The Management of Intellectual Property

Edited by

Derek Bosworth
Elizabeth Webster

New Horizons in Intellectual Property

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Series Editors: Christine Greenhalgh, Robert Pitkethly and Michael Spence, *Senior Research Associates, Oxford Intellectual Property Research Centre, St Peter's College, Oxford, UK*

In an increasingly virtual world, where information is more freely accessible, protection of intellectual property rights is facing a new set of challenges and raising new issues. This exciting new series is designed to provide a unique interdisciplinary forum for high quality works of scholarship on all aspects of intellectual property, drawing from the fields of economics, management and law.

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The Management of Intellectual Property
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PART I

Introduction

1. The management of intellectual property: introduction

Derek Bosworth

1 IMPORTANCE OF IP AND IPRS

The present book brings together 15 chapters by economists, managerial scientists, accountants and lawyers on different dimensions of the management of intellectual property (IP) and, by implication, intellectual property rights (IPRs). Management could, in principle, imply management by government as well as by companies. In practice, the focus of the present contributions is on private sector issues such as the private costs and benefits of alternative strategies, rather than on how the government or international bodies manage (or should manage) IPRs. Almost without exception, the discussion considers company and organizational issues within the context of the existing IPR framework. Thus, the optimal design of the framework of IP laws lies well outside the bounds of the present book.

In principle, IP covers the creative activities of literary, artistic and scientific works; performances of performing artists, phonograms and broadcasts; inventions in all fields of human endeavour; scientific discoveries; industrial designs; trademarks, service marks, and commercial names and designations; protection against unfair competition; and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields (WIPO, 1967, Article 2(viii)).

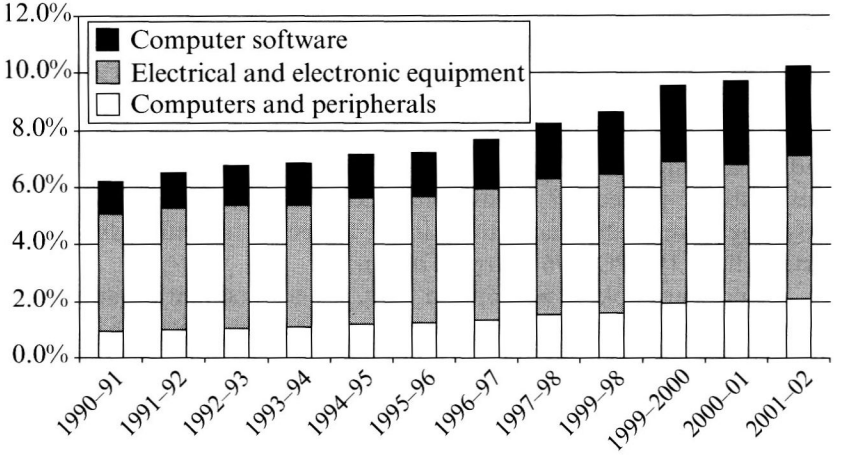
The present book, in principle at least, has a somewhat broader focus than some of the earlier attempts to explore the management of IP, which have tended to focus on patents and patent-related IPRs (for example, Granstrand, 1999). Patenting remains an important dimension of the present discussion, but there is some coverage of the trade and service marks, as well as an attempt to place them in the broader context of other forms of IP and IPRs. The discussion in this chapter does not dwell on the different forms of IPRs; these are made clear in Chapter 2 (although not every form of IPR is considered) as well as when they are discussed in various other chapters (for example, Chapter 7). In addition, the present

discussion does not outline the distinction between IP, intellectual capital (IC) or intangible assets (IAs), but detailed consideration is given to the differences between them in Chapters 3 to 5.

2 THE CHANGING ECONOMIC LANDSCAPE

The world in which firms operate today is very different to that of the past. While IP and, more broadly, intangible assets have always been important to firms, there is no doubt that the shift towards a knowledge-based economy has given them even greater prominence as a focus for company behaviour and decision-making. This can be illustrated by the growing importance of investment in computers and software vis-à-vis the net capital stock in Australia. The growth in the net information technology (IT) capital stock relative to the overall net capital stock was 4.4 per cent per annum, while the corresponding relative growth in the net stock of software was 6.4 per cent per annum over the period 1991 to 2002 (Figure 1.1). More broadly, Webster (1999, p. 58) shows that the ratio of intangible to tangible capital among Australian publicly listed companies approximately doubled over the period 1947 to 1997 (from about 15 to 30 per cent).

