
1 Background

The rise of the ‘knowledge economy’ has brought productivity gains. But the extent of diversity in performance improvement across firms, industries and some countries has increased attention on the role of investments in certain intangible assets — such as computerised information (for example, databases), innovative property (for example, patents and designs) and economic competencies (for example, ‘organisational capital’). Most of the focus on intangibles has been on computer software and R&D. But the other intangibles also warrant investigation — for example, it has been suggested that organisational capital facilitates adaptation to change and has complementarities with ICT capital.

Lev (2001) suggests that intangibles, while not new¹, have come to prominence because of intensified competition, due to globalisation of trade and deregulation in key economic sectors, and ICTs. These factors have changed the structure of firms and elevated the role of intangibles. However, despite this elevated role, intangibles are not well understood.

- Lev (2001, p. v) suggests that, despite their importance, intangibles are poorly measured, if at all, and their implications for public policy are not understood.
- Corrado, Hulten and Sichel (2005, p. 37) suggest that the conventional framework and current data used in growth analysis are “not telling us all we need to know about the role of knowledge capital in economic growth.”
- Nakamura (1999, p. 13) traces the exclusion of intangibles from the capital stock in the national accounts to long-standing statistical conventions that assets had to be material and states that “... we need to recognize the increasing importance of intangible investment for our economy. Otherwise, statistical conventions can cause us to misread the fundamental forces propelling economic activity.”

It has been argued that there are several areas of potential distortion of resource allocation and policy that arise from the fact that intangibles are only incompletely revealed in available statistical data and company accounting and reporting. There

¹ There is also a considerable history of research into intangibles — see Webster (1999) for an overview of the earlier roots of this literature.

are four main issues (see Mortenson 2000, Vickery 2000 and Lev 2001 for further details):

- capital markets, partly due to regulation, emphasise tangible rather than intangible capital, with an effect on access to and cost of capital
- mandatory expensing of intangibles leads to asymmetric information available to managers and shareholders and potentially distorts market transactions
- within companies, insufficient information about intangibles may distort management decisions and the formulation of business strategies
- within public policy, insufficient information about intangibles may distort particular policies (for example, industry policy, taxation, R&D and intellectual property protection).

There is an important measurement issue — treating expenditure on intangibles as a current expense, rather than as an investment, has an impact on the magnitude of measured value added and hence also on productivity measured. More fundamentally, intangible assets can be seen as a necessary pre-condition for optimising productivity gains. Specifically, investment in intangibles, such as new organisational structures, is needed in order to tap fully the productivity potential that information and communications technology presents.

Conventionally-measured GDP treats much of intangible expenditure as an intermediate input rather than an investment. This means that expenditure on intangibles is not included as investment in GDP and the flow of services from intangible capital is not included as an input. This will affect the measurement of multifactor productivity (MFP) and can affect the pattern of growth.

The rationale for treating intangibles as capital, put forward by Corrado, Hulten and Sichel (2006), is that any use of resources that reduces current consumption in order to increase it in the future qualifies as an investment. While computer software is now treated as capital in the national accounts of many countries, many other intangibles, including R&D, are currently not.

Recent studies have investigated the puzzle as to why knowledge activities are not as ‘visible’ in the economic statistics as expected. These studies have attributed:

- an important part of the US productivity acceleration since the mid-1990s to growth in intangible assets (Corrado, Hulten and Sichel 2006)
- a lack of productivity uplift in the United Kingdom to mismeasurement (a period of seemingly-low growth was actually a period of more rapid build-up of intangible assets) (Marrano, Haskel and Wallis 2007)

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- a lack of productivity uplift in Japan to the lack of investment in intangibles (Fukao et al. 2007).

1.1 Definition of intangibles

Intangible capital — as well as being known by different names, such as knowledge assets and intellectual capital — is variously defined:

- a nonphysical claim to future benefits
Assets are claims to future benefits, such as the rents generated by commercial property, interest payments derived from a bond, and cash flows from a production facility. An intangible asset is a claim to future benefits that does not have a physical or financial (a stock or a bond) embodiment. (Lev 2001, p. 5)
- private expenditure on assets that are not tangible but are necessary to the creation and sale of new or improved products and processes (Nakamura 2001)
- the ‘glue’ that creates value from the usual factor inputs (Cummins 2005)
- all assets that are neither natural or produced — a very broad measure that includes raw labour, human capital, social capital and institutional infrastructure, such as the judicial system (World Bank 2006).

The focus of this paper is narrower than that used by the World Bank, concentrating on intangibles invested in by businesses. Intangibles have been categorised (and quantified) by Corrado, Hulten and Sichel (2006) as:

- *computerised information* (software and computerised databases)
- *innovative property* (scientific and non-scientific R&D and design)
- *economic competencies* (brand equity, firm-specific human capital and organisational capital).

This paper uses this categorisation of intangibles.

1.2 Objectives and scope of the paper

The overall objective of this study is to gain a better understanding of the nature, role and importance of intangible assets in Australia’s productivity performance.

More specifically the objectives are to:

- develop quantitative measures of intangible assets and provide time series estimates of intangible asset investment and stocks

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- assess the contribution to conventionally-measured MFP growth in Australia
 - provide an international perspective on the types and magnitudes of intangible assets in Australia compared with other countries.

Measuring intangibles contributes to:

- a better understanding of the importance of intangibles for Australian productivity growth
- a better understanding of the international differences in the mix of drivers of productivity growth (for example, does Australia have lower R&D but higher organisational capital than other countries?)
- a better understanding of the potential for interactions between intangible and other capital (for example, complementarities between ICT and organisational capital).

This study is a continuation of the Commission's stream of research that has 'parcelled out' elements of MFP growth and also builds on previous Commission research on some aspects of intangible assets, such as R&D.

1.3 The rest of the paper

The remainder of this paper is organised as follows.

- Chapter 2 outlines the methodology for identifying the contribution of intangibles in the measurement of MFP — covering previous studies and the current treatment of intangibles in the Australian national accounts. Appendix B provides details of the model specification.
- Chapter 3 outlines the way in which investment in each of the intangibles has been measured. Appendix A provides details of the data sources and method of construction of these estimates.
- Chapter 4 describes the construction of the capital stocks for each of the intangibles. Appendix A provides details of the assumptions used in their construction.
- Chapter 5 reports the results of explicitly identifying the contribution of intangibles in growth accounting in the Australian context. Related appendixes provide details of the construction of the capital services indexes for intangibles and the steps taken to adjust the growth accounting framework to treat intangibles as capital (appendix C) and the sensitivity testing of results (appendix D).
- Chapter 6 compares the Australian results with those from other country studies.