THE UNIVERSITY OF MELBOURNE

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IBM® – Melbourne Institute
'Innovation Index of Australian Industry'

Second Edition

MELBOURNE INSTITUTE
of Applied Economic and Social Research

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Foreword

Glen Boreham
General Manager,
IBM Australia/New Zealand

There's no doubt we live in a complex business environment. In our interconnected world, Australian businesses are being impacted by a range of global issues, including rising energy costs, climate change and volatile financial markets. Local challenges such as a tight labour market and water shortages only compound the uncertainty that characterises the current economic climate.

But for many Australian businesses, this climate also provides an opportunity to rethink the way they do things, and find new ways to create value and grow. That means looking closely at changing customer needs, re-assessing business models, and changing the way business operations are run. Put more simply, we have an opportunity to innovate.

In this, the second ***IBM – Melbourne Institute Innovation Index*** *of Australian Industry, we continue to track Australia's innovation effort over time, using a multi-indicator methodology to measure innovation effort across 13 industries, and right back to 1990.*

We examine the challenges and opportunities facing key industries, and discuss the different ways innovation can be used to deliver greater customer value and more sustainable growth.

Pushing to one side the archaic view that innovation is solely the domain of large enterprises with billion-dollar R&D budgets, we also shine the spotlight on the relationship between innovation and organisational size. In particular, we examine the barriers and drivers of innovation faced by differently sized businesses, and how smaller companies collaborate and source new ideas, compared with their larger counterparts.

Through this research, we aim to provide business leaders, analysts and policy makers with a unique insight into how Australian organisations approach innovation in this globally integrated environment. Only through a detailed and rigorous understanding of our strengths and weaknesses, can we build the platform of innovation we need for a more sustainable, resilient and competitive Australian economy.

I hope you find this research insightful.

Professor Stephen Sedgwick
Director, Melbourne Institute of Applied
Economic and Social Research,
The University of Melbourne

A culture that fosters market-relevant innovation is critical to Australia's continuing economic prosperity. The ***IBM – Melbourne Institute Innovation Index*** *provides a unique, multi-faceted indicator of innovation in Australia that captures, in a simple way, product and process improvements, organisational and managerial changes and marketing innovation. Using advanced statistical techniques, the* ***IBM – Melbourne Institute Innovation Index*** *offers a comprehensive measure of innovation that traces innovation performance over time. It thus provides a unique insight into an important driver of economic growth.*

Executive Summary

The *IBM – Melbourne Institute Innovation Index of Australian Industry* is a comprehensive, inter-industry, multi-indicator approach to measuring the rate of innovative activity in Australia. It embraces six different dimensions of innovation adjusting the measure for the level of economic activity. Accordingly, the Innovation Index is a measure of the proportion of total activity that is taken up with innovative endeavours in Australia.

The main observations to be drawn from the second edition of the *IBM – Melbourne Institute Innovation Index of Australian Industry* are:

- The annual increase in the rate of innovative activity in Australia in 2006 was only 0.7 percent, a figure which is much lower than the average rate of increase in the period since 1990 (2.0 percent per annum).
- Most of the growth in the Index was due to an increase in trademarking intensity, and to a lesser extent, the growth of Research and Development (R&D) activity. The intensity of patenting and design activity fell between 2005 and 2006.
- Organisational and managerial innovation continues to trend downwards – in 2006, the annual rate of innovative activity fell by 2.0 percent.
- Across the 13 industries considered, nine experienced falls in the rate of innovative activity in 2006. The largest falls were recorded in Health & Community Services; Utilities and Construction.
- Only four industries experienced an increase in the annual rate of innovative activity in 2006. The largest recorded increases occurred in the Communication Services, Mining, and Finance & Insurance Industries.
- A lack of skilled labour is increasingly seen as a major barrier to innovation across firms of all size.
- Price competition is seen as an increasingly important driver of innovation for small businesses – 34.5 percent of small businesses stated it was a driver of innovation in 2005, up from 23.2 percent in 2003.
- Across firms of all size, revenue and cost reduction were seen as less important drivers of innovation in 2005 compared to 2003.

Innovative activity in Australian industry tapers off

After falling by 2.6 percent in the year to 2005, there was a modest rise in the Australian Innovation Index of 0.7 percent in 2006. Most of the increase in the index came from the Mining, Communication Services and Finance & Insurance Industries. While Health & Community Services recorded the largest fall, this was due to an anomalous spike in 2005 and does not necessarily indicate a crisis in Health & Community Services innovation. Large apparent falls in innovation intensity were found in the Utilities Industry, Construction, and Cultural & Recreational Services Industries.

Table 1 presents a breakdown of the Index according to the six innovation measures. In the year 2006, the strongest growth was recorded in R&D and trademark intensity (2.4 and 3.5 percent respectively). The biggest fall during 2006 occurred in patent intensity, which is symptomatic of the trend since 1990. Both R&D and trademark intensities have experienced the strongest trend rises while patent intensity has shown a more modest rise. Organisational and managerial innovation continues to trend downwards – in 2006, the annual rate of innovative activity fell by 2.0 percent.

It should be noted that all of these indicators are normalised for the growth of either employment or value-added in the industry. Accordingly, while it does suggest that Australia as a whole is putting more resources into innovative activities, vis-à-vis direct production activities, this effort has tapered off over the last couple of years.

IBM – Melbourne Institute Innovation Index of Australian Industry

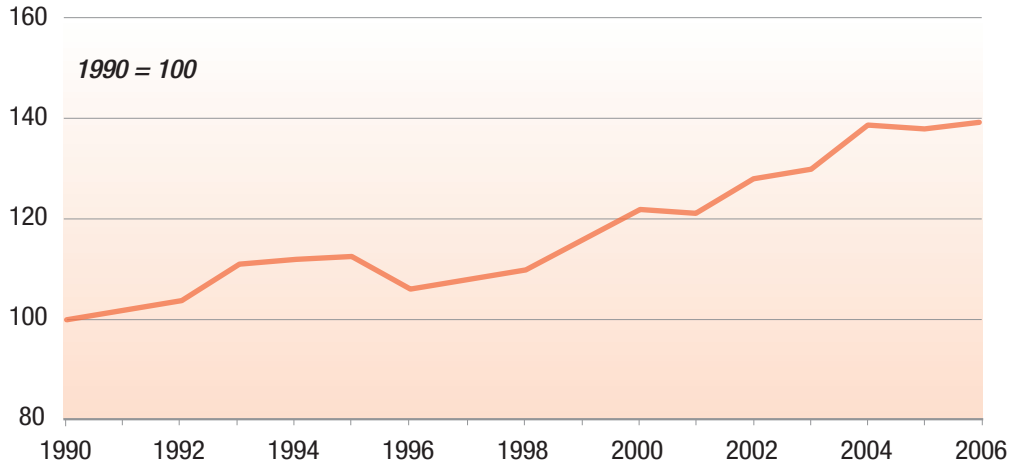


Table 1. Innovation Index of Australian Industry and its components – five yearly intervals

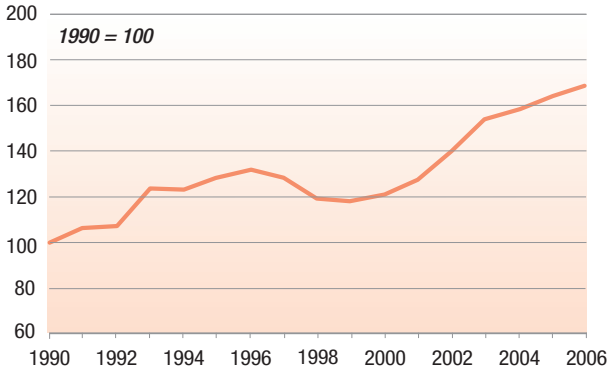
	1990	1995	2000	2005	2006	% change 2006 on 2005
Innovation Index	**100**	**113**	**122**	**138**	**139**	**0.7**
R&D intensity	100	128	121	164	168	2.4
Patent intensity	100	91	121	126	117	-7.1
Trademark intensity	100	143	157	199	206	3.5
Design intensity	100	96	83	61	60	-1.6
Organisational/ managerial innovation	na	na	na	98	96	-2.0
Productivity	100	107	122	128	129	0.8

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Components of the Index

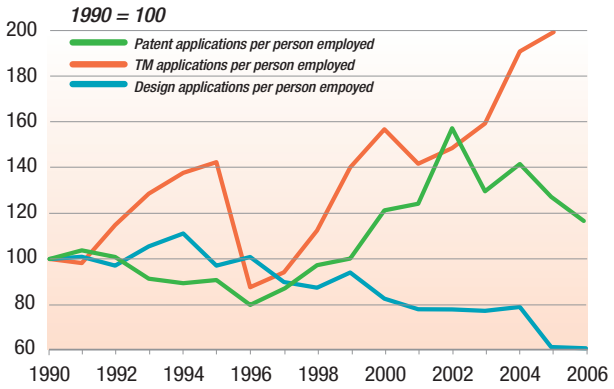
R&D Intensity

R&D intensity continued to rise for the seventh year in a row. R&D intensity, which is an average of R&D expenditure and R&D employment normalised for the overall level of economic activity, appears to be strongly correlated with business cycles. The only decline in this component occurred in the mid-late 1990s when there was a moderation of economic activity.



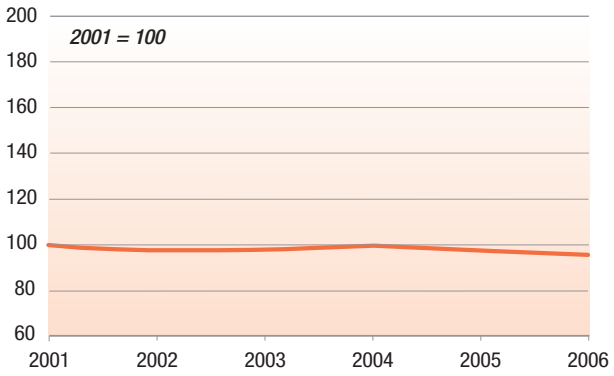
Patent, Trademark & Design Intensity

While the intensity of trademark activity has continued to rise strongly, there has been a notable decline since the early 1990s in design density. Patent intensity continued to decline during 2006, having declined almost continuously from 2002 onwards. However, both trademarking and patenting intensities are well above their 1990 benchmark which suggests a strong positive long-term trend in the degree of innovation intensity of Australian industry



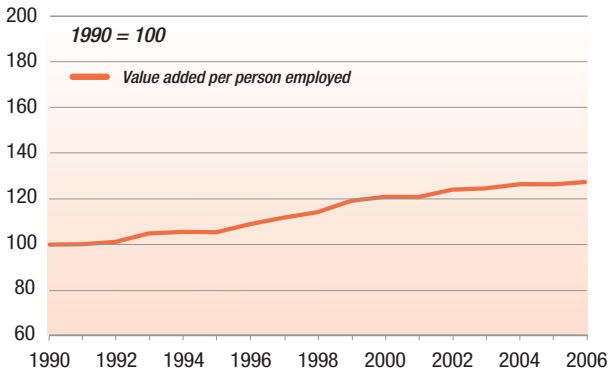
Organisational/Managerial Innovation Index

Similar to previous years, there was little variation in the organisation and managerial innovation measure. Overall Australian industry reported a two percent decline in 2006 relative to 2005. However, some caution must be used when interpreting this as the data series is too short to infer a discernable trend.



Productivity

Labour productivity (as measured by value added per person) is a good overall indicator of past successful innovations, since it captures the effects of both product and process innovations in the operations of a business. This indicator recorded a rise in 2006 of 0.8 percent compared with 2005.



Innovation Index – Breakdown by industry

The disaggregation of the Innovation Index shown in Table 2 below reveals that Communication Services was the best performing industry in 2006. Its index level was 256 in 2006, which means that since 1990, the rate of innovative activity in this industry has more than doubled. The growth in the Communication Services Index from 2005 to 2006 was 36.9 percent. Three other industries also recorded increases in the 2006 index – Mining (8.6 percent), Wholesale Trade (0.4 percent), and Finance & Insurance (6.1 percent). Note, however, that the growth experienced in the Wholesale Trade Industry (0.4 percent) was lower than the all-industry average (0.7 percent).

Despite this growth in certain industries, the majority of industries actually recorded falls in their Innovation Index. In fact, nine of the 13 industries considered experienced a fall in 2006 in the rate of innovative activity. The largest decreases occurred in Health & Community Services (however as we discuss below, this was due to an anomalous year in 2005); Utilities; and Construction. Other industries to experience a fall in the rate of innovative activity in 2006 were Cultural & Recreational Services (-12.2 percent), Personal & Other Services (-9.3 percent), Property & Business services (-5.6 percent), Retail Trade (-4.4 percent), Transport & Storage (-4.9 percent) and Manufacturing (-1.9 percent).

Table 2. Innovation Index by Industry – five yearly intervals

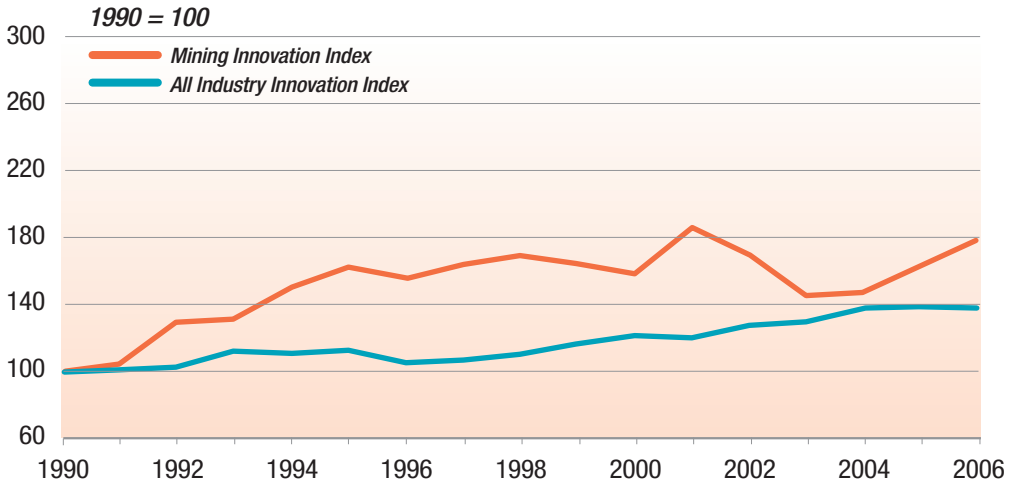
	1990	1995	2000	2005	2006	% change 2006 on 2005
Mining	100	161	158	162	176	8.6
Manufacturing	100	124	137	160	157	-1.9
Utilities	100	180	210	162	132	-18.5
Construction	100	79	81	121	99	-18.2
Wholesale Trade	100	143	203	232	233	0.4
Finance & Insurance	100	135	182	213	226	6.1
Retail Trade	100	122	134	159	152	-4.4
Transport & Storage	100	123	129	164	156	-4.9
Health & Community Services	100	106	123	247	130	-47.4
Communication Services	100	118	222	187	256	36.9
Property & Business Services	100	104	103	125	118	-5.6
Cultural & Recreational Services	100	102	123	115	101	-12.2
Personal & Other Services	100	130	167	193	175	-9.3
All Industry Innovation Index	**100**	**113**	**122**	**138**	**139**	**0.7**

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details.

