invisible value

the case for measuring and reporting intellectual capital

Business Competitiveness Division

Department of Industry, Science and Resources

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The identification, measurement and reporting of intellectual capital emerged as an important issue at the (Australian) National Innovation Summit in February 2000. The Government's major package on innovation, *Backing Australia's Ability*, announced in early 2001, is based on the recognition that intangible assets are outstripping traditional assets as drivers of growth. This paper reviews several internal and external measures of intellectual capital and the accounting treatment of intangible assets. International experiences and developments in this area are also considered.

This version of the paper includes technical detail and bibliography; a shorter less technical version is also available at www.isr.gov.au/industry/kbe/publications/index.html.

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foreword

By the Minister for Industry, Science and Resources

Intellectual capital is being regarded as an increasingly important factor in innovation and productivity growth, business competitiveness and economic performance. Innovation - developing skills, generating new ideas and turning them into commercial success - is the key to Australia's future prosperity.

This means we need to better manage our intellectual capital in order to increase our innovative capacity. But how do we manage something that traditionally has not been measured and how do we show the world the extent of our innovative capacity?

Australia has an immense store of intellectual capital and this Government recognised its importance and placed it as a high priority at the National Innovation Summit held in Melbourne in February 2000. Following the Summit the Government established an Innovation Summit Implementation Group to form key recommendations relating to innovation. One of the recommendations included the need to *enhance recognition of the significance of intellectual capital and intangible assets*.

The Government has acted on these recommendations and in January 2001, the Prime Minister announced our innovation strategy for the future - *Backing Australia's Ability*. This package includes a national innovation awareness strategy that supports activities aimed at formulating better measures of innovation and of reporting intangibles on company balance sheets.

This issues paper delivers on a commitment of *Backing Australia's Ability*. It is aimed at stimulating discussion and encouraging national debate about improved ways of measuring and reporting intellectual capital. It offers an introduction to the issues surrounding the identification, measurement, valuation and disclosure of intellectual capital.

The paper also canvasses international efforts to address the growing demand for information on intangible assets and notes that this issue is gathering increasing attention. The paper concludes that while not all intellectual capital can be put directly onto balance sheets, better reporting of off-balance sheet intellectual capital would improve investment decisions and resource allocation. This will help entrench more deeply a culture of innovation, from the shopfloor to the boardroom. It is by no means the last word on the subject.

Nick Minchin
June 2001

preface

Intellectual capital and the ability to extract value from it is increasingly gaining more attention. This growing interest has emerged as economies become more knowledge-based, more competitive, more globally focused and more networked. Simultaneously, the rapid development and uptake of technology, greater labour mobility, reduction in trade barriers and market liberalisation have facilitated the transformation.

Over the past few years, intellectual capital has become an increasingly important area of research among the academic community, statistical agencies and the accounting profession. Several international conferences have also been held on intellectual capital, including the 1999 International Symposium on *Measuring and Reporting Intellectual Capital: Experience, Issues and Prospects* held by the Organisation for Economic Cooperation and Development (OECD), the four World Congresses on Intangibles and recently, the intangibles conference *Advances in the Measurement of Intellectual Capital* organised by the Stern School of Business, New York University. In Australia, intellectual capital emerged as an important issue at the National Innovation Summit held in February 2000. This paper is a background paper for one of the recommendations arising from the Summit: *to enhance recognition of the significance of intellectual capital and other intangible assets*. The Government's major package on innovation, *Backing Australia's Ability*, is based on the recognition that "intangible assets - our human and intellectual capacity - are outstripping traditional assets as drivers of growth."

This paper is issued for discussion and information purposes only. Views expressed do not necessarily reflect the views of the Commonwealth or of the Department of Industry, Science and Resources.

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Canberra, June 2001

executive summary

The rise of a new, more knowledge-based economy has driven the need to reassess the key economic drivers of growth and well being. One factor that is rapidly gaining prominence is intellectual capital. This paper discusses what intellectual capital is and why it is important. It offers an introduction to some streams of thought with which to understand the role of intellectual capital at both a micro and macro level and also provides a literature review on the economics of intellectual capital.

Growth in a knowledge economy is to a large extent, characterised by the degree to which a country has adopted or embraced new technology, techniques, ideas and processes and this is getting increasingly difficult to measure. Various attempts to measure intellectual capital - internal and external measures - are reviewed in this paper. Internal measures, such as Human Resource Accounting, the Intangible Asset Monitor and the Balanced Scorecard, are used to manage and guide a firm's intellectual capital so that it can be leveraged to provide a greater return for the company. Such measures can be used to support decision making within an organisation to enhance intellectual capital as a means to generate value. The external measures, which include market-to-book value, Tobin's Q and Real Option Theory, are distinct from the internal measures because of the focus on investors and others attempting to value a company (provides a signal to external parties).

Within the accounting profession, the treatment of intangible assets remains a controversial issue. Currently international accounting standards do not recognise intangibles as assets and effectively ignore intellectual capital. This is now more of a problem than ever before, as intellectual capital is as fundamental to a knowledge economy as physical capital was to a traditional manufacturing-based economy. This paper examines the accounting treatment of intangibles and the consequences of inadequately accounting for them.

Finally, this paper examines the current state of play and the future direction of intellectual capital, both in Australia and overseas and considers the acceptance of the International Accounting Standard on intangibles (IAS 38).

1 introduction

Intellectual capital (IC) is now regarded as an increasingly important factor in innovation and productivity growth, business competitiveness and economic performance.[1] Most companies view intellectual capital (or intangibles) as one of their most important assets, yet it is invisible on the balance sheet. Despite the fact that most companies now view intangibles as one of their most important assets, intellectual capital is intangible and cannot be quantified using traditional accounting models.[2] At present, it is argued that markets are not providing the right incentives to disclose information on such investments. If investment in intellectual capital is a key factor driving success, and intellectual capital is not being adequately reflected in financial measures, then firms need to develop a way to disclose or report such investments.

Intellectual capital consists of several components. These include:

- research and development;
- technology;
- intellectual property rights;
- human capital;
- organisational structure;
- customer and supplier networks; and
- software.

Unfortunately, such components are often poorly identified and measured—conventional financial reporting and accounting practices generally fail to recognise them as assets.[3] This leads to a gap in reliable and accurate accounting information that interferes with effective intellectual capital management, distorting the efficient allocation of resources among different forms of capital, including intellectual capital.[4] New measurement systems are needed to help investors, financiers, managers, and policy-makers manage and invest more effectively in the knowledge economy.

The objective of this paper is to stimulate discussion and encourage national debate about improved ways of measuring and reporting intellectual capital. It aims to increase awareness and raise the profile of the role that intellectual capital plays in driving organisational success in the new economy.

The issues to be addressed in the paper include:

- how widespread is intellectual capital reporting;
- the tools used to manage intellectual capital within the firm;
- how we can value intellectual capital;
- whether measuring and reporting intellectual capital improves financial performance;
- whether capital markets are appropriately rewarding investments in intellectual capital;
- incentives to encourage voluntary disclosure of intellectual capital; and
- if there is a need for new or revised accounting standards.

Chapter 2 reviews the literature—in particular, the economics of investment in intangibles and how this relates to theories of economic growth. The nature of knowledge and the role of government in ensuring its efficient production are also discussed.

1 Mortensen (1999); Forbes (1997) - 'Over the next decade, Dataquest predicts that the intellectual capital consulting business will grow to $4 billion a year'.

2 As in any emerging field of study, terminology is continually emerging and evolving. Terms like 'intellectual assets' and 'intangible assets' are used interchangably. This paper has adopted that view.

3 Davidow (1995)

4 Mortensen (1999)

Chapter 3 attempts to define and characterise intellectual capital and discusses the components of intangibles. In addition, the importance of capturing, measuring and leveraging intellectual capital at a micro and macro level and the debate on whether capital markets recognise the value of intellectual capital are examined.

Chapter 4 examines why traditional financial measures are becoming less relevant. It also illustrates how the information asymmetry associated with the limited incentives to report intellectual capital will increasingly challenge the accounting profession in developing an accounting standard on intangibles. The adequacy of the current accounting framework to incorporate intangible assets is also examined.

Chapter 5 presents the three main methods currently used to value intellectual capital—market-to-book ratio, Tobin's Q and Calculated Intangible Value (CIV). In addition, the use of option pricing theory to evaluate intellectual capital is also examined. This technique, known as real options, attempts to use the operation of the market to determine a price and value on assets that are expected to yield future economic benefits.

Following the quantitative valuation of intellectual capital, Chapter 6 examines some of the more popular models used to manage and report intellectual capital—such as the Balanced Scorecard (BSC), Human Resource Accounting (HRA) and the Intangible Assets Monitor (IAM)—and examines the strengths and weaknesses of the different approaches. The research also attempts to identify best practice for measuring and reporting intellectual capital.

Chapter 7 explores barriers to intellectual capital reporting and focuses on the need for appropriate incentives to encourage the voluntary disclosure of investments in intellectual capital. This chapter also discusses how public policies can facilitate the development of better measures of intellectual capital.

Chapter 8 outlines the current state of play, both in Australia and overseas and reports on the concerns that have been raised about the impact IAS 38 (International Accounting Standard on Intangibles) may have if adopted in Australia.

2 the economics of intellectual capital

The importance of intellectual capital is emerging through the economic literature and is captured under the umbrella of information and innovation economics. The recent focus on knowledge and innovation and their impact on the economy has created a renewed interest in the discipline. While significant technical progress towards measuring the output of intellectual capital was made during the 1960s, demand was not strong enough to drive development further at that time.[5] Recent work on the knowledge-based economy has, however, enriched the conceptual framework for measuring intangible investment.

A defining characteristic of the knowledge economy is the enormous flow of investment in human capital, research and development and information and communication technologies. The new economy potentially offers unlimited resources because the human capacity to create knowledge is infinite. Intangibles are fast becoming substitutes for physical assets. The laws that govern the old economy do not necessarily apply to the new economy. As Stiglitz (1999) noted: "*as the importance of land in production changed dramatically when the economy moved from agriculture to industry, the movement to a knowledge economy necessitates a rethink of economic fundamentals*".

There is a growing perception that technological change, organisational change and innovation are the key determinants of growth in the long run. It is no longer appropriate to explain economic growth and development as a function of the accumulation of physical capital. Economists are now looking beyond traditional classical factors of production—labour, capital and land—as drivers of growth, development and productivity.[6] Knowledge is now explicitly recognised as a key factor of economic production. In developed economies especially, these less tangible forms of capital contribute significantly to economic activity and growth.

This chapter examines the economic nature of knowledge and reviews the major theories in the context of explaining how investment in intellectual capital can be regarded as a key input in the knowledge economy. Important contributions to the theory of investment in intangibles have emerged from three main streams: human capital theory, innovation theory and new growth theories. These theories underpin the main theories behind the process of economic growth and development. They highlight several key considerations that need to be understood within countries that aspire to be knowledge-based economies. A complete review of the literature is beyond the scope of this paper. Instead, this chapter aims to provide a broad overview of the different approaches to understanding how investments in intellectual capital contribute to economic growth.

2.1 Human capital theory

The term human capital refers to the productive capacities of individuals as income producing agents in an economy. Central to this theory is the notion that individuals are investors in their own capital. As a result of its economic interaction with the labour market and its complementary relationship with investment in physical capital as a factor of production, it is generally referred to in the literature as

5 Buckstein (1999)

6 It is argued that the growth of knowledge is the fundamental reason why output and living standards are so much higher than in previous centuries.

human capital. For example, individuals will be willing to forego current consumption or suffer a short-term loss of income to invest in their own education in order to achieve higher incomes in future periods. Higher growth rates can often be achieved only by lower consumption in the present and so a trade-off is made. This trade-off has long been recognised as an essential factor of production and economic growth.

Human capital theory has contributed to the theory of investment in intangibles as a driver of economic growth in two ways:

- as a stock of skills—a factor of production, education and training; and
- as a stock of productive knowledge embodied in people or, more technically, 'effective labour'—a source of innovation. [7]

The origins of human capital theory lie in its application to household decision making. More recently, however, the focus on investments in intangible capital has shifted from households to firms. As Webster (1999) explains:

> *While the role played by the household sector in the provision of human capital has been widely acknowledged since the mid-twentieth century, it has taken longer to explicitly recognise the importance of firms' investment in non-physical forms of capital. .....a large portion of intangible capital is embodied in labour and the values of items which are not, such as patents and mining leases, depend heavily on the skill of labour to interpret and employ them. This fusion with skilled labour gives intangible capital four notable qualities. First and obviously, labour cannot be owned, sold and mortgaged. Second, labour is innately heterogeneous. It cannot be uniformly mass-produced like physical capital. Third, humans are more volatile and unpredictable than machines. And finally, labour appreciates with usage and is a highly malleable factor of production that can metamorphose in many ways.*

Investment in human capital generates externalities that produce costs and benefits to society above the private rate of return. For example, education is an example of an investment that provides positive externalities through the efficient acquisition and dissemination of knowledge. In the new economy, knowledge is the chief resource and knowledge workers make up the biggest part of the workforce.[8] As Ducharme (1998) explains, markets are no longer expanding at the same pace. Therefore it is not appropriate to continue to expect high rates of growth offered through the economies of scale gained from the accumulation of physical capital.

Empirical studies by Kendrick (1976) and Griliches (1969), reveal that human capital has a positive effect on productivity. Furthermore, their research shows that a large proportion of improvements in productivity could not be explained by just the inputs of capital and labour, but also by residual factors such as investment in health, education and skills, research and development and more generally in the acquisition and transmission of know-how. Becker (1975) and Schultz (1969) in their seminal work also stressed human resources as a major production factor and as such contributing significantly to increases in productivity.[9]

Other studies, such as Griliches (1969), found a strong relationship between highly skilled workers and physical capital. Bartel and Lichtenberg (1987) argue that technological innovation alters demand in favour of better educated workers because they have a comparative advantage in implementing new technologies. Bartel (1991) says training has a positive and significant effect on wage growth that translates into a return of at least 13 per cent for the company.

7 Over the past 25 years, much progress has been made in extending the principles of capital theory to human agents of production.

8 Drucker (2000)

9 Ducharme (1998) pp. 3–4.

2.2 Innovation theory

The literature on innovation or technical change has contributed significantly to the theory of intangible investment. Innovation theory views investments in innovation as the key driver of growth. By providing growth opportunities, innovation contributes significantly to the survival of firms. Increased competitiveness is achieved through investments in research and development (R&D) and other intangibles. Traditionally, innovation studies focused primarily on R&D activities, where R&D expenditures and personnel were examined in isolation with few other input variables such as labour, material and physical capital.[10]

The empirical work on technical change is extensive. It ranges from estimating the residual factor—as a proxy of technical change—to more detailed and complex analyses such as a measure of the spillover effects from R&D and payments for technology as a production factor.[11] Spillover effects from R&D is a commonly used measure for quantifying the social benefits arising from innovation. An OECD report (2000) quotes research by an Oxford university economist that due to technology spillovers, the social rates of return to R&D investment are higher than private returns, often in the range of 20 to 50 per cent.

2.3 New growth theories

Endogenous growth theory

Endogenous growth theory proposed by Paul Romer, views the accumulation of knowledge as the fundamental source of economic growth. Knowledge is interpreted broadly and includes human capital, organisational change, some aspects of physical capital—embodied technology—and technical change. Endogenous growth theory, through the construction of formal economic models, examines how knowledge and innovation arise from, and contribute to, the economic system from the allocation of scarce resources. In Romer's (1998) endogenous growth model, a given stock of skilled workers is available to generate ideas and new knowledge. The larger the pool of researchers, scientists, and inventors, the faster an economy grows. Drawing on other branches of economics—industrial organisation, networks, human capital, and technical change—the accumulation of knowledge is incorporated as an input into the production function and the long-run growth rate is determined within the model rather than by an exogenous rate of technical progress. In contrast to the neo-classical notion of exogenous factors affecting growth (residual factor), endogenous growth theory explicitly internalises or endogenises the accumulation of human capital in determining growth and growth differentials. In the neo-classical approach, technical progress is an exogenous variable in the production function. In new growth theory, technical progress is treated as an endogenous variable—inherent to the growth process—as the result of long-term and costly investment. As such, investment decisions generate technical change.

In models of endogenous knowledge accumulation, markets are assumed to be imperfectly competitive, thereby creating the needed incentives for firms to invest in knowledge. This has a number of implications for a wide range of government policies such as intellectual property, incentives for R&D, subsidies to university research and public investment in education.

Evolutionary theory

Evolutionary theory focuses on the role of routines in the behaviour of firms, the process of learning and discovery and on the cumulative nature of technical change. The theory's main objective is to understand the actual processes and dynamics of innovation and growth in modern economies. Unlike endogenous growth theory, evolutionary theory states that growth and economic dynamism are determined through learning and discovery rather than through the allocation of limited resources.

10 ibid., p. 6.

11 ibid.