By 1997 over half of the value added of the UK was attributed to knowledge-based services and industries (DTI 2001, p. 78). In Germany the



Source: ABS (2004) Cat. No. 5204.0, tables 98 and 86.

Figure 1.1 Share of selected equipment in the net capital stock, Australia, 1991–2002, per cent

figure was closer to 60 per cent. By late 2004, statistics show that about 11.25 per cent of private sector business investment was on computer software and hardware – about 4.5 per cent on software and 6.75 per cent on hardware. The results of a number of mainly US studies show how such investments have impacted on company organization and performance (see Chapter 5 in this volume; Bosworth, 2005). Estimates of intangibles for particular companies, such as Gillette and Coca-Cola, suggest that they represent significantly higher values than the tangible assets and, even though the ratio of intangible to tangible assets is lower in Proctor and Gamble and Pepsicola, it is still high (Buchan and Davies 1997, p. 116). In the mid-1990s GrandMet (now Diageo) reported their brand value to be £3.8 billion compared with other assets of £7.3 billion (Corbett 1997); by the year 2000, that value was reported at £5 billion (Bartram 2000, p. 1).

One reflection of the growing importance of IP and the associated IPRs is the growth in licensing revenues. Ganguli (2000, p. 167) argues that the USA's annual licensing revenue grew from $200 million in 1980 to $20 billion 1997. IBM moved from 1724 registered patents in 1997 to 2658 in 1998 and the company made over $1 billion through licensing arrangements. Samsung Electronics, which earned about $400 000 from its IP in 1998, is reported to be expecting to generate more than $1 billion from its Moving Picture Expert Group 2 (MPEG2) technology. High-technology exports are also highly dependent on protection from IPRs. According to the World Development Indicators compiled by the World Bank, high-technology exports formed about 18 per cent of all manufacturing exports in 2003. However, this overall average hides a huge variation across countries, with the UK having 26 per cent, the USA 31 per cent and East Asia 33 per cent. The percentage for China grew from 17 per cent in 1999 to 27 per cent by 2003.

In this increasingly global economy, many of the changes are linked to IP and IPRs. Foreign direct investment (FDI), for example, often involves various forms of technology transfer, as well as the transfer of management skills, organizational forms, and so on. The World Bank's World Development Indicators database highlights the massive growth in FDI. In the case of China, for example, prior to the open-door policy FDI was largely non-existent, but this has changed enormously over the subsequent 30 years or so, and by 1999 net inflows of FDI[1] had reached US$38 billion, and by 2003 this had further risen to $53 billion. This investment would not have been made without the introduction of a whole raft of IPRs (Bosworth and Yang 2000).

There is considerable evidence that the gestation time between invention and innovation has been falling. Gomulka (1990, p. 37) shows how the average time lag between invention and innovation fell from around 90 years in 1725 to about 20 years in 1925. He also demonstrates that the

same patterns of reduction can be found in different areas of technology (for example, basic chemical inventions, basic electronic inventions, other early basic inventions and other modern basic inventions – ibid., p. 36). The finding is not surprising; while there are costs of reducing the applied research cycle time, the benefits can be even larger. In a study of participants in the US Advanced Technology Program (ATP), Laidlaw (2003) asked them to give the economic benefit associated with just a *one-year* reduction. The estimates ranged from $1 million to 'billions' for a one-year reduction (the median was $5–6 million). These estimates not only exclude the potential broader social benefits, but also the fact that some participants on the ATP believed they had saved up to ten years of research time, saving on expenditure, getting to market early and bringing forward in time the stream of revenues associated with the new product or process.

Products also appear to have moved closer to the science base. In an analysis of the UK Community Innovation Survey 3, Tether and Swann (2003) report that, while a relatively small percentage of all firms utilize the science base as a source of information (19 per cent of production and 14 per cent of service firms), the proportions were significantly higher amongst those that made the greatest commitments to innovation. Half of production and 45 per cent of service firms in the highest quintile of innovators indicated they had used the science base as a source of information for innovation. The result is further confirmed by relating a measure of dynamism among firms undertaking at least some innovation activity and the use of the science base. They report that, while less than one in ten of the firms that scored only one dynamism point used the public science base as a source of information for innovation, more than half those that scored seven or more points used the science base. A similar relationship can be found between innovation expenditures and collaboration with universities and between dynamism and collaboration with universities.

