, universities and public laboratories. The result has been the rapid surge in virtually all

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