Evolutionary theory attempts to explain not only growth, but also the processes of change, innovation and technological progress. It differs from the neo-classical approach in three fundamental ways. First, evolutionary theory does not assume technological progress as being determined exogenously, but that it be viewed as an endogenous variable in the process of economic development. Secondly, it disputes the assumption that individual production factors can be separated. Rather, it asserts that they influence one another to a high degree. Finally, evolutionary theory asserts that growth and economic dynamism are determined through the processes of learning and discovery, and not by the results of resource allocation.[12] Empirical studies by Dosi (1988) argue that based on the 'cumulativeness' and 'tacitness' of knowledge, the innovation process follows 'trajectories' within the firm.[13]

2.4 The economic nature of knowledge

Knowledge and intellectual capital are linked conceptually. Knowledge, the most elementary intangible capital asset will increasingly be the predominant source of competitive advantage and wealth creation. While the importance of knowledge is central to new growth theory, this importance was recognised long before recent theoretical developments using general equilibrium models. Profit-seeking firms and agents can generate new knowledge. The production of knowledge creates externalities, discovery draws on other discoveries and will be itself used as an input in further technical advancements. The standard argument is that markets will tend to under-invest in knowledge because firms face weakened incentives to investment in knowledge as much as socially desirable when they cannot appropriate the full return. The differing private and social rate of return on knowledge-producing activities is viewed as a market failure—that is, as an externality. This justifies a role for government and non-market institutions in the innovation process.

There are a number of key factors that distinguish knowledge and information from traditional goods and services.

(1) Knowledge, unlike traditional factors of production, exhibits increasing returns to scale. This gives rise to positive feedback and lock-in effects. The larger the network of users, the greater, and the more valuable, the benefit to everyone. Knowledge feeds on existing knowledge, just as discoveries can be born out of other discoveries. The increasing returns to scale occur because of the distinctive cost structure—low marginal costs and large fixed costs—of knowledge products and information goods. In an economy of increasing returns and falling costs, competition is driven by firms trying to capture as much market share as possible. Competition occurs through the introduction of new products rather than by the price competitiveness of existing goods. In some industries, particularly industries based on knowledge, low marginal costs and network effects will result in increasing returns to scale, and thus the emergence of monopolies. However, because of the changing nature in which business is now conducted, mediums such as the Internet will generally reduce the barriers to entry, making markets more contestable. Competition and efficiency are still likely to increase across the economy as a whole.

(2) Knowledge is diverse in nature. Its value depends on its relationship to the user, so it cannot be quantified in the same way as physical objects like land or industrial capital.[14] Each piece of information is different from every other piece of information. This means that information cannot satisfy the essential property of homogeneity that characterises competitive markets. If knowledge is expensive it will not be distributed efficiently.

12 Clement, Hammerer & Schwarz (1998) p. 7.

13 Much of the literature on evolutionary theory is empirical and covers a broad range of areas. See Dosi (1988) and Amendola & Gaffard (1988)

14 OECD (1999a) p. 1.

Markets for trading intangibles are limited. This makes it difficult to assign market prices to such capital assets. Sellers do not give up the knowledge that they sell. Knowledge is automatically and permanently vested in whomever acquires it. Potential buyers have no use for additional units of knowledge identical to what they already have. Buyers cannot appraise the knowledge that they might acquire without actually acquiring it.[15] There is no well-accepted method of appreciating and depreciating intangible assets. Periodic revaluations are thus very difficult.

The diverse nature of knowledge and its increasing return highlights that while in the physical world—with diminishing returns—there are perfect prices; in the knowledge economy—with its increasing returns—there are no perfect prices.

2.5 Government's role in promoting intellectual capital

An implication of the non-rivalous property of knowledge is that the production and allocation of knowledge cannot be completely governed by competitive market forces. As discussed, knowledge and information as a commodity differ from ordinary commodities in a number of fundamental ways. These differences have fundamental implications for public policy.

Knowledge is a global public good.[16] Once knowledge is discovered and made public, the marginal cost of supplying an additional item of knowledge to an additional user is essentially zero. This implies that the efficient use of knowledge requires that there be no charge; yet without charging, firms will have limited incentive to produce knowledge. If firms—an economic agent—cannot appropriate the returns from investing in knowledge, they will have limited incentives to do so. In deciding how much to invest, firms will only look at the return they could potentially receive, not the benefits that accrue to others.

As the production or provision of knowledge generates considerable externalities, there is clearly a role for government in ensuring its socially optimal production. National public goods provide one of the central rationales for national collective action and the role of government. In the new economy, governments have to ensure efficient usage and aim to promote future innovation and ideas. The unique characteristics of knowledge have demonstrated externalities which arise from, among other things, investment in capital embodying new technology, the development of human capital, and investment in R&D.

Many innovations receive little or no external support and are motivated by the desire for private gains. For knowledge to be produced privately some form of protection or exclusive control over its use is required. Governments address this market failure by issuing patents and copyright protection. By conferring monopoly powers to the economic agent, this ensures that firms receive a return on their knowledge. Another strategy that governments use to deal with problems of appropriately rewarding investment in knowledge and R&D is to provide direct financial support (i.e. grants) or indirect assistance in the form of tax deductions or tax credits[17].

Knowledge gained from basic scientific research has traditionally been made available relatively freely. Research was not motivated by the desire to earn private returns in the market. Since it is made available at zero cost, and serves as a useful input in production, it has a positive externality. Government should address market failures where externality is greatest. Thus, government should subsidise its production.[18]

15 Carter (1996)

16 Knowledge can also be considered a quasi-public good or an impure public good, because it is to some extent excludable—returns can be appropriated.

17 Most OECD countries, including Australia, US, France, UK, Japan, Spain and Portugal provide some form of support for R&D activity.

18 It is sometimes argued that adopting the 'protection' or intellectual property rights strategy is preferable to that of direct government subsidisation on the grounds that the patent system provides an effective 'self-selection' mechanism: those who believe they have a good idea invest their own money and the money of those whom they can persuade of the attractiveness of their idea. Such selection mechanisms may be more effective than the government attempting to pick winners.

The ability to leverage and exploit knowledge is well documented in the United States. It has been argued that the success of the US economy is due to a number of key factors. The US economy has conditions favourable to business and maintains a regulatory and financial environment that make it relatively easy to create new companies, raise capital and start new businesses. It is further argued that the United States has a flexible labour market, an open and competitive market, and an entrepreneurial culture that encourages risk taking and tolerates failure. In addition, the US economy has the ability to take advantage of new knowledge as demonstrated by the success of firms such as Du Pont.[19]

Some economists believe America's success in exploiting IT partly reflects its flexible, competitive markets. For example, the Internet may yield smaller benefits in more tightly regulated economies. Such economies often have rigid labour and product markets and inefficient capital markets, which prevent labour and capital shifting in response to new opportunities.[20] According to Romer, the real success of American economic policy is due to moderately strong property rights coupled with substantial subsidies for inputs—like research and education—which are used in the innovation process. With these incentives in place, governments should then hold back and allow firms to compete in the marketplace.[21]

19 "The success of DuPont was due partly to their capacity to implement new organisational arrangements that addressed the inadequacies of more successful centralised management structure. Now, as then, one of the characteristics of more successful economies is likely to be the presence of dynamic organisations that can transform themselves so they are well positioned to respond to new opportunities". See Gera, Lee & Newton (1999) p. 17.

20 See *The Economist* (2000a)

21 Kurtzman (1997)

3 intellectual capital: concept and why it is important

Intellectual capital can be described simply as *knowledge that can be converted into profits*.[22] There are, however, many other definitions of intellectual capital and experts have yet to reach agreement on a commonly accepted definition. Statisticians, researchers and accounting institutions have played an important role in the search for suitable classification of intangibles. Here we do not attempt to define or endorse a specific definition of intellectual capital, but rather provide a framework for understanding intellectual capital. Some definitions of intellectual capital used in the literature include:

> *The sum of everything everybody in a company knows that gives it the competitive edge.*
>
> *Intellectual capital is intellectual material—knowledge, information, intellectual property, experience that can be put to use to create wealth.*
> (Stewart 1998)
>
> *Intellectual material that has been formalised, captured and leveraged to produce a higher-valued asset.*
> (Klein & Prusak 1994)
>
> *Intangible assets as non-monetary assets without physical substance that are held for use in the production or supply of goods or services, for rentals to others, or for administrative purposes: (a) that are identifiable; (b) that are controlled by an enterprise as a result of past events; and (c) from which future economic benefits are expected to flow to the enterprise.*
> (International Accounting Standards Committee, 1998)
>
> *Nonphysical sources of probable future economic benefits to an entity that have been acquired in an exchange or developed internally from identifiable costs, have a finite life, have market value apart from the entity, and are owned or controlled by the entity.*
> (The Intangible Research Center at New York University)

3.1 Components of intellectual capital

To value and measure intellectual capital, it is necessary to understand its components. Understanding the different components of intellectual capital will help to improve its management at a strategic and operational level. Intellectual capital includes inventions, ideas, general know-how, design approaches, computer programs, processes and publications. Some components of intellectual capital are difficult to measure, and the costs and benefits are difficult to quantify. For example, quantifying the value of customer relationships is highly subjective and determining a dollar value is very difficult.

One of the most popular models for classifying intellectual capital is the Hubert Saint-Onge model. This model, developed in the early 1990s, divides intellectual capital into three parts: human capital, structural capital and customer capital. A slight variant of this model, devised by Dr Nick Bontis, Director of the Institute for Intellectual Capital Research, restates customer capital as relational capital to include relationships with suppliers. Adopting Bontis's classification, intellectual capital can be divided into three broad categories as shown in the table below.

22 Intellectual Capital Management (ICM) Gathering developed this definition at its first meeting in Berkeley in January 1995.

Human capital	Structural capital	Relational capital[23]
Knowledge, competence, skills and experience of employees; Training; Networks.	Organisational processes; Databases, software; Manuals; Trademarks and patents; Laboratories and market intelligence; Culture, leadership; Organisational capacity for salable innovation; Organisational learning capacity; Leaseholds, franchises; Licenses, mineral rights.	Customer relationships; Customer loyalty and satisfaction; Distribution relationships and agreement; Relationships with other partners and other stakeholders.

Human capital is recognised as one of the largest and most important intangible assets in an organisation. It is the capital which ultimately provides the goods or services which customers require or the answers to their problems. Human capital includes the collective knowledge, competency, experience, skills and talents of people within an organisation. It also includes the creativity and innovativeness of the organisation. The predominant intangible in any organisation is largely driven by, and derived from, the human side of the enterprise—that is, its people and their collective intelligence.[24] Improving productivity and skills through the provision of employee training is not a new phenomenon, but the financial commitment and scale at which companies are now investing in human capital is growing.

The effects of human capital formation on an organisation are hard to determine. Apart from the measurement difficulties, many argue against the inclusion of human capital on the balance sheet because:

- human capital is not owned by the organisation, it is only for rent; and
- for ethical reasons—placing a price on individuals runs the risk of making employees appear substitutable for other forms of capital.[25]

However, in spite of these shortcomings, human capital provides another approach to training and human resource management policies, ultimately improving the management of an organisation.

Structural capital is the supportive infrastructure for human capital. It is often referred to as the capital that remains in an organisation when employees go home at night and is considered the 'hard' assets of the firm. It consists of the supporting resources and infrastructure of a firm, such as processes, inventions, data, publications and copyrights. It reflects the collective capabilities of the organisation that enable it to function to meet market requirements. Unlike human capital, structural capital is company property and can be traded, reproduced and shared by and within the firm.

Relational capital comprises not only customer relations but also the organisation's relationships with its network of suppliers, as well as its network of strategic partners and stakeholders. The value of such assets is primarily influenced by the image or reputation of the firm. For example, Anderson Consulting recently spent US$300 million in marketing to establish its name. In measuring relational capital, the challenge is to quantify the strength and loyalty of customer satisfaction, longevity, and price sensitivity.

23 Nick Bontis, Director of the Institute for Intellectual Capital Research is credited with restating 'customer' capital as 'relational' capital to include relationships with other strategic partners and other stakeholders.

24 Sullivan (1998) p. 43.

25 In early 2000, the Australian Securities and Investment Commission forced One.Tel to change its policy of treating advertising and staff costs associated with customer acquisition as an asset. See Boyd (2000)

For accounting purposes, classifying intellectual capital into structural, relational and human capital may be less useful. For an intangible asset to be recognised as an asset, certain characteristics must be satisfied. Control is one requirement that intangible assets have the most trouble satisfying. Although legal rights are not essential in the recognition of an asset, it does indicate control. However, in the intangible economy, resources no longer have to be controlled or funded by the organisation to be used in their economic activity. Resources can be obtained through strategic alliances, partnerships, organisational structures and joint ventures. Consequently, accounting standard setters see the control criterion as the main hurdle in the recognition of intangible assets.

3.2 Knowledge companies

The term "knowledge companies" or "knowledge-intensive companies" is increasingly being used to describe companies that focus or leverage their intellectual capital.[26] Knowledge companies use their intellectual capital as a key source of competitive advantage. In a knowledge company, profits are generated primarily though the commercialisation of new ideas and innovations, that is through the interactions of the company's human capital and structural capital. Activities that create intangibles always lead to tangible outcomes, over time. Corporate value is determined by the interaction between tangible and intangible assets. It is this entrepreneurial activity that generates the primary value for many businesses. The embedded know-how or knowledge of an organisation is dynamic, complex, heterogenous and networked.

3.3 Why do companies want to measure intellectual capital?

There is a consensus among managers, investors, financiers and accountants that intangibles are important to company performance. New, knowledge-intensive organisations often experience great difficulty attracting external financiers—they need to develop a way to quantify their intellectual capital to attract investors and financiers.

Attempts to measure intellectual capital have largely been driven by companies that rely heavily on knowledge as a key input to production. Having discovered that fostering growth in intellectual capital can improve profits, businesses are attempting to quantify this in their financial statements. A company invests in intangibles when it expends money for future gain but does not acquire physical assets. Creating measurement and reporting requirements and using benchmarking activities are a valuable aid to assessing the effectiveness of investment in intangibles.

Reporting such information has the potential to improve internal management and the efficiency of resource allocation by providing more explicit recognition of assets. Other benefits include increased transparency, more detailed information for investors and lenders, and more effective and efficient allocation of resources in the capital market. Companies that develop a thorough understanding of the role of knowledge in their business treat it as an asset. Cultivating and exploiting their intangibles gives them significant business benefits.

Reasons for reporting intellectual capital internally include[27]:

- it helps managers assess the effectiveness of the firm's use and management of its intellectual capital;
- it helps to predict current and future income from intellectual capital;
- it helps to determine the most effective management incentive structures;
- it relates employee contributions to intellectual capital to profits;

26 The OECD defines knowledge-based industries as those which are relatively intensive in their inputs of technology—high-tech and medium-high tech industries—and/or human capital and includes three service sectors—communications; finance, insurance, real estate and business services; and community, social and personal services. See OECD (1999b)

27 Some of the benefits of greater disclosure on intangibles is closely related to the accounting debate between the use of fair value and historical cost accounting.

- internal reporting aligns intellectual capital resources with strategic vision;
- to make the company appear to the employees as a name, providing an identity for the employees and branding the company in public. Knowledge of employees and customers will stimulate the development of a set of policies to increase customer satisfaction and customer loyalty; and
- 'What gets measured, gets managed'—it helps managers focus on protecting and growing those assets that reflect value.

Reasons for reporting intellectual capital externally include:

- growing demand for effective governance of intangibles. Social and environmental reporting are examples of this (triple bottom line reporting);
- it more truly reflects the company's actual worth;
- improving stock prices by providing a more accurate picture of a firm's assets to current and potential customers;
- it supports a corporate goal of enhancing shareholder value;
- to support or maintain awareness of the company;
- to help bridge the present and the past—stimulates the decentralised development of the need for constant development and attention towards change;
- strategic positioning; and
- its effect on the cost of capital.

3.4 Why it is important to report intellectual capital at a macro level

There is growing recognition, among industrialised countries, of the role that knowledge and technology play in economic development. The ability to create, distribute and exploit knowledge is now regarded as a key underlying factor for economic growth, improvements in the standard of living and quality of life. At the same time, countries are becoming increasingly integrated into the global economy, through increased international flows of goods and services, investment, people and ideas.[28]

Investment is crucial to the adaptation and long-term growth of industry. As technology, organisational structure, software, R&D, knowledge and skills increasingly influence business performance across a growing range of activities, business investment is increasingly directed towards the intangibles that drive performance in the new economy. Improved identification, measurement and disclosure of intellectual capital is essential to develop and promote public policy in terms of national capital investment, employment, education and training policies.