Of course, as the authors point out, there are also indirect ways in which the science base can impact on firms. A simple example is that, while an interaction may lead one firm to be the first to innovate, other firms may imitate this innovation. A further example is that universities supply graduates and there is a link between the employment of graduates and enterprise performance (Bosworth 2005; Bosworth et al. 1992). Tether and Swann (2003) again use the UK Community Innovation Survey to demonstrate this linkage. They report that, within the same industrial sub-sectors, firms that employ graduates tended to have higher dynamism scores than those that did not employ graduates and, in addition, firms that employ more than the median value of graduates for their sector tended to have even higher dynamism scores.

Innovation is important in the generation of profit because, even in the presence of patents, firms eventually invent around or invent a superior product or process (Gort and Klepper 1982; Mansfield et al. 1981; Pavitt 1999) or the patent eventually expires. When that occurs, abnormal profits created by the innovation are competed away, although some firms may reduce the effects of new competition through their trademarks and brand names. There seems to be a view that product life cycles have become shorter, reducing the period in which monopoly profits are made (Powell 1997; Zirulia 2004, p. 2), although not all authors adhere to this (Bayus 1992; Golder and Tellis 2003). Shorter product life cycles would be consistent with increased innovation activity, the pressure to reduce the applied research cycle time and increased speed to market.

This form of dynamic competition, in which innovation and quality are an integral part, increases the importance of appropriation of the results of discretionary investments of the firm. Discretionary investments refer to expenditures on research and development (R&D), advertising and marketing, training, management information systems (MIS), and so on. As Laursen and Salter (2005, p. 18) argue, 'Obviously, the ability of innovative firms to control the imitation strategies of other firms in their market will always remain limited. However, the choices managers make about how best to protect their intellectual capital can be a matter of life and death for their firm'.

Laursen and Salter (2005, pp. 19–20) outline the two major contrasting strategies for appropriation: a 'legal strategy' and a 'fast mover strategy'. They conclude that,

> Both legal and fast mover appropriability strategies, associated with increased managerial attention to appropriability, helps innovative performance. This finding indicates that managerial researchers are right to point to the need for managers to greater attention to appropriation in the development of their corporate and innovation strategies. However, we also found that an overemphasis on either legal or fast mover appropriability can have detrimental consequences for innovation performance – this is especially the case with respect to the legal appropriability strategy.

One other feature is that these forms of investment, which have become increasingly important with the passage of time, are inherently risky – a factor which management (and shareholders) have to take into account. New forms of decision-making focusing on the inherent risk or uncertainty need to be introduced.

As IP and other intangibles have taken centre stage, IPRs have become a strategic policy issue both at the company level and nationally. The USA has been at the forefront of changing the IPR landscape, initially at least through

what became known as 'Special 301', introduced under the Omnibus Trade and Competitiveness Act, signed by President Reagan in 1988. Section 301 authorizes the US Trade Representatives (USTR) to retaliate against countries that take unjustifiable, unreasonable or discriminatory trade practices. The USA was also actively involved in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), which set out the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) in December 1993 and established the World Trade Organization (WTO), both of which became effective in 1994. This was an attempt to overcome the wholly inadequate protection for IP in many developing countries. TRIPS is binding on all WTO signatories and, hence, formed a further source of pressure for countries such as China, who wanted to become a WTO member, to introduce the necessary IP legislation. Under TRIPS, any countries intent on accessing world markets must introduce and enforce IP protection of the same standard as developed countries within five years. At the same time a range of parallel negotiations at the international, regional and bilateral levels has been taking place, which has already begun to reshape the existing IPR regime – the so-called 'TRIPS-plus' agreements (Vivas-Eugui, 2003). These agreements often involve commitments well beyond the minimum standards set by TRIPS.

3 THE FOCUS AND CONTENTS OF THE PRESENT BOOK

The developments outlined above have major implications for the management of companies. The present book focuses on information and analytical tools used for the management of IP and intangible assets. These assets are driven by investments in R&D, advertising and marketing, education and training, management information systems, organizational structure, and so on. The development of such assets can involve invention or some other creative step, as well as innovation. The investments and the activities involved are all inherently risky. Thus, understanding the management of IP and intangible assets requires inputs from a variety of disciplines, including economics, law, accounting and finance, management, and so on.

Part II of the book contains four chapters drawn from four different disciplines, providing legal, accounting, management and economic perspectives. These chapters describe how the different disciplines define and view intellectual property and other intangible assets, as well as describing the evolution of the literature in their area.