CREATING VALUE FROM INTELLECTUAL ASSETS

MEETING OF THE OECD COUNCIL AT MINISTERIAL LEVEL 2006

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Meeting of the OECD Council at Ministerial Level

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OECD

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

At its meeting in May 2004, the Ministerial Council proposed a programme of work aimed at improving understanding of the role played by intellectual assets in value creation, growth and economic performance. The study launched in response to this request was conducted in a multidisciplinary fashion by the OECD Secretariat. This report documents the growing importance of intellectual assets for firms and the economy more generally and draws a number of implications for policy makers.*

* The Directorate for Science, Technology and Industry; the Directorate for Education; and the Directorate for Financial and Enterprise Affairs.

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EXECUTIVE SUMMARY

The continuous shift towards a knowledge-based and innovation-driven economy has brought to the fore the issue of how knowledge is created, disseminated, retained and used to obtain economic returns. Knowledge embodied in intellectual assets (*e.g.* human capital, R&D, patents, software and organisational structures) is becoming crucial for firms' and countries' economic performance and growth. In this new environment, characterised by increasingly global markets, including those for intellectual assets, companies need to be able to earn economic returns from both developing and using intellectual assets. Policymakers need to ensure that the beneficial effects of intellectual assets are spread throughout the economy, thereby encouraging the dissemination of best practices, and that an appropriate balance is maintained between the legal control and diffusion of knowledge.

Intellectual assets are important in sustaining economic growth…

Although investment in intellectual assets in the OECD area remains slightly below investment in machinery and equipment, their annual growth rates were generally higher between 1994 and 2002. According to a recent study, investment in unmeasured intellectual capital in the United States in 1995-2003 was roughly equal to that in tangible capital, 10-11% of GDP, and contributed as much as tangible capital to labour productivity growth during those years.

A large number of studies show that intellectual assets such as R&D, human capital and software make a substantial contribution to economic growth:

- Econometric studies suggest that estimated private rates of return to R&D investment are high and that estimates of social rates of return (including gains that may spill over to firms not involved in the research effort) are even higher, although with substantial differences across sectors.
- By the second half of the 1990s, human capital (measured as the improved composition of labour input) had become a key driver of growth, contributing between 15% and 90% to labour productivity growth in the G7 countries.
- At an aggregate level, software has been the most dynamic component of ICT investment in OECD countries in recent years. Investment in software has generally contributed more to labour productivity than other ICT investments, such as communication and IT equipment.

Given the quantitative importance of intellectual assets, their inclusion in measures of economic activity (*e.g.* GDP) is important for obtaining an accurate picture of economic growth, productivity and cyclical developments. The increasing importance of intellectual assets also poses new challenges to the system of national accounts, which are trying to grapple with this difficult area of measurement.

Because intellectual assets are not always separately identifiable, but tend to be complementary and can overlap significantly, they are difficult to measure. For example, the bulk of R&D expenditures in fact covers wages for highly skilled labour and results in training and the development of skills; patents frequently are the result of R&D and are a legal device for securing the ideas emanating from human capital; the development of software represents a large portion of R&D spending, especially in services; software and organisational structure are frequently the codification of human expertise and know-how. These interactions and complementarities need to be taken into account or the resulting picture may be incomplete and lead to an inaccurate view of the overall contribution of intellectual assets to economic performance.

... but creating value from them depends on management capabilities...

The ability to create economic value from intellectual assets is highly contingent on the management capabilities of individual firms and the implementation of appropriate business strategies. For example, leading firms have adopted new R&D management practices that aim to link R&D spending more closely to their business strategy, while relying on external sources to gain access to complementary knowledge and round out technology portfolios. As intellectual assets become a more important source of value creation, so does the firm's ability to retain them. There is a need to further explore the trade-offs between open and controlled access to intellectual assets (such as via intellectual property rights) and the effect on business innovation and economic performance, especially in industries where innovative products rapidly become commodities through follow-on innovation and imitation. This includes a range of policies involving intellectual property rights, confidentiality agreements pertaining to highly qualified employees and the receptivity to foreign ideas and investment.

... that can be disciplined through the efficient operation of capital markets.

Intellectual assets are not generally recognised in financial accounts. Although accounting standards can probably be developed to take account of a wider range of intangibles, it is difficult to establish and verify monetary values (valuation) for such assets, which are often risky and have high rates of depreciation. The relative lack of recognition of intangibles in accounting, coupled with their growing importance in the value creation process, means that financial statements have lost some of their value for shareholders. If other information does not fill the void, there could be misallocation of resources in capital markets. Providing the market with sufficient and material non-financial information about intellectual assets improves the exercise of ownership rights and helps discipline management and boards, with positive economic consequences.

Though empirical research suggests that capital markets already incorporate intellectual assets in companies' valuation to some degree, this may not apply equally to all markets and to all segments, and especially to small listed companies. For listed companies, which account for the bulk of intellectual assets in OECD economies, accounting and disclosure standards (both financial and non-financial), together with procedures and requirements for disclosing company strategy and business models, might require strengthening. Some companies are already coping with the non-financial reporting of intellectual assets but there appear to be great discrepancies between companies, sectors and countries. Additional public disclosure and broader dissemination of information could serve to improve market efficiency, and, at company level, reduce the

cost of capital. These practices will support a more efficient allocation of resources and provide stronger incentives for management to adopt best practices with respect to intellectual assets and value creation.

Policy challenges

Gauging the impact of intellectual assets as sources of economic growth. Research on gauging the impact of intellectual assets on economic performance at the economy and firm level needs to be more fully developed, especially as regards the value of different intellectual assets, the interaction among them and how to effectively exploit potential synergies to support innovation. Better information on intellectual assets in the national accounts (*e.g.* experimenting with satellite accounts for specific assets) would provide a clearer picture of economic growth and thus aid policies designed to stimulate growth.

Investing in human capital development. Increases in educational attainment levels over the past few decades have provided an important foundation for productivity growth and the emergence of the knowledge economy. But the costs (direct and indirect) of formal education make it difficult in some countries to sustain quality and equity as participation rises. Investment in adult education and training generates high levels of combined returns to firms and individuals. Evidence also suggests that existing stocks of human capital are under-utilised, a situation that could be improved by wider adoption of high performance work organisation and more systematic recognition of competencies acquired outside formal education and training. Upgrading and updating of adults' knowledge and skills goes increasingly to more highly qualified workers, giving them an edge over poorly qualified workers with respect to earnings, employability and the likelihood of participating in still further learning opportunities. Social partners may play an important role in ensuring an equitable distribution of training opportunities, but government will almost certainly have to play a role, particularly to ensure adequate learning opportunities for those excluded from opportunities provided through work.

Ensuring diffusion of knowledge while encouraging the development of intellectual assets. As intellectual assets contribute a larger share of economic value, policy makers will face a growing need to balance the benefits of encouraging innovation by providing property rights against the benefits of wide diffusion and open access. While control helps firms to realise value from their investments in intellectual assets for a period of time – and may encourage them to invest more – it can also entail costs to society. The rights of patent holders have been strengthened across OECD countries over the past two decades through changes in law and practice. This has led companies to file for more patents and boosted their licensing activity, which has positive effects on the diffusion of technology. However, increased patenting has also restricted other companies' freedom to operate. The balance between the two effects has not yet been well investigated. Whether the patent system should be strengthened or loosened in order to further encourage the accumulation of technological assets economy-wide and across countries remains to be clarified.

Improving disclosure standards and practices for listed companies. Competition in financial markets already encourages companies to improve their reporting and managerial practices on intellectual assets. However, best practices have not been widely disseminated across companies and jurisdictions. Governments need to encourage the diffusion of best practices, already pioneered by advanced firms. Given the wide range of intellectual assets held by firms in different industries, and the comparatively early stage of development of reporting frameworks, the approach to improved disclosure should remain principles-based.