Evidence that investment in intangible assets is growing

There is growing recognition among OECD countries that an increasing proportion of investment in the business enterprise sector is directed towards intangible investment products such as R&D, marketing, training and software.[29]

Nakamura (2001) in a recent paper argues that the annual US gross investment in intangibles is at least one trillion dollars. Much of this investment is missing from the US national income. Presently, the only intangible included in the US GDP is software investment, where gross investment is more than $230 billion - contributing more than 2 percent to the GDP. Nakamura argues that the rate of investment in intangibles and its economic value began to increase significantly around 1980. This is a consequence of the electronic revolution of the 1970s which raised the return on investments in intangible assets.[30]

28 See OECD (1999b)

29 See Vosselman (1998)

30 Nakamura (2001)

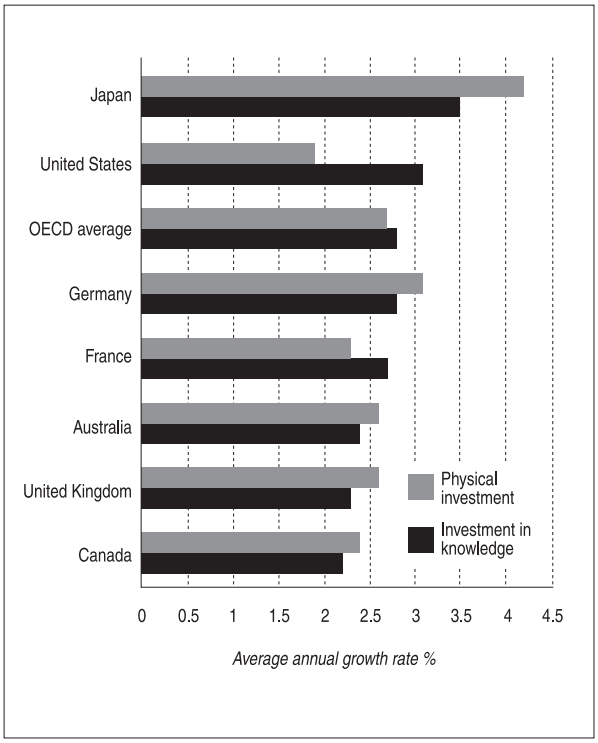
Recent work by Lev (1998) shows that intangible investment now exceeds traditional fixed investment in the US economy. This analysis shows an eight-fold increase in intangible investment in the US since the early 1970s, and that by 1992 intangible investment had caught up with physical investment in plant and equipment.

Research conducted by the OECD (1999b) indicates that OECD economies are increasing their spending on intangible investments. In 1995, investments in knowledge represented eight per cent of OECD-wide GDP, a share similar to investment in physical equipment.[31] This figure would exceed 10 per cent if private expenditure on education and training was included.

Between 1985 and 1995, investment in knowledge grew by about 2.8 per cent annually in OECD countries—slightly more rapidly than GDP. In Australia the average annual growth rate for that period was 2.4 per cent (see figure 1).

In the mid 1990s, knowledge-based manufacturing and knowledge-based services accounted for more than half of the business sector value added in the OECD economies.[32]

Figure 1: A comparison of growth in investment in knowledge and physical investment, 1985-1995



3.5 Have we moved beyond goodwill?

Goodwill is often described as the corporate reputation of the acquired entity and includes the buyer's value of all unidentified assets, such as human capital, organisational structure and market image. It might also flagship value, customer relationships, and a range of equally difficult to describe, much less quantify, business intangibles. Goodwill is often interpreted as the value of the company's trade identity. Accountants describe goodwill as the market price (purchase price) of the business as a whole less fair value of other assets acquired.[33] Economists define it as the result of a firm's above-average ability to generate future earnings.

Historically, the accounting treatment of goodwill served as a convenient category in which to allocate intellectual assets. Goodwill under conventional accounting practices is only assigned a value when a business is sold—acquired—and consequently, for companies that have not purchased other businesses, there is no goodwill value. This does not imply that such companies do not own any intellectual assets. The line item 'goodwill' represents the difference between the book value and what is actually paid. It represents value in the eye of the buyer—not in the company value. The buyer might perceive value in trademarks, brand names and other intangibles not recorded in the books of the company being taken over.

The emerging interest in intellectual capital reporting means the relevance and appropriate use of goodwill will be scrutinised more thoroughly. While the accounting profession is still dealing with the problems of goodwill, the rise of intellectual capital reporting has added another dimension—and perhaps a new perspective—to the art of accounting for goodwill.

31 Investment in knowledge is defined by the OECD as R&D, software and public spending on education.

32 OECD (1999b)

33 International Federation of Accountants (1998)

4 conventional accounting of intangible assets

Traditionally a company's performance could be evaluated using financial accounting and reporting practices. The fundamental objective of financial accounting is to provide users of financial statements with useful information for the purpose of efficient and effective decision making.[34] Outside the company, financial reporting should provide information that helps existing and potential investors and creditors make rational investment and credit decisions. Within the firm, accounting information is essential for efficient managerial decision making. Managers need timely and accurate information for budgeting and implementing effective control mechanisms. Consequently, any event that is likely to affect a firm's current financial position or its future performance should be reflected in its annual accounts. Unfortunately, conventional financial statements are rapidly becoming less useful in today's dynamic business environment.

4.1 Why are traditional financial measures becoming less relevant?

In recent years, cost-based accounting information has become increasingly irrelevant.[35] Conventional accounting systems and the system of national accounts used in all industrialised countries were developed for manufacturing economies where most wealth was in the form of property, plant and equipment.[36] These systems were designed to provide accurate and reliable cost-based information about the value of assets used in production, and about the net value of the output produced by these assets. However, in the current business environment, conventional accounting principles simply do not account for many drivers of corporate success in the knowledge-based economy—for example, investments in intangible assets such as know-how, brands, patents and customer loyalty.

The global transition towards a knowledge-driven economy is a principal factor behind the growing irrelevance of conventional financial statements. According to Mavrinac and Siesfeld (1998), data compiled by Lev to track changes in the market-to-book ratio for some 300 firms over the period 1973-1992 reveals a decline in the value relevance of traditional financial measures. Lev writes: "The gap in 1992 indicates that roughly 40 per cent of the market valuation of the median corporation was missing from its balance sheet." During the last two decades most industrialised economies have moved progressively towards a knowledge-based, rapidly changing economy where investments in human resources, information technology, R&D and advertising have become essential to strengthen a firm's competitive position and ensure its future viability.

Intangible factors play a predominant role in companies' ability to innovate and their subsequent competitiveness in a knowledge-based economy. Such assets enable knowledge-intensive economies to maintain their competitive position compared to resource or labour-intensive economies. This dematerialisation of the economy involves greater investment in intangibles. There is a growing awareness in OECD member countries that an increasing part of total investment in the business enterprise sector is directed towards intangible investment products such as R&D, marketing, training and software. Nevertheless, OECD data on intangible investment is still relatively scarce.[37]

34 Horngren et al (1997)

35 Cost-based accounting is a managerial accounting activity designed to help managers identify, measure, and control operating costs. Good cost accounting statements guide managers in pricing their products to achieve greater profits and determine when a product is not profitable and should be dropped.

36 Blair and Wallman (1997)

37 Vickery (1999)

With the transition to a knowledge-based economy, the principal source of economic value and wealth is no longer the production of material or tangible goods, but the creation and manipulation of intangible assets. Economic growth is not influenced as much by investments in physical capital—that is, land and machinery—as by knowledge, which is a critical determinant for the productive application and exploitation of physical capital.[38] Consequently, companies depend on being able to measure, manage and develop their knowledge and currently, there are no adequate accounting techniques for determining and reporting the value of intangible assets.

4.2 Problems with conventional accounting treatment of intangible assets

Research has shown that traditional financial accounting performed reasonably well when a company's investment in intangibles was high and stable. Traditional accounting does not perform so well, however, when companies increase their investment in innovation—for example, to open up a new market. It is difficult for investors, managers and accountants to value this additional investment, particularly because the future earnings it could potentially generate are so uncertain. Traditional accounting finds it particularly difficult to cope with fast moving industries and with rapid change that is driven by investment in intangibles.

The greatest challenge to conventional accounting is not quantifying the level of investment in intangibles but accounting for the rate of change. Changes to investment in intangibles are difficult to track. Those investments can lead to a marked and unpredictable change in business performance. Traditional accounting measures have been undermined by this faster, less predictable rate of change because accountants find it increasingly difficult to match costs and investments in one period with earnings and revenues in another. Earnings in one period are an increasingly poor guide to earnings in a subsequent period. This faster rate of change is due in part to deregulation and technological change, which have exposed companies to new competition and opened up new markets that are difficult to value. However, intangible investment—for example, R&D to create new products—also plays a significant role in driving change.

Conventional accounting performs particularly poorly with internally generated intangibles such as R&D, brands and human capital—the very items considered the engines of modern economic growth. Accountants generally agree that any internally generated intangibles should not be treated as an asset. However, if intangibles are separated from a business' operations and acquired in an arm's length transaction, they may be classed as an asset, and valued at market price—for example, purchased licensing agreements or franchises. Unlike rent and interest payments, investing in intangibles often produces rich future rewards. Expensing investments in intangibles can produce serious distortions in reported earnings and detract from the relevance of financial reports. Studies have shown that investors implicitly recognise R&D expenditures as assets rather than expenses. For example, Lev et al (1996) found that net annual R&D investment—that is, R&D expenditure minus the amortisation of the R&D capital—is positively and significantly associated with stock prices despite the fact that this amount is expensed in the income statement.[39]

Nakamura (1999) explains how investment, profit, and savings are understated in corporate and national accounts, particularly since the mid-1970s, because of the accounting mistreatment of intangible assets. Nakamura argues that if investment in R&D was treated similarly to investment in tangible assets, profits—and hence retained earnings—would be higher and reported business savings would increase enough to raise reported gross national savings in the U.S. during the 1990s from 15.9 per cent to 17.1 per cent of GDP. This percentage would be even higher if investment in R&D was extended to include investments in intangibles.

38 Bishop (1999)

39 Lev & Sougiannis (1996) pp. 107–138

The consistent evidence about the substantial future benefits associated with intangible investments suggests the immediate expensing of practically all intangible investments, is inappropriate. But this strategy is often justified by the conservatism principle.[40] Managers attempt to display the most positive image of their firm. They seek to maximise perceptions of its performance and potential so as to exceed analysts' earnings forecasts and to enhance competition. The conservatism principle of immediately writing-off intangibles runs counter to a managers' strategy of presenting their company's most positive image. However, the high level of uncertainty associated with investing in intangibles justifies conservative accounting treatment.

However, others such as Lev see immediate expensing of R&D as biased and inaccurate. For example, expensing is only conservative when outlays on intangible investments exceed their revenues—which usually happens when a company is starting out. Later on, as investment in intangibles decreases and revenue from intangibles increases, reported profitability is often overstated.[41] Frequently, even internally generated corporate data is insufficient to support appropriate analysis and evaluation of the firm's intangible investment activities. Thus, internal and external performance evaluation and monitoring of investment in intangibles are hampered by the absence of adequate accounting information.

In short, traditional accounting techniques are inadequate for calculating the dollar value of the principle activities of a knowledge-intensive business. According to conventional accounting practices, tangible acquisitions—such as computers, land and equipment—are treated as company assets. Investment expenditure on knowledge-building activities such as training and R&D are still largely treated as costs. This is despite such activities being a primary source of organisational wealth in the new economy.

4.3 Consequences of inadequate accounting for intangibles

Interest in accounting for intangibles is based on the assumption that the present non-accounting of intangibles is producing misleading balance sheets. Supporters for the inclusion of human capital and structural capital on balance sheets argue that such capitals may largely explain the gap between book value and market value, namely intellectual capital. Opponents argue that balance sheets are not designed to be speculative and that determining precise figures is highly subjective and difficult to measure. If intangibles are not reflected on balance sheets, and intangible investments are fully expensed when the investment is made, the conventional accounting model understates earnings and the book value of equity. This makes it practically impossible for investors and company managers to:

- assess the rate of return—productivity—of investment in intangibles, and changes over time in the efficiency of the firm's investment activity;
- evaluate shifts in the characteristics of intangible investments; such as from long-term research to short-term development; or from product development to process—cost reducing—R&D; and
- determine the value of a firm's intangible capital, and the expected lives—benefit duration—of such assets.[42]

40 Lev, Sarath & Sougiannis (1999). Conservatism emerges in financial reporting in two ways:

1. Accounting policy makers often trade off relevance for reliability in making the rules for financial reporting.

2. Largely, because of the trade-offs referred to in (1) above, the fundamental measurement attribute for many balance sheet assets is historical cost. However, firms must write down the book values of these assets to their current cost or market value if these amounts fall below the historical cost measures. Such write-downs from cost to market on the balance sheet result in losses on the income statement. This reflects a general rule that companies must anticipate all future losses but recognise no gains until realised.

41 Lev (1997)

42 The Intangibles Research Project (http://www.stern.nyu.edu/ross/ProjectInt)

The lack of visibility of investments in intellectual capital has several consequences. If intellectual capital or human capital is not accounted for regularly, under-investment results. If a better technique is developed to account for these investments, resources will be allocated more efficiently and the economy will benefit. Current measurement and accounting hide intangible investments. Hence, the poorer the information that investors have about the companies they invest in, the greater the information inequality between companies and investors. This results in a higher cost of capital and markets allocating capital less efficiently.

There is considerable evidence that this lack of information about intangibles and true sources of value in corporations is already an urgent problem for corporate investors and managers.[43] Valuation and disclosure issues related to intangibles are complex and little understood, accounting standard-setters around the world are finding it very difficult to improve accounting systems for disclosing intangible assets.

4.4 Accounting for intangible assets—general approaches

The increased importance of intellectual capital to business competitiveness has driven change in the accounting treatment of intangibles. So far there are two broad streams of development. One approach is to improve information about intangibles by making it easier to treat them as assets in financial statements. This would increase transparency in financial accounting and reporting. The International Accounting Standards Committee (IASC) moved in this direction in 1998 when it approved International Accounting Standard (IAS) 38—a standard on intangibles, including advertising, training, start-up and R&D activities.[44] For intangibles to be recognised as assets, they must comply with definitions in the standard, generate a flow of benefits that are likely to accrue to the company, and be able to be measured reliably. This compels businesses to include intangible assets on their balance sheets and strictly regulates the capitalisation of these assets—providing greater certainty that they can be realised in the future. This fact, to a certain extent, limits its applicability in measuring and valuing a number of intangible assets. Indeed, it has been argued that accounting may not be the right approach in which to pursue the measurement of intellectual capital.

Another approach is to increase the availability of non-financial information about investment in, and management of, intangibles. This is happening in Europe. For example, some countries require companies to report certain information about human resources, and many companies (Skandia, Ramboll and Ericson) voluntarily disclose non-financial information about everything from training efforts to customer networks and in-process R&D. If intangible assets can not be defined specifically enough to allow the accounting profession to quantify it, then qualitative disclosure in financial statement can provide useful information on the intangible assets of the organisation. Unlike reporting requirements linked to accounting standards, the disclosure of non-financial information about intangibles has been far less transparent. Definitions, measurement and the capacity to verify information are unclear. In addition, consistency over time and the comparability of information across companies are not assured. Accounting standard setters have long confirmed that disclosure is not a substitute for recognition.

4.5 Conclusion

With the transition to a knowledge-based economy, the competitive position of a firm is increasingly determined by its investments in intangible assets such as human resources, information technology, R&D and advertising. Most of this expenditure is not recognised as investments, in either companies' financial accounts or national income and product accounts. This practice may have seemed reasonable when intangible investments were a negligible portion of total corporate investment, but this is no longer the case.

43 Nakamura (1999) pp. 3–16.

44 International Accounting Standards Committee (1998)

In a knowledge economy, economic growth is largely driven by intangibles such as knowledge, brand names and relationships. Therefore, it is highly desirable for companies to provide a reliable and accurate insight into their intangible strength to both investors and managers. Unfortunately, conventional financial statements and management reports currently lack sufficient information on the factors that contribute to a company's success. Every business enterprise has intangible assets. Yet only tangible assets and intangible assets purchased in an acquisition appear on a company's balance sheet. Consequently, a company's conventional book value is often far removed from its true value.

Accountants have long argued that there are sound reasons for not treating intangibles as assets on a company's balance sheet.[45] Indeed, we need to consider whether the accounting discipline will provide the solutions to problems associated with the measurement of intangible assets. Definition and measurement problems limit the degree to which data on intangibles is substantial and comparable. This complicates valuation on the basis of historic costs—and valuation on the basis of expected future economic benefits is inappropriate for the balance sheet, which is retrospective. Another complication is the fact that it is virtually impossible to impute a value for intangibles such as customer or supplier networks, which are difficult to isolate from other aspects of the business. Furthermore, human capital cannot be easily treated as a financial asset because companies do not own their employees. Accounting standard setters view the inability to satisfy the control criterion as one of the major obstacles in recognising intangible assets on balance sheets. Finally, taxation policies encourage the immediate expensing of investment in intangibles as a way of reducing tax liability. There is also strong opposition, among accountants, to recognising internally generated intangible assets, largely because (1) the cost (of internally generated intangible assets) is not a reliable measure of underlying value and (2) that measures other than a cost measure, lack sufficient reliability. Many accountants believe this would allow management the flexibility to capitalise nearly all expenditure as an asset in an attempt to increase book value and defer expenses. This means that companies would be able to manipulate earnings both in the short term by determining economic feasibility, and in the long term by the judicious use of amortisation and impairment tests.

However, in the knowledge-driven economy—where the key factors are complexity, intangibility, integration and dynamics—managers clearly need new management tools and stakeholders need new measurement techniques to form a clear view of a company's true economic potential. Such techniques should make the quality and value of a company's intangible assets, and their potential value in the future, transparent, and be consistently applied across the economy.

Unfortunately, accounting for intangible assets is more easily described than implemented. It is a new discipline, as yet largely undeveloped. There are clearly difficulties in quantifying immaterial attributes such as openness to change, competency and the strength of customer loyalty. The numerous problems associated with traditional financial measures of intangible assets have resulted in general agreement that new measurement systems are needed to help investors, managers and policy-makers manage more effectively in the knowledge economy. The problem is recognised internationally and several countries are working on developing a system of accounting for intangible assets[46] (see chapter 8).