Mining Industry Innovation

In 2006/2007 the Mining Industry accounted for around seven percent of GDP. This growth has been underpinned by strong demand from emerging markets in Asia such as China and India. Accordingly, the industry has undergone a resurgence in recent years, with massive increases in demand and prices (the RBA non-rural US$ commodity price index rose 145 percent from January 2000 to end 2006 and has continued to rise since). The Mining Innovation Index rose significantly in 2006 (by 8.6 percent), largely as a result of a sharp upturn in R&D intensity. There was also a small increase in organisational and managerial innovation. As can be seen from the chart below, the Mining Innovation Index fluctuated around an upward trend from 1990 until around 2001 before falling and the rising again in the past three years. Much of the observed decline in innovative activity in 2001-2002 was related to a sharp decline in patent intensity, and this has continued through to 2006. Meanwhile, R&D intensity has more than doubled since 2003.

Having risen sharply up until 2001, productivity in the Mining Industry has since fallen back in line with the all-industry average perhaps due to capacity constraints. Strong growth in labour and capital inputs have not been matched by rises in output volume. This is likely due to bottlenecks in infrastructure and labour supply; the delayed output response to new investment; and the mining of more marginal deposits. In the absence of significant new discoveries industry analysts expect this downward trend in productivity to turn around in the coming years. They believe it will flatten out, however, at a lower level than in 2000. Analysts have noted that the high correlation between prices and multi-factor productivity suggest that over the very long term, discoveries and improvements in technology and production practices (innovation) largely offset the effects on productivity of resources depletion[1].



	1990	1995	2000	2005	2006	% change 2006 on 2005
Mining Innovation Index	100	161	158	162	176	8.6
R&D intensity	100	240	217	315	426	35.2
Patent intensity	100	182	123	23	12	-47.8
Trademark intensity	100	71	86	161	24	-85.1
Design intensity	100	224	77	20	140	600.0
Organisational/ managerial innovation	100	100	100	81	83	2.5
Productivity	100	141	183	148	134	-9.5

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details.

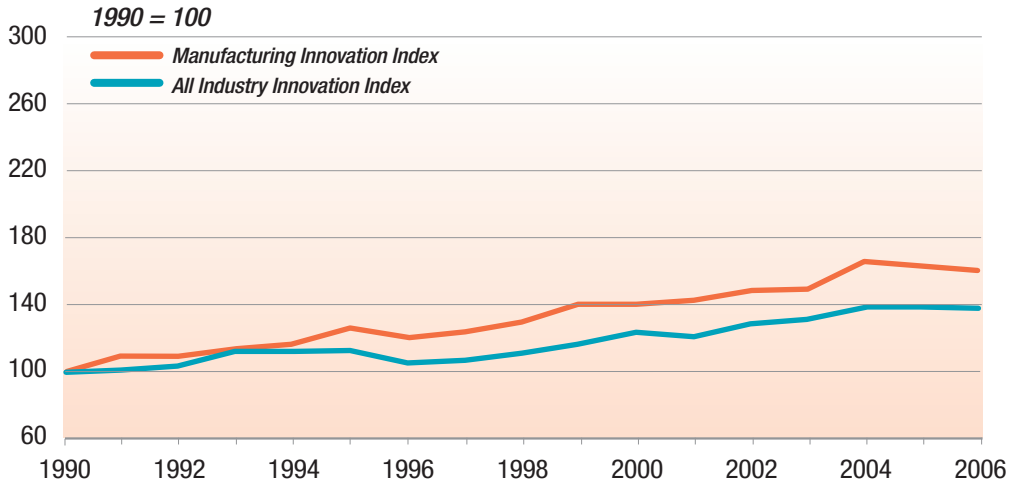
1 Productivity Commission, *Productivity Perspectives 2007*

Manufacturing Industry Innovation

The Australian Manufacturing Industry has been exposed to increased competition in recent decades due to significant reductions in rates of government assistance, general microeconomic reform, and increased competition from low-cost producers in Asia, particularly China. These factors have in turn contributed to the production of more high value-added products over time. More recently, the sharp increase in the value of the Australian dollar since mid 2003 (of around 17 percent in trade-weighted index terms and almost 50 percent against the US dollar) has added further to competitive pressures, contributing to a downturn in investment in the sector since 2005.

After a 6.6 percent fall in 2005, the Manufacturing Innovation Index incurred another fall of 1.9 percent in 2006. However the Index, shown in the chart below, grew fairly steadily throughout the period to 2004, before falling after 2005. R&D intensity as a component of the Manufacturing Innovation Index rose strongly throughout the period under review, before slowing marginally in 2006 (-1.1 percent). Patent and trademark intensity have also recorded falls in 2006 (-4.8 and -7.7 percent respectively). Meanwhile, the performance of the other components was mixed in 2006: productivity increased by 0.7 percent while organisational and managerial innovation fell by 1.0 percent.

While manufacturing productivity growth has averaged two percent per annum over the longer term, it has slowed considerably in the three years to 2006. This slowdown arguably reflects some of the factors discussed above. Within the manufacturing sector, there is evidence that those industries making the greatest use of information and communication technologies (ICTs) over the past 20 years (steel, non-ferrous metals, oil refineries, motor vehicles, scientific and medical instruments and electronics) have also experienced above average productivity growth[2].



	1990	1995	2000	2005	2006	% change 2006 on 2005
Manufacturing Innovation Index	100	124	137	160	157	-1.9
R&D intensity	100	141	133	184	182	-1.1
Patent intensity	100	118	180	207	197	-4.8
Trademark intensity	100	173	228	274	253	-7.7
Design intensity	100	136	118	86	94	9.3
Organisational/ managerial innovation	na	na	na	98	97	-1.0
Productivity	100	109	119	135	136	0.7

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

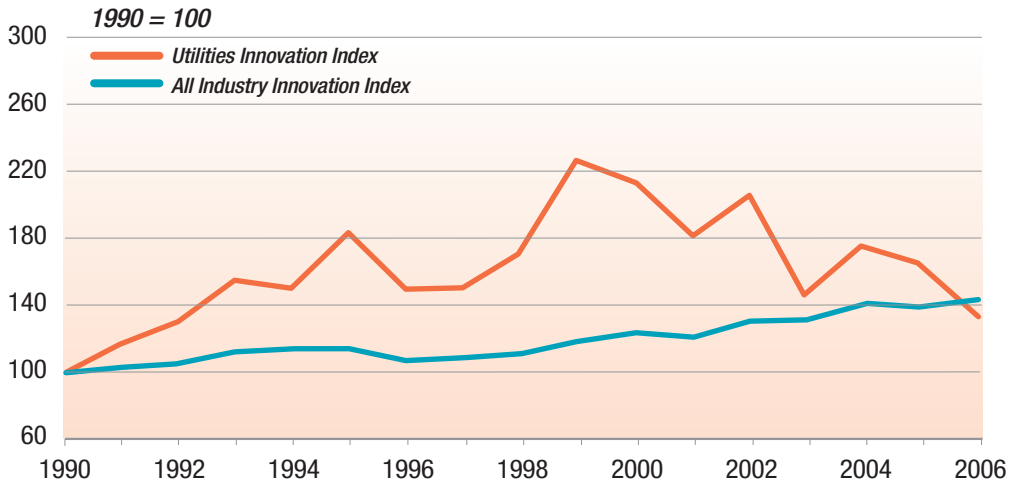
2 National Office for the Information Economy, 2004, *Productivity Growth in Australian Manufacturing*, NOIE Occasional Paper, Canberra

Utilities Industry Innovation

The utilities sector has undergone massive industry restructuring in the past two decades in the form of privatisations and de-regulation. This has lead to a large increase in the number of businesses and hence increased competition in the sector. In recent years the drought has put pressure on water supply and prices and also driven up costs in the electricity sector.

After falling in 2005, the Utilities Innovation Index fell again in 2006 by 18.5 percent. Innovation in the electricity, gas and water industry in Australia, as shown by the Utilities Innovation Index, has exceeded that of Australian industry overall for most of the period since 1990, but turned sharply down from 2001. However, as the chart below indicates, there has been considerable volatility. The Intellectual Property (IP) components of the Utilities Innovation Index (which include patents, trademarks and designs) have been extremely volatile, which may be partly due to the fact that the IP applications data are relatively few in number. The downward trend in overall innovation since 2001 appears to be due to declines across the board in the components of the index. In 2006, R&D intensity fell by 14.9 percent, patent intensity fell by 53.7 percent and organisation/ managerial innovation fell by 13.6 percent.

Productivity in the Utilities Industry almost doubled in the decade to 2000 before falling through to 2006 to a level 21 percent below the 2000 peak. Despite the fact that productivity fell by 3.9 percent in 2006, average annual productivity growth in the utilities sector has nevertheless outperformed productivity growth for Australian industry as a whole since 1990. The sharp downturn in productivity since 2000 can be partially attributed to the impact of the ongoing drought and the decline in the output of the water supply industry.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Utilities Innovation Index	100	180	210	162	132	-18.5
R&D intensity	100	273	160	168	143	-14.9
Patent intensity	100	308	146	121	56	-53.7
Trademark intensity	100	173	608	298	234	-21.5
Design intensity	100	0	224	135	0	-100.0
Organisational/ managerial innovation	na	na	na	108	93	-13.9
Productivity	100	139	195	159	154	-3.1

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

IBM Index Viewpoint – Utilities Industry

The second IBM-Melbourne Institute Innovation Index indicates the utilities sector experienced a major decline in innovation in 2006. The index is down 18.5 percent overall on last year's index, with falls across the board: R&D, patent, trademark, design and organisational innovation as well as productivity are all lower than in 2005.

However, the utilities sector is largely based on a five-year transmission and distribution planning cycle. Whilst innovation can dip at the end of a cycle, the current cycle includes provisions for an intelligent utility network roll-out, and considerable network rejuvenation, so you would expect to see innovation increase. So does this year's index indicate we have come to the end of one of these cycles, before we have fully recognised the advent of new technologies and engineering initiatives?

If we look at more recent events, the energy industry has been very active on innovation. For example, utilities are restructuring their business models. Some have chosen to outsource entire back office and IT operations. Others have unbundled their retail businesses on the back of privatisation.

There has also been operational innovation. We've seen some organisations replace multiple billing and customer relationship management systems with a single integrated system, with significant savings claimed as a result.

There is strong evidence of growing technological innovation, with pilot smart meter rollouts underway in Victoria and NSW, as well as environmental innovation in support of the growing push towards renewable energy. Investments in solar projects by utilities are becoming more commonplace.

The slide in innovation seen in this year's index is likely to reverse with the Index climbing for 2007 and beyond. We can expect it to reflect further investment in intelligent utility networks, which incorporate smart meters, automation and analytics. Its likely we'll also see greater focus on network rejuvenation and transformation of customer operations.

However, the road won't be without obstacles. Energy companies still have to consider how much they're prepared to commit to renewable energy and clean power generation, and how they'll balance these with traditional power generation. They need to look at demand management programs if they're to understand what impact intelligent networks will have on their business, particularly if the idea of self-generation of power in the home gets off the ground.

On top of these, there are regulatory barriers, the shortage of skilled labour and the knowledge loss as older workers retire.

Of course, barriers to innovation are surmountable. A sustainable intelligent network roadmap is crucial for energy companies in consultation with regulators. An increased awareness of carbon footprints may improve business efficiency, and a greater emphasis on analytics can save companies from drowning in data produced by intelligent network devices and smart meters.

If all goes to plan, it's likely we'll see a flush of innovation in R&D, trademark and design in the next few years, followed by a lift in productivity as companies work through implementation to full deployment.

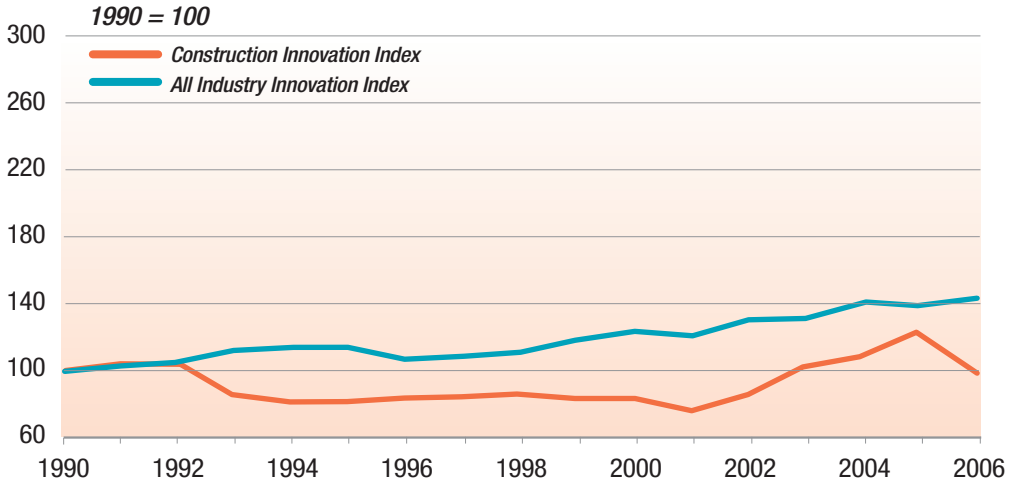
David Murray, General Manager for Communications Sector, IBM Australia & New Zealand

Construction Industry Innovation

Developments in the Construction Industry have been dominated by the strength of the business investment cycle in recent years. Strong growth has been in engineering construction and non-residential building, rather than residential building. While the business investment cycle is now decelerating, ongoing strong demand from mining-related sectors will put a floor under any downturn in construction activity.