CREATING VALUE FROM INTELLECTUAL ASSETS

Introduction

Value creation is being affected by the evolution towards a knowledge-based economy. The pace of this process has accelerated owing to the expansion of the services sector, stronger competition resulting from globalisation and deregulation, and the emergence of new information technologies. Innovation – the development and deployment of new products, processes and business models – is a central element of a transformation that has altered the relative importance of different factors in business performance and economic growth (OECD, 2000a; OECD, 2001a). In OECD economies, the shift to a knowledge-based economy has led to a structural change, from traditional scale-based manufacturing, which mainly relies on tangible assets, to new innovation-oriented activities, which rely largely on human capital and knowledge. At the same time, the increasing weight of emerging countries in manufacturing operations has obliged OECD economies to rely more on their comparative advantage, which lies mainly in the production and use of human capital and knowledge.

The pursuit and exchange of scientific and technological knowledge through R&D – with results increasingly protected by intellectual property rights – have become more systematic, while knowledge of markets and effective management practices are being codified in software or organisational structures. Here, these various elements are collectively called *intellectual assets*, and they are becoming the key strategic assets of firms that seek to survive and grow, with beneficial effects for overall economic growth. There is no globally accepted definition and classification of intellectual assets. Most definitions seem to agree that they have three core characteristics: *i)* they are sources of probable future economic profits; *ii)* they lack physical substance; and *iii)* to some extent, they can be retained and traded by a firm. The scope of intellectual assets has evolved in recent years from a narrow focus on R&D, patents and trademarks to a broader concept that includes human resources and capabilities, organisational competencies (databases, technology, routines and culture) and "relational" capital such as organisational structures and processes, and customer and supplier networks. The expansion in the scope of intellectual assets has, however, led to a confusion between intellectual assets themselves – such as patents, software and human capital – and the importance of managerial capabilities (also considered by some as an intellectual asset) for executing a strategy that generates value from these intellectual assets and improves a company's competitiveness.

As intellectual assets become more central to firm performance, networking, co-operation and knowledge flows within and across firms and national borders are also gaining in importance. In this changing environment, innovation has become more market-driven, more rapid and intense, more closely linked to scientific progress, and more widely diffused throughout the economy (OECD, 2000a). Information and communication

technologies (ICT), particularly the Internet, have facilitated these changes by significantly reducing the costs of outsourcing and co-operation with entities outside the firm. They have fostered greater networking in the economy, speeding the diffusion of codified knowledge and ideas. This has altered the management of the value creation process, as firms increasingly seek profit not only by selling end products but also by breaking up the value chain and trying to realise profits from individual segments: their R&D, their patent portfolio, software developed in house, their brand name and the distribution chain.

The combination of firms that increasingly see themselves as comprising multiple profit centres, the shift from mass production to highly differentiated products with greater knowledge content, and the changing nature of innovation have transformed the value creation process, making it necessary to update measurement methods and conceptual models of what constitutes investment. This is true at both the economy-wide level and at the firm level.

At the same time, traditional accounting has remained focused on tangible assets. The only intangible assets recognised in financial statements have traditionally been purchased intellectual property, such as patents and trademarks, and acquired items such as goodwill. As a result, a significant portion of corporate assets are under-reported in the financial accounts. The relative lack of accounting recognition of intangibles, coupled with their growing importance in the value creation process, means that financial statements have lost some of their value for shareholders. If other information does not fill the void, a misallocation of resources in capital markets may result (Bismuth, 2006).

The evolving nature of the knowledge-based economy sets the framework for this study. Three questions are asked:

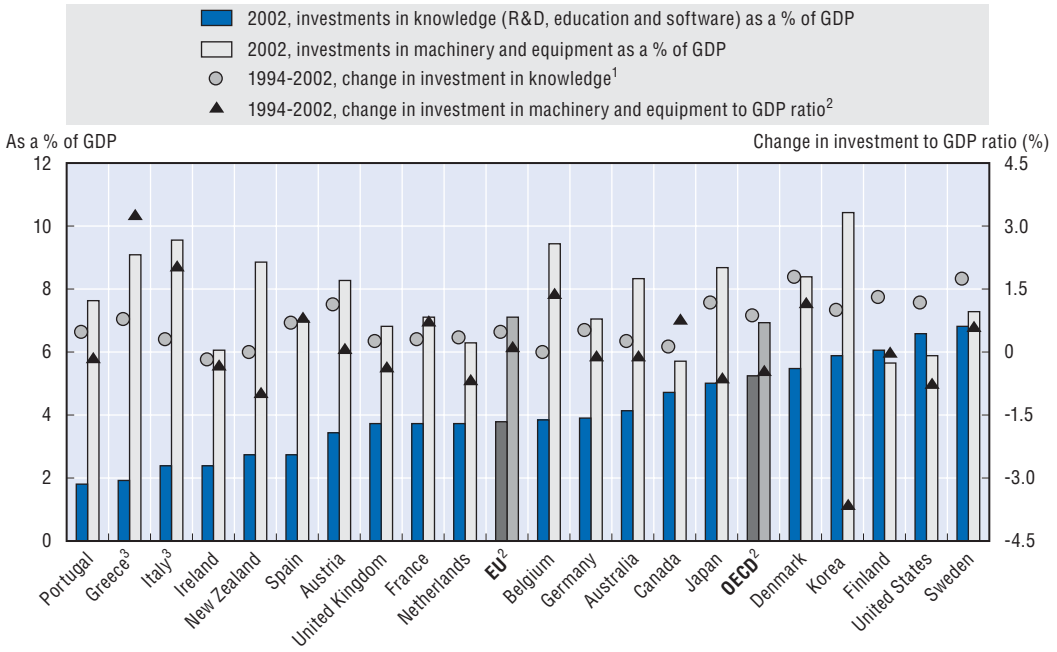
- What is the role of intellectual assets in sustaining economic growth?
- What means are used by firms to develop, retain, protect and obtain economic returns from their intellectual assets?
- What are the implications of the growing importance of intellectual assets for policy making?

This report has four sections. The first presents evidence from economic studies on the contribution of investments in intellectual assets, such as R&D, human capital and software, to productivity and economic growth. The second looks at the critical role of management and markets in the creation of value from intellectual assets. Noting the advantages of improved information on intellectual assets and of the diffusion of good practices, the third section reviews existing initiatives on disclosure of intellectual assets in some jurisdictions. The report concludes by identifying a number of challenges policy makers would need to address to better understand the role of intellectual assets and improve their contribution to economic growth.

Intellectual assets as sources of economic growth

Investments in intellectual assets across OECD countries are sizeable and growing. They rival investment in machinery and equipment in some countries. In 2002, investment in R&D, software and higher education ranged from approximately 2% to 7% of GDP and averaged more than 5% across the OECD area. Although these investments remain below investments in machinery and equipment, which average almost 7% of GDP, they generally grew faster between 1994 and 2002 (Figure 1).

Figure 1. **Investment in knowledge versus investment in machinery and equipment**



1. 1994-2001 for Greece and Italy. 1995-2002 for Korea. EU figure excludes Belgium, Greece and Italy. OECD figure excludes Belgium, Greece, Italy and New Zealand.
2. Excludes Greece and Italy.
3. 2001 data.

Source: OECD Science, Technology and Industry Scoreboard (OECD, 2005a).

As investments in intellectual assets increase, so does their economic impact. OECD expenditures on R&D were around 2.2% of GDP in 2003 and increased steadily by 3.7% annually (in real terms) between 1995 and 2003. Econometric studies applying a measure of R&D intensity (often R&D expenditure relative to sales or value added) typically suggest that R&D spending is associated with an increase in productivity, with estimated gross rates of return (including both net return to capital and depreciation) in cross-sectional studies ranging between 10% and 20%. However, the evidence shows considerable differences across sectors, with higher returns from R&D in research-intensive sectors. Estimated social rates of return (including gains that spill over to firms not involved in the research effort) are even higher (Griliches, 1995; Fraumeni and Okubo, 2005; OECD, 2000b; CBO, 2005). The estimated strong impact of R&D on productivity may be partly due to the fact that complementary investments in innovation (*e.g.* training, organisational change, marketing) are often excluded. These can be quite high (see Box 1).