45 Wurzburg (1999)

46 Neilson (1999)

5 valuing intellectual capital

The growing influence of intangibles in company performance is driving the need to develop techniques to value intellectual capital. There are however, several substantial difficulties associated with valuing intangibles. These include:

- values are subject to frequent changes;
- many intangible assets are produced internally, rather than acquired in an arm's length transaction; and
- the value of an intangible asset often depends on the value of related tangible and intangible assets.

According to an OECD study by Mavrinac and Siesfeld (1998), empirical results collected using revealed preference analysis suggest that non-financial measures of quality and strategic achievement have a profound effect on investment and valuation.

Frank Lichtenberg compared the return on investment in physical capital—spending on new plant and equipment—with the return on R&D expenditure and found that a dollar spent on R&D returned eight times more than a dollar spent on new machinery.[47] According to a 1997 study, about 84 per cent of the market value of ten of the leading Fortune 500 companies were attributable to intangible assets.[48]

Research by Hall (1998) using US data also generally conclude that the market value of current year R&D spending is between 2.5 and 8 times the expenditure; and that the stock of R&D from previous years is generally valued between 0.5 and 2 times the value of ordinary assets when R&D expenditure is depreciated over seven years. In Australia, Bosworth & Rogers (1998) found that R&D affects the market value of a firm, but not at a statistically significant level. This research suggests that for a median sized firm in their data set—with fixed assets of $133 million—increasing R&D spending by $1 million would increase market value by 0.75 per cent.[49]

An analysis of 390 corporate takeovers in the US from 1981–1993, with a median value of $2 billion, showed that the average price that purchasing companies paid to acquire a company was 4.4 times the value of assets recorded in their balance sheets.[50] Furthermore, the average market-to-book ratio of 500 of the largest US companies—Standard & Poor's 500—many of which are not in high-tech industries—reached 6.25 in 1999.

European stockmarkets show broadly similar, though less marked, trends.[51] A working group organised by the Centre for European Policy Studies (1997) examined the market-to-book ratios for thousands of companies in Europe and the US between 1990 and 1995. This study found that the average market-to-book ratios of European companies rose from 149 per cent to 202 per cent in 1995. Over the same period, the US ratio rose from 194 per cent to 296 per cent.

In Australia, there is a similar level of capital market recognition for intangible assets. For example, in 1997 the recruitment company Morgan & Banks listed on the Australian Stock Exchange with a capital asset base of around $11 million. A conservative valuation would have priced the company at $20–$30 million. The company was soon valued at over $300 million—almost 30 times the book value of its assets.[52]

47 Stewart (1998) p. 24.
48 Puri (1998)
49 Bosworth and Rogers (1998)
50 Bradley (1997)
51 Lev (1998)
52 Sherry (1999)

Such statistics clearly indicate that investors in developed countries recognise that the most productive resources of business enterprises are intangible, or knowledge, assets. This is demonstrated by the high stock prices that companies with relatively low levels of tangible assets receive, as well as the high market-to-book ratios that many companies now exhibit.

The growing interest in benchmarking intellectual capital stock between firms has led to the development of three broad indicators:

- market-to-book ratios
- Tobin's Q and
- Calculated Intangible Value (CIV).

The value of intellectual capital is both time-sensitive and context dependent. As a result, these measures of intellectual capital should be interpreted as a stock valuation, not a flow. It is also important to understand that quantifying the amount "invested" in intangible assets and quantifying the "value" of intangible assets are two very different concepts. That is, reporting the organisation's investment in intangible assets does not necessary equate to the value of its intangibles.

This Chapter examines the three major techniques used to value intellectual capital and outlines the benefits from reporting intangibles. It also considers the use of real options as a way of valuing the anticipated benefits from investments in intellectual capital. This technique attempts to use the workings of the market to determine a price and value on assets that are expected to yield future economic benefits. Unlike the static techniques—market-to-book ratios, Tobin's Q and CIV—real options provide a forward looking approach to valuing intellectual capital.

5.1 Market-to-book values

The value of intellectual capital is commonly expressed as the difference between the market value of the company and its book, or equity, value.[53] People are recognising the growing divergence occurring in the marketplace between the book value and the market capital of various corporations. This divergence indicates there is something not accounted for on the balance sheet or in financial statements.[54] Recent acquisitions show that the price paid for an acquired company is invariably higher than its book value—and conventional accounting practices incorporate this difference as goodwill on the balance sheet. In today's increasingly fast-paced business environment, where mergers and acquisitions occur more frequently, the dollar value of the goodwill component is increasing all the time.

The growing disparity between market value (MV) and book value (BV) is largely based on the intangibles of the business providing the foundation for future growth. The largest disparity occurs in high-tech and knowledge-intensive industries where investment is heavily concentrated in intangible assets such as R&D and brands. According to Skyrme (1997), in June 1997 the ratio of market-to-book value for all Dow Jones Industrial companies was 5.3, while for many knowledge-intensive companies—for example, Microsoft and pharmaceutical companies—the ratio was more than ten. Between 1973 and 1993, the median ratio of MV to BV of American public companies doubled; the difference has grown with the boom in high-tech companies. The greatest differences are seen in firms that have most rapidly boosted spending on R&D.[55]

From an internal perspective, differences between MV and BV are due primarily to assets that are not currently included in the conventional balance sheet total—such as knowledge, relationships, and image. The external perspective on the gap between MV and BV is due primarily to the company's future opportunities and these are currently not valued in the conventional balance sheet.[56]

53 Book value is also known as net tangible asset value.

54 Ministry of Economic Affairs (1999) - 'There are many other explanations for the gap between market value and book value. One claims that it is due to knowledge (Buckman Laboratories), while another attributes it to the brand (Coca-Cola) or the ownership of a standard (Microsoft)'.

55 *The Economist* (1999)

56 The internal value of intangibles can be proxied on replacement value or market value while the external perspective on the value of intangibles can be proxied on economic value or future potential.

Table 1 shows market-to-book values for several large corporations and suggests that there is enormous hidden value that is not obvious when traditional accounting methods are used. Yet investment in these hidden assets is growing. Such investments include customer relations, information technology, networks and competence.[57]

Research undertaken by Margaret Blair, a Brookings Institute economist, demonstrated that the value of hard assets represented 62 per cent of a company's market value in 1982. In 1992, this figure had dropped to 38 per cent. In 1995, health and personal care companies had the highest market-to-book value in the world with almost 75 per cent of MV attributable to intangible assets. Recent estimates suggest that 50 to 90 per cent of a firm's value is derived not from its management of traditional physical assets, but from its management of intellectual capital.[58]

57 See Skandia Group Yearend Report Supplement (1996)

58 International Federation of Accountants (1998) p. 4.

Table 1

		Ratio of Market Value to Book Value	
Company Name	Market-to-Book Value	Sector	Date
Coca-Cola	24.3	Food and drink	August 19, 1998
Microsoft	19.8	ICT	August 19, 1998
Cisco	16.6	ICT	August 19, 1998
Intel	6.9	ICT	August 19, 1998
IBM	6.7	ICT	August 19, 1998
Nike	3.4	Footwear	August 19, 1998
Merrill Lynch	3.3	Financial	August 19, 1998
Citicorp	3.2	Financial	August 19, 1998
Southwest Airlines	3.1	Airlines	August 19, 1998
Merck	11	Pharmaceuticals	MV as at May 31st 1998. Based on actual results and 1998-2000 IBES projected results.
DuPont	7.6	Science	MV as at May 31st 1998. Based on actual results and 1998-2000 IBES projected results.
Morgan & Banks	30	Recruitment	Soon after listing on ASX
Monsanto	8	Life science	MV as at May 31st 1998. Based on actual results and 1998-2000 IBES projected results.
Bristol-Myers Squibb	14.8	Worldwide health & personal care company	MV as at May 31st 1998. Based on actual results and 1998-2000 IBES projected results.
Johnson & Johnson	7.5	Manufacturer of health care products	MV as at May 31st 1998. Based on actual results and 1998-2000 IBES projected results.

Source: Adams Capital Inc (1998); The Economist (1999); Sherry (1999).

For example, analysis in Business Week (July 1997) found that Microsoft's stock market value of $148.5 billion was worth the same as the combined value of Boeing ($37.9 billion); McDonald's ($34.7 billion); Texaco ($28.7 billion); Time-Warner ($26 billion); and Anheuser-Busch ($21.2 billion).[59] Moreover, at the time, only about seven per cent of Microsoft's stock market value was accounted for by traditional tangible assets—land, buildings, machinery and equipment—recorded on its balance sheet. Intangible assets—for example, brands, R&D and people—constituted the remaining 93 per cent of the company's assets.

Limitations of market-to-book values

Market-to-book value is an indirect measure of intellectual capital and has both theoretical and practical problems. First, the stock market is volatile, responds to factors outside the control of an entity and can be dominated by irregular, seasonal and cyclical factors. Furthermore, market-to-book values ignore external factors that can influence the market value of a company. These include deregulation, supply conditions, general market nervousness and other information that contributes to investors' perceptions of the income-generating potential of the firm—for example, industrial policies in foreign markets, media and political influences. The share price of companies with large intangible values tends to fluctuate more than other companies. In a publicly traded company, the greater the ratio of intangible to book value, the more uncertain the investment—as demonstrated by falls in technology stocks beginning in early to mid 2000.[60]

Second, there is evidence that both market value and book value are usually understated. To encourage companies to invest in new equipment, the US Internal Revenue Service's rules allow companies to depreciate assets faster than the rate at which they actually wear out.[61] Calculations of intellectual capital that use the difference between market and book values can be inaccurate because book values can be affected if firms choose, or are required, to adopt specific tax depreciation rates for accounting purposes. Other changes to the accounting standards also affect book value, such as the US Federation of Accounting Standards Board's Statement 115—*Accounting for Certain Investments in Debt and Equity Securities, in accordance with GAAP*—which affects reported book value.[62]

Third, adopting the market-to-book approach for valuing intangibles can be affected by timing inconsistencies. Market value is determined and revised constantly whereas book values are only updated periodically.

Looking at the ratio between the two, rather than at the raw number can enhance the reliability and usefulness of the difference between market value and book value. Using the ratio this way means that a company can be compared with similar competitors or benchmarked against the industry average. Year-to-year comparisons of the ratios can also be made. Whilst using the market-to-book method to value intellectual capital has several limitations, it is useful in highlighting the existence and degree of intellectual capital within an organisation.

5.2 Tobin's Q

Tobin's Q compares a company's market value with the net-of-tax replacement cost of its assets. It uses the ratio—the Q— to analyse dynamic firm behaviour, independent of macroeconomic conditions such as interest rates. The replacement cost of fixed assets can be calculated by adding the reported value of a company's fixed assets to its accumulated depreciation and adjusting the result for inflation. According to Smither & Wright, Wall Street's Q is currently more than two.[63]

59 Kaufman (1997) p. 5.

60 In addition, organisations that are not traded in public markets do not have a market value that is easily determined. Presumably, these organisations still have intellectual capital which has value to the organisation.

61 Stewart (1998) p. 225.

62 Robertson (1995) - 'Under Statement 115, effective for fiscal years beginning after December 15, 1993, returns on equity for a given company will fluctuate inversely with the book value and will be unusually high when the book value is depressed because of high interest rates'.

63 *The Economist* (2000b)

Technology and human capital assets are typically associated with high Q values.[64] A study using Tobin's Q as an indicator of company value conducted by the Department of Industry Science and Resources (2000) found that the market places a higher value on firms which invest in R&D and patents. Indeed, there is a relationship at work between these intangible assets—R&D is valued more highly if it leads to patent applications.[65]

Tobin's Q can be a useful measure of intellectual capital because it can reflect the value markets place on assets that are not typically reported in conventional balance sheets.[66] By making intra-industry comparisons between a firm's primary competitors, these indicators can act as performance benchmarks and be used to improve a company's internal management or corporate strategy.[67] The information provided by these ratios facilitates internal benchmarking and enables the organisation to track its progress in an area it defines as integral to its success.

As with market-to-book ratios, Tobin's Q is most revealing when similar companies are compared over several years. Tobin's Q and the market-to-book ratio are best suited to comparing the value of intangible assets of firms within the same industry, serving the same markets, with similar tangible assets. These ratios are useful for comparing the changes in the value of intellectual capital over a number of years. When the Q and the market-to-book ratio of a company fall over time, it is a good indicator that a firm's intangible assets are depreciating. This might tell investors that a particular company is not managing its intangible assets effectively and lead them to adjust their investment portfolios towards companies with climbing, or stable Qs. An advantage of Tobin's Q over the market-to-book ratio, is that it neutralises the effects of different depreciation policies.

5.3 Calculated Intangible Value (CIV)

Developed by NCI Research, an economic research firm affiliated with the Kellogg Business School at Northwestern University, Calculated Intangible Value (CIV) is a method for calculating the fair value of intangible assets. CIV assigns a value to intangible assets by comparing a firm's performance with an average business competitor holding similar tangible assets. The CIV approach is similar to that used to evaluate brand equity. Brand confers economic benefits to the owners—pricing power and greater distribution—above the return on assets to unbranded competitors. If the premium induced from the brand can be calculated, it is possible to infer the asset value of the brand. An advantage of the CIV approach is that it allows firm-to-firm comparisons using audited financial data and, as such, can be used as a benchmarking tool. As a benchmarking tool, CIV can help assess whether an organisation is fading or indicate value not reflected in traditional financial measures or whether the company is generating the capacity to produce wealth in the business future.

Determining CIV

1. Calculate average pre-tax earnings
2. Calculate average year-end tangible asset—from balance sheet
3. Calculate the return on assets (ROA). This equals average pre-tax earnings divided by average year-end tangible assets
4. Compare the ROA with the industry's average ROA

64 International Federation of Accountants (1998) p. 18.

65 See Department of Industry, Science and Resources (2000) - 'Markets value investment in these intangible assets five times greater than investment in physical assets. This is consistent with US studies, which find that R&D spending is capitalised into a firm's market value at a rate between 2.5 and 8—with most estimates centred between 5 and 6'.

66 Jones & Sharma (forthcoming early 2001?) p. 9.

67 International Federation of Accountants (1998)

If a company's ROA is greater than the Industry ROA proceed to step 5. If the ROA is less than the industry average the company does not have excess earning power.

5. Excess return = Pre-tax earnings—[industry average ROA * company's average tangible assets]
6. (1-t) * excess return = premium attributable to IA (where t = average income tax rate and IA= intangible assets)
7. $NPV_{premium}$ = premium / company's cost of capital = CIV (where NPV = net present value).

Limitations of CIV

Calculated Intangible Value has several limitations. It uses average industry ROA to determine excess returns. By nature, average values suffer from outlier problems and could result in excessively high or low ROA. The Net Present Value (NPV) of intangible assets will depend on the company's cost of capital. However for comparability within and between industries, the industry average cost of capital should be used as a proxy for the discount rate in the NPV calculation. Again the problem of averages emerges and care must be taken when calculating an average that has been adjusted for outliers.[68] CIV also lacks the precision that balance sheet numbers provide. For CIV to be useful a company must have reported earnings and an above average return on assets. In addition, CIV has limited applicability in industries dominated by a small number of firms.

5.4 Real options-based approach

An emerging new market approach to valuing intangibles is rapidly gaining currency. Over the past 20 years, a growing body of academic research has taken the theory and methodology of financial options and applied it to the valuation of intangible assets. This is known as real options theory, an extension of financial options theory.[69] A financial option is the right, but not the obligation to buy (or sell) an underlying asset at a fixed price for a predetermined period of time. A real option is an option that is based on non-financial assets and unlike a financial option, the underlying asset is non-tradeable . It applies the same techniques and variables as the Black-Scholes model on which financial options are based, but uses non-financial inputs. Real options can be applied to determine the value to proceed, defer, expand or abandon investment. By drawing on financial market techniques, benchmarks, and information, businesses can discipline their investment decisions and align them with the investment decisions of the market. They can close the gap between strategy and shareholder value.[70]

As stated earlier, reporting intellectual capital is often criticised by accounting professionals for the high uncertainty associated with the returns on intellectual assets. Intellectual capital by its very nature, derives its value from the opportunities it creates. Unlike the previous measures of intellectual capital—market-to-book value, Tobin's Q, and CIV—real options provides an approach which values the opportunities arising from intellectual capital.[71] Deciding how much to expend on R&D, or the kind of R&D in which to invest, translates to the valuation of opportunities. Companies with new technologies, product development ideas, defensible positions in fast-growing markets, or access to potential new markets own valuable opportunities. For some companies, opportunities are the most valuable things they own and the question is how to map the opportunity to reality.[72] Real options is a formal strategic tool, offering proactive, rather than just reactive, flexibility.

68 ibid., p. 19.

69 The term 'real option' was coined in 1977 by Stewart C. Myers of Massachusetts Institute of Technology. Its earliest applications were in oil, gas, copper, and gold, and companies in such commodity businesses remain some of the biggest users.