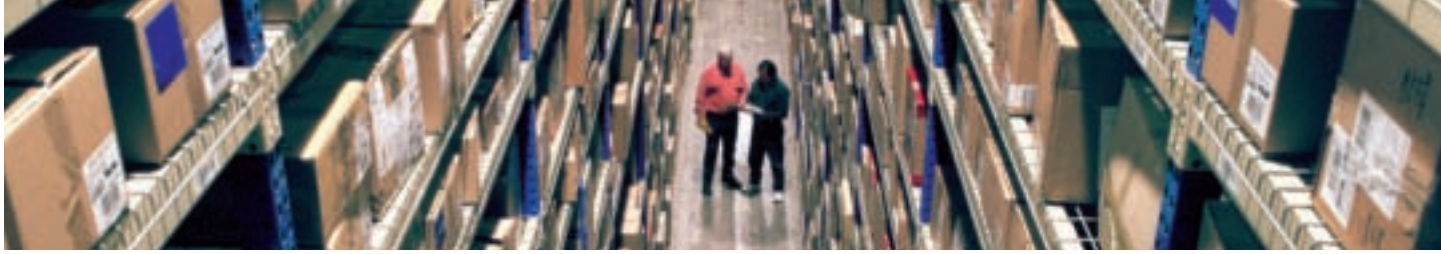
Despite a strong increase in the Index over the period 1999-2005, the Construction Innovation Index fell by 18.2 percent in 2006. The main contributors to the observed fall in 2006 were large recorded reductions in R&D intensity (-20.0 percent), patent intensity (-40.5 percent) and trademark intensity (-60.8 percent). This is indicative of the fact that innovation in the Construction Industry has failed to keep pace with overall innovative activity in Australia during the course of the period under review. The R&D intensity index and the IP indexes more or less mirror shifts in the overall innovation index for this industry during the period under review. However, trademark and design intensity have been particularly volatile.

Despite an increase of 1.7 percent in 2006, average productivity growth in the Construction Industry has under performed relative to the average of Australian industry as a whole since the early 1990s. Productivity growth in construction was also relatively volatile during the period with negative growth recorded in a number of years. This poor relative performance most likely reflects in part the intrinsic nature of the industry. It is relatively less exposed to foreign competition and with perhaps fewer gains to be achieved from the application of new ICT technologies and R&D than other industries.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Construction Innovation Index	100	79	81	121	99	-18.2
R&D intensity	100	21	37	120	96	-20.0
Patent intensity	100	54	65	79	47	-40.5
Trademark intensity	100	139	78	278	109	-60.8
Design intensity	100	81	30	24	57	137.5
Organisational/ managerial innovation	na	na	na	87	100	14.9
Productivity	100	100	116	117	119	1.7

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

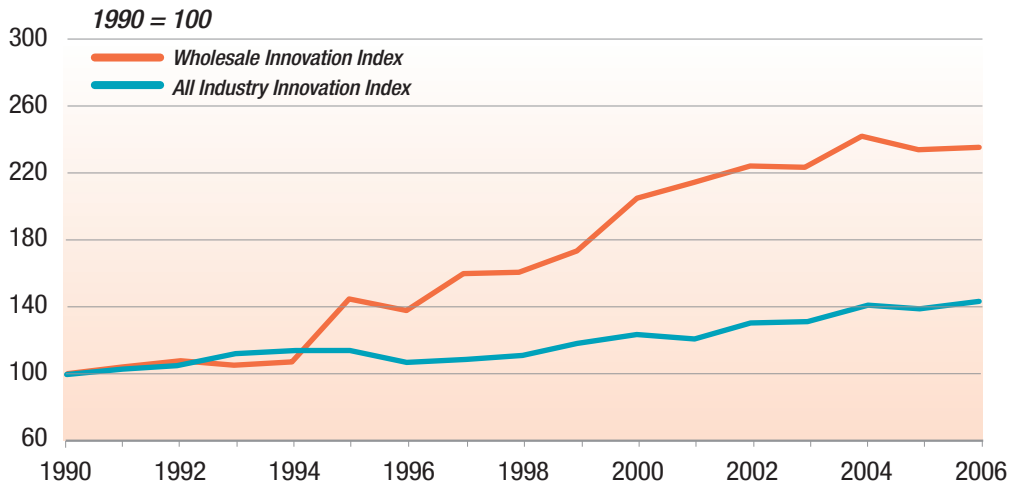


Wholesale Trade Industry Innovation

As an intermediate industry, the Wholesale Trade Industry is reliant on demand from industries such as Manufacturing and Retail Trade. Supply chain rationalisation in those industries in recent years has probably subdued the performance of wholesale trade sector. Having said this, the industry has been one of the biggest winners from developments in and the spread of ICTs in the past 15 years. This is reflected the large increase in the Wholesale Trade Innovation Index (133 percent) during the period under review.

In 2006, the Wholesale Trade Index remained steady with a slight fall of 0.4 percent. This small increase in innovative activity is attributed primarily to increases in the following components: trademark intensity (3.2 percent), design intensity (12.9 percent) and organisation/managerial innovation (3.2 percent). At the same time, the Wholesale Trade Index experienced falls in R&D intensity (-0.4 percent), patent intensity (-4.2 percent) and productivity (-3.1 percent). These reductions are in stark contrast to the overall trends in R&D, patent and productivity growth over the period 1990-2005. Both patent and trademark applications in particular had grown very strongly in the period up to 2005, while design applications have exhibited a less marked increase overall.

Despite the fall (of 3.1 percent) in 2006, productivity growth in the wholesale trade industry was strong over the period 1990-2005, as shown in the table below. A number of factors have contributed to these productivity gains. The correlation between productivity growth and the uptake of ICTs in the distributive trades has been widely noted (for example, innovations such as bar-coding and automatic re-ordering processes have transformed the industry from a storage-based system to a fast flow distribution network).



	1990	1995	2000	2005	2006	% change 2006 on 2005
Wholesale Trade Innovation Index	100	143	203	232	233	0.4
R&D intensity	100	109	176	270	269	-0.4
Patent intensity	100	156	287	311	298	-4.2
Trademark intensity	100	221	302	344	355	3.2
Design intensity	100	163	194	132	149	12.9
Organisational/ managerial innovation	na	na	na	94	97	3.2
Productivity	100	110	160	193	187	-3.1

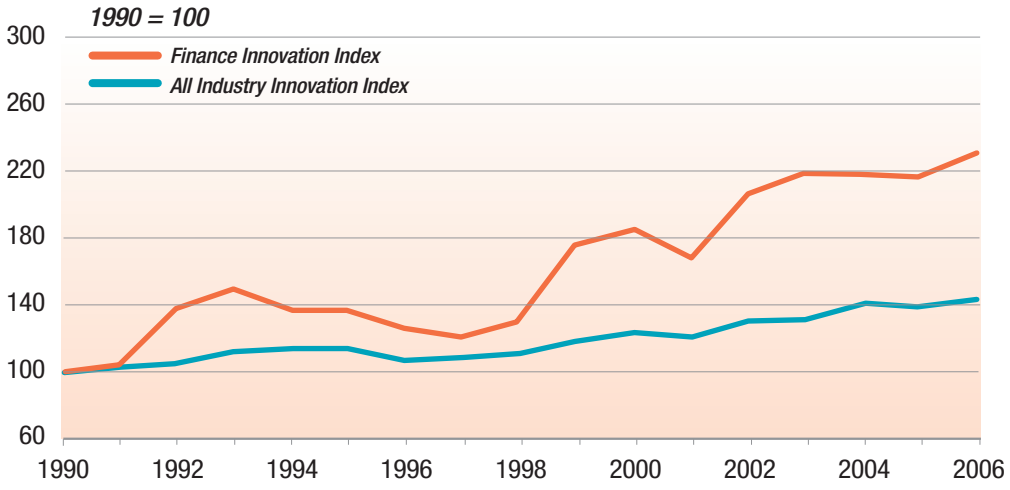
Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Finance & Insurance Industry Innovation

Innovation in the Finance & Insurance Industry has risen strongly during the course of the period 1990-2006, as shown in the chart below. In 2006 the Finance & Insurance Index rose by 6.1 percent. The increase in 2006 was due mainly to increases in design intensity (145.5 percent) and trademark intensity (13.1 percent). Note, however, that the observed increase in design intensity was from a low level, so the proportional increase looks much more important. Productivity also increased by 2.5 percent. At the same time, there were also falls in R&D intensity (-0.5 percent), patent intensity (-18.9 percent), and organisational/ managerial innovation (-1.1 percent).

The Finance & Insurance Index has risen by almost 90 percent since 1997. As discussed below in relation to the productivity performance of the finance sector, this innovation was significantly related to the diffusion of Information and Communication Technology (ICT) within this industry. Growth in the R&D component of the Finance Index has been very strong but volatile during the period since 1990, while growth in trademark intensity has been even stronger but less volatile. Strength in these two areas has offset weakness in design and patent intensity.

Average productivity growth in the finance and insurance services industry since 1990 has been substantially above average productivity growth in Australia. According to the Productivity Commission the finance and insurance sector has been the largest investor in ICT, which has contributed to the acceleration of financial intermediation and strong productivity growth in the sector. Strong growth in R&D expenditure has played an important role in this process.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Finance & Insurance Innovation Index	100	135	182	213	226	6.1
R&D intensity	100	179	177	382	380	-0.5
Patent intensity	100	53	66	74	60	-18.9
Trademark intensity	100	200	352	389	440	13.1
Design intensity	100	66	33	11	27	145.5
Organisational/ managerial innovation	na	na	na	95	94	-1.1
Productivity	100	125	152	159	163	2.5

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

IBM Index Viewpoint – Finance & Insurance Industry

Australia should be the envy of the world when it comes to innovation in the finance and banking sector.

We've seen innovation in how banks use technology and, encouraged by R&D tax credits, in how the industry designs and develops in-house, bespoke software applications.

Australia has also been highly innovative in financial products and services, which is reflected in the 6 percent rise in this year's Innovation Index. The concept of reverse mortgages was created here. Until recently, another local innovation – fixed and variable rate mortgages – was unknown in the United States. The introduction of an infrastructure asset class for investments was something else Australia can take credit for.

Banks have had to be highly innovative to generate the growth in revenue, profit and shareholder returns they have, year in and year out. The four-pillar policy has forced banks to grow organically, unlike the US, Europe or Asia where banks have expanded by swallowing other banks.

Our major banks have been particularly innovative in moving from simple banking products to taking a portfolio view of financial services. They have in turn led the world in integrating financial services such as banking and wealth management.

The majors have also been innovative in managing the awkward relationship between fee income and interest income, and in how they've balanced retail business, such as credit cards and mortgages, with meeting the needs of small business.

New entrants and smaller banks have shown the way too. We have seek the arrival of direct banking with high interest Internet savings accounts, launched by smaller players and copied by the majors. Some smaller banks have opted for end-to-end services like the Big Four, while others have got into the white-label ATM business. We've also seen the rise of the community-banking program. All have been extraordinarily creative in finding new markets and growth.

Banking supervision in Australia has been very innovative as well. The Australian Prudential Regulation Authority, or APRA, was created as a supervisor for all financial institutions, in part to address the universal financial services approach of the majors. The Reserve Bank of Australia has led the world in the supervision of payments systems, especially on card based payments instruments. The Reserve Bank is the only central bank to have two boards: one for the bank overall, and one for payments.

Going forward, however, the major banks need to continue differentiating from one another if they're to continue growing and they need to specialise more. They must be more innovative with customer services. More than being customer-focused, they must find new ways for customers to feel happier about them and to convince them they're receiving better service.

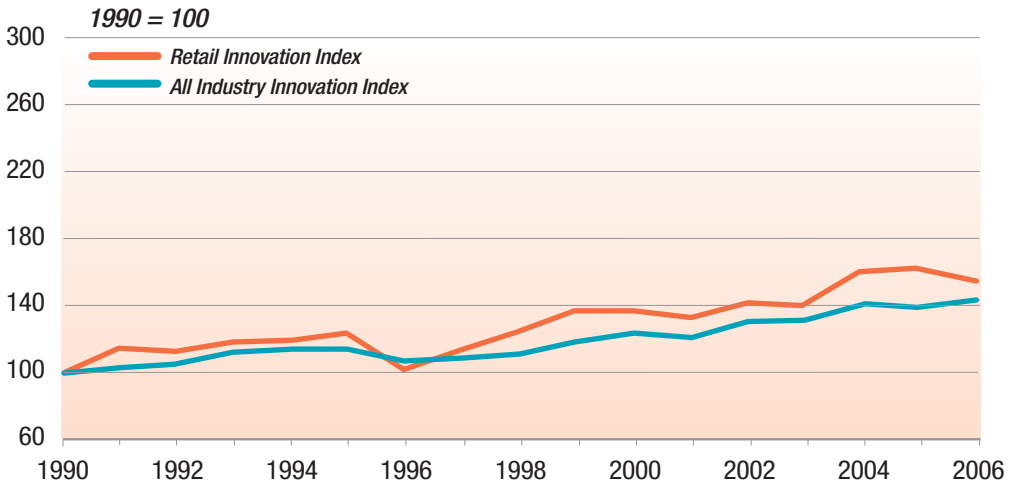
But how do banks do that? That's the big challenge. Innovation, once again, holds the key.

Michael Aaron, Director of Banking & Finance Management, IBM Asia Pacific

Retail Trade Industry Innovation

The Retail Trade Index fell by 4.4 percent in 2006. In fact, all component indexes – with the exception of productivity – experienced falls in 2006. Some of the most substantial falls were recorded in patent intensity (-11.5 percent) and organisational/managerial innovation (-13.9 percent). This was after a period (1996-2004) of moderate growth. Comparing the Retail Trade Industry Innovation Index with the all-industry index suggests that the two are tracking each other fairly closely.