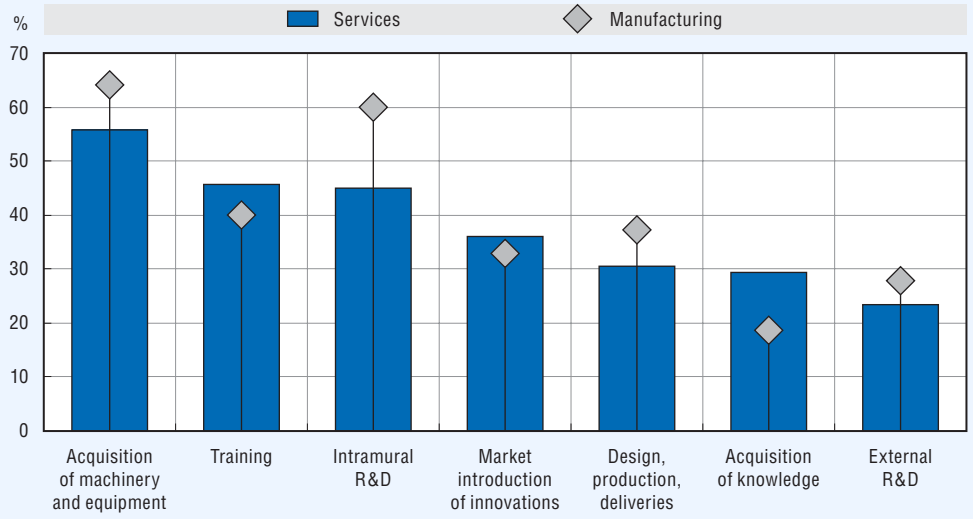
Recent research showing that R&D performed in both the public and private sectors has positive effects on productivity also reveals that there are differences across countries and that foreign R&D has a significant effect in countries with high levels of domestic business R&D. This is an indication that the size of knowledge spillovers depends on a country's ability to adopt foreign technologies (Guellec and Van Pottelsberghe, 2004; Luintel and Khan, 2006).

By providing a patent holder with some market exclusivity, the patent system aims to provide incentives to undertake R&D and inventive activities. Once firms develop and patent an invention, they can commercialise it themselves; alternatively, they can use the

Box 1. **Activities that contribute to innovation**

Innovation includes a wide range of complementary activities that range from R&D expenditures to costs related to launching innovations in the market. Knowledge can be both generated internally and obtained externally, either by acquiring R&D results from other enterprises, research institutes or public bodies or by acquiring knowledge in the form of licensed goods, patents or copyrights. An alternative is to purchase machinery and equipment that embodies technology and specifically leads to the introduction or implementation of innovations. Training the workforce for the skills required to develop or introduce innovative products and processes is another type of innovation expenditure, as is investing in market research or advertising in relation to the market introduction of a new product. Innovation expenditure is usually estimated to be two to four times R&D expenditure at the firm level.

Share of innovative European firms engaged in different innovation activities, 2000



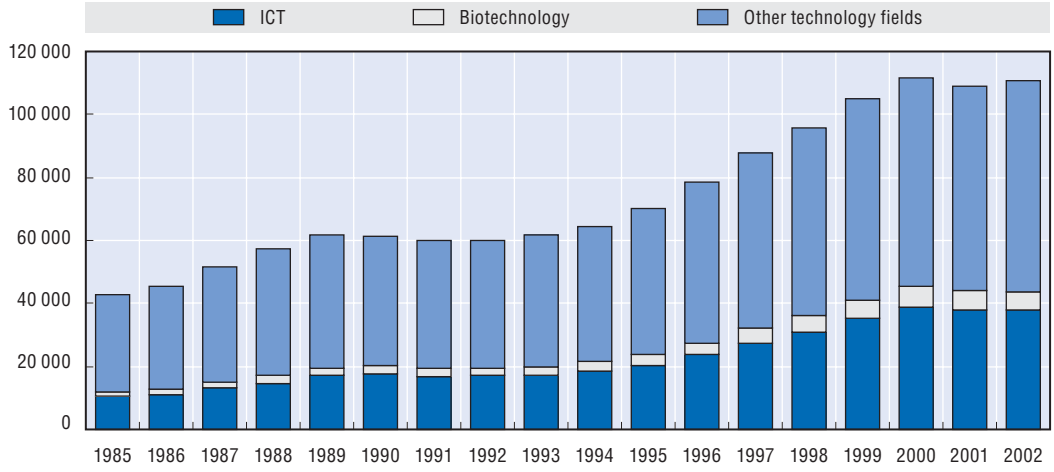
Note: Figures are merely indicative (simple average of available country shares) and should be considered as such.

Source: Figure 4.13 in "Promoting Innovation in Services", Chapter 4, in *OECD Science, Technology and Industry Outlook 2004*, based on Eurostat, CIS3 survey 2004 (OECD, 2004b).

patent to attract external financing (including venture capital) or license or sell it to third parties in exchange for royalties or freedom of action (*i.e.* to reduce risks of infringement via cross-licensing agreements) (Hall and Ziedonis, 2001; Ziedonis, 2003; Ceccagnoli *et al.*, 2005). Patent filings grew by 94% in the United States and by 76% in Europe between 1992 and 2002, with ICT, one of the most R&D-intensive sectors, driving most of the growth. Biotechnology has also seen a significant increase in patenting in recent years (Figure 2). In addition, the patent licensing activities of some firms have become significant profit centres (*e.g.* Merck and DuPont earned 2% and 8% of their net income, respectively, from licensing revenues in 2004).

Investment in human capital, as reflected in workers' educational attainment, professional skills and know-how, also has a positive impact on business and economic performance. At the macroeconomic level, the contribution of human capital to economic

Figure 2. **Trends in patents filed at the European Patent Office**



Note: Patent counts are based on the priority date.
Source: OECD, Patent database, January 2006.

growth changes over time, reflecting the substitution of workers with higher marginal product for those with lower marginal product. Changes in the composition of the workforce are the result of demographic shifts, business cycle effects or government policies that affect the distribution of hours worked by, and compensation for, different types of workers. When workers' characteristics – such as educational levels, skills and experience, age and gender distribution – are taken into account, the change in the stock of human capital (composition of labour) is shown to play an important role in productivity growth (GDP per worker). Its impact has increased over time in the larger European countries. By the second half of the 1990s and into the early 2000s, the improved composition of labour input was a key driver of growth, contributing between 15% and 90% to labour productivity growth in the G7 countries (Colecchia, 2006).

The payoffs from investment in formal education and training filter down to employees in the form of higher wages and earnings, higher employment rates and higher levels of participation in further education and training. In spite of continuing increases in average levels of educational attainment, there are few signs of systemic oversupply or diminishing benefits.[1] However, the costs (direct and indirect) of formal education make it difficult for some countries to sustain quality and equity as participation rises. Moreover, countries present substantial differences in terms of the value created by domestic investment in human capital (defined as the cost of replacing the adult population at its actual level of educational attainment, or the cost of the population's education). Aggregate estimates of returns to human capital – as the ratio of GDP to cumulative public spending on formal education up to the tertiary level – ranged from 0.32 to 1.16 in 1995 and from 0.31 to 0.96 in 2002. Observed differences in countries' ability to generate returns from investing in education are a function of differences in the cost of systems of formal education, utilisation rates of human capital, and a bundle of other factors that drive GDP growth (Bassi *et al.*, 2006).