70 Amram & Kulatilaka (1999) p. 96.

71 Rapid change has also exposed the weaknesses of these less flexible valuation tools.

72 Partanen (1998) p. 51.

Exploiting uncertainties

Executives readily see how today's investment in R&D, or in a new marketing program, or even in certain capital expenditures, can generate the possibility of new products or markets. A corporate investment opportunity is like a call option because the corporation has the right, but not the obligation, to acquire something—for example, the operating assets of a new business. If a company finds a call option sufficiently similar to the investment opportunity, the value of the option tells the company something about the value of the opportunity.[73]

Companies acquiring research and technology from universities in the US are increasingly using the options approach.[74] The real option pricing models largely borrowed from the financial markets may assist companies and investors to overcome the problem of valuing R&D in an environment of great uncertainty.[75] R&D expenditure should be viewed as an investment to create an asset—knowledge capital—which in turn can produce an income flow.

Increasingly companies are using the options approach to acquire and fund research in stages. At each stage of the research the company can either choose to renew the option, terminate it or sell it to another bidder. Projects can be viewed as a sequence of options—for example, oil extraction includes stages such as licensing, exploration, appraisal and development. Importantly, this approach recognises that options have value. As the research project progresses, the company can potentially gather additional information about the prospects of the project.

An organisation's future is related to its ability to respond to changing conditions. By building option pricing into a framework designed to evaluate opportunities as well as physical assets companies gain financial insights early in a project rather than later when they might have invested more time and resources.[76] Managers can then compare every incremental opportunity arising from existing investments with the full range of opportunities open to them.

Applying the discipline: valuing the option

The full value of a project is the value of all the options it creates, not just the value if it is successful. Spending money to exploit business opportunities is analogous, for example, to exercising an option on a share of stock. The money spent corresponds to the option's exercise price. The length of time the company can defer the investment decision without losing the opportunity corresponds to the

73 Luehrman (1998a) pp. 51–2.

74 See Ziedonis (1999) for an empirical study of real options in technology licensing.

75 Options are commonly used in financial markets, for example in markets linked to trade in minerals and agricultural commodities. Stock options are increasingly used by companies to reward staff.

76 Luehrman (1998b) p. 99.

Example: Oil Industry

Oil companies today place far greater emphasis on exploration to find new reserves. This exploration is akin to R&D: it is highly speculative, risky and uncertain, particularly in the early stages of the process. To counteract this uncertainty, oil companies have become increasingly sophisticated in the way they price the risks involved by using real and financial options. If an exploration project is successful, a company has the option to drill wells and pump oil. If the project is unsuccessful, the company has the option to cease development and end the project. Even so, the exploration may have generated useful knowledge and diverted competitors. The option increases the value of the exploration project because it protects the full potential gain of the investment while limiting the possible losses. Oil companies have little difficulty evaluating the value of oil option contracts that mirror the value of their own exploration options.

option's expiry date.[77] The possibility of deferral gives rise to two additional sources of value. First, all other things being equal, it is preferable to pay later rather than sooner because the company can earn the interest on the deferred expenditure. Second, while the company is waiting, the world can change. The more uncertain and volatile the pay-offs from the project, the more it makes sense for a company to hold an option. Hypothetical examples of the most common types of real options—timing options; growth options; staging options; exit options; flexibility options; operating options and learning options—are described in Appendix 1.

Traditional net present value (NPV) analysis misses the extra value associated with deferral because it assumes the decision cannot be delayed. In contrast, option pricing presumes the ability to defer and provides a way to quantify the value of deferring. However, value may be lost as well as gained by deferring. For example, deferring would not be appropriate if it meant losing the opportunity to commit to a valuable project. However, when there are predictable costs to deferring, deferral becomes less valuable, and companies should factor in such costs.[78]

Option valuation tools and models are constantly being improved, and additional types of risk are constantly being securitised. Many risks that once had to be considered private risks have turned into market-priced risks. For example, the establishment of a trading market for sulfur dioxide emissions has enabled manufacturers and energy companies to think systematically about the most economic way to reduce pollution.[79] For examples of industry applications of real options, refer to Appendix 2.

Future prospects of real options

The real options approach is in its infancy and there are limits to its usefulness. Historically, R&D and other forms of knowledge capital were difficult to value because knowledge is not actively traded. However, according to an OECD study by Charles Leadbeater (1999), a market for knowledge capital is emerging, at least in the United States.[80] The emergence of markets where R&D and other intangibles are traded should be monitored closely. Prices established as reliable in these markets could provide guidelines for changes in accounting procedures. Natural resources companies have been the early experimenters in using real options. This is largely a result of their ability to link the future value of their assets to traded commodities, for which market information is readily available. Using real options is now appealing to a wider corporate audience.

Advocates of real options believe that it reinforces management intuition. Real options analysis is a big step beyond static valuation measures such as price-earnings and market-to-book-ratios. Because the options approach handles simple contingencies better than standard Discounted-Cash-Flow (DCF) models, option pricing theory has been regarded as a promising approach to valuing business opportunities since the mid–1970s. However, a combination of factors—large, active competitors, uncertainties that do not fit neat probability distributions, and the sheer number of relevant variables—make it impractical to analyse real options formally. As a result, option pricing has not yet been widely used as a tool for valuing opportunities.[81] According to Copeland & Keenan (1998a), option pricing has not been widely used to evaluate corporate investments for three reasons:

- the idea is relatively new;
- the mathematics are complex, making the results hard to grasp intuitively; and
- the original techniques required the source of uncertainty to be a globally traded commodity such as oil, natural gas, or gold.

77 Luehrman (1998a) p. 52.

78 ibid., p. 53.

79 Amran & Kulatilaka (1999) p. 104.

80 In particular, the growth of the Internet has produced new online marketplaces - yet2.com, Intellectual Property Technology Exchange, Inc (TechEx), The Patent & License Exchange (Pl-x.com), The Intellectual Property Exchange (Ipex), HelloBrain, Patent Auction.com and PatentCafe.com.Inc - which bring together potential buyers and sellers of patents, licences and intellectual property on a global scale.

81 Partanen (1998) p. 51.

Although this new measure seems attractive, there are significant drawbacks. Determining the value of real options remains an inexact science. Substantial difficulties remain in valuing non-financial assets accurately at a firm level. Unfortunately, most business opportunities are unique, so the likelihood of finding a similar option is low. The only reliable way to find a similar option is to construct one. Furthermore, real options pricing is often too complex to be worthwhile for minor decisions. The use of real options presents two fundamental problems: quantifying real options value; and persuading an organisation to change the way it traditionally thinks about valuation and investment. Several limitations to using real options have been identified, such as model risk, imperfect proxies, lack of observable prices and lack of liquidity – see Appendix 3.

5.5 Conclusion

The challenge of valuing intellectual capital is fundamentally an economic issue—how to price intangible assets in the absence of proper functioning markets. From an economic standpoint, the challenge is to create an internal market for intellectual capital, where buyers and sellers can exchange intangible assets at fair market prices.[82] In practice, however, markets for knowledge and information depend critically on reputation, on repeated interactions and on trust. Through the Internet, companies such as yet2.com, Intellectual Property Technology Exchange, Inc (Techex.com), Patentauction.com, The Patent & License Exchange Inc (pl-x.com) and Inventions for Sale.com are providing a marketplace for trading technology, patents, licenses, and intellectual property.

The complexity involved in valuing intellectual capital means that a multi-disciplinary and multi-institutional approach is needed to develop a model for valuing intellectual capital. Economists, accountants, regulators, standard setters, investors and intellectual property specialists have a role in developing such a model.

Real options is an emerging technique used in the valuation of intellectual capital. It can be broadly applied in industries characterised by high levels of R&D, manufacturing, and marketing investment. Research is now focusing on extending real options beyond commodities—into biotechnology, pharmaceuticals, software, computer chips, and similar fields. The frontier of the real-options approach continues to advance rapidly. The models are becoming more sophisticated, and information from the markets is becoming more quantifiable and useful.

The measurement of intellectual capital can be approached from several bases:

- internal versus external;
- qualitative versus quantitative; and
- dollar based versus non-dollar based.

With the exception of the real options approach, the valuation techniques discussed in this Chapter are aggregate measures that attempt to assign a value to a firm's stock of intellectual capital. The techniques outlined in this chapter can also be used for internal benchmarking and for making comparisons between firms. These economic valuations serve as a starting point from which to experiment, develop and progress the measurement of intellectual capital.

82 Klein (1998) p. 6.; Wlaker (1999) - 'It is estimated that the uncommercialised technology lying dormant in US companies is worth more than $179 billion (US$115 billion)'.

6 intellectual capital measures and models

The intellectual capital models considered in this chapter have more of an internal measurement focus—such as budgeting, patent counts and staff turnover. These micro-level measures of intellectual capital are largely designed to support management's decision-making process and to assist in the development of knowledge management strategies. Given the difficulties associated with determining precise values for intellectual capital, most of the measures considered in this chapter do not attempt to put a dollar figure on the value of intangibles. Instead they measure processes or results that are dependent on it. Because the chapter focuses on these aspects of intellectual capital, many of the measures considered are non-financial.

In a world of increasing technological change and shortened product life cycles—where knowledge work and intangible assets are of profound importance—future financial performance is often better predicted by non-financial indicators than by financial indicators.[83] The underlying principle of measuring intangible assets must be that it complements the accounting system with a new language, rather than replacing it with a new control system. A growing number of measurement systems are appearing, and one of the challenges for users is to determine the relative merits, scope and suitability of each. In this chapter, four popular approaches to intellectual capital measurement will be briefly discussed. They are:

- Human Resource Accounting;
- Intangible Assets Monitor;
- Skandia Navigator™; and
- Balanced Scorecard.

6.1 Human Resource Accounting

Human Resource Accounting (HRA) is an accounting method that describes the management of a company's staff. It has two aims:

- to improve the management of human resources from an organisational perspective—by increasing the transparency of human resource costs, investments and outcomes in traditional financial statements; and
- to improve the bases for investors' company valuation.

It focuses on employees' education, competence and remuneration. HRA supports accounting for investments in staff, thus enabling the design of human resource management systems to follow and evaluate the consequences of various HR management principles.[84] There are four basic human resource accounting models.

- The **anticipated financial value** of individuals to the company. This value depends on two factors—the individual's productivity, and how happy they are working in that company.
- The **financial value of groups** describes the connection between motivation, organisation and financial results. This model measures motivation and welfare rather than value. Under this model, employee satisfaction measures are very important.

83 Mavrinac & Siesfeld (1998) p. 4.

84 The Danish Trade and Industry Development Council (1999)

- **Staff replacement costs** describe the financial costs of recruitment, re-education and redeployment of employees. This model focuses on comparing replacement costs with the costs of staff acquisition, training and separation. Acquisition covers recruitment, advertising and other start-up expenses. Training covers education and on-the-job training. Separation covers lost production when a person leaves a job. This model can be used to describe the development of costs in connection with replacements.
- **Human resource accounting and balancing** as complete accounts for the human resource area. This model concentrates on cost control, capitalisation and depreciation of the historic expenses for human resources. By focusing on the results of poor resource management, this model demonstrates the importance of human resource management to a company's performance.

The difficulties associated with several major human resource evaluation methods cast doubt on HRA's accuracy. The difficulties for any model of human resource evaluation include Input Measurement, Output Measurement and Replacement Values.

Inputs—such as training—are not necessarily effective, so cost is not always a good proxy measure of output value. Trained personnel may also move to another employer through higher labour mobility—thus inhibiting the returns from corporate training investment. Virtually no firm actively measures the output benefits from training. Replacement values are rare—usually calculated to help product sales or the sale of the company—and are often highly debatable.

Case Study: The Swedish Civil Aviation Administration (SCAA)

The Swedish Civil Aviation Administration (SCAA) is a government agency experiencing increased competition within several business areas. The company's business is related to airport operation. SCAA aims to turn its human resources into a key resource for the company's development.

SCAA's intellectual capital accounts are a direct spin-off from the company's human resource management system. SCAA has had an elaborate and integrated human resource management system for some time. The delegation of decision-making authority in recent years has necessitated the consolidation of reporting for various aspects of human resource management.

The SCAA's intellectual capital accounts are structured around a financial representation of the company's staff expenses per division, and for the entire group. They also include information about staff composition—for example, age, sex, breakdown by managers and non-managers, absence and education. These intellectual accounts include non-financial information about the composition and education of the staff and a financial description of the staff, which specifies the staff categories of the ordinary financial accounts.

SCAA's accounts are an example of consolidated accounts within the staff area. They enable management to consider questions about education, employment and redeployment of staff from a strict financial position so the profitability of staff-related activities can be calculated. SCAA's intellectual capital accounts have internal and external consequences. Internally, they help emphasise the need for responsible management to work with human resource development. They highlight the importance of this by comparing divisional results within this field. Non-conformance with standards, the average of all divisions, is discussed in detail by senior managers. Externally, such accounts draw attention to SCAA as a business attentive to staff-related issues. This creates a good reputation among potential SCAA recruits. In this way, intellectual capital accounts contribute to attracting better job applicants.

6.2 The Intangible Assets Monitor

Karl-Erik Sveiby developed the Intangible Assets Monitor (IAM) as a management tool for organisations wanting to track and value their intangible assets.[85] In the 1980s, accountants were searching for a model that demonstrated how intangible assets account for the difference between a company's market value and book value. Sveiby was one of the first to develop a method for measuring intangible assets. The Konrad Group, to which Sveiby belonged, introduced the "intellectual capital family of three" concept. This divided intellectual capital into:

- external structures or customer capital;
- internal structures or organisational capital; and
- individual competence or human capital.[86]

This concept became the basis for many intellectual capital measurement systems, including Sveiby's Intangible Asset Monitor.

The IAM is based on the fundamental premise of people being an organisation's only profit generators. According to Sveiby, people are the only true agents in business. All assets and structures, whether tangible physical products or intangible relations, are the result of human action and depend ultimately on people for their continued existence.[87] Therefore, according to the IAM, human actions are converted into both tangible and intangible knowledge structures. Such structures are either directed outwards—external structures; or inwards—internal structures. These structures are assets because they affect the organisation's revenue streams. According to the IAM, the profits generated from people's actions are signs of that success, but not the originators of it.

The IAM is a stock/flow theory. It assumes that some of the organisation's assets are intangible assets. The IAM's purpose is to guide managers in their use of intangible assets, to identify the flows that are increasing and renew them and guard against the risk of losing them.[88] According to the IAM, the intangible part of a company's balance sheet consists of three parts:

- *External structure:* is a company's relationships with its customers and suppliers, brand names, trademarks and organisational reputation or image.

85 Sveiby (1997)

86 The Konrad group (Konradgruppen) consisted of members from several Swedish knowledge companies.

87 Sveiby (1998)

88 Sveiby (1997)

Case Study: South Gippsland Shire Services, Q4C Community Services

South Gippsland Shire Council's business unit, Q4C Community Services, recognises the integral role of its staff and their knowledge. The IAM provides a framework that has helped Q4C explicitly manage and exploit its key resource—its intangible assets. Developing the IAM has resulted in dynamic understandings about Q4C and the key factors that drive its success.

Using the IAM model of intangible assets, Q4C focused on the following key business factors:

- key indicators of financial success—traditional financial measures such as profit; measures of Q4C's customer relationships, and how they affect revenue, growth, competence and image;
- measures of Q4C's internal systems and structures that support effective and efficient service delivery; and
- indicators of human capital that provided a picture of the combined expertise and experience of Q4C staff.

By helping Q4C to understand and articulate these key drivers, the IAM provided it with the opportunity to recognise that a customer project brings more than just financial benefits. Indeed, when managed correctly, such projects will educate staff, create new solutions and processes and develop new knowledge and revenue.

- *Internal structure:* is a company's organisational assets. It includes patents, processes, systems, concepts, and computer and administrative systems. These structures are generally created by the employees and are thus owned and adhered to by the organisation. A key feature of such structures, is that they largely remain intact even if people leave the organisation.
- *Individual competence:* is a person's ability to act in various situations. It includes skills—including social skills—education, experience, and values. According to Sveiby, a key determinant of an organisation's success is its staff's competence. This competence is directed in two ways: externally and internally.

6.3 The Skandia Navigator

The Swedish financial services firm, Skandia, prepared the world's first annual intellectual capital report. Its 1994 intellectual capital report, *Visualising Intellectual Capital*, represented a coherent first attempt to report the value of intellectual capital in an organisation. The Skandia Navigator is perhaps the best-known business model developed to identify the intangible assets that are the key to company performance.[89] A feature of the Skandia Navigator is its definition of intellectual capital. In addition to the skills and expertise of its workforce, it also includes the systems and processes that it has put in place to capture and exploit all the knowledge it can. The Navigator is based upon the same broad conceptual framework as the IAM.

The Navigator is a future-oriented business planning model designed to provide a balanced picture of financial and intellectual capital. Consequently, it incorporates measures in categories similar to those of the balanced scorecard. The focus on financial results, capital, and monetary flows, is complemented by a description of intellectual capital and its development. The Navigator framework, as expected, has at its top end a series of measures about financial focus. But it also has below the line measures of intellectual capital. These involve four areas and two dimensions. The four areas and what they quantify are:

- customer focus—how the organisation views its customer;
- process focus—key aspects of the organisation's process performance;
- renewal and development focus—what is being done to renew and develop the intellectual asset base; and
- human focus—the virtual binding force of customer, process, renewal and development and finance.