While growth in the Innovation Index for the retail sector slightly outpaced that of the index for Australia overall, productivity in the retail sector equalled the overall industry productivity growth in Australia. However, productivity growth in the retail sector picked up pace from 2003 and outperformed the average of Australian industry overall. In 2006, productivity in the Retail Trade Industry increased 2.4 percent. The sector has also been subject to significant competitive pressures as well as changed operating conditions in the past decade or so, with changes in distribution practices.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Retail Trade Innovation Index	100	122	134	159	152	-4.4
R&D intensity	100	17	46	225	217	-3.6
Patent intensity	100	73	99	96	85	-11.5
Trademark intensity	100	218	230	247	240	-2.8
Design intensity	100	133	121	94	60	-36.2
Organisational/ managerial innovation	na	na	na	108	93	-13.9
Productivity	100	104	118	126	129	2.4

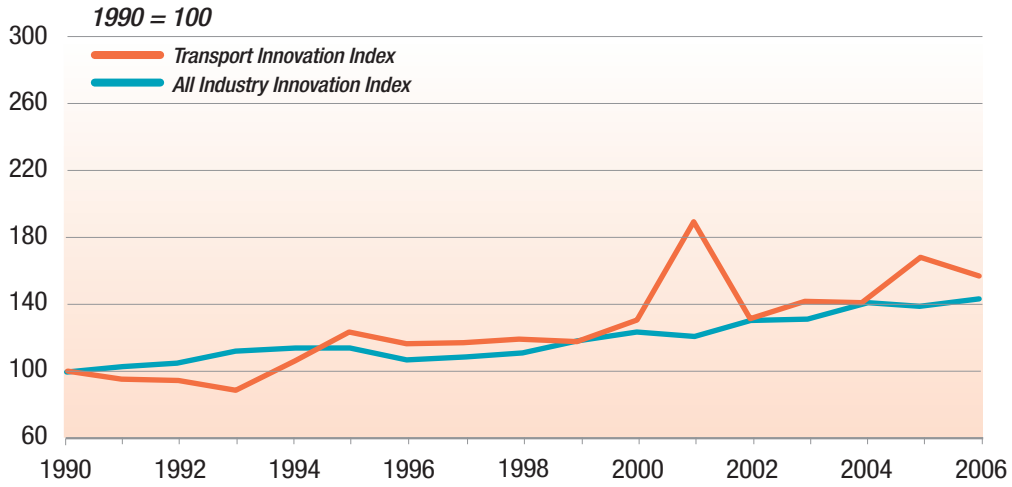
Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Transport & Storage Industry Innovation

The transport index fell by 4.9 percent in 2006. Despite increases in R&D intensity, organisational/managerial innovation and productivity – which increased in 2006 by 59.6 percent, 9.3 percent and 1.4 percent respectively – the gains were overwhelmed by large falls in patent, trademark and design intensity.

As shown in the chart below, the Transport Innovation Index has grown fairly much in line with overall innovation in Australia during the period since 1990, notwithstanding some brief periods of divergence (such as in 2001). The moderate overall improvement in innovation in the transport industry since around 2000 has been mainly due to R&D intensity. Meanwhile, the performance of the IP components of the index (patents, trademarks and designs) has been variable, with only the trademark applications measure showing a strong steady upward trend.

Annual productivity growth in the Transport & Storage Industry from 1990 has exceeded that of Australian industry overall, benefiting from developments in, and the application of, ICTs since the early 1990s. As a result, Productivity Commission estimates suggest that the multifactor productivity, or efficiency, contribution to labour productivity in this industry during the 1990s was substantial. As with Australian productivity growth overall, productivity growth in the transport and storage sector has slowed in recent years, albeit by less than the all-industry average.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Transport Innovation Index	100	123	129	164	156	-4.9
R&D intensity	100	70	63	136	217	59.6
Patent intensity	100	65	57	68	50	-26.5
Trademark intensity	100	187	209	296	246	-16.9
Design intensity	100	151	84	94	20	-78.7
Organisational/ managerial innovation	na	na	na	86	94	9.3
Productivity	100	114	130	148	150	1.4

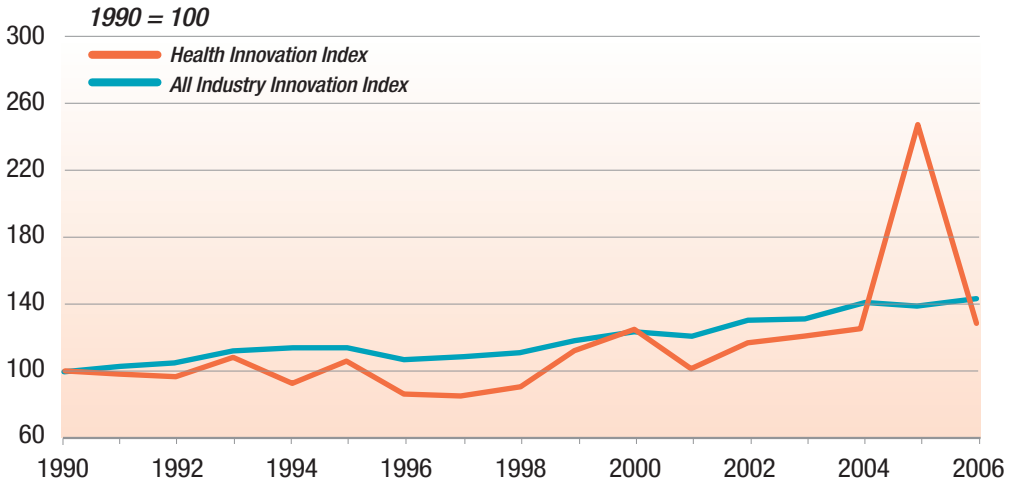
Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Health & Community Services Industry Innovation

The Health & Community Services Industry is dominated by the public sector, with governments paying, directly or indirectly, for two-thirds of national health expenditure. Similar to other service sectors, this industry has experienced rapid growth in employment in the past decade. Due to government measures aimed at reigning in the rapid growth in public sector health spending, output from the Health & Community Services sector moderated in 2006/2007.

The health index has generally underperformed the all industry Innovation Index during the period since 1990, with the obvious exception of 2005, when the health index rose appreciably. Aside from the anomalous spike in 2005, which was due to an unexplained rise in trademark activity, the health index is close to the index for all industries. Compared with all industries, the Health & Community Services sector since 1990 has experienced lower growth rates in R&D, patent and design intensities. The overall picture in this industry fits the pattern of other service industries where the role of an individual human input cannot be easily replicated or automated (think, for example, of such industry employees as nurses, doctors and social workers).

Productivity in this industry, as with some other industries in the services sector, has underperformed the national average since 1990, with average growth of just 0.9 percent compared with 1.6 percent nationally. Despite the labour intensive nature of this industry there may be scope for further productivity growth resulting from the application of ICTs in certain areas.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Health & Community Services Innovation Index	100	106	123	247	130	-47.4
R&D intensity	100	22	28	120	119	-0.8
Patent intensity	100	62	62	114	50	-56.1
Trademark intensity	100	159	142	653	227	-65.2
Design intensity	100	122	479	31	14	-54.8
Organisational/ managerial innovation	na	na	na	119	102	-14.3
Productivity	100	106	112	117	116	-0.9

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

IBM Index Viewpoint – Health & Community Services Industry

Innovation and health – get it right and the dividends for society are enormous. Reduced costs, increased productivity and efficiency, and most importantly, better health outcomes. It sounds obvious, but in recent years innovative activity in health has been erratic – the spike we saw in 2005 is perhaps case in point.

There's no doubt technology has delivered innovation. For example, much has been done to provide medical staff with better access to clinical information at the point of care – the Vocera solution, which is an innovation that enables clinicians to communicate in a hands-free environment is one such example. It enables staff to treat patients at the bedside or complete other life saving tasks whilst communicating with others at the same time, thus increasing the ability of the clinician to accurately describe the patient's condition.

But this is only one part of the story. Too often innovation is hampered by competing priorities across the spectrum of medical services, when what's needed is a greater alignment responsibility with different healthcare service delivery stakeholders.

Solutions abound that are ready to transform health care provision in Australia. The development of the health avatar, uniting disparate health information repositories through a single 3D human interface, and using a standard taxonomy is but one example. Then there's the use of health portals – integrated, one-stop online resources enabling patients to manage their health records, and access the necessary information to create a more accountable, patient-centric system.

There are other, more targeted advances to be leveraged too, in the areas of mobility tele-health, which assist with management of chronic conditions outside the hospital. There are also wellness programs to promote preventative healthcare and enable GP's to provide improved patient care.

But for these types of innovation to embed in Australia, it's vital we align accountability across all players – healthcare providers, payers, the layers of government, clinicians, and of course patients themselves. No doubt all agree we can make better use of technology to transform the healthcare industry, but only through a shared responsibility, and leadership from each the stakeholders, can innovation flourish across the entire healthcare system.

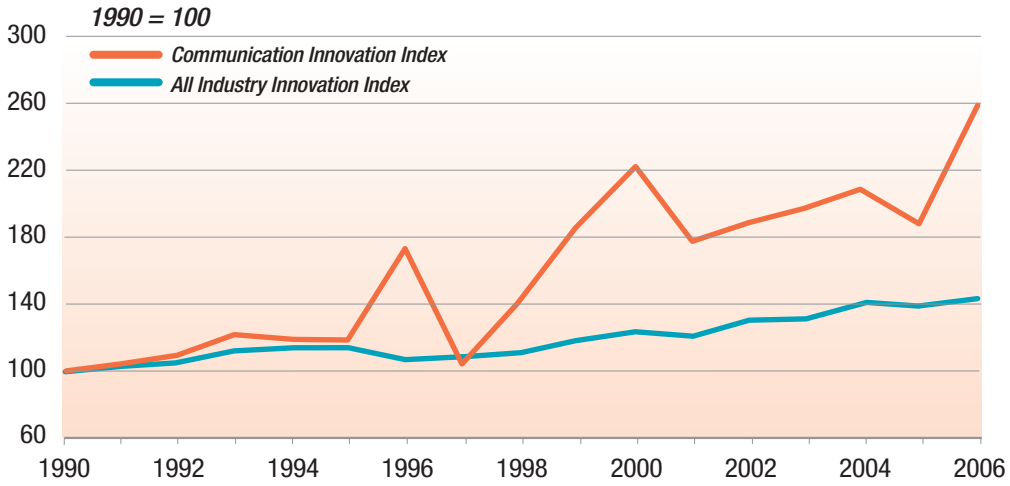
Steve DeLaurier, Healthcare Consulting Lead, IBM Australia & New Zealand
Catherine Caruana-McManus, Health & Public Sector Executive, IBM Australia & New Zealand

Communication Services Industry Innovation

Although the Communication Services Industry has roughly doubled its share of Australian GDP in the period under review, its share of total employment has fallen over time, reflecting improvements in productivity as a result of rapid innovation and widespread application of new technologies. The communications industry has tended to experience growth spurts following the introduction of significant new technologies and services.

After falling in the year to 2005, the communications index shot up markedly in 2006. All components of this index contributed to this rise, but the most marked increase was in patent intensity (which increased by 247.1 percent), trademark intensity (which increased by 58.4 percent) and R&D intensity (which increased by 42.7 percent).

Growth in the communication index has been somewhat higher and much more volatile than that of the overall industry innovation index since the early 1990s. Meanwhile the gap between the productivity performance of this industry and Australian industry as a whole is even more significant. Productivity in the Communication Services Industry increased by 8.2 percent in 2006. Overall, productivity has grown by 6.5 percent per annum since the early 1990s compared with 1.6 percent per annum for Australian industry overall. Diffusion of ICTs can bring productivity gains from spill-overs and complementary product and process innovations[3].



	1990	1995	2000	2005	2006	% change 2006 on 2005
Communication Innovation Index	100	118	222	187	256	36.9
R&D intensity	100	88	14	89	127	42.7
Patent intensity	100	100	151	51	177	247.1
Trademark intensity	100	100	459	286	453	58.4
Design intensity	100	100	68	32	36	12.5
Organisational/ managerial innovation	na	na	na	100	124	24.0
Productivity	100	155	205	243	263	8.2

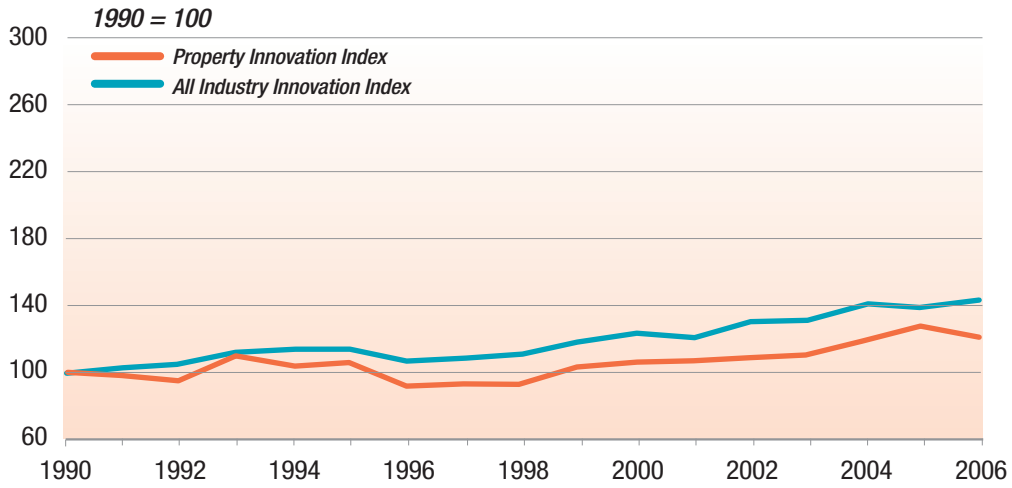
Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

3 Productivity Commission (2003), *Sources of Australia's Productivity Revival*, Canberra.

Property & Business Services Industry Innovation

In contrast to the rise in significance of this sector the property index has underperformed relative to overall Australian industry in the period since 1990. There was a fall in the property index in 2006 of 5.6 percent. All components contributed to this decline, with patents and designs being most notable. Since 1990, the R&D and trademark intensity components relating to the property sector have experienced the strongest growth.