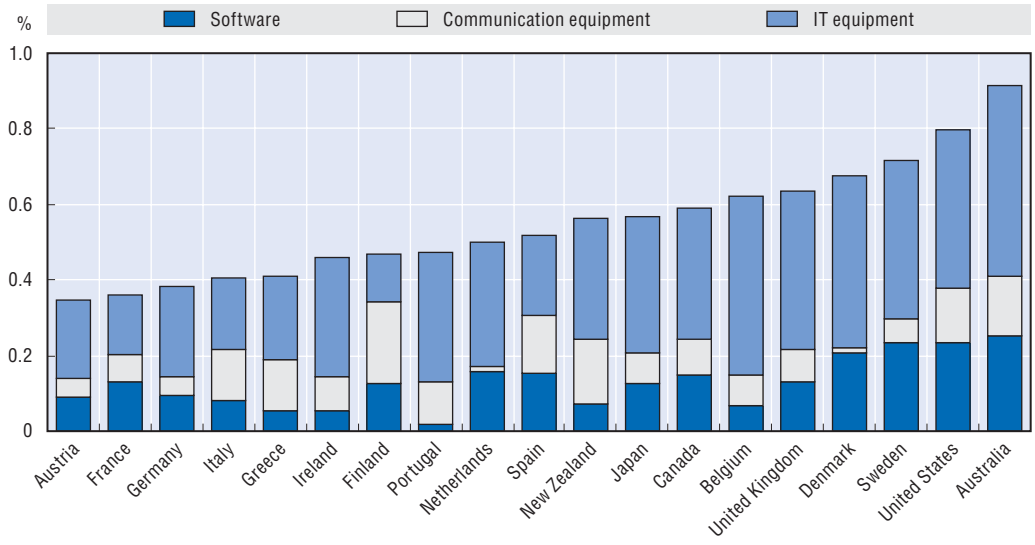
When it comes to investment in adult education and training to update and upgrade the skills and competencies of individuals already in the labour market, the evidence strongly points to underinvestment, though it is more ambiguous than the evidence on returns to initial formal education and training. This is largely attributable to the methodological

difficulties of specifying and measuring many learning outcomes at this level and netting out the returns from other factors that influence labour market outcomes (unobserved personal characteristics, sector of employment, employer demand for skills). It is due as well to the fact that what appear to be consistently high levels of private returns to such investment are shared between firms and individuals. The evidence supports the view that there is underinvestment in human capital of workers because neither firms nor individuals are sure of capturing the benefits of their investment (Bassi *et al.*, 2006). The way in which benefits are shared is a function of the respective power of firms and workers in collective bargaining processes as well as external labour and product market conditions (*e.g.* labour shortages and skills shortages) that may influence firm preferences regarding retention of staff with critical skills and know-how (Brunello and De Paola, 2006). Finally, the absence of arrangements for systematic recognition of competencies acquired outside formal education and training implies that much of the investment in human capital of experienced workers remains invisible (Colardyn and Bjornavold, 2005; OECD, 2004a; also see Shah and Long, 2004, for discussion of the related issue of recognition of foreign qualifications).

Investments in software by businesses also contribute to business performance and economic growth. In the second half of the 1990s, software's contribution to US labour productivity growth (0.4 percentage points) more than tripled from the period 1974-90. Software's contribution to US labour productivity during the later period was more than double that of communications equipment and nearly two-thirds (63%) that of computer hardware (Oliner and Sichel, 2002). This is not only the case for the United States: at the aggregate level, software has been the most dynamic component of ICT investment in OECD countries in recent years, and investment in software has generally contributed more to labour productivity than investment in communication equipment and IT equipment. In Denmark, France, the Netherlands, Sweden and the United States, investment in software accounted for one-third of the total contribution of ICT capital to GDP growth between 1995 and 2003 (Figure 3).

Figure 3. **Contribution of ICT capital to GDP growth by component, 1995-2003**

In percentage points



Note: 1995-2002 for Australia, France, Japan, New Zealand and Spain.

Source: OECD, Compendium of Productivity Indicators (OECD, 2005b).

Organisational changes are increasingly difficult to separate from innovative activities, especially in the services sector (European Commission, 2004), and organisational structures can be regarded as an increasingly important intellectual asset of firms. Indeed, in innovative firms total quality management, lean administration, flatter hierarchies, decentralised decision making, and better communication channels are inter-related with skills and ICT and advanced technologies (Gera and Gu, 2004). This integration of ICT, especially software, with organisational change and its impact on firm performance are described in a growing body of work (Pilat, 2004). Moreover, such organisational changes also increase the ability of firms to adjust to changing market conditions, *e.g.* through technological innovation, the reduction of inventories and supply chain management.

A changing perception of investment

The growing importance of intellectual assets poses new challenges for national accounts. With the 1999 revision of the system of national accounts, published measures of GDP have been expanded to include expenditure on software as investment along with fixed capital formation, thereby leading to an increase in measured GDP. Likewise, the capitalisation of R&D expenditures (changing their treatment in national accounts from intermediate inputs to investments) was recommended in 2005 and will likely take place soon. While these changes represent improvements in the system of national accounts, making it better suited to tracking knowledge-based economies, a number of practical measurement issues remain. These include determining the depreciation rate of R&D, developing an appropriate price index, measuring software developed in house, and the question of whether other investments in intellectual assets should be included. For instance, some critics argue that other innovation expenditures, such as payments for technologies through licensing agreements, payments for patents and applied development work should also be included. R&D expenditures are only part of the total amount spent by businesses to improve their technological capabilities and bring innovations to market (Baldwin *et al.*, 2004).

Intellectual assets are not always separately identifiable, rather they tend to be complementary and can overlap significantly. In many cases the borders between different categories is blurring. For example, the bulk of R&D expenditures in fact goes for wages for highly skilled labour and results in training and the development of skills; patents are frequently the result of R&D and are a legal device for securing the ideas emanating from human capital; the development of software represents a large portion of R&D spending, especially in services; software and organisational structure are frequently the codification of human expertise and know-how. These interactions and complementarities need to be taken into account or the resulting picture may be incomplete and lead to an inaccurate view of the overall contribution of intellectual assets to economic performance.

Using a variety of official and non-official sources of information, a recent study attempting to account for these interactions found that, had it been included in the official figures, investment in intellectual assets (termed intangible capital in the study) would have been about 10% to 11% of GDP by the late 1990s, roughly the same share as tangible investments (Corrado *et al.*, 2005; 2006). Indeed, when an effort is made to estimate an expanded measure of GDP that includes a broadly defined set of expenditures on intangibles as part of business capital spending, investment in intangibles is found to contribute as much to labour productivity growth as investment in tangibles in the United States for the period 1995-2003 (see Box 2). Given that expenditures on intellectual assets have generally been increasing, their inclusion in measures of the economy can alter perceptions of growth, cyclical variations and aggregate savings versus consumption.

Box 2. **Intangible capital becomes the dominant source of growth in "extended GDP" measures**

Recent research by Corrado *et al.* (2005; 2006) has questioned whether intangible expenditures should be classified as capital or as an intermediate good, and what the consequences would be of treating them as capital. Including intangible expenditures as investments makes a significant difference in the observed patterns of US economic growth and points to different sources of growth:

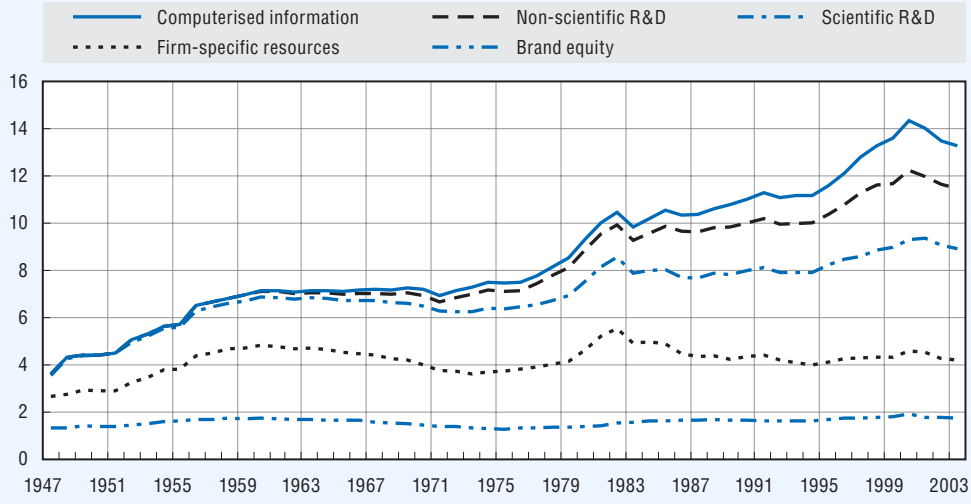
- The capitalisation of intangibles increases the growth rate of output per hour by 11% during 1995-2003.
- The relative importance of the factors that explain growth changes significantly. When intangible capital is included, capital deepening accounts for 54% of labour productivity growth, with 27% explained by intangibles, roughly the same share as for tangible investment.