The Navigator incorporates approximately 30 key indicators in the various areas, which are monitored internally each year. The key indicators for each area are:

- customer focus—includes number of accounts, brokers and lost customers;
- process focus—includes the number of accounts per employee and administrative costs per employee;
- development/renewal focus—includes satisfied employee index, marketing expense per customer and share of training hours; and
- human focus—includes personnel turnover, proportion of managers, proportion of female managers and training costs per employee.

Almost more importantly, the Navigator includes two dimensions. The measures in each focus area are specified in terms of today's performance and tomorrow's performance—a clear view of articulating targets for the Navigator.

The Skandia Navigator is used to identify important areas of know-how in the organisation which need to be developed and shared. Each of Skandia's strategic business units have used the Navigator framework to develop their own specific measures of intellectual capital. Skandia says that by identifying important assets like its customer and innovation capital more systematically, the Navigator has improved its management of these assets, benefited overall performance and increased its share value.[90] Skandia's managers say its ability to identify and use relevant know-how easily has enabled it to set up foreign offices much more quickly than in the past. The Swedish Government uses the Skandia Navigator and other companies are adapting it for their circumstances.

89 David Skyrme Associates (1998)

90 http://www.skandia-afs.com/

Case Study: SkandiaBanken Fonder

SkandiaBanken Fonder is the Skandia business unit that manages and markets securities funds. In this case, the company vision is focused on this unit of Skandia being viewed as the best and most customer-oriented business of its kind. Their goal is to be the market leader outside the traditional banking community. The measures selected using the Navigator model were :

- financial focus—total assets, assets per employee and ratio of income to managed assets;
- customer focus—market share, number of accounts and customers lost;
- process focus—administrative expense to managed assets ratio, and cost of administrative error to management revenues ratio; and
- renewal and development focus—competence development expense per employee, employee satisfaction index and marketing expense per customer.

It is easy to see that, from a financial perspective, the key behaviours will centre around growth of fund assets, the efficiency of maintaining those assets, and increasing the income per unit of asset. At the same time, the customer focus will be on growing the market share, increasing accounts, and not losing customers. Concurrently, an internal process perspective will focus on the cost of managing per unit asset while at the same time reducing process errors. Finally, the unit is encouraged to invest in its people, while increasing internal satisfaction, and investing in its customers through marketing. SkandiaBanken Fonder found that focusing on such key areas improved their business performance substantially.

The Intangible Assets Monitor and the Skandia Navigator are two popular methods for calculating and demonstrating the value of intangible assets. There are critics of both approaches despite their widespread popularity. Both approaches share the presupposition that intellectual capital represents the difference between market and book value of a company.

Some authors, however, are concerned that two other important aspects of evaluation and value creation remain unresolved by the Navigator and IAM. For companies not listed on the stock market, market based IC value can not be determined. There is also no adequate system monitoring the efficiency of current business activities performed by the employees, indicating whether their potential is directed towards value creation or value destruction.[91]

Another criticism of these two models relates to their definition of intellectual capital. Both models define intellectual capital as having three components: human, customer and structural capital. Critics argue that defining the components of intellectual capital does not provide an objective measure for calculating it. Although there are many indicators for measuring human, customer and structural capital, most of them are subjective. Objective indicators are needed before comparisons of intellectual capital can be made between companies.[92]

6.4 The Balanced Scorecard

The Balanced Scorecard (BSC) is an organisational framework for implementing and managing a strategy at all levels of an enterprise by linking objectives, initiatives and measures to an organisation's vision and strategy.[93] The BSC translates a business's vision and strategy into objectives and measures across four balanced perspectives:

91 Pulic (2000)

92 Pulic (1998)

93 Kaplan & Norton (1996)

- financial performance;
- customers;
- internal business processes; and
- organisational growth, learning and innovation.

The Balanced Scorecard provides a structured way of communicating measurements and targets. Its use as a tool for managing, measuring and communicating a company's financial, non-financial and intangible assets is growing. The BSC allows an organisation to monitor both its current performance—financial, customer satisfaction and business process—and its efforts to improve processes, motivate and educate employees and enhance its ability to learn and improve. It is closely related to the concept of intellectual capital and is comprised not only of tools for measuring intangible resources but also a vision of continuous learning and change so as to create value for the future.[94] Since its introduction in 1992, the balanced scorecard has been implemented at the corporate, strategic business unit and individual level in hundreds of public and private sector organisations worldwide. Despite its widespread use, the balanced scorecard concept has several shortcomings.[95]

Firstly, the creation of a BSC can involve a considerable amount of time on the part of everyone whose performance is to be measured. The selection of appropriate measures for the four perspectives can be especially time consuming. This is due to the fact that in any company there are a large number of potential goals and targets, and even more ways to measure them. People are likely to disagree about which objectives should be measured and how, and it will take time to achieve consensus.

Secondly, a well-designed scoreboard will be useless without the participation and commitment of staff in implementing and using it.

Thirdly, companies using BSC often come up with too many measures. For example, a division of one company came up with 500 important measures for its scorecard on the first pass. This is a problem because it is very difficult to accurately track a large number of measures.

Fourthly, the BSC does not have an explicit focus on intellectual capital—unlike some later intellectual capital measurement models.

Case Study: Mobil North American Marketing and Refining (NAM&R)

Mobil NAM&R, a $15 billion per year subsidiary of Mobil Corporation, started its BSC program in 1994. The scorecard was instituted to support the transformation of this division from a functional, highly centralised, product-centric organisation to a decentralised, profit centre, customer focused one. NAM&R's ranking, using the standard industry measure of profit-per-gallon, ranked it last (7th) among its industry peers of integrated oil and gas companies. Mobil's return on capital was seven per cent—well below the cost of its capital. Moreover, it also required a cash infusion of about $US500 million from the parent company to maintain and upgrade its facilities.

NAM&R's management launched a new customer-focused strategy, along with the BSC. Mobil soon jumped to the top of its industry peer group in profitability. It was the industry leader in profitability for 1995, 1996, 1997 and 1998. Despite falling prices, in 1998 NAM&R produced a 14 per cent return on invested capital, and generated a $900 million cash surplus. The operating cash flow improvement of almost $1.5 billion in Mobil's operations, and its unprecedented ability to sustain its industry-leading profitability ranking, occurred in an industry selling a commodity, non-differentiated product with generally strong and respected competitors.

94 Johanson et al (1999)

95 Leadbeater (1999)

Other intellectual capital measurement tools

In addition to these four intellectual capital measurement tools, there are a wide variety of other intellectual capital models in use. Because there are no formalised intellectual capital reporting standards, many firms have devised their own methods for reporting their intellectual capital. Other popular intellectual capital measurement systems include the:

- Intellectual Capital Index™;
- Holistic Approach;
- the European Foundation for Quality Management Business Excellence model (EFQM); and
- the Value Creation Index.

6.5 Firms that have benefited from reporting intellectual capital

The following examples describe how companies have benefited from reporting their intellectual capital. These companies used several different intellectual capital measurement tools .

- PLS Consult, a Danish consulting firm has worked with intellectual capital issues since the early 1980s. It attributes its considerable growth in the past five years—in particular, the systematic and future-oriented management of this growth—to its use of its intellectual capital accounts. At PLS Consult, the intellectual capital accounts focus on objective statistical information about the education, age and experience of their human resources.[96]
- Skandia, the first company to release an intellectual capital supplement to its annual financial report, found that its stock price rose by approximately 40 per cent. Leif Edvinsson, vice president for intellectual capital, reports that Skandia considers 25 of those percentage points to be a direct response to the intellectual capital supplement.[97] In addition, by reusing knowledge and transferring experiences, Skandia has reduced the time spent on administrative aspects of acquisitions by 60 to 70 per cent.
- According to Consultus, another Swedish consulting firm, the publication of their intellectual capital accounts helps define—internally as well as externally—the company's strategic plan for organisation and management. Consultus developed the Complete Balance Sheet to measure their intellectual capital. Using the Complete Balance Sheet, structural, human, customer and social capital are recorded as a liability and when aggregated must be equivalent to the goodwill on the asset side of the accounts.
- ABB Sverige is Sweden's largest industrial company and has an internal and external intellectual capital management system. Since introducing the system, ABB has become more productive, with an increase in turnover per employee and reductions in lead-time. ABB uses human resource accounting—for external purposes—and their EVITA system—for internal purposes such as developing corporate strategies—to bring the upgrading of employee qualification and responsibilities into focus and improve co-operation with suppliers and customers.
- WM Data, Sweden's fastest growing IT company, uses intellectual capital to identify imbalances with the composition of its staff—for example, age, seniority, and educational background. Staff turnover ratios are used to assess whether knowledge crucial to the company can be retained.
- In Australia, Morgan and Banks (now known as TMP Worldwide eResourcing) publicly acknowledges the role that their intellectual capital plays in their financial success, and includes this information in its reports to shareholders. For example, in its 1998 Annual Review, Morgan and Banks acknowledges the importance of its customer, human and structural capital to its success.

96 The Danish Trade and Industry Development Council (1997) p. 32.

97 Sullivan (1998) p. 301.

7 incentive mechanisms and encouraging voluntary disclosure

The accounting and reporting treatment of intangible assets was first identified as an issue in the 1960s. But, until recently, relatively little progress was made. Ideas were never broadly adopted or incorporated into accounting conventions, partly because of definitional problems, real measurement problems and unresolved questions about ownership of intangible assets. Even today, few annual reports attempt to measure intellectual capital, which is now probably the key driver of growth in a knowledge economy. The demand for the disclosure of company information concerning intellectual capital has further widened the debate surrounding the treatment, feasibility and merits of intellectual capital.

This chapter focuses on the broader policy question of encouraging intellectual capital reporting and incentive regulation, and reviews the adequacy of the current accounting system to reflect wealth creation. This is a major policy concern because micro and macroeconomic policies based on statistics derived from existing accounting systems will become increasingly misleading due to two factors:

- the increase in the volume and value of intangibles; and
- the limited relevance of the traditional accounting framework in reflecting investment in intangibles.

As noted in earlier chapters, the nature of intangibles makes reporting the value of a firm's intellectual capital very difficult. There are widespread gaps in information about intangibles. The potential benefits and costs from producing better information on intellectual capital need to be made obvious; specifically, through developing appropriate units of measurement, establishing credible valuations and quantifying measurable returns.

A 1997 Ernst & Young Centre for Business Innovation study shows, better practices and measures are needed to present the organisational competence of firms to banks and the stock market. Given the mobility of international capital, these instruments have to be intelligible to international capital markets. Companies seek standardised rules by which they can compare measures of knowledge-based success, and declare those human capital capabilities to the external world.[98]

Lev (1998) found evidence that the inadequate reporting of intangibles gives rise to information asymmetries. Managers can exploit these by insider trading to make abnormal gains.[99] To avoid a company's abuse of the information advantage, sound accounting standards and rules need to be developed, enforced and regulated. A more rigorous way of guiding and monitoring voluntary disclosure of intellectual capital is needed to reduce the information asymmetry between managers and investors.

Increased non-financial information on intangible assets is needed for financial markets to function more efficiently. Improving disclosures makes the capital allocation process more efficient, reduces the cost of capital, enhances credibility and improves investor relations. However, the relevant organisations and agencies who advise market regulators on reporting financial information have neither the expertise nor the mandate to advise on the disclosure of non-financial information. Resolving the dilemma requires a cooperative effort between government, accounting and financial bodies to identify the kinds of information on intangibles, including human resources, that informs investors, as well as managers, on the capacity of an enterprise to generate sustainable profits.[100]

98 Ernst & Young Center for Business Innovation & OECD (1997) p. 3, 27.

99 Canibano, Covarsi & Sanchez (1999) p. 38.

100 ibid., p. 48.

A recent report, *Improved Business Reporting: Insights into Enhancing Voluntary Disclosures* by the Financial Accounting Standards Board's (FASB) Steering Committee found that [101]:

- Many leading companies are voluntarily disclosing an extensive amount of business information that appears to be useful in communicating information to investors.
- The importance of voluntary disclosures is expected to increase in the future because of the fast pace of change in the business environment.
- Voluntary disclosures related to matters that are important to the success of the individual companies are very useful, particularly disclosures of management's view of company's "critical success factors" and trends surrounding those factors.

7.1 Possible strategies

New approaches to disclosing information about intangibles begin with recognising the unique characteristics of intellectual capital. To encourage firms to experiment with identifying, measuring and reporting intellectual capital, key criteria need to be satisfied. First, companies must be convinced that real tangible outcomes—that is, improved internal efficiency, lower cost of capital or greater profit margins—can be achieved through better management of intellectual capital and through improved measures and reporting methodology of intangibles. Second, government, financial and accounting bodies need to cooperatively design appropriate incentives that allow for the experimental disclosure of intellectual capital. Firms must be made to realise the benefits of reporting intangible assets. Third, organisations need to create a culture that encourages formation and investment in intangibles. Following is a description of possible strategies to encourage voluntary disclosure of intellectual capital.

Traditional financial reports would remain the primary focus of corporate reporting, but could be supplemented where appropriate by relevant, substantial, non-financial information on intangibles. This approach, would involve the disclosure of diverse features of a company's intangibles. An attempt to put intellectual capital on the balance sheet is currently being considered in Australia through the Government's major innovation policy: *Backing Australia's Ability* – see Chapter 8 for more information.

Valuing intellectual capital may become increasingly market-based, through techniques such as real options as discussed in Chapter 5. A real options approach would help bring financial valuations and internal valuations of intangibles closer together and help reconcile market values with book values. This market-led approach provides a platform for valuing the future prospects of intangible assets. The valuations determined in this market could be reflected in the balance sheet.

Improving the market valuation of intangible assets by creating better functioning markets will become critical. Accountants would be better equipped to value intangibles if there were more robust, open markets in which to trade intellectual assets and where the accounting consequences would become more obvious. Policy makers could examine the creation of new markets for knowledge. For example, the creation of a market for financial options to trade in intangibles—an intangible options market. Another possibility is the creation of insurance markets for companies to insure themselves against loss of talent or against the outcome of a project.

An intermediate organisation, such as the OECD, can issue guidelines for voluntary disclosure as supplementary information.[102] Such information can also be periodically reviewed and audited. If information about intangibles can be audited, it will be more rigorous and more likely to be viewed credibly. In the United States, the FASB Steering Committee have already taken steps to provide a framework for providing voluntary disclosures. The Steering Committee developed basic guidelines for voluntary disclosures that helps (1) identify information that would be helpful to investors and (2) decide whether disclosure would be appropriate.[103]

101 FASB (2001a)

102 This was suggested at the *To Manage and Account for Intangibles* workshop in Brussels, 15-16 February 1999, Stockholm University.

103 See FASB (2001b) for more information on a framework for voluntary disclosures.

Stronger protection for intellectual property rights could also encourage firms to disclose greater information. As Leadbeater (1999) suggests, reliable valuation methods for intellectual capital may develop more rapidly in industries which enjoy strong intellectual property protection and where patenting is common, such as chemicals and pharmaceuticals.

7.2 Encouraging disclosure

Legal and institutional reforms to the ways markets operate could provide an environment that encourages firms to disclose information on their intellectual capital. For example, securities and investment commissions could provide greater protection to companies that attempt to disclose information on their intellectual assets. This would protect companies who were sued because of expectations formed from such information. In the US particularly, the uncertain and unreliable nature of intellectual capital can lead to companies being sued by shareholders if information is disclosed, but later is not realised or proves to be incorrect. For companies, there is a tradeoff between the benefits and potential liabilities of voluntarily disclosing supplementary information—for example, on intangibles. The United States Securities and Exchange Commission is trying to minimise any perceived risk posed by this tradeoff by drafting legislation that would protect companies. The legislation provides "safe-harbour for forward looking statements," when forward-looking information is disclosed in 'good faith' and with 'reasonable basis'.[104]

At the April 1996 U.S. Securities and Exchange Symposium on financial accounting and reporting of intangible assets:

> *Professor Lev and George Hatsopoulos, chairman and president of Thermo Electron Corporation, argued for mandatory disclosure, on the grounds that the only companies disclosing would be the ones who thought they performed well.*
>
> *Professor Lev argued further that the choice could be fine-tuned through trial-and-error changes in regulation. Siegel of Price Waterhouse emphasised the usefulness of leading companies establishing disclosure best practices through example. Commissioner of SEC, Steve Wallman and others see the "Safe Harbour" legislation as a valuable precondition for such experimentation.*[105]

Governments have a role in encouraging experimentation and voluntary disclosure at both a firm and national level. The Government needs to encourage accounting bodies to develop a framework on experimenting with the types of information disclosed, the manner in which it is disclosed and to develop standards and conventions for reporting intangible assets that can be applied nationally and internationally.[106] Financial and non-financial information needs to be captured in a useful, consistent and relevant manner. To ensure this governments need to make sure that accounting bodies consult with financial investors and users when they are developing reporting standards.

Policymakers should actively support and encourage research aimed at enhancing the information infrastructure related to investments in intellectual capital. Policy decisions are based largely on statistics and good metrics tell a story. Statisticians need to begin to measure and incorporate IC metrics into describing the state of the economy. If the return on public investment in knowledge could be measured more accurately, better decisions could be made on moving towards a knowledge-based society. Many of the assumed negative effects that may result from the non-accounting or non-reporting of intangibles are speculative. More research is needed to find empirical evidence of the effects caused by not accounting for intangibles.