Consistent with the modest growth in innovation in this industry, productivity growth has also been much lower than that of Australian industry overall. Even the Productivity Commission has acknowledged that information about productivity trends in this sector is relatively thin.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Property Innovation Index	100	104	103	125	118	-5.6
R&D intensity	100	195	179	231	229	-0.9
Patent intensity	100	54	55	68	54	-20.6
Trademark intensity	100	116	120	177	159	-10.2
Design intensity	100	72	37	22	18	-18.2
Organisational/ managerial innovation	na	na	na	99	94	-5.1
Productivity	100	91	93	100	99	-1.0

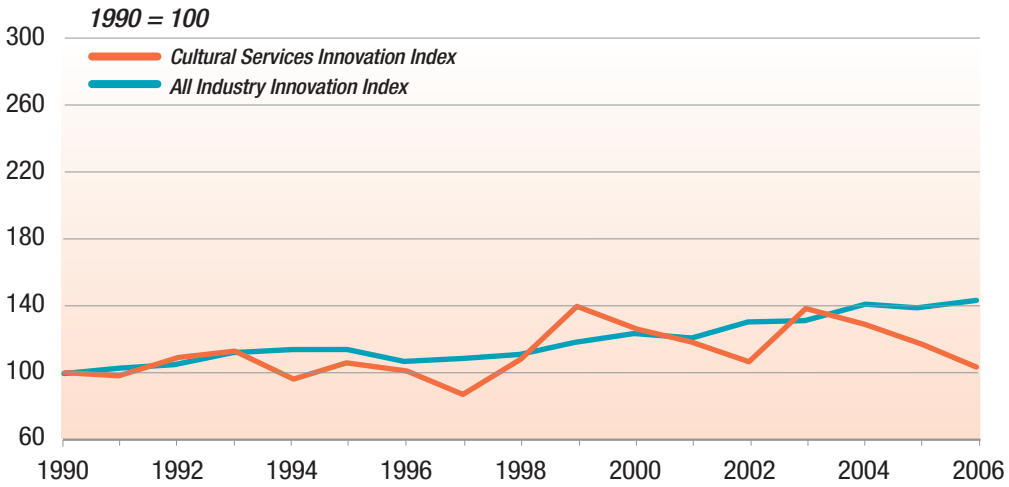
Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Cultural & Recreational Services Industry Innovation

While innovation in the Cultural & Recreational Services industry broadly kept pace with innovation in Australian industry overall for much of the period under review, the cultural index fell in both 2005 and 2006. It ended the period significantly below the All Industry Innovation Index. Substantial falls were recorded in patent intensity (-65.1 percent) and organisational/managerial innovation (-17.3 percent), while there were increases in R&D intensity (63.5 percent) and productivity (3.4 percent).

All components of the Cultural & Recreational Services Innovation Index, except trademark intensity, were lower in 2006 than their initial starting point in 1990. The volatility of patent and design intensity in this industry may reflect the relatively low absolute number of IP applications.

Average productivity in the Cultural & Recreational Services Industry from 1990 fell by 0.4 percent per annum and was very volatile. As with some other service industries, such as Property Services, the relatively limited scope for this industry to benefit from some of the key drivers of productivity growth elsewhere in the past decade and a half probably accounts for this relatively poor performance. Specifically, some services are not easily automated or affected by technological improvements.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Cultural & Recreational Innovation Index	100	102	123	115	101	-12.2
R&D intensity	100	100	172	52	85	63.5
Patent intensity	100	151	158	189	66	-65.1
Trademark intensity	100	115	168	166	158	-4.8
Design intensity	100	56	63	44	13	-70.5
Organisational/ managerial innovation	na	na	na	110	91	-17.3
Productivity	100	88	87	88	91	3.4

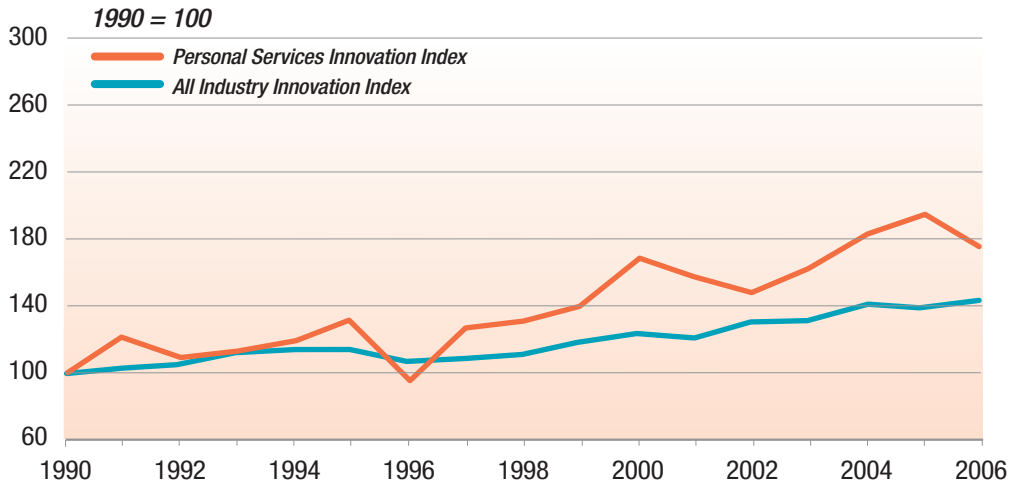
Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Personal & Other Services Industry Innovation

The Personal & Other Services Industry is made up of a diverse range of occupations and businesses. The Personal Services Innovation Index has outperformed that of the overall industry innovation index in recent years. However, compared with 2005, it fell quite sharply in 2006 as shown in the chart below as a result of reductions in patent intensity (-72.2 percent), trademark intensity (-15.8 percent) and organisational/managerial innovation (-17.3 percent). The R&D intensity component of the Personal Services Innovation Index has been relatively volatile throughout the period, and increased sharply in 2006 (by 103.2 percent).

The small number of patent applications in this industry has no doubt contributed to the apparent volatility shown in this chart.

Productivity in this sector has underperformed compared with the national average since 1990, with average growth of just 0.6 percent compared with 1.6 percent nationally. As with some other service industries, the labour intensity of this industry and its intrinsic nature, being less easily automated or affected by technological improvements, means there is less scope for increases in productivity due to ICT-related capital deepening and efficiency gains.



	1990	1995	2000	2005	2006	% change 2006 on 2005
Personal Services Innovation Index	100	130	167	193	175	-9.3
R&D intensity	100	33	128	95	193	103.2
Patent intensity	100	45	82	97	27	-72.2
Trademark intensity	100	276	353	467	393	-15.8
Design intensity	100	94	104	65	80	23.1
Organisational/ managerial innovation	na	na	na	104	86	-17.3
Productivity	100	97	107	108	110	1.9

Notes: Component weights and some ABS data have been revised since the 2007 report. See Appendix 1 for details. na = Not available

Comparing Innovation Trends by Business Size

Within the Australian marketplace, small to medium-sized businesses make up a large proportion of the economy, so an understanding of innovation and how it is approached by differently-sized organisations is important for business leaders and policy-makers alike. In this section, we seek to analyse the relative innovation performance of Australian industry across businesses of different size over time, with a particular focus on opportunities and barriers to innovation.

To do this, we rely on the Innovation Surveys conducted by the Australian Bureau of Statistics in 2003 and 2005. We classify businesses as being small (10–249 persons employed), medium (250–499 persons employed) and large (500+ persons employed) and analyse factors such as the main barriers to innovation, the skills required to innovate, the methods used to acquire new ideas, and the effectiveness of different methods used to appropriate the returns from innovative investments. A detailed account of the issues relating to the construction of the graphs, charts and figures is provided in Appendix 2.

A brief summary of the main results from this section of the report are as follows:

- Risk is perceived as a less important barrier to innovation in 2005 than in 2003
- There has been a huge increase – across small, medium and large businesses – in shortages of skilled labour which have hampered the extent of innovative activities
- Price competition is an important driver of innovation for both large and small firms
- Recruitment of new staff remains the most important method of generating new ideas.

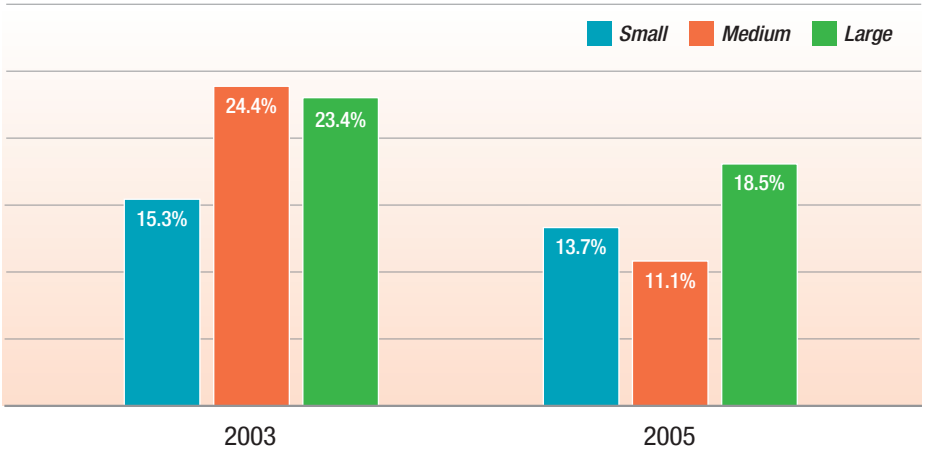
Barriers to Innovation

Businesses were asked a number of questions relating to perceived barriers to innovation: examples of barriers are cost-side difficulties (such as the risk of undertaking innovation, the costs imposed by government regulations or the availability of finance) or market-side difficulties (such as the dominance of an incumbent business or the inability to secure a strategic partnership). Understanding the proximate causes underlying businesses' decisions not to innovate (and whether these change over time) is important for public policy making since it provides a gauge on suitability of the environment in Australia for inducing innovation.

Barriers to Innovation – Risk

In the following graphs, we chart changes in businesses' responses regarding a number of important barriers to innovation over time (2003 and 2005) and across businesses of different size (small, medium and large). In the first chart, we report the impact that excessive economic risk (as perceived by the business) has had on the ability to perform innovative activities.

Excessive Economic Risk Perceived



The evidence relating to this factor suggests that there has been an overall reduction in the impact of risk on businesses' innovative activity since 2003 for businesses of all sizes. The received wisdom is that large businesses are commonly believed to be more able to pool risk across a range of different activities and are therefore able to manage risk more efficiently than small businesses.

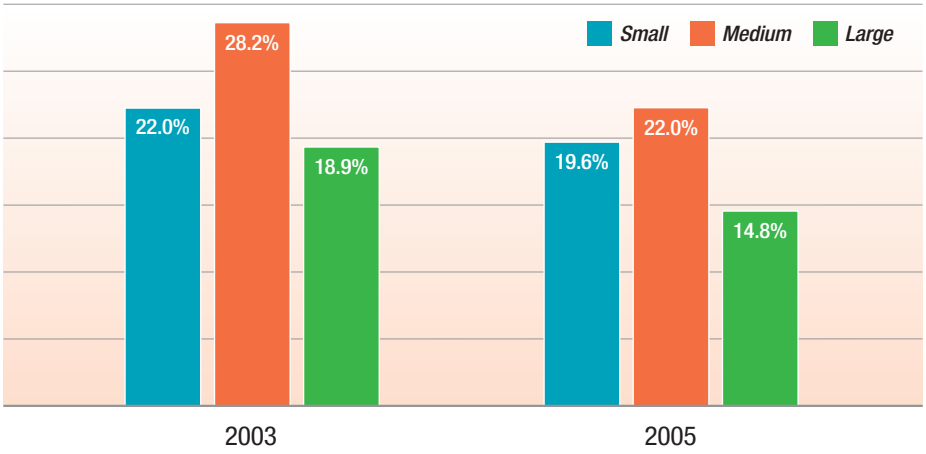
However, our results don't provide much support for this contention in either 2003 or 2005. A higher proportion of large businesses (23.4 and 18.5 percent respectively) reported that excessive economic risk was an important barrier to innovation than small businesses (15.3 and 13.7 percent respectively).

Barriers to Innovation – Regulation

Governments are often criticised for excessive regulation of business. In many instances, the intention underlying regulation has a solid foundation: for example, hygiene and cleanliness standards in restaurants and hospitals, and occupational safety standards in the construction industry. Of course, government regulation might not be necessary: that is, it might not induce better outcomes than self-regulation. Nevertheless, government regulation is common in many industries and there are many who argue that it imposes unnecessary costs on business. Given that businesses have budget constraints (and that resources are scarce), expenditure outlaid on conforming to government regulations must reduce expenditure somewhere else.

The next chart shows the extent to which government regulations have acted as a barrier to innovation in Australian industry. The bad news is that a fairly high proportion of businesses do believe that government regulation is a barrier to innovation, but the good news is that the proportion of businesses who believe this has fallen over time. For medium sized businesses, for example, the proportion dropped from 28.2 percent in 2003 to 22.0 percent in 2005. Businesses in other size categories reported similar falls in the impact of government regulations on innovation.

Government Regulations or standards

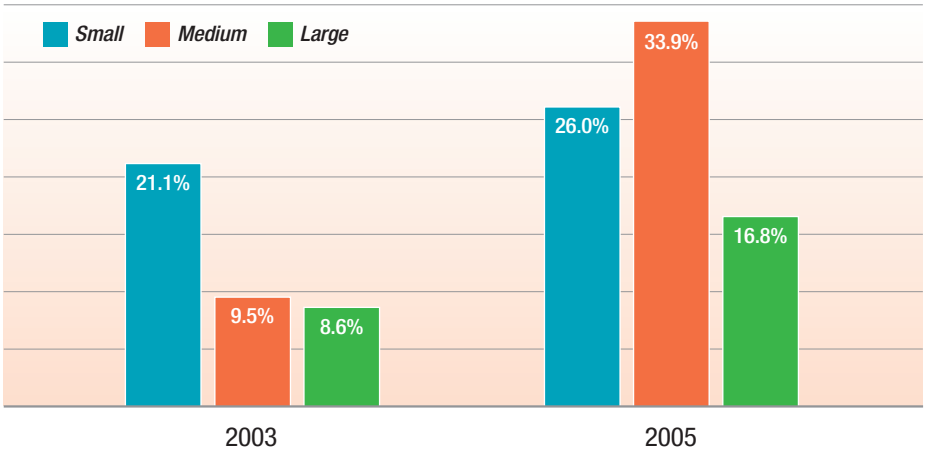


Barriers to Innovation – Skilled Labour

In recent times, there has been a crisis in the availability of skilled labour across Australia. More and more people are going on to undertake tertiary studies and fewer people are undertaking technical training as mechanics. In some instances, businesses in Australia have attempted to fill the shortfall by recruiting workers from overseas. However, for a variety of political and economic reasons, this is not always possible or desirable. In the following chart, we present evidence on the impact that shortages of skilled staff have had on the ability of Australian businesses to undertake innovative activities. Of course, the data we provide here are averages across all industries – it is no doubt the case that skilled labour shortfalls are more acute in some industries than in others. However, this is not something we are able to address here.