These results, it is argued, illustrate the potential magnitude of the bias arising when intangible investment is excluded from growth accounting.

For the analysis, which is based on the idea that any use of resources that reduces current consumption in order to increase it in the future should qualify as an investment, the authors construct an extended measure of GDP for the United States that includes non-traditional types of intangible capital in addition to published capital spending. These non-traditional types of intangible capital include expenditures, from official and non-official sources, on computerised information (mainly computer software), innovative property (scientific and non-scientific R&D) and economic competencies (brand equity and firm-specific resources) (Corrado *et al.*, 2006).

Intangible investments

Per cent of business output



Source: Corrado *et al.* 2006, Figure 2.

Although Corrado *et al.* recognise a number of arguments usually raised against the inclusion of intangibles as investment (lack of verifiability for assets not acquired through market transactions; lack of visibility after acquisition; non-rivalness and lack of appropriability of returns), they argue that most amount to measurement difficulties rather than conceptual problems. The real issue, they conclude, is the economic character of the expenditures and whether they were made to increase future consumption or not.

The role of management and markets

The ability to create economic value from intellectual assets depends significantly on the management capabilities of individual firms and the implementation of appropriate business strategies. At the microeconomic level, work on the impact of R&D, patents, human capital and software shows not only that the average returns on investments in intellectual assets can be large, but also that the value of many intellectual assets is highly skewed. A small number of patents, for example, account for most of the value of firms' patent portfolios (Harhoff *et al.*, 1999). Many R&D projects do not result in a successful new product or service, but the returns on successful projects can more than compensate. The role of management is to direct investment to areas of higher expected returns and develop processes that ensure that those returns are realised. There is now significant empirical work to support the view that effective use of intellectual assets and technologies depends on the quality of management. One study shows that management practices, including management of human capital and technology, setting targets and reporting on performance, vary widely both within and between countries and within industries (Bloom *et al.*, 2005). In general, there are many poorly managed firms; well-managed firms excel in productivity, profitability and sales growth.

Management capabilities are critically important for realising value from investments in individual assets. In the area of human capital, research suggests that the adoption of the so-called high performance work system (HPWS), which includes more sophisticated human resource management systems and human resources policies in line with business goals, creates value for companies. Firms that invest in HPWS also provide their employees with more training and performance incentives, and are associated with lower staff turnover, higher employment growth, higher job satisfaction and higher returns. For the United States, Black and Lynch (2001) find that the implementation of human resource practices giving employees greater voice in decision-making, profit-sharing mechanisms and new industrial relations practices is important for productivity.

Management practices are also important for improving returns on investments in knowledge. Leading firms have increased the efficiency of their R&D processes by linking internal R&D activities more closely to their business strategy and relying on external sources to gain access to complementary knowledge and round out technology portfolios (OECD, 2002). The likelihood of success also appears to increase when management ensures that, before R&D projects are initiated, there is clear customer demand for the new products or services and a profitable way to bring them to market (Jaruzelski *et al.*, 2004). In the area of intellectual property, a number of firms have achieved considerable revenue growth through the adoption and active implementation of intellectual asset management procedures. These aim to realise value from patented inventions through licensing and sale, to transfer low-value patents to venture capital enterprises and to link patents better with innovation through incorporation into improved products and services (Kamiyama *et al.*, 2006). Such techniques are particularly important in competitive industries where innovative products become commodities rapidly through follow-on innovation and imitation.

Retaining intellectual assets

A key element of intellectual asset management is retention of the assets developed or acquired by a firm. Many intellectual assets are far more mobile than fixed capital: workers can leave one firm for another; knowledge diffuses through various channels,

including published papers, reverse engineering of inventions and conversation. As intellectual assets become a more important source of value creation, firms need to carefully manage and retain their assets. To retain human resources, they use non-competition and confidentiality agreements in employment contracts, stock options and attractive benefits. Intellectual property rights like patents, copyrights and trademarks are used along with secrecy to protect knowledge. Licences allow patent holders to share patented inventions or other intellectual property in a controlled manner and receive revenue (*e.g.* royalties) or other benefits (*e.g.* access to another firm's knowledge).

The ability of companies to manage risks also gains in importance. This requires systems of internal control – and not only financial controls. Information about intellectual assets such as patent portfolios, key technologies and brands is crucial for management and for the boards that monitor companies. In spite of companies' increasing obligations to examine their internal systems (*e.g.* United Kingdom, France), there appears to be a great difference between actual and good practice – and what is not counted or reported is often not managed. For example, one study found that "while the overwhelming majority of board members and senior executives said they need incisive information on their companies' key non-financial drivers of success, they often find such data lacking; when non-financial information is available, it is of mediocre or poor value" (Deloitte and EIU, 2004).

Disclosure: diffusion of best practices

The importance of company management for realising value from intellectual assets limits the ability of governments to influence value creation processes directly. While a number of policy instruments can be used to encourage investment in particular intellectual assets, fewer options exist for influencing business management practices. However, as the OECD Growth Project noted, policies can encourage innovation and entrepreneurship. Policies to encourage the diffusion of best practices already pioneered by advanced firms are a necessary part of the strategy.

Several studies indicate that diffusion of good management depends significantly on the strength of competition and the ability of firms to enter and exit a market (Bloom *et al.*, 2005; Scarpetta *et al.*, 2002; Brandt, 2004). New firms may have a more efficient mix of labour, capital and technology than existing firms. This is particularly true for industries that have grown rapidly in response to new technological opportunities, such as the ICT sector, where new firms play a central role. Available estimates show that entry and exit of firms have made a sizeable contribution to multifactor productivity growth in many OECD countries. Provided barriers to entry and exit are low, that innovation is rewarded and that markets work to reallocate displaced resources, this continuing process of creative destruction brings strong productivity gains and higher GDP. In turn, this requires an environment in which entrepreneurship is respected and encouraged. The ease and speed with which new firms can be created varies strikingly among OECD countries, and bankruptcy legislation can have an important impact on how quickly resources can be reallocated as well as on the willingness of managers to invest in risky but possibly very rewarding projects.

One way to diffuse best practices is to provide financial markets with sufficient and material non-financial information about intellectual assets, thereby improving the exercise of ownership rights and tightening the financial discipline of management and boards, with positive economic consequences. The management, measurement and

reporting of intellectual assets is intimately linked with key corporate governance issues such as board monitoring of senior management and oversight of strategy, reporting tools and accountability to shareholders, and internal control and risk management. Major issues related to the non-financial reporting of intellectual assets relate to: *i)* taxonomies of intellectual assets meaningful both to managers and investors; *ii)* management of intellectual assets with respect to resource allocation decisions and to risk management; *iii)* measurement of intellectual capital by non-financial metrics to better indicate their contribution to value creation; and *iv)* corporate reporting of intellectual assets to improve the validity, accuracy, materiality, completeness and objectivity of non-financial information and to foster the comparability across organisations, industries and over time.