104 Ernst & Young Center for Business Innovation & OECD (1997) p. 45.

105 ibid., pp. 46–7.

106 The United States has begun to move in this direction. The FASB's Steering Committee have developed a basic framework for providing voluntary disclosure. See FASB (2001, p. 13).

If voluntary disclosure of intangibles is permitted, government or stock exchange regulation will need to ensure that the information being disclosed is credible and not misleading for investors.[107] In addition, governments must act to protect companies that may potentially be sued. Businesses will gradually be subjected to the same accountability standards as the rest of society. Some firms view the external reporting of intellectual capital as an opportunity for investors to conduct critical reviews of company activities that could potentially affect their credibility in the capital markets. Yet for most knowledge companies, external reporting and the promise of increased financial credibility, often opens the door to lower capital costs. It enables investors, shareholders and stakeholders to base their decisions on a more complete picture of the company.

In the past decade, the study of measuring and reporting intellectual capital has gained momentum, driven largely by firms themselves. Increasingly, companies are finding more and better ways to define the intellectual capital activities they wish to influence, to manage those activities and to measure their inputs, processes, and results. The challenge for the accounting community is to make the disclosure system work in the collective interest.

107 While the Australian Securities and Investment Commission (ASIC) does not formally approve disclosure statements, ASIC has the power to stop a disclosure document which it believes is misleading or omits material information.

8 future direction of the intellectual capital movement

Global interest in intellectual capital has grown in recent years. The level of interest was demonstrated at the international OECD symposium *Measuring and Reporting Intellectual Capital* in June 1999. Coupled with the growing awareness of intellectual capital, the accounting treatment of intangibles will be fundamental to the future development and acceptance of intellectual capital. Internationally, several, mainly European, countries are developing better techniques for measuring, and reporting intellectual capital.

This chapter examines recent efforts to develop intellectual capital and reviews the current state of play, both in Australia and overseas.

8.1 International efforts

Netherlands

The Netherlands aim to play a leading role in Europe concerning the disclosure of intangible assets. In 1998, the Ministry of Economic Affairs[108] launched an *Intangible Assets Pilot Project* on intellectual capital reporting. In response to the difficulty that knowledge-intensive companies encounter in attracting investment capital, the Dutch Government commissioned four firms of accountants to develop a method for measuring and valuing intellectual capital that produced a more realistic value for financial accounting purposes. Also in 1998, EUROSTAT commissioned Statistics Netherlands[109] to produce a report on intangible investments. Other organisations working on measuring intellectual capital include the MERIT Institute[110] in Maastricht and the Economic Institute for Small and Medium Sized Industry.

To continue the debate concerning intangibles and transparency in the Netherlands, the Dutch government has introduced a number of follow up actions, such as an intangible assessment tool for SMEs, a promotional campaign for entrepreneurs, and further studies involving Dutch Statistics and the Dutch Central Planning Office.

Denmark

In 1996–97, the Danish government sponsored the preparation of a report on various private sector attempts to prepare intellectual capital accounts. In 1998, the Intellectual Capital Accounts Project was created as a key Government initiative to encourage Danish companies to move from an industry-based economy to a knowledge-based economy. The Danish Agency for Development of Trade and Industry has organised a project involving 23 firms to see how they develop their intellectual capital statements. The data from this project will be used to establish guidelines which companies can use when establishing intellectual capital accounts. These guidelines were expected to be available by the end of 2000.

108 http://info.minez.nl/ezenglish/

109 http://www.cbs.nl/en/index.htm

110 http://meritbbs.unimaas.nl/

Sweden

In 1986, Statistics Sweden[111] started a voluntary pilot study focusing on investment in intangible assets. This pilot study was subsequently enlarged to cover all manufacturing enterprises with more than 500 employees. Unfortunately, Statistics Sweden has not been able to extend the study. However, several Swedish firms have taken a proactive approach to reporting intellectual capital. Skandia, ABB and Telia were some of the first few companies that experimented with intellectual capital reporting.

In November 1998, six European nations—Denmark, Finland, France, Norway, Spain and Sweden—launched the Measuring Intangibles to Understand and Improve Innovation Management[112] (MERITUM) project. The project is divided into five sub-projects—each addressing a specific problem—and aims to quantify the policy implications of measuring and reporting on intangibles. Nine universities and research institutes are currently participating in this project, which is expected to finish in April 2001.

Norway

The Norwegians are attempting to generate interest in, and raise awareness of, intellectual capital in business and industry. Their approach focuses on the internal role of intellectual capital—that is, how it can improve business performance—competencies and the need to develop 'first practices'. Local and regional workshops and seminars are held to further extend this awareness. The aim is to generate interest in the business community in using intellectual capital in their business. The external role of intellectual capital, that is, accounting guidelines for financial disclosure, is deemed less important at this early stage for attracting investors because of the limited role of the Oslo Stock Exchange.[113]

The major Norwegian project, *Competence Capital*, headed by the Norwegian Confederation of Business and Industry[114] is named in a parallel to the Danish project Knowledge Capital. The project's aim is to generate a level of interest in, and activity around, intellectual capital, as has been achieved in Denmark, without copying in full the Danish project. To date, the Norwegians prefer the Balanced Scorecard. However, they acknowledge that its application may be limited to large firms that already have an elaborate measurement and reporting infrastructure.

By cooperating with other Nordic countries, Norway is hoping to develop a Nordic approach to intellectual capital, based on a preference for intellectual capital certifications as opposed to accounting guidelines. The *Competence Capital* project aims to have a number of intellectual capital recommendations for their members by the end of 2000. These recommendations are likely to focus on the preference for certification and be based on the accumulated wants of Norwegian firms in steering their competence capital. The OECD symposium was perceived as the starting point for such an effort.

Canada

In Canada, the Canadian Institute of Chartered Accountants[115] is driving the development of tools for measuring and reporting on intellectual capital. The Institute is actively pursuing a leadership role in helping the global accounting community come to terms with intellectual capital and its challenge to the traditional accounting model. Since 1994, when it began tracking the leaders in the intellectual capital movement, the Institute has participated in raising awareness of intellectual capital and its role. Its activities include the 1995 publication, *Performance Measures for the New Economy*. This was followed by a survey that explored knowledge management and business practices among Fortune 500 companies in the U.S. and Financial Post 300 companies in Canada.

111 http://www.scb.se/indexeng.htm

112 MERITUM - http://www.fek.su.se/current_research/ONGOING8.htm

113 Lovdal & Roberts (1999) p. 4.

114 http://www.nho.no/

115 http://www.cica.ca

However, the Institute's major contribution to work on intellectual capital issues was the launch of the Canadian Performance Reporting Initiative (CPRI). The CPRI was established to provide innovative performance measurement tools that address information and reporting needs, in particular, intellectual capital reporting. As CPRI chair, Jim Goodfellow (1998) explains:

> *the objective of the CPRI is to advance the art of performance measurement for public and private sector organisations. This will have substantial benefits for the Canadian economy, for business and public sector enterprises, and for Canadian society as a whole. In addition, as these techniques are adopted internationally, we believe that this will create new opportunities for Canadian chartered accountants in global markets.*

In addition, the CICA has developed the ICM Evaluation Guide, a practical tool that allows Institute members to evaluate an organisation's performance in managing intellectual capital. The CICA has also established the CPRI Board, formally recognising performance measurement and reporting, and its role in the knowledge economy.

The Institute's activities are aimed at encouraging voluntary adoption of intellectual capital measurement and reporting tools. As Beverly Brennan, chair of CICA explained in a speech at the 1999 OECD Symposium on intellectual capital:

> *we (CICA) have advised the Canadian business community that we have no intention of mandating reporting requirements and standard in these areas for at least five years.*

On January 17-19 2001, the 4th World Congress on the Management of Intellectual Capital was held in Hamilton, Ontario. This forum provided an opportunity to discuss current methodologies, case studies, and forward thinking analysis related to intellectual capital.

United States

In 1992, the American Society for Training and Development (ASTD) formed the Benchmarking Forum. The Forum brought together several large corporations to help develop a set of indicators to measure companies' human capital investments. The set of core indicators used by the Benchmarking Forum has become relatively stable over time, although some of the indicators on which data are collected vary from year to year. The Benchmarking Forum represented a solid foundation for ASTD's later efforts to extend available indicators to a wider set of organisations.

In early 2001, the American Financial Accounting Standards Board (FASB) as part of its Business Reporting Research Project released a report, *Improving Business Reporting: Insights into Enhancing Voluntary Disclosures*, addressing non-financial performance metrics, forward looking information and the disclosure and recognition of internally generated intangibles. The FASB has also recently published a Special Report, *Business and Financial Reporting: Challenges from the New Economy*, as part of its research into placing a project on internally generated intangibles, non-financial metrics and forward looking information onto the Board's active agenda. Both reports aim to encourage companies to follow the examples of other organisation and begin to voluntarily disclose more information about non-financial performance metrics and forward looking information thus improving business reporting for investors and other users. The study also hoped to encourage additional research by academics and that various industry groups will study other industries and develop suggested disclosures for those industries.

A number of research institutions - such as the New York University's Stern School of Business and the Brookings Institute - have set up major projects aimed at exploring the technical aspects of intellectual capital.

On May 17-18, 2001, the fourth intangibles conference, *Advances in the Measurement of Intangible (Intellectual) Capital* was organised by the Stern School of Business, New York University. The conference addressed the key issues surrounding intangibles - measurement and valuation. Specifically, progress in managing and reporting on intangible-intensive enterprises, policymaking for intellectual property and progress in developing new corporate disclosure systems reflecting the value of intangible assets.

Austria

The Austrian Intellectual Capital Research Center[116] is a research institution formed by several institutes from the Karl Franzens and other universities. The research group includes business people and aims to achieve results that can be used in the field. One of their key objectives is to become one of the world's leading research institutes for measuring and managing intangibles on both a micro and macro level.

United Kingdom

The Department of Trade and Industry has worked on measuring the level of investment in intangibles by UK firms and has attempted to discuss the quality of the component measurements and some of the associated problems.

Spain

The Spanish research team, as part of the MERITUM project, has focused its research on analysing best practice in measuring intangibles and their use in management decision making. The Spanish Government, through their official institutions, is also supporting the MERITUM project with advice and data collection.

8.2 Organisational efforts

Organisation for Economic Cooperation and Development (OECD)

In 1996, the OECD, in conjunction with Ernst & Young (EY), organised a conference in Helsinki on the valuation of companies in the knowledge society. This mutual interest led to the joint publication, in 1997, of *Measuring Performance in the Age of Intangibles: Enterprise Value in the Knowledge Economy.*

In June 1999, an international OECD symposium, Measuring and Reporting Intellectual Capital: Experience, Issues and Prospects was held in Amsterdam.[117] The objective of this Symposium was to assess the feasibility and value of improving non-financial information on intellectual capital so as to better inform decision-making. Other issues examined at the symposium included:

- how firms invest in intellectual capital, and how the resulting intellectual assets are currently identified, measured, reported and disclosed by enterprises;
- the costs and benefits to firms of identifying and measuring intellectual capital, and reporting such information;
- the effects of better intellectual capital information on internal business management, investment and lending decisions, data collection and government policy;
- the extent to which indicators developed at the enterprise level can be aggregated to the macroeconomic level; and
- how information on intellectual capital, that is relevant for business management and government policy makers, might be improved.

There were two sessions at the Symposium: a technical meeting and a policy and strategy forum. The technical meeting considered the feasibility of developing indicators for identifying, measuring and reporting investment in, and management of, intellectual capital at an enterprise level.

116 http://www.measuring-ip.at/english/aicrc.htm

117 http://www.oecd.org

The technical meeting, attended by researchers, business representatives, and experts reviewed results of recent surveys of 1800 companies, and case studies and experimentation in 125 companies in OECD member countries.

The Policy and Strategy Forum considered the possible mismatch between the existing information on intellectual capital, and the demands for information that result from the progressive shift towards more knowledge-intensive economies. In the lead-up to the OECD Symposium, a number of research projects were launched and existing projects identified. The Symposium was an ideal forum for assessing the findings of these different projects and pilot schemes. It also allowed for some conclusions to be drawn about the future development of intellectual capital indicators in the private sector.

The Symposium's findings suggested that the traditional accounting and financial reporting process needed reform. If intangible assets are not incorporated into a formalised accounting framework, then for many organisations, financial statements will become increasingly irrelevant as a tool for effective and efficient decision-making. It is also clear, from the reports tabled at the Symposium, that companies in Europe are well ahead of their North American and Asian counterparts in measuring, reporting and managing their intellectual capital—with Nordic nations standing out as pioneers in the field.[118] For example, the Swedish financial firm Skandia and the Danish consulting firm Ramboll have included intellectual capital measures in their annual reports since 1994.[119] In addition, several major intellectual capital research projects are currently being undertaken in various European and Nordic countries—for example, MERITUM.

The Intangibles Research Project

At the Vincent C. Ross Institute of Accounting Research at New York University[120], The Intangibles Research Project was established to explore the nature, measurement, and disclosure of the complete set of assets, tangible and intangible, which create value for shareholders. The project's focus will be on internally generated intangibles, often considered the most critical deficiency of current reporting in meeting users' needs. The Intangibles Research Project has also been running annual conferences addressing the latest developments in the field of intellectual capital.

The Brookings Institute

The project on Accounting for Intangible Assets at the Brookings Institute aims to help initiate a national discussion about:

- better ways of measuring, monitoring and reporting on critical intangible sources of wealth, both inside firms, and in the national accounts; and
- to assess work already under way to develop better measures of intangibles.

The Brookings Institute believes that because the issues at stake are so contentious, there is a need for a respected, but neutral, non-partisan research institute such as itself to play a role in convening the parties for reasoned dialogue. To this end the Institute has convened a task force of approximately 50 individuals representing a variety of perspectives. They aim to identify public policies that may be influencing efforts by the private sector to develop better ways to measure, monitor, and invest in intangible assets

US Securities and Exchange Commission (SEC)

Steve Wallman, former SEC Commissioner is a strong advocate for reporting intangibles. In April 1996, the Securities and Exchange Commission sponsored a high level summit on *Reporting of Intangible Assets*. A keynote speaker at this event was Professor Baruch Lev[121], an academic specialising in research on the affect of intangibles on the stock market capitalisation of corporations.

118 Guthrie & Petty (1999)

119 See Skandia (http://www.skandia.com) and Ramboll (http://www.ramboll.dk)

120 http://www.stern.nyu.edu/ross/ProjectInt/about/

121 Professor Lev is a director of the Vincent C. Ross Institute for Accounting Research and the Intangibles Research Project

Ernst and Young Centre for Business Innovation

Ernst & Young (EY), one of the Big Five business services firms, is a leader in intellectual capital research. The Cap Gemini Ernst & Young Centre for Business Innovation, EY's applied research centre, has completed much research on performance measurement and knowledge management issues.[122] This research has largely focused on the rising value of intangibles, and on identifying new ways to measure and manage them more effectively.

Arthur Andersen and the Massachusetts Institute of Technology: New Economy Value Lab

Arthur Andersen is another Big Five company that has devoted considerable resources to research on intellectual capital. On 28th January 2000, Arthur Andersen and the Massachusetts Institute of Technology (MIT) Sloan School of Management launched a five-year, US$10 million research program to advance understanding of the sources of economic and social value in the New Economy. The research program, called the New Economy Value Research Lab (NEVRL), will be located at the Sloan School of Management at the Massachusetts Institute of Technology. The MIT NEVRL's objective is to promote research with a view towards the following outcomes:

(1) empirical testing of models of valuation measurement;

(2) business modelling and systems design;

(3) visualisation.

The International Accounting Standards Committee

The International Accounting Standards Committee (IASC) is an independent, private sector body, established in 1973. Its aim is to harmonise the accounting principles used by businesses and other organisations for financial reporting around the world. The Committee's membership is currently comprised of 143 professional accounting bodies in 104 countries. The IASC issued International Accounting Standard (IAS) 38, on Intangible Assets, in September 1998.[123]

8.3 Measuring intellectual capital in Australia

The importance of intellectual capital is well recognised in Australia. Several business and professional bodies—the Group of 100, the Business Council of Australia , the Institute of Chartered Accountants in Australia, CPA Australia and the Australian Institute of Company Directors—have requested that the Australian Accounting Standards Board (AASB) give high priority to producing Australian guidelines and an Australian accounting standard on intangible assets.[124]

Australian businesses also recognise the important role that intellectual capital plays in their company's success. Several large Australian companies—for example, Morgan and Banks, AMP and Lend Lease publicly acknowledge the role of intellectual capital in their financial success, including it in their reports to shareholders. Annual reports are a key reporting mechanism which senior managers can use to signal what they consider is important to the future growth and performance of their company. Morgan & Banks, for example, in their 1998 Annual Review recognise that their intellectual capital is one of their major strengths.[125] AMP (Australian Mutual Provident) openly states that its main strengths include brand names, customers and the skills and abilities of its employees.[126] Lend Lease also views its people and its strong corporate culture as key factors which positively differentiate it from its competitors.[127] These organisations use a variety of intellectual capital reporting tools, including the Balanced Scorecard and the Intangible Asset Monitor.