The evidence presented below suggests that businesses of all sizes reported an increase in problems associated with skilled labour shortfalls. Medium-sized businesses reported the most substantial increases – from 9.5 percent in 2003 to 33.9 percent in 2005. For small businesses, the corresponding increase was from 21.1 percent to 26.0 percent, while the corresponding figures for large businesses were 8.6 percent and 16.8 percent.

Lack of Skilled Staff



IBM Index Viewpoint – Innovation and Business Size

Working in Australia our business landscape mainly consists of small to medium businesses who have the unique challenge of competing with both large organisations, and the global business community. Perhaps because of this challenge, Australian organisations of all sizes constantly demonstrate innovation in their products, services and business models.

Fast-growing SMBs often use product or service innovation to gain a competitive foothold nationally or to break into a global market. It enables them to create a point of difference, or to appear fresh and new. However this form of market innovation only takes an organisation so far.

As the Index results show, in order to increase the level of innovation activity and success, SMBs must collaborate more. This is evidenced in the research through the challenges in finding skills, sources of new ideas, and an internal focus on innovation.

While the current shortage of skilled labour has struck companies across the board, this year's Innovation Index clearly shows the small-to-medium business (SMB) sector believes it has been hit harder.

Two of the most intriguing findings of the Innovation Index is that businesses believe that innovation is best developed in-house rather than through external means, and that smaller businesses are collaborating less in generating new ideas. The danger is if SMBs don't collaborate or build relationships with their business partners, they're less likely to receive the stimulus and input they need, to create or reinvigourate the systems and process required for sustainable, consistent growth in the future.

Through collaboration what we see are SMBs – particularly of mid-market size of between 100 and 1,000 employees – changing the way they do business. They are adopting new practices to leapfrog competitors burdened by legacy systems and entrenched ways of running their operations.

The best of these mid-sized companies are investing in financial, HR and supply chain systems and people who analyse business data to improve delivery times, service quality and operational consistency for customers.

The flipside is that SMBs will inhibit their growth if they under invest in systems and resources. However, understanding how to invest and what to invest in is one of the greater challenges for any growing business.

If you look at the Innovation Index, it is curious revenue has weakened as a driver for innovation while price competition has strengthened – although there is strong correlation between the two. This is fine as long as the drivers aren't focusing overly on product innovation at the expense of innovation in systems and processes crucial to creating a sustainable business.

Through greater collaboration, SMBs will not only ensure that the level of innovation increases in Australia, but that they remain competitive and sustainable in this new globally integrated landscape.

Charles Bligh, Vice President, Commercial Sector, IBM Australia & New Zealand

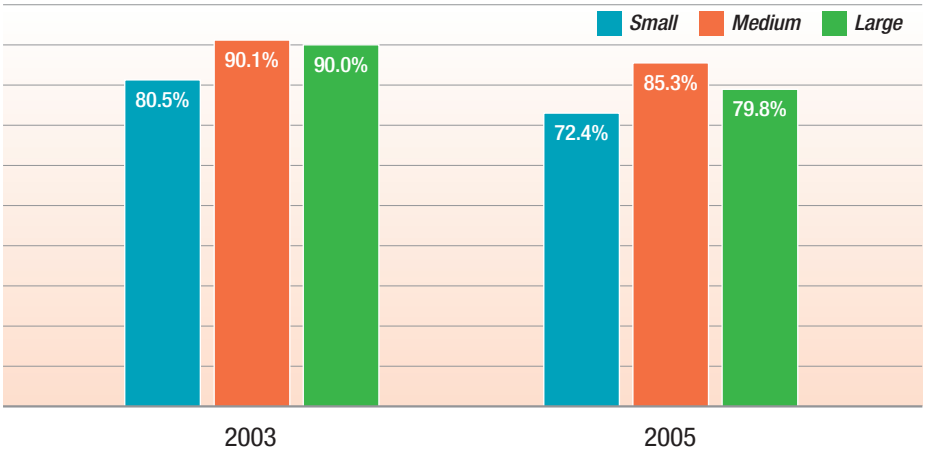
Drivers of Innovation

Economists often argue that everything businesses do is driven by the search for profits. Of course, there are other factors which play a role – the desire to be an ethically responsible corporate citizen, for example – but these are often considered to play a secondary role. When it comes to innovation, economists argue that innovation is risky – it enhances both the likelihood of superior business performance and the likelihood that a company will fail (i.e. go bankrupt). The old adage that 'there is no reward without risk' comes to bear in this regard. To understand the factors influencing business' investment in innovation, the survey asked companies a series of questions relating to "drivers of innovation". We present a sample of these questions here and compare the responses, as usual, across business size and over time.

Drivers of Innovation – Revenue

The below above summarises the results relating to the question about whether the search for ways to increase revenue drives innovation. This question is only relevant for businesses that actually innovate – those businesses which do not innovate clearly don't have drivers. The responses are somewhat surprising: although a high proportion believes that enhancing revenue is an important determinant of innovative activity, this appears to be falling over time. The reduction is modest for businesses of all sizes – the proportion reduced from 80.5 to 72.4 percent for small businesses, 90.1 percent to 85.3 percent for medium businesses, and 90.0 to 79.8 percent for large businesses.

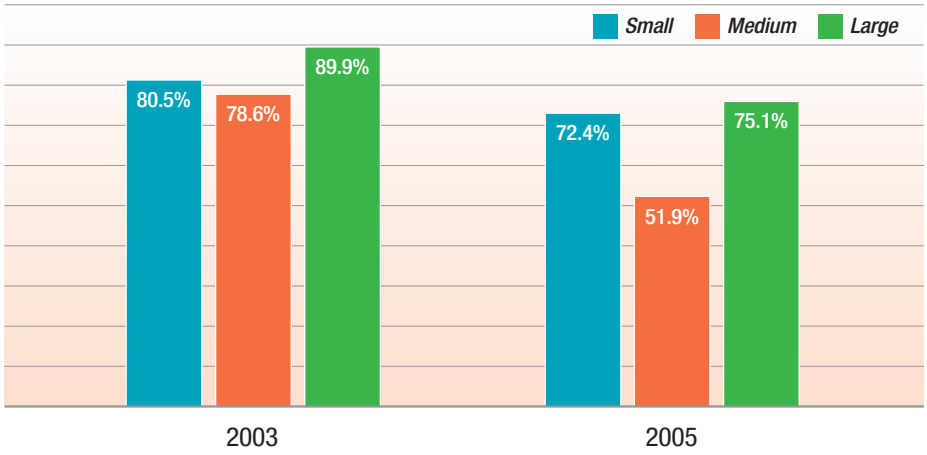
Increase Revenue



Drivers of Innovation – Costs

Perhaps it is the flip-side of the profits equation that is driving innovation? That is, maybe it is the search to reduce costs which is driving innovation. The chart below presents a summary of the data on the extent to which cost reduction is perceived to be a driver of innovation. The numbers suggest that cost reduction has fallen as a major impetus for innovation as well. Caution must be used when interpreting the numbers for medium-sized businesses since the estimate produced by the ABS has a high standard error (which means it cannot be accurately estimated given the small number of observations – see Appendix 2 for more on this). Nevertheless, the data for small and large businesses is quite conclusive – cost reduction has become less important over time as a driver of innovation.

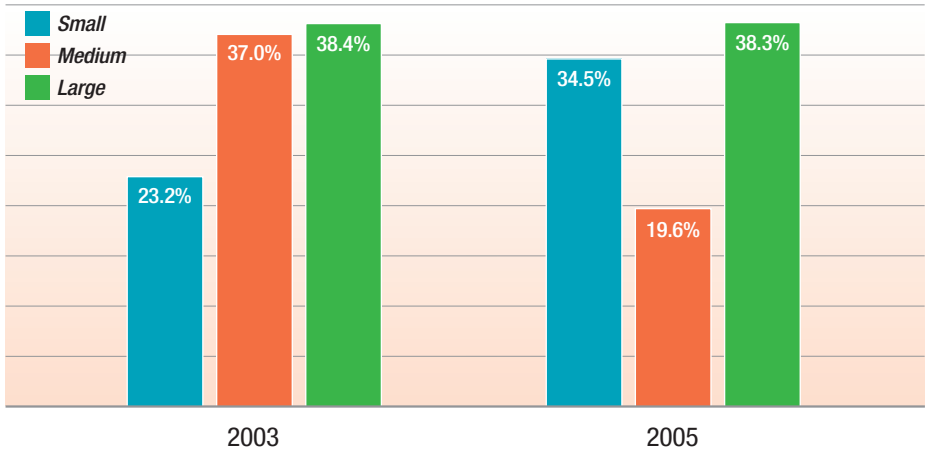
Reduce Costs



Drivers of Innovation – Competition

Another component of the profits puzzle for businesses is the degree and nature of competition they face – some industries are characterised by fierce price competition while others are characterised by quality competition. Perhaps this affects the nature of innovation drivers? In the chart below, we examine the extent to which the degree of price competition is a driver of innovation. In fact the degree of price competition appears to be increasing in importance for small businesses – between 2003 and 2005, the proportion of businesses stating that price competition was a major driver of innovation jumped from 23.2 percent to 34.5 percent. Although this figure is less than that reported for large businesses in 2005 (38.3 percent), this still suggests that price competition is an important feature of the imperative small businesses landscape. [Note that the figures for medium-sized businesses have relative standard errors of 10-25 percent and cannot be reliably interpreted.]

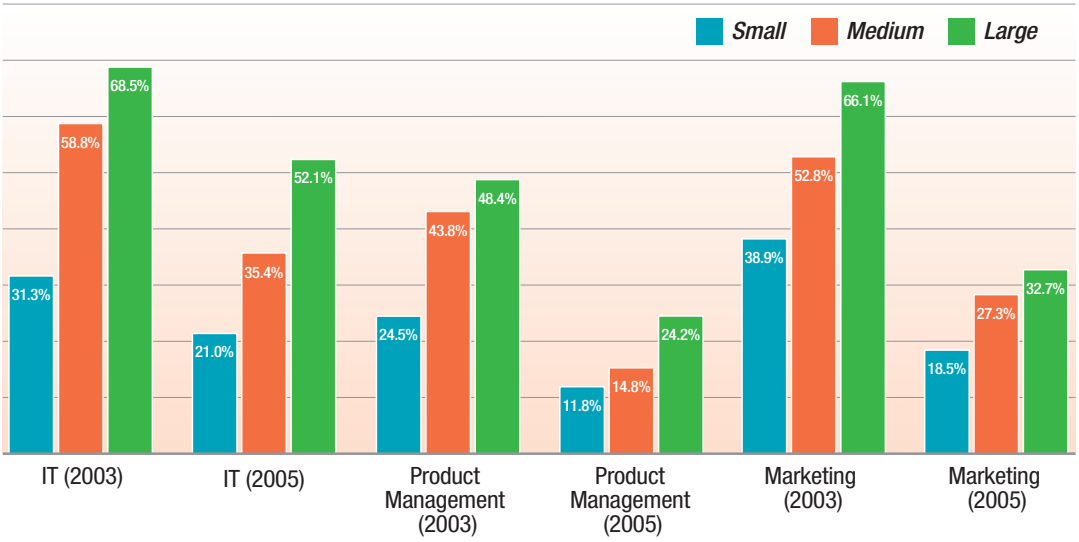
Degree of Price Competition



Skills and Capabilities Sought

So far, we have observed that shortages of skilled staff are quite acute. However what sort of staff and capabilities are sought for innovative purposes? Answers to these questions are important for policy making because this helps to inform where further educational investments may be made. Although there are long lags between observing a shortage of engineers and being able to do anything about it (since it takes many years to stimulate the supply of people entering university, obtaining an engineering degree and moving into the business sector), it is still important to understand exactly where the labour supply shortages are occurring. In the following chart, we provide a snapshot of the changes in skills required over time. We focus on the main skills as reported by businesses: information technology (IT), product management and marketing. Note that the demand for all skills increases with business size – that is, large businesses demand more of everything, from IT to product management and marketing. In all three types of skill sets, there was a fall in demand from 2003 to 2005. This seems at odds with the results presented earlier on the shortage of skills.

Skills and Capabilities Sought

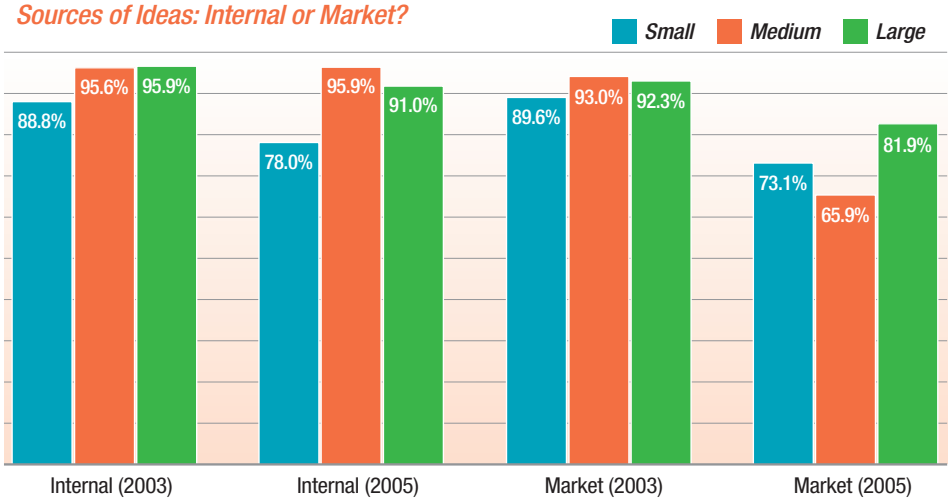


Sources of Ideas

Sources of Ideas – Make or Buy

New ideas are hard to come by. There are at least two ways in which businesses commonly come up with new ideas – 'make' or 'buy'. That is, they can either spend time in their own R&D lab tinkering with existing products and processes, or they can enter the market and look for a new product. The market for technology is a burgeoning area of new development: many new ways to search for and acquire new technology have appeared in recent times – including online patent clearing houses such as OceanTomo – and this may have induced more businesses to adopt this option. The efficiency of markets for technology rely on enforceable property rights since the owner of technology must be able to ensure that once it has been shown to a potential buyer, it will not be expropriated.