It is important to ensure that financial markets reward good management and penalise poor management by listed companies, but this requires information. The only intellectual or intangible assets traditionally recognised in financial accounts are purchased intellectual property, such as patents and trademarks, and acquired items such as goodwill; other intellectual assets such as human capital, R&D and brands are not generally recognised. In order to be reported as an asset in financial statements, an item must meet several criteria. According to the US Financial Accounting Standards Board (FASB), for example, the item must first meet the definition of an asset and offer probable future economic benefits to be obtained or controlled by a particular entity as a result of past transactions or events. Second, it must satisfy the following three criteria: *i)* measurability (measurable with sufficient reliability); *ii)* relevance (capable of making a difference in user decisions); *iii)* reliability (faithful, verifiable and neutral). In addition, accounting standards often require firms to treat expenditures on intellectual assets such as training costs and most R&D costs as current expenses since future revenue flows are uncertain. Although accounting standards can probably be developed to take into account a wider range of intangibles, clear limits are set by the difficulty of establishing monetary values (valuation) for often risky assets with high rates of depreciation that are consistent across firms, verifiable and not easily manipulated.

Whatever the limitations of financial accounting, capital markets use other channels of information. For example, market valuations often reflect information provided by analysts and specialised publications (Darby *et al.*, 1999), while large investors discuss directly with management the company's innovation strategy and intellectual asset base. Nevertheless, obtaining information on intellectual assets and business strategies by such means inevitably incurs costs, and delays in the dissemination of their assessments in the financial markets occur as investors seek an economic return on their private knowledge (Holland, 2002).

Intense market pressures are already encouraging more companies to improve their reporting practices but companies differ widely in this respect. Some companies are already coping with the non-financial reporting of intellectual assets but on an unsystematic basis and with great discrepancies between companies, sectors and countries (for examples, see PricewaterhouseCoopers, 2005). The evidence suggests that additional public disclosure would enhance capital market efficiency. Empirical studies provide evidence that stock market valuations are influenced by the extent and type of information on intellectual assets that is publicly disclosed:

- A study of the pharmaceutical industry showed that US Food and Drug Administration (FDA) approvals had an average affect of 0.5% on stock prices in the absence of further information. The returns rose to 1.1% when the announcement was accompanied by qualitative information, and quadrupled to 2.0% when quantitative information was also provided (Lev, 2002).
- The stock market value of listed firms has been found to respond positively to announced R&D expenditures. A unit increase in R&D leads to an increase in market valuation of just slightly less, and the market reaction is greater than for tangible investment (Hall and Oriani, 2004; Ballardini *et al.*, 2005).
- With respect to more general disclosure, one study used as a benchmark the PricewaterhouseCoopers system of value added reporting, which includes disclosure about a wide range of strategic issues and value creation that goes well beyond mandatory standards. Those companies with better general reporting in line with this benchmark enjoyed a lower cost of capital than those whose reporting did not go beyond the requirements of existing standards of disclosure (Barnett, 2003).

In sum, the evidence indicates that more comprehensive disclosure to capital markets results in important efficiency gains. The experience of the dotcom bubble is also a powerful reminder of what can happen when disclosure about business models is insufficient or misinterpreted. But the firm's ownership structure determines how disclosure and transparency can best be improved. For non-listed companies, acquiring information on intellectual assets and firm strategy may be relatively straightforward as there is often a strong correspondence between management and ownership. When ownership is more diffuse and includes venture funds, for example, the need for information is best handled by private contractual arrangements if the legal framework allows parties sufficient flexibility. For listed companies, which account for the bulk of intellectual assets in OECD economies, the situation is far more complex and involves accounting and disclosure standards and practices (both financial and non-financial) together with procedures and requirements for disclosing company strategy and business models. Many of the standards and procedures covering strategy and business models are voluntary, and are often developed by the private sector. The options chosen both by companies and jurisdictions appear to have an important impact on capital-market efficiency, the cost of capital for individual firms and the efficient allocation of resources in the economy.

Non-financial disclosure initiatives

Broader dissemination of information can serve to improve market efficiency and encourage management to adopt good practices. The main challenges faced by non-financial reporting frameworks are: *i)* to assist companies in producing and disclosing timely, relevant and comparable reports which allow providers of capital to make more informed estimates of the future benefits and risks associated with their investment opportunities; *ii)* to avoid overlap with existing voluntary reporting and ensure consistency with all existing reports; *iii)* to avoid overload of information disclosure and to ensure the materiality of information released; and *iv)* to avoid increasing preparation costs for companies listed in multiple jurisdictions.

The absence of specific reporting guidelines on intellectual assets in North America, especially in the United States, does not come from a lack of debate. Interest in the issue of

corporate reporting and accounting for intellectual assets has waxed and waned over the past decade. The interest shown by various US constituents, such as the American Institute Certified Public Accountants (AICPA, 1994), the Chartered Financial Analyst (CFA) Institute (CFA, 2003) or the Brookings Institution (Blair and Wallman, 2001), culminated in the creation of FASB's Business Reporting Research Project in 1998. The FASB recognised that the US accounting system was inadequate to cope with the growing importance of intellectual assets and partly tackled the issue of the recognition of intangibles by issuing two standards: SFAS 141 and 142.[2] The project related to reporting of intellectual assets (FASB, 2001), however, has been abandoned and has not been taken up by other parties in the United States. Out of the many explanations for the decline of interest in reporting intangibles – bursting of the dotcom bubble, a wave of accounting scandals, a shift of interest to other issues – a recurrent one is the perceived absence of a market failure in the United States that would justify additional requirements to disclose non-financial information on intellectual assets. Indeed, there is currently little active investor pressure in the United States since, it is argued, the investor community already considers intellectual assets on a routine basis. Some investors ask and obtain very detailed information and evidently already incorporate it in their valuations.[3] They do not feel that information/indicators promoted by some existing intellectual assets statements (*e.g.* number of patents, number of employees with a PhD, amount of money spent on training) would be very useful for future valuations. However, they are interested in having standardised information directly linked to a revenue or income stream. This is quite clear in industries such as pharmaceuticals where a number of indicators based on intellectual assets are widely used.

With respect to the management of the reporting guidelines, there appears to be little feeling in the United States that small innovative companies need to be encouraged to rethink their management of intellectual assets. Small innovative firms can rely on an active and efficient venture capital and private equity industry to provide them with creative and diverse ways of financing their early stages of development as well as with strong managerial inputs. On a macroeconomic level, the venture capital industry contributes significantly to innovation[4] and R&D, especially in the information technology and biotechnology sectors (Global Insight, 2004), with small venture firms acquiring intellectual assets discarded by big companies as being non-core business activities.[5] While this explanation might be valid for such special high-technology firms, recent evidence shows that industry in the United States is also characterised by a long tail of poorly performing companies (Bloom *et al.*, 2005). However, poor performers also seem to be forced to exit an industry more rapidly than in other countries.

In countries with less active venture capital industries, the main sources of finance come from banks and the financial markets. The reporting guidelines on intellectual assets are intended to help small innovative companies in Europe and Japan to improve their creditworthiness and attractiveness as investments. Empirical research has shown the benefits of increased disclosure for small listed companies. The link between corporate transparency and stock price volatility is stronger for smaller companies (Barnett, 2003).[6] The importance of presenting good quality information increases greatly as the level of analyst coverage declines. The findings suggest that companies can mitigate the problem of poor analyst coverage by taking a proactive stance in their corporate reporting. The rewards are important: for the companies that have below median analyst coverage, a 10% increase in the overall disclosure score resulted in a 1.5% reduction in stock price volatility, a result which is economically significant in determining their cost of capital.

To supplement companies' financial statements, two areas appear to offer the best means of improving the functioning of financial markets: better narrative/non-financial reporting and specific reporting on intellectual assets, sometimes in the form of stand-alone reports (Table 1).