122 Ernst & Young Centre for Business Innovation (http://www.businessinnovation.ey.com/main.html)

123 International Accounting Standards Committee (http://www.iasc.org.uk/frame/cen2_138.htm)

124 The AASB, is presently preparing an exposure draft regarding International Accounting Standard 38: *Intangible Assets*. This draft was scheduled to be released in the fourth quarter of 2000. However, it is likely that this will not happen until early 2001 given recent changes to the AASB and the complexity of IAS 38.

125 Morgan and Banks (1998)

126 Ferrier & Wells (1999) This report formed part of the Guthrie et al (1999) paper.

127 Lend Lease Annual Report (1999)

A study by Guthrie & Petty (2000) showed a significant shift in the composition of Australia's largest companies. By the end of 1998 only two of Australia's largest 10 companies were resource based—BHP & Rio Tinto. In the remaining eight companies intellectual capital made up a significant portion of the company's assets.[128]

How does Australian reporting compare internationally?

To date, little work has been done on Australian companies' relative global position in managing and reporting their intellectual capital. A study in 1999 by Guthrie et al examined Australian organisational practices in managing and reporting intellectual capital.[129] This study focussed primarily on developing an awareness of how proactive Australian companies are in measuring, reporting and managing their intellectual capital.

The research strategy for the Guthrie et al study involved three elements:

- a literature review of government policy and other policy pronouncements about intellectual capital;
- the annual reports of the top 19 Australian listed companies—by market capitalisation—were analysed to determine the extent to which these companies report their intellectual capital; and
- seven case studies investigating the internal development of intellectual capital were conducted to provide a deeper understanding of how major Australian organisations are managing the identification, management, measurement and reporting of their intellectual capital.[130]

The study found that:

- the key components of intellectual capital are poorly understood, inadequately identified, managed inefficiently, and not reported within a consistent framework;
- reporting was generally minimal but the types of intellectual capital reported most often included human resources, technology and intellectual property rights, and organisational and workplace structure;
- a review of industry clusters within the study suggested that no individual industry is significantly ahead of any other in its intellectual capital reporting practices; and
- all company representatives believed the management of intellectual capital is an important factor in determining future company success and competitiveness. Few executives, however, were able to identify initiatives within their organisation that are designed to help manage intellectual capital. The frequent claim that human resources are a firm's most important resource was not supported in terms of the intellectual capital elements measured and reported in most annual reports.

Guthrie's results suggest that few Australian enterprises have taken a proactive approach to reporting their intellectual capital. Furthermore, while there is some evidence that Australian enterprises are identifying their stock of intellectual capital, they do not compare favourably with their overseas counterparts in their ability to manage, develop, support, measure, and report their intellectual capital.

Government initiatives in intellectual capital

Intellectual capital was identified as a key issue by the National Innovation Summit[131] held from 9–11 February 2000. The Commonwealth Government and business convened this Summit to examine the suitability of Australia's current national innovation system against our emerging needs. It provided an opportunity to develop new strategies for the 21st century by looking at other countries' experiences and assessing Australia's capacity for innovation. The Summit's aim was to develop consensus between Government, industry and the research community.

128 Guthrie & Petty (2000) p. 205.

129 Guthrie, Petty, Ferrier & Wells (1999)

130 Ferrier & Wells (1999). This report was undertaken as part of the Guthrie et al (1999) paper.

131 http://www.isr.gov.au/industry/summit/index.html

An Innovation Summit Implementation Group (ISIG)[132] was established to progress the Summit's findings. The Group was tasked with developing strategies that will create a culture of innovation in Australia that encourages risk-taking and the development of strong links between the research, industry and government sectors. The Group reported in August 2000 and one of its recommendations was that *business and the Commonwealth Government, as a matter of some urgency, work with regulatory authorities to develop adequate reporting techniques for intellectual capital and intangible assets*.

The Government's major package on innovation, *Backing Australia's Ability*[133], was announced in late January 2001. This package entails a National Innovation Awareness Strategy which includes *an initiative to support activities to improve the understanding of the impact of science and technology by devising better measures of innovation and of recording intangibles on company balance sheets.*

International Accounting Standard 38 and Australia

The International Organisation of Securities Commissions (IOSCO) is the leading international grouping of securities market regulators. Its current membership is comprised of regulatory bodies from over 130 countries, including Australia, which are responsible for securities regulation and the administration of securities laws. At its 25th Annual Conference on 17 May 2000, IOSCO gave its support to 30 standards devised by the International Accounting Standards Committee (IASC).[134] One of these, International Accounting Standard 38 (IAS 38), issued in September 1998, deals with accounting for intangible assets.

International Accounting Standard 38 defines an intangible asset as an:

> *Identifiable non-monetary asset without physical substance held for use in the production or supply of goods and services, for the rental of others, or for administrative purposes.*

The Standard applies to intangible assets that are not specifically dealt with by other International Accounting Standards. IAS 38 also replaces IAS 9: *Research and Development Costs*. This leads to a harmonised Australian Accounting Standard (AAS) 13 and Australian Accounting Standard Board (AASB) 1011 *Accounting for Research and Development Costs*.

If an intangible asset conforms to the definition of an asset, IAS 38 requires the recognition of an intangible asset at cost where the cost can be reliably measured. This recognition also applies to intangible assets that are generated internally. IAS 38 also requires all expenditure on research to be expensed. However, some development expenditure—such as internally developed software—may qualify for recognition as an intangible asset. For example, once R&D costs result in a technically feasible software product, all costs associated with the development of the product from that point on are capitalised and then systematically amortised to expense—such that the amortisation expense is recorded in periods corresponding to the periods in which revenues from the sale of the product are recognised.

IAS 38 also specifically prohibits the recognition of many intangible assets. For example, internally generated goodwill, brand names, mastheads, publishing titles, customer lists and similar items. For a number of Australian reporting entities, this requirement is likely to lead to internally generated intangibles which were previously recognised as assets no longer being recognised and the ongoing recognition—as an expense—of expenditure on intangibles.[135]

Thus, according to IAS 38, companies will be able to put acquired brands on their balance sheets, but not homegrown ones. This creates a glaring paradox.[136] For

132 http://www.isr.gov.au/industry/summit/ISIG/isig.html
133 http://www.innovation.gov.au/iap/index.html
134 International Organisation of Securities Commissions (2000)
135 Parker & Souskeun (1998)
136 Brown (1998)

example, companies A and B are identical except for one fact. Company A first purchased its brands from another company—whilst company B did the work internally. Under IAS 38, company A will be able to treat its brand names as intangible assets, equivalent in almost every sense to tangible assets—that is, land, buildings and machinery—company B's brand will be regarded as having essentially no value.

There are however, some positive outcomes from the adoption of IAS 38. It will be easier to compare financial reports from different entities, because all companies will be subject to the same rules. This cannot be done currently because of the variety in reporting practices. However, the rigidity of the rules regarding recognition and revaluation of intangible assets move IAS 38 significantly away from accounting for the intangible assets and will further undermine the relevance of financial reports.

If IAS 38 is adopted in Australia:

- many existing intangible assets would no longer be recognised as assets because of the standard's specific exclusions;
- far fewer new intangibles would be recognised as assets;
- decreased operating results as costs associated with the developing intangibles would be expensed; and
- there would be less information in financial reports.[137]

The requirements of IAS 38 are inconsistent with existing accounting practices in Australia, yet there is no specific accounting standard that addresses intangibles.[138] In 1989, Exposure Draft 49 *Accounting for intangible assets* was issued, but stalled due to lack of consensus. To advance the debate, in 1995 the Australian Society of Certified Practising Accountants' External Reporting Centre for Excellence released *Accounting for Identifiable Intangibles and Goodwill*. Among other things this report contained recommendations for the development of a standard that could be applied nationally and internationally. This monograph formed the basis for the Society's submission on E50 Intangibles—which became IAS 38. CPA Australia—formerly the Australian Society of Certified Practising Accountants—through its membership of the IASC, has expressed concerns about IAS 38 and has asked its representatives on the IASC to vote against it.[139]

The Australian Accounting Standards Board has indicated that the Intangible Assets Project is the highest priority project on the Board's current work program. This is an encouraging move by the AASB to address the complex issue of accounting for intangible assets and pressure must be maintained to ensure that the project remains the highest priority of the AASB.

137 Parker & Souskeun (1998)

138 ibid.

139 Parker (2000)

9 conclusion

In the new economy, economic activity will be increasingly based on knowledge, technology and other more intangible factors. Leveraging our intellectual capital will be one of the key avenues to creating value. Currently, two streams of thinking dominate discussion concerning intellectual capital. One group focuses on intellectual capital's value as a financial analytical tool while the other group views it as a tool in which to drive growth and guide the operations of a company.

Accounting bodies, standard setters and international regulatory organisations recognise the challenge that intellectual capital creates for accounting. The difficulty and imprecision with which intellectual capital is measured, can result in incorrect valuations (much of which is subjective) that can mislead users of financial information. Therefore, accounting bodies are reluctant to allow intangibles to be included in financial reports. However, the failure to account for intellectual capital can lead to a misallocation of investments, in both tangible and intangible assets.

Although an abundance of literature exists on the study of intellectual capital and despite the growing involvement of business consultants and technical accountants on intangible issues, there has been no major work in any country that has succeeded in pushing intellectual capital to be widely accepted. Much work is needed to improve our understanding of the role intellectual capital plays at a firm, industry and national level. Statistical agencies and international research organisations are attempting to quantify the growing investment in intellectual capital and the contribution this has to economic growth. Presently, measuring, valuing and reporting intellectual capital remains a challenge and future work in this area will need to focus on transforming intellectual capital from a theoretical, conceptual ideal to a more practical form.

Appendix 1
types of real options

Timing options

Uncertainty arising from new or expanded markets can bring with it opportunities and risks. The option of delaying the investment until the strength of demand for the product is known represents value. It may be that the risk avoided by waiting to invest has a greater value than the sales that might be forfeited by postponing the investment. The possibility of deferral gives rise to two additional sources of value. First, we would rather pay later than sooner, all else being equal, because we can earn the time value of money on the deferred expenditure. Second, while we are waiting, the world can change. Deferral is most attractive when uncertainty is high.

Growth options

Growth options have value because the future is uncertain. By buying the initial option, the investors gain access to potential upside while limiting the losses they would incur from unfavourable outcomes. The value of the growth options can be calculated by first determining the value of the mature business—once all options have been exercised— and then measuring the uncertainty of actually realising that value. An early investment is a pre-requisite or a link in a chain of interrelated projects, opening up future growth opportunities—for example, new products or processes.

Staging options

Many investments have the potential to create value above and beyond the returns generated by the initial operation/investment. Staging investment as a series of outlays creates the option to abandon the enterprise in midstream if new information is unfavourable. Each stage can be viewed as an option on the value. This is particularly relevant in R&D intensive industries.

Exit options

The exit option increases the value of the project because it reduces the size of the investment at risk. Holding an exit option will allow the company to abandon the project if there is insufficient demand or if new government regulation proves unfavourable. The option to abandon a project provides a partial insurance against failure. This is similar to a put option. The exercise price is the value of the project's assets if sold or shifted to a more valuable use. If market conditions decline severely, management can abandon current operations permanently and realise the resale value of capital equipment and other assets on secondhand markets.

Flexibility options

If prices or demand change, management can change the output mix of the facility—product flexibility. Alternatively, the same outputs can be produced using different types of inputs—process flexibility.

Learning options

Where the holder pays to learn about an uncertain demand, cost, price or technology. An oil company may own the rights to a plot of land, without knowing exactly how much oil it contains. Rather than trying to predetermine a particular level of production capacity, the company might find it worthwhile to spend money discovering the actual extent of the reserves. Then it can develop the field without wasting resources building facilities designed to process more oil than is actually there[140]. Learning options arise when a company can speed up the arrival of important information by making an investment or use what it has learned about the market demand for the project output to modify future investment decisions. This is equivalent to owning a call option on the investment project.

140 Copeland & Keenan (1998b)

Appendix 2
industry applications

Film Industry

Options are already being used by the film industry to value projects. As Leadbeater (1999) explains:

> *Studios routinely buy options on thousands of scripts that never get made into films. When the studio buys the option to the script (movie rights), it purchases the option to make it into a film in the future, but it is not obliged to do so. Holding an option to a film script has a value even if the film does not get made. The script is taken off the market and so denied to potential competitors. The studio acquires some additional flexibility to deliver a wide range of films to a fluid and changing market. Options provide a way for investors to hedge their bets until the very last moment when they have to make a decision to either go ahead or pull out. In markets beset by uncertainty, buying this extra time to make a decision has value in its own right, even if the project does not come to fruition.*

Oil industry

Oil companies today place far greater emphasis then they used to on exploration to find new reserves. This exploration is akin to R&D: it is highly speculative and uncertain, particularly in the early stages of the process. To counteract this uncertainty, oil companies have become increasingly sophisticated in the way they price the risks involved by using real and financial options.[141] If an exploration project is successful, a company has the option to drill wells and pump oil. If the project is unsuccessful, the company has the option to cease development and cut its losses. Even so, the exploration may have generated useful knowledge and diverted competitors. The option increases the value of the exploration project because it protects the rights to the full potential gain of the investment while reducing the possible losses. Oil companies have little difficulty evaluating the value of oil option contracts that mirror the value of their own exploration options.[142]

Pharmaceuticals

Merck, a pharmaceutical company, uses a highly sophisticated options pricing model to value its R&D portfolio. The value of a drug in the R&D stage can be obtained through a nested options valuation model. According to Merck's Chief Financial Officer, Judy Lewent, the uncertainties associated with investing $1 billion annually in research were not properly valued until the company adopted an options pricing model, akin to one used in financial markets. Lewent explains:

> *Options analysis, like the kind used to value stock options, provides a more flexible approach to valuing our research investments than traditional financial analysis because it allows us to evaluate those investments at successive stages of a project. Merck's experience with R&D has given us a database of information that allows us to value the risk or volatility of research projects. If I use option theory to analyse that investment, I have a tool to examine uncertainty and to value it.* [143]

141 Leadbeater (1999, p. 32) - 'An oil field exploration contract is very similar to a call option contract on oil: both provide, for a cost, a right to get oil at some point in the future. The price of the call option, which is traded in financial markets is a guide to the value of the real option'.

142 Amran & Kulatilaka (1999)

143 Leadbeater (1999) pp. 31–2.

Utilities: Power

The Tennessee Valley Authority (TVA) used real options in a 1994 decision to contract out for 2 000 megawatts of power instead of building its own plants. For some cases, the TVA paid for options to buy power but never exercised them. Purchase options on power provide a more efficient buffer against unexpected demand than, for example, building a nuclear power plant that might not be needed. Using real options, the TVA gained the ability to bid feasibility for marginal business by converting fixed costs into variable costs.

Enron, a Houston company realised that the supply of natural gas was, in effect an option on electricity because it could be used to generate power. It built power plants near gas pipelines to produce electricity when gas prices spiked, taking advantage of the increased volatility.[144] Price volatility means that for short periods, relatively large margins can be earned.

Information technology

Hewlett-Packard (HP) used real options when it decided to proceed with a business-to-business e-marketplace project. According to HP officials, the project may not have proceeded if traditional Return On Investment analysis was used. The marketplace allows HP to buy merchandise from suppliers on the spot market; sell excess inventory; or expand its option by enabling the company to mix traditional contracts with more dynamic spot trading with suppliers.[145]

144 See Businessweek Online (1999)

145 Stackpole (2000)

Appendix 3
limits to real options

Model Risk

Once a real option is identified, a valuation model must be developed. The difference between the solutions of the model and the theoretically correct answers represent the model risk. For simple or short-term financial contracts, little model risk will exist. However, for complex options, and long-term contracts, the model may be quite different from the way events turn out. Therefore, the company's risk will be greater than it anticipated. As traders and managers become more experienced with options, they will become better able to anticipate and allow for modelling errors. In the meantime, managers need to be aware of model risk and take it into account when using model outputs.

Imperfect proxies

The degree to which a proxy is imperfect and the importance of it to a business will determine the severity of the impact. If the impact is potentially large, it may be possible to get an investment bank or a commodity dealer to draw up a contract.

Lack of observable prices

Price data is often not available from the market as quickly as a business needs it to make strategic decisions. The relevant securities may not be frequently traded or reports on trades may be delayed. Without such data, a company may need to rely on educated guesses about price movements when making decisions about whether to buy, sell or exercise an option. Guessing increases the probability that an option's full value will not be realised. The speed with which data can be transmitted using electronic trading is making data availability less of a problem.

Lack of liquidity

Real assets and thinly traded stocks tend to share a common problem: a lack of liquidity. The trading volume is so low that any sizeable trade can move the price. Traders in the financial markets have adopted various trading techniques to mitigate the distortions caused by a lack of liquidity, and real options users can adopt some of them.

Private risk

The value of many real options is heavily influenced by private risk—risk that is peculiar to one company. Because managers are used to thinking about private risk, they tend to give it too much emphasis when they make strategic decisions. A better approach is to consider only the most important sources of private risk and to ensure that they are in balance with the key sources of market-priced risk.[146]

146 Amram & Kulatilaka (1999)

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