Sources of Ideas: Internal or Market?



The above chart presents a summary of the data on the sources of ideas used by businesses of different size. The data suggest that internal sources are by a small margin the most important way for businesses to develop innovations. For medium-sized and large businesses, more than 90 percent of all businesses use internal sources as the well-spring of ideas. This could simply reflect the traditional view of the innovating business: that it is more efficient to appropriate the returns from innovations that you have conceived, developed and commercialised within the business. The key here is in the appropriation of the returns.

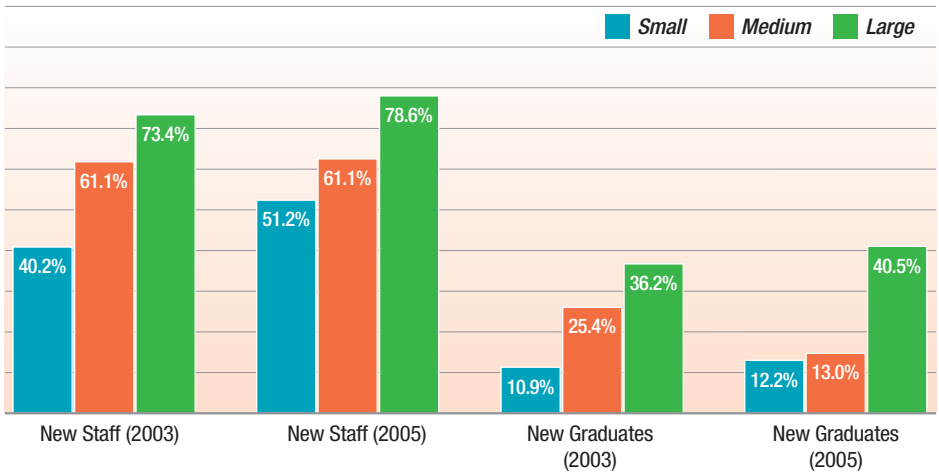
The proportion of businesses relying on external sources for new ideas has been falling over time, especially for medium-sized businesses.

Of course, there are numerous avenues that businesses can use to assist in the generation of ideas within the business: they can employ new staff from other businesses (who may have expertise in a specific area on interest), hire bright young graduates with specialised skills in new technology areas, provide new incentives to staff to develop new ideas, or employ consultants with knowledge of cutting-edge technologies.

Sources of Ideas – New Staff

We turn to these issues in the next chart, which provides a summary of the methods in which businesses generate innovative ideas. The results suggest that hiring new staff (and hiring new graduates) are both increasingly important ways of generating innovative ideas. Perhaps not surprisingly, large businesses lead the way on both fronts: the proportion of large businesses hiring new staff increased from 73.4 percent in 2003 to 78.6 percent in 2005, while the proportion of large businesses hiring new graduates increased from 36.2 percent in 2003 to 40.4 percent in 2005. While the absolute proportions were much lower in magnitude, similar patterns were observed for small businesses.

Methods of Generating Ideas

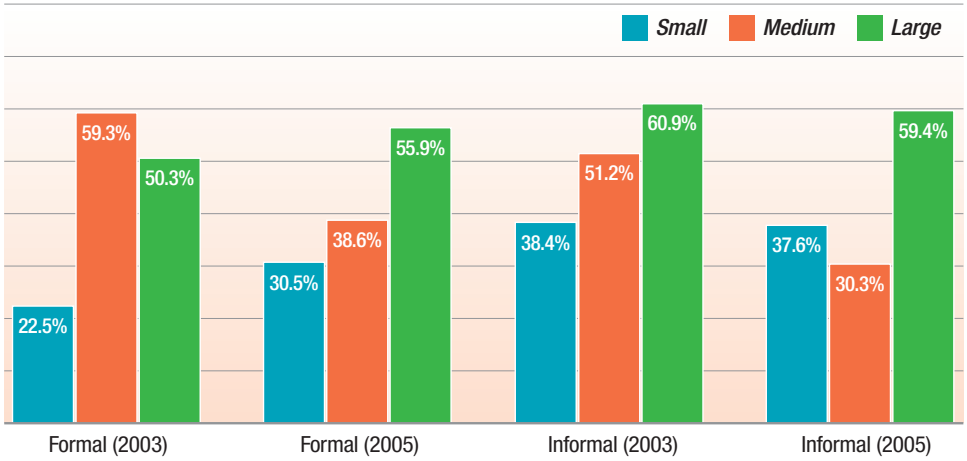


Protecting Innovation Profits

Next we turn to the issue of the protection of innovative ideas once created and/or commercialised. This is an area of great interest in research since there is considerable evidence from around the world indicating that methods of protection have varying degrees of effectiveness across different technology areas and industries. For instance, there are some industries such as pharmaceuticals where patenting is quite effective, while there are others such as the service industries where patents have been shown to be ineffective. One potential explanation for this fact relates to the nature of the knowledge underlying the technology: knowledge which is easily codifiable enables successful patenting whereas knowledge which is tacit in nature does not.

There are a number of different protection methods available to businesses, which are loosely grouped into 'formal' and 'informal' methods. The 'formal' group includes patents, trademarks, designs and copyright. All except copyright require registration by a third party (normally a government agency). Copyright is automatically extended to original works, whereas patents are only available to innovations which represent a large inventive step over / existing knowledge and have utility. The 'informal' protection methods include trade secrecy and product complexity. The graph below demonstrates that there is a large proportion of businesses that rely on both formal and informal methods of protection – thus, it appears that businesses rely on a portfolio of protection, not just a single universal approach. In both periods, small businesses were more likely to rely on informal protection methods (in 2003, 38.4 percent used informal methods compared to 22.5 percent which used formal methods; in 2005, the respective figures were 37.6 percent and 30.5 percent). Large businesses, however, were much more likely than small businesses to use both formal and informal protection methods. Approximately 60 percent of all large businesses used some sort of informal protection, while between 50 and 55 percent reported using some sort of formal protection. Medium-sized businesses display the exact opposite trend: they appear to be more likely to use formal methods of protection in both reference periods. Moreover, the trend is downwards: that is, they were less likely to use either protection method in 2005 than in 2003.

Protection Methods



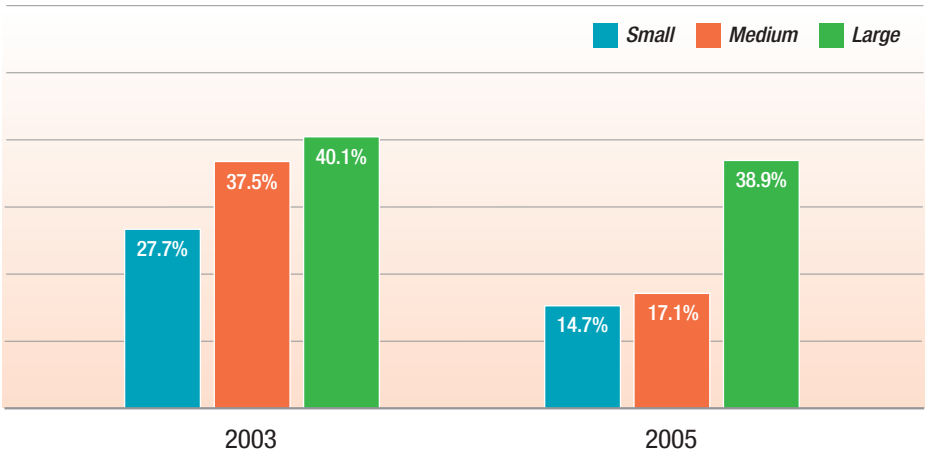
Collaboration

Another way in which businesses are able to generate new ideas is through collaboration. Sometimes businesses do not have the internal resources or expertise to conduct R&D on their own, which provides powerful incentives to collaborate with other organisations, whether they are rivals, universities, or upstream suppliers.

Sharing the costs, however, also means sharing the spoils. In the following chart we have grouped all types of collaboration together, whether it relates to joint R&D, manufacturing or marketing. It also includes more tangential types of 'collaboration' such as whether or not the business has engaged in licensing a product or process from another organisation.

The data indicates that there was a reduction in the level of collaboration from 2003 to 2005, especially for small and medium-sized businesses. For small businesses, the proportion indicating that they collaborate with other organisations fell from 27.7 percent in 2003 to 14.7 percent in 2005, while for medium-sized businesses the corresponding figures were 37.5 percent and 17.1 percent. Large businesses, on the other hand, registered almost the same proportion of businesses collaborating in 2003 as in 2005, suggesting that collaboration remains an important strategy for large businesses.

Any Form of Collaboration



Appendix 1: Construction of the IBM – Melbourne Institute Innovation Index of Australian Industry

Innovation – which is typically defined as the introduction of something 'new and useful' – is widely regarded as the wellspring of economic prosperity, since the introduction of new processes, techniques, and products drive productivity growth. However, innovation is much more than the introduction of new processes, techniques, and products, since it also relates to a wide range of activities such as how people organise themselves, how businesses are structured, and how products are packaged.

Despite the fact that innovation is relatively easy to conceptualise, several variants of its meaning exist and identifying what is 'new' is not unambiguous. For example, should something that is simply an imitation of practices used by other companies be called an innovation? While such new-to-the-firm innovations are clearly important, since they foster productivity growth within the firm, many people would not regard this as innovation. Rather, they would think of innovation in a narrower (and grander) sense – that is, as involving something which is new-to-the-world, such as the creation of penicillin or the launch of the personal computer.

In trying to measure the extent of innovative activity, we also need to consider whether we should include the many 'useful' new products which are abandoned because they don't find a niche market or the organisation that created them goes out of business. Should such 'innovations' be counted in an exercise which is designed to identify the level of innovative activity? Or are we really only interested in those innovations which are successful, however this is measured?

For the purposes of this report we adopt a broad definition of 'innovation'. We include innovations which are both new-to-the-world (such as patents) and those which may be simply new-to-the-firm (such as trademarks). We also seek to include all innovative activities, not just the few that achieve success, which we do by including data on R&D expenditure and employment since it embodies elements of both successful and unsuccessful innovation (not all R&D projects end up in marketable products or new processes). And while relying heavily on activities which create a paper trail, such as patent and trademark applications, we supplement this with survey information on the R&D activities and organisational reforms of businesses. This provides us with the broadest possible conception of all those activities which constitute innovation in Australian industry.

Even with a clear definition of 'innovation', a further problem lies in its measurement, since many innovative activities are trade secrets or improvements in production processes which are not reported outside the innovating organisation. As consumers we may see the effects of such innovations (in terms of better products or lower prices), but it is less clear how to include the innovations in an index of innovative activity since they are essentially unobservable. Here we measure these types of innovations indirectly, through the inclusion of industry-by-industry productivity, since any internal process innovations should ultimately be reflected through productivity improvements.

In terms of coverage, we include innovative activity in all one-digit Australian New Zealand Standard Industrial Classification (ANZSIC) industries (see Appendix 3 for details). However, we exclude non-market sector industries – such as government and defence, education, not-for-profit health services, as well as agriculture, forestry and fishing. Included therefore are the industries, mining, manufacturing, construction, utilities, wholesale trade, retail trade, accommodation, cafes and restaurants, transport and storage, communication services, finance and insurance, property and business services, the for-profit part of health and community services, cultural and recreational services, and personal and other services. In general, we include government trading enterprises, but not the non-traded government sector such as education. Nonetheless, the Innovation Index presented here is a comprehensive measure of the level of activity in Australian industry since it covers the vast majority of businesses, industries and organisations active in Australia.

Thus, the *IBM – Melbourne Institute Innovation Index of Australian Industry* tracks patterns in the rate of innovative activity across a wide range of Australian businesses. The Innovation Index itself covers changes in the rate (rather than the level) of innovative activity from 1990 up to the present. It covers innovations relating to goods and services, business processes, and organisational and managerial functions. These dimensions are measured by six industry data series comprising:

- R&D intensity (measured by R&D expenditure as a percent of total value added and R&D employment as a percent of total employment)
- Patent intensity (measured by the number of patent applications per person employed)
- Trademark intensity (measured by the number of trademark applications per person employed)
- Design intensity (measured by the number of design applications per person employed)

- Organisational/managerial innovation (measured by responses to questions in the Melbourne Institute Management and Innovation Survey relating to such things as: the extent of business resources devoted to organisational change – for example, restructuring and changes in work practices; managerial change – for example, new management techniques and enterprise bargaining; and the marketing of new products or processes)
- Productivity (value added per person employed).

There are three main sources of data used to construct the Index. The Australian Bureau of Statistics (ABS) supplied data on productivity, R&D employment, R&D expenditure employment and value added by industry. We also used ABS data to construct the weights used to reflect the relative importance of each component of overall business performance in the Innovation Index (using two recent ABS surveys of innovation in Australia which reported results on the proportion of sales income that resulted from the introduction of goods/services, processes and organisational/managerial innovations).

In addition, IP Australia supplied the data on patent, trademark and design applications. These are matched through to business listings from the telephone book to produce industry series. The Melbourne Institute of Applied Economic and Social Research supplied the data on organisational/managerial innovation through its annual enterprise level 'Management and Innovation Survey', which has been conducted every year since 2001.

The *IBM – Melbourne Institute Innovation Index of Australian Industry* is constructed using the following equation:

$$I = \lambda_1 (RD) + \lambda_2 (Patents) + \lambda_3 (Trademarks) + \lambda_4 (Designs) + \lambda_5 (Orgman) + \lambda_6 (Productivity)$$

where λ_j denotes the intensity of the j-th measure of innovative activities – R&D intensity which is the mean of R&D expenditure as a proportion of valued added, R&D employment and R&D research staff as a proportion of total employment *(RD)*; Patent applications per person employed *(Patents)*; Trademark applications per person employed *(Trademarks)*; Design applications per person employed *(Designs*); the mean of three survey questions from the Melbourne Institute's Management and Innovation Survey on the extent of business resources devoted to organisational change (e.g. restructuring, changes in work practices), managerial change (e.g. new management techniques, enterprise bargaining) and the marketing of new products or processes *(OrgMan*); and Value added per person employed *(Productivity)*. Thus, there are six distinct components of the Innovation Index. Each data component is disaggregated by one-digit ANZSIC industry and year.