Table 1. **Guidance for non-financial reporting and for reporting of intellectual assets**

Type	Institution/country	Initiative	Scope	Application		Reference
Narrative/ non-financial reporting (*e.g.* contextual information on major factors affecting a company's performance)	European Union	Public	All companies	Mandatory	2003	Modernisation Directive
			Listed companies	Mandatory	2004	Transparency Directive
	Australia	Public	Listed companies	Mandatory	2003	ASX Listing Rule 4.10.17
	Canada	Public	Listed companies	Mandatory	2003	Securities Administrator
	Germany	Public	All companies	Mandatory	2004	DRSC
	United Kingdom	Public	Quoted companies	Under discussion	2005	DTI
	United States	Public	Listed companies	Mandatory	1980	SEC Guidance in 2003
	International Accounting Standards Board	Private	Accounting standard-setters IFRS		2005	IASB
Specific reporting about intellectual assets (*e.g.* stand-alone reports on intellectual assets)	European Union	Public	All companies	Voluntary	2002	MERITUM
	Australia	Public	All companies	Voluntary	2002	Society for Knowledge Economics
	Austria	Public	Public universities	Mandatory	2002	Universities Act
	Denmark	Public	All companies	Voluntary	2003	MSTI
	Germany	Public	SME	Voluntary	2004	BMWA
	Japan	Public	All companies	Voluntary	2005	METI

Accounting and listing standards in a number of jurisdictions now call for, or recommend, extensive narrative reports that cover the major factors underpinning the company's present and expected future performance. Examples include the standards in operation in Australia, Canada, Germany, the United Kingdom and the United States, as well as the new system proposed by the International Accounting Standards Board (IASB). In addition, private initiatives such as that of the Enhanced Business Reporting Consortium (EBRC) emphasise that external reporting should be closely related to internal management information and monitoring systems. Such reporting appears to be a useful place to include more information about intellectual assets and innovation strategy, using numerical indicators where appropriate. Today, a number of leading companies use narrative reporting to discuss their intellectual assets and corporate strategy with respect to innovation.

Narrative statements have not always lived up to expectations, however, in part because board members and management sometimes seek to minimise potential litigation risk by reducing the information furnished and avoiding discussion of foreseeable future material risks. Guidelines covering narrative reporting therefore need to be principles-based and focus on the materiality criteria for disclosure of information. Another issue is the use of suitable indicators when reporting on intellectual assets. A number of jurisdictions and companies have introduced separate reports on intellectual assets which include quantitative indicators on assets and on progress in fulfilling company strategy.

In the last ten years, companies throughout the world have started to issue reports on intellectual assets that go beyond mandatory requirements (Table 1). Some listed companies in Denmark, Germany, Scandinavia and Japan have decided to extend disclosure beyond listing

requirements in their efforts to promote systematic management of their organisation. Apart from a way to meet information requirements of some investors and improve market efficiency, reports on intellectual assets may also serve as a management tool for the board's oversight of strategy and its implementation by management. By managing and reporting their intellectual assets, managers are reported to gain new insight into the value and performance of the organisation's knowledge-intensive resources (MSTI and National Agency for Enterprise and Construction, 2005). Nevertheless, the lack of convergence of proposed non-financial reporting frameworks sets a clear limit to the dissemination of good reporting practices by companies and to the comparability of reports. Attempts to provide a common framework are being made by the Enhanced Business Reporting Consortium (EBRC).

All these recent initiatives have helped result in the issuance of guidelines for managing and reporting on intellectual assets at national level (Denmark and Japan), supra-national level (European Union), and investor level (Enhanced Analytics Initiative). The main features of such guidelines include provisions for companies to report: *i)* contextual information that enables a more complete understanding of current and prospective financial results; *ii)* expanded information on both financial and non-financial performance; *iii)* forward-looking information for assessing prospective performance; *iv)* information on key performance indicators that companies use in managing their business. Non-financial information on intellectual assets comprises not only qualitative but quantitative performance measures and indicators. Current guidelines aim to improve the validity, accuracy and objectivity of non-financial information and to foster comparability across organisations and industries and over time.

Critics argue that improved disclosure will increase the size of company reports and lead to information overload. There is also a risk that such disclosures will result in overabundant rather than meaningful information. They also point to disincentives, such as the need to protect commercial confidentiality. Companies may also be discouraged from disclosing forward-looking soft information owing to concerns about litigation risks if their expectations are not met. These points are legitimate but may be ill-founded. The argument that a company might be "forced" to give away its commercial secrets is inappropriate. Research indicates that competitors are usually well informed by participants in the product market. It is investors that are poorly informed unless they invest significant resources in obtaining product market information.

Challenges for policy

Although creating innovations and value through the efficient use of intellectual assets is primarily the role of company management and their boards, public policy is nevertheless important. As stressed by the OECD Growth Project, "something new is taking place in the structure of OECD economies…and this transformation might account for the high growth recorded in several OECD countries. Policies that engage ICT, human capital, innovation and entrepreneurship in the growth process, alongside fundamental policies to control inflation and instil competition while controlling public finances are likely to bear the most fruit over the longer term". That project's analysis can be extended by focusing on the role of intellectual assets – R&D, intellectual property such as patents, human capital, software, and the managerial capabilities and organisation of a firm – to better understand their role in creating value and how that role can be enhanced. As is frequently the case with work in new, ill-defined areas, this report raises a number of questions and offers a few tentative answers.

Promotion of competition to support value creation and innovation

Governments need to promote competitive product markets, remove barriers to entry and exit by firms, and ensure the efficient flow of resources to new activities. Diffusion of good management practices depends on the strength of competition. It is important for governments to implement policies that encourage poorly performing companies to exit.

Gauging the impact of intellectual assets as sources of economic growth

It is difficult to assess the impact of intellectual assets on the creation of value owing to measurement problems and conceptual limitations. Nevertheless, researchers have explored different aspects of the impact of intellectual assets on economic performance at both the economy and firm level. OECD work undertaken over several decades and for this report complements these studies. This body of research shows that investments in intellectual assets are large and growing and positively affect growth and economic performance. At the firm level, the impact tends to depend largely on the type of intellectual asset and the ability of management to create value from it. Research on gauging the impact of intellectual assets on economic performance at the economy and firm level needs to be extended to cover the value of different intellectual assets and the interactions among them and to see how potential synergies can be better exploited to support innovation.

Public policy making would benefit from greater recognition of the impact of investing in intellectual assets to generate economic growth. Better information on intellectual assets in the national accounts (*e.g.* experimenting with satellite accounts for specific assets) would provide a clearer picture of economic growth and be of service to policy makers seeking to stimulate growth. The lack of sound evidence on the size and contribution of intellectual assets to growth limits understanding of the drivers of long-term economic growth.

Investments in human capital development

The cost of investment in formal education and training and underinvestment in training to update and upgrade the qualifications of adults may affect the contribution of human capital to value creation. The costs of formal education vary markedly and are particularly high in certain OECD countries (OECD, 2005c). OECD member countries have not seen the kinds of structural transformations and productivity improvements in education and training that have occurred in other sectors. Education systems have generally done remarkably well in broadening participation in upper secondary and tertiary education. Yet significant numbers of young persons still do not complete upper secondary education or acquire a recognised vocational/technical qualification. Moreover, per student expenditure at the elementary and secondary level has risen substantially since the mid-1990s in nearly all countries but more slowly at the tertiary level in most. This raises questions about how to spend more efficiently, particularly since a large number of OECD countries will face declining student numbers in the next few years (OECD, 2005c).

In most countries returns to education show no signs of diminishing despite rising levels of educational attainment. However, rising participation rates at the tertiary level and rising (direct and indirect) costs make it increasingly difficult, under existing arrangements, to maintain quality and adequate financing. Upgrading and updating of adults' knowledge

and skills also raise problems. There is strong evidence of underinvestment because of market failures (*e.g.* incomplete information on workers' competencies, fear of poaching). Institutional arrangements between employers and individuals for sharing the costs of skills updating and upgrading are unevenly developed (OECD, 2001b; OECD, 2004a); arrangements that influence the distribution of returns to investment in human capital are only beginning to be addressed (Creelman, 2004; Fallick *et al.*, 2005). While employers, employees and society in general share the benefits of investments in human capital, institutional arrangements to facilitate co-financing have not kept up. This is linked to some degree with the fact that training goes increasingly to more highly qualified workers (Bassi *et al.*, 2006).

To ensure equitable distribution of training outcomes, collective agreements should be more explicit about provision of and access to training and its link to firm strategy. The sharing of training costs between employers and individuals can also be fostered by joint training agreements to the extent that unions and work councils are sufficiently well placed to monitor training content and quality (OECD, 2003, p. 274). However, insofar as less qualified workers are at greater risk of being unemployed (and have less access to employer-provided training), governments must work to ensure that they have adequate access to education and training (OECD, 2003b; OECD, 2003c; Bassi *et al.*, 2006).

Ensuring diffusion of knowledge while retaining intellectual assets

As innovation becomes more collaborative within and across firms and as the pace of innovation accelerates, policies need to strike a proper balance between private and public goals. In particular, policy makers need to ensure that firms have the tools to protect and control the use of their intellectual assets, without undermining competition. At the same time, they need to promote the mobility of human resources and the diffusion of knowledge. Policies should encourage economies to be receptive to ideas from abroad by encouraging inward and outward foreign direct investment, international mobility of human resources, and openness of innovation processes to foreign contributions. The trade-offs between open and controlled access to intellectual assets and their effects on business innovation and economic performance need to be further explored, especially in an environment that is changing rapidly as a result of technical developments, such as the Internet.

While control helps firms to realise value from their investments in intellectual assets for a period of time – and may encourage them to invest more – it can also entail costs for society. Worker mobility and diffusion of knowledge are essential for fostering follow-on innovation, spreading good practices and otherwise boosting productivity and growth. They also influence the economic incentives and financial means of individuals to invest in education and training. As intellectual assets contribute a larger share of economic value, policy makers will face a growing need to balance the benefits of control against the benefits of access.

In addition to providing market exclusivity, patents also serve as a mechanism to diffuse technical information about inventions to firms via licensing agreements and to the public more generally owing to the requirement to disclose inventions in patent applications. The rights of patent holders have been strengthened over the past two decades through changes in laws and practice across OECD countries (Martinez and Guellec, 2004). This has helped to increase substantially the value of patents (Ceccagnoli *et al.*, 2005) and has in turn led companies to file for more patents. It has also boosted their licensing activity (Sheehan *et al.*, 2004) with positive effects on the diffusion of technology. However, increased patenting has also restricted the freedom to operate of other

companies. The balance between the two effects has not yet been well investigated. Whether the patent system should be strengthened or loosened in order to further encourage the accumulation of technological assets economy-wide needs to be clarified. The issue also needs to be addressed at the international level, as international licensing is a major vehicle of technology transfer (Park and Lippoldt, 2005). A related issue is the development of markets for technology, as these increase the value of technological assets for their holder and society. It is necessary to review potential obstacles (*e.g.* regulatory, fiscal, informational, etc.) to the further development of technology markets and to explore policy options for overcoming such obstacles (Kamiyama *et al.*, 2006).

Related to the central role of human capital in enterprises' changing value creation processes is the policy issue of competition among firms, on the one hand, and individuals and society, on the other, over claims on the returns to human capital and the means for exercising those claims. Though this issue is less important when mobility is low, firms increasingly rely on mechanisms such as confidentiality agreements and "non-competition clauses" (employment contract provisions that prohibit individuals from taking up employment with a competing firm during a specified period of time) to restrict the ability of individuals who acquire knowledge and know-how in one firm to apply them in another. This issue raises legal questions of enforceability (so far tested with mixed results in the United States) as well as broader questions of fairness and efficiency.

Policies to improve disclosure by listed companies

The lack of consensus on a taxonomy of intellectual assets reflects a confusion between intellectual assets *per se* and their value drivers, on the one hand, and between intellectual assets, extra-financial issues and corporate social responsibility issues, on the other. Providing the market with a clear taxonomy useful both for investors and managers would ensure that the information released in a company's report usefully matches investors' needs. A more systematic analysis of intellectual assets in analysts' reports would promote broader dissemination of information on intellectual assets by companies.

Providing the market with sufficient and appropriate information about intellectual assets improves decision making by investors and helps discipline management and boards. Investors can better assess future earnings and the risks associated with different investment opportunities when non-financial information is consistent, reliable and comparable over time and across companies. Additional public disclosure, coupled with broader dissemination of information, could serve to improve market efficiency, and, at company level, reduce the cost of capital and allow for a more efficient allocation of resources. It could provide management with stronger incentives to adopt best practices with respect to intellectual assets and value creation. One way to do this is to promote the development and use of voluntary standards such as those for risk management and internal and external reporting. Given the wide range of intellectual assets held by firms in different industries, and the comparatively early stage of development of reporting frameworks, it is important for the approach to disclosure to remain principles-based. Industry-specific standards would seem to offer the best way forward since they can accommodate the very different role of the various intellectual assets from sector to sector.

To encourage more companies to improve their disclosure practices as well as their internal management systems, knowledge about potential benefits needs to be more widely disseminated. Intense market pressures are encouraging more companies to improve their reporting and managerial practices but companies' practices differ widely.

The OECD could facilitate improved practice by analysing, in a comparative context, the development of national, company and industry practices and by documenting the resulting microeconomic and macroeconomic benefits. This could show how improved reporting contributes to better internal control, risk management and innovation. Such work would also underpin future initiatives by standard-setting bodies such as the International Accounting Standards Board, the Financial Accounting Standards Board and the International Organisation of Securities Commissions.

Notes

1. There is a vast literature on returns to formal education and training; for a summary see OECD (1998); for recent data on relative earnings, employment rates and participation in further education and training see OECD (2005c).
2. FASB, *Statement of Financial Accounting Standards*, No. 141; *Business Combinations*, June 2001 and *Statement of Financial Accounting Standards*, No. 142; *Goodwill and Other Intangible Assets*, June 2001.
3. For example, this might even extend to valuing the reputation of the leading scientists, which actually turns out to be a good predictor of success in biotechnology (Darby *et al*., 1999).
4. Kortum and Lerner (1998) argue that the amount of venture capital activity in an industry significantly increases its rate of patenting.
5. "IBM Opens Patents to VCs", *Red Herring*, 13 December 2005, available at *www.redherring.com/*.
6. Barnett (2003) uses the ValueReporter communication score provided by PricewaterhouseCoopers on a sample of 131 companies across a range of seven industries.

RELATED OECD EVENTS

Forum on Business Performance and Intellectual Assets, Paris (France), 6 October 2004. This forum was jointly organised by the OECD Committee for Industry and the Business Environment (CIBE) and Committee for Scientific and Technological Policy (CSTP).

International Conference on Intellectual Property as an Economic Asset: Key Issues in Valuation and Exploitation, Berlin (Germany), 30 June and 1 July 2005. This conference was jointly organised by the European Patent Office (EPO), the German Federal Ministry for Economics and Labour (BMWA) and the OECD.

International Policy Conference on Intellectual Assets and Value Creation: Value Creation in the Knowledge Economy, Ferrara (Italy), 20-22 October 2005. This conference was jointly organised by the University of Ferrara and the OECD.

SUPPORTING OECD MATERIAL

Bassi, L., B. Hansson, R. Frederick and G. Wurzburg (2006), "Human Capital and Value Creation: Evidence and Issues", forthcoming.

Bismuth, A. (2006), "Intellectual Assets and Value Creation: Implications for Corporate Reporting", forthcoming.

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