By including numerous dimensions in our quantitative measure of innovation, we capture information about the extent of innovative activity within an industry at different stages of the innovation pathway. Each of these items captures different points in the innovation lifecycle. R&D data, for example, captures both the initial investment made in conducting research about a potential innovation and the subsequent expenditure made in conducting the trials necessary to ensure that the innovation actually works. Note that the R&D data relate to internal expenditure on research and development and do not include expenditure (or employment) contracted out to third parties. Intellectual property, such as patent, trademarks and designs, reflect the outputs of innovative activity – these are typically observed after the R&D process has been completed and new products (or modifications of existing products) are launched on the market. The effect of combining these dimensions into an innovation index is to provide us with a much more comprehensive picture of the breadth and depth of innovative activity across all stages of the innovation pathway. Note, however, that this implies that the components of the Index are not mutually exclusive – some research expenditure no doubt results in patent applications while spending on development is probably also captured in the productivity component.

To compute the Innovation Index, we need to know the importance of each individual component since the components do not necessarily have equal importance. That is, we need to know the values of the weighting factors (the λ_j s). To do this, we use estimates of enterprise expenditures on the development, introduction or implementation of three types of innovation – new and significantly improved goods and services; operational processes; and organisational/managerial processes from the ABS publication Innovation in Australian Business (see cat. 8158.0 2005; Table 2.14, column 4). The average responses to these questions have been used to weight the components of the Index.

The main expenditure during 2004-05, was expenditure on goods and services innovations. This comprised 50 percent (~1.8/3.7) of all business innovations. We use industry data on R&D, patents, trademarks and registered designs to proxy for this type of innovation. Given that the propensity to conduct innovative activity through formal R&D and the propensity to protect innovative assets through formal IP varies by industry, we have given R&D a greater weight in the predominantly goods sectors (mining, manufacturing, utilities and construction) and trademarks a slightly higher weight in the remaining services sectors. In the former we allocate the sub-weights between R&D, patent, trademark and design intensities as 25, 10, 10 and 5 percent. In the services sector, these weights are 10, 10, 25 and 5 percent respectively. The shape of the Index is not sensitive to reasonable variation in these weights (see below). The weights for the whole of industry are 20, 10, 15 and 5 percent respectively.

The contribution to the Index from operational process innovations is 35 percent (~1.3/3.7). We apply this weight to our measure of *Productivity*. The contribution from organisational and managerial innovations is 15 percent (~0.6/3.7) and we apply this to the mean of the three survey questions used to construct the variable *OrgMan*.

Since the data from the ABS publication Innovation in Australian Business is an average of the entire population of Australian enterprises, we apply the weights equally across all industries in our Index. Ideally, if more data were available, we would apply industry-specific weights since it is probable that the impact of patents pharmaceuticals sector is quite different to that in the mining industry. Weights must be invariant with respect to time so a change in the Index represents changes in the underlying fundamentals (i.e. types of innovative activity) not changes in the weights per se. Using this approach, our final estimating equation for all industries is:

For the predominantly goods-based industries of mining, manufacturing, utilities and construction:

$I = 20(RD) + 10(Patents) + 15(Trademarks) + 5(Designs) + 15(OrgMan) + 35(Productivity)$

For the predominantly services-based industries of wholesale and retail trade; transport and storage; communications services; finance and insurance; property and business services; health and community services; cultural and recreational services and personal and other services:

$I = 25(RD) + 10(Patents) + 10(Trademarks) + 5(Designs) + 15(OrgMan) + 35(Productivity)$

To eliminate distortion caused by applying the same weights to all industries covered by the report, we forced the Index to equal 100 in 1990. This means that the Index in industries which report zero or very low levels of some components are not affected by the inclusion of the component. For example, utilities have very few patents but the variable 'patents per person employed' is so small in every year that it hardly affects the height and rate of change of the utilities' Index.

In order to examine the robustness of our results, we conducted sensitivity analyses by applying different weights to the R&D, patent, trademark and design components of the Index. Specifically, we varied the R&D weight by ± 33 percent (i.e. from 12 to 24); the patent and trademark weight by ±16 percent (i.e. from 10 to 14); and the design weight by ±33 percent (i.e. from 4 to 10). The results of the sensitivity analysis indicate that the overall shape of the Index is robust to different assumptions regarding the weights – in fact, the correlations between the various estimations we conducted as part of the sensitivity analysis ranged from 0.9269 to 0.9997. In other words, the overall pattern in the rate of innovative activity was consistent across all estimations.

The latest historic ABS data on R&D, employment and value-added by industry was used for this report and accordingly some components will vary slightly from the earlier report. Revised historic R&D data by industry was published on 21 August 2007. No R&D data are available for: agriculture, forestry and fishing; or accommodation, cafes and restaurants. Data on patent, trademark and design applications (from IP Australia) were collated at the industry level by matching the name of the business to business listings in the telephone book.

The survey data used to construct OrgMan were collected from the Melbourne Institute's Management and Innovation survey, which has been conducted annually at the Melbourne Institute since 2001 and includes about 200 valid responses a year (i.e. approximately 1000 observations in total). Firms included in the Management and Innovation Survey are drawn from the largest 1500 firms in Australia across a wide range of industries. Although there are no small firms in the sample frame, the survey is representative in terms of its inter-industry composition (for more details on the survey and some analysis of the results, see Jensen and Webster 2004).

References

Bosworth, D. and Rogers, M. (2001), "Market value, R&D and intellectual property: An empirical analysis of large Australian firms", *Economic Record* 77, 323-337.

Feeny, S. and Rogers, M. (2003), "Innovation and performance: Benchmarking Australian firms", *Australian Economic Review* 36(3), 253-264.

Jensen, P.H. and Webster, E (2004), "Examining biases in measures of firm innovation", *Intellectual Property Research Institute of Australia (IPRIA) Working Paper* 05/04, University of Melbourne.

Appendix 2: Data Issues Relating To Analysis of Innovation By Business Size

The analysis of innovation across businesses of different size presented here relies on data collected by the Australian Bureau of Statistics (ABS) Innovation Surveys in 2003 and 2005.[4] The method of data collection varied between these two years and it is not possible to make an exact comparison. Our categories of business size vary from the standard ABS definition and many of the reported figures had standard errors so high that they are impossible to interpret. We deal with these three issues below.

Changes in the Surveys from Year-to-Year. Although the two ABS Innovation Survey years (2003 and 2005) have much in common, there were also numerous changes made following the initial report. The two most significant changes were: a move from a three-year reference period to a two-year reference period for innovation activity; and a change in the scope of innovative activity (which was extended to include work that started but was not yet complete or was abandoned during the reference period). Both of these changes make it difficult to strictly compare across the reference periods. There were also some slight changes in the way questions were asked. In order to maximise the comparability of the data, we have focused on questions which were the same across the two reference periods. However, some caution must still be used in making these comparisons.

Catergories of Business Size. The ABS Innovation Survey 2005 presented data by business size using the following categories of employment: 10-49, 50-249, 250-499 and 500 or more persons employed. Our catergories vary considerable from these: we catergorise businesses as "small" (10-249 persons employed), "medium" (250-499) and "large" (500+ persons employed). Rather than taking a simple average of the different business sizes presented by the ABS, we construct weighted averages using the following formula:

$$\overline{x} = \sum_{i=1}^{n} w_i x_i \Big/ \sum_{i=1}^{n} w_i$$

where $\overline{x}$ is the weighted average of the observations and x_i and w_i are the weights (the number of businesses in each size category). A comparative method was used to calculate the 2003 responses using the employment categories: 10-19, 20-49, 50-99, 100-199, 200-249, 250-499, 500 or more persons.

Relative Standard Errors. Due to the small number of businesses surveyed, many of the cells when the data are disaggregated have high standard errors. This means that little confidence can be placed in the accuracy of these numbers. The ABS states that "Estimates with RSEs between 25 percent and 50 percent are annotated with the symbol *, indicating that the estimates should be used with caution as they are subject to sampling variability too high for most practical purposes". The simple way to understand this is that an estimate of 40 percent with a relative standard error of 25-50 percent means that the "true" value of the figure (i.e. the value of the figure that occurs if a full enumeration of the population had been surveyed) could lie beyond the range 15-65 percent. Obviously, this is a highly inaccurate estimate. In this report, we have refrained from using some inaccurate estimates. In some instances, however, we have used figures where the relative standard errors are between 10-25 percent. These have been noted in the text and should be treated with caution.

4 The title is Innovation in Australian Business, Cat No. 8158.0, December 2006.

Appendix 3: Industrial Classifications and Definitions

Business and production units generally typically undertake a range of activities which may include, for example; manufacture, research, wholesaling and insurance. However, for the purposes of classification, this report is based on data that assigns businesses according to their sole primary activity. As such, the classification of business units will depend on the level of aggregation of businesses within the economy. For example: a research division located within a manufacturing enterprise will be included in the 'manufacturing' industry, while its stand alone counterpart will be included in the 'property and business services' industry. There will always be some ambiguity for businesses operating on the margins between industries and businesses which alter the type of work they do over time. While every care, and in the case of the official Australian Taxation Office considerable expense, is taken over the classification of businesses, it is not possible to have the exact same classifications across different business datasets. We use the ABS business R&D publication (cat. 8104.0) as our baseline classification to which other datasets should conform. Accordingly, the Innovation Index for the most part excludes non-trading public sector organisations such as CSIRO, government research bureau and university research institutes. It was not possible however to exclude these organisations from the productivity component of the Index. This incongruence will only distort the final index to the extent the productivity change of the non-trading public sector varies from the industry average.

Definitions	
R&D (research and development)	Creative work undertaken on a systematic basis, in order to increase the stock of knowledge, including the knowledge of people, culture and society, and the use of this stock of knowledge to devise new applications.
R&D employment	R&D researchers, technicians and secretarial and clerical staff associated with the R&D activity measured in person years of effort.
R&D research employment	R&D personnel involved in the conception or development of new products/processes. Excludes executives concerned primarily with budgets and human resources measured in person years of effort.
Person employed	Average number of persons employed by the industry over the year (derived from quarterly surveys).
Productivity	Value added (adjusted for inflation) divided by persons employed.
Business	All organisations whose primary activity is the production of goods and services for sale to the public at a price intended to at least cover costs. Includes private businesses and government trading or financial enterprises. Excludes government departments, CSIRO and the higher-education sector. Includes separately registered entities with its own ABN such as university spin-offs.
Patent applications	Number of filings by businesses with an Australian address of complete, standard patent applications. To be patentable, an invention must be novel, involve an inventive step; be useful and able to be manufactured.
Trademark applications	Number of filings by businesses with an Australian address of trademark applications. A trademark is a sign that is intended to be used, to distinguish the goods or services of one trader from those of another. A trademark can be a word, name, number, aspect of packaging, shape, colour, sound or scent, or any combination of these.
Design applications	Number of filings by businesses with an Australian address of design applications. A registered design protects the visual appearance of a manufactured or hand made product, such as shape, configuration, pattern or ornamentation, as opposed to the function of that product.
ANZSIC	Australian and New Zealand Standard Industrial Classification. This system is the official classification system used for Australian (and New Zealand) industry for data collection purposes, and is aligned with the international system of industry classification.

Melbourne Institute Economic Indicators

Introduction

The Melbourne Institute of Applied Economic and Social Research was established in 1962 and is a department of the Faculty of Economics and Commerce at the University of Melbourne. As part of its research activities the Melbourne Institute produces monthly leading and coincident

indexes of economic activity; undertakes monthly and quarterly surveys of consumer perceptions and expectations; and conducts a monthly survey of consumer price movements. All of the associated published reports are sponsored by external organisations – Westpac Banking Corporation (the indexes of economic activity and consumer sentiment), the Reserve Bank of Australia (consumer inflationary expectations and the wages survey), ING DIRECT (the household saving and investment survey) and TD Securities (the inflation gauge).

The indexes of economic activity report, first published in 1985, provide leading and coincident indicators of aggregate activity.

The consumer surveys relate to the following key areas: consumer sentiment, inflationary expectations, wage changes and household saving and investment behaviour. The survey of consumer sentiment was first undertaken in 1973 and was conducted on a quarterly basis until 1976, a six-weekly basis from 1976 to 1986, and has been conducted monthly ever since. The survey of consumer inflationary expectations began in 1973 as a quarterly survey but was converted to monthly from 1993. The quarterly wages survey was introduced in 1998. The quarterly survey of household saving and investment behaviour was first undertaken in 1993. Survey responses can in all cases be cross-classified by age, sex, the presence of children, household size, voting intention, education, home ownership, state, capital city, education, occupation, household income and work status. Extensive time series data relating to the surveys are available. At least 1200 people are interviewed each month.

The monthly inflation gauge was first published in July 2003 as an experimental measure of monthly shifts in consumer prices.

Indexes of economic activity

The leading index of economic activity is a weighted average of eight economic series which typically lead economic activity by six to nine months. The index includes building approvals, share prices, materials prices, real money supply, over-time worked, gross operating surplus, labour costs and US industrial production.

The coincident index of economic activity is a weighted average of six economic series which are typically coincident with economic activity. The index aims to give a more up-to-date picture of economic activity than conventional measures such as GDP. The coincident index includes real retail trade, civilian employment, unemployment, industrial production, non-farm product and real household income.

Consumer sentiment

The consumer sentiment index is an average of five component indexes reflecting respondents' views about their current and prospective household financial situation; the one-year and five-year economic outlook; and current buying conditions for major household items. Each month expectations about the outlook for unemployment are also surveyed. Each quarter perceptions in regard to buying conditions for cars and dwellings, the wisest place to invest savings and news about economic conditions are also included. The latter specifically refers to politicians, government, taxation, wages, inflation, unemployment, money, the Australian dollar, business, economic conditions, farming, overseas influences and union power.

Each quarter the Melbourne Institute produces a states' report which presents the above data in relation to consumer sentiment (with the exception of 'news heard' data) for NSW, Victoria, Queensland, Western Australia and South Australia.

Consumer inflationary expectations

Each month consumers are surveyed about whether, and by what percentage, they believe prices will rise or fall in the coming year.

Wages

The quarterly wages survey records employees (self-reported) wage changes over the preceding twelve-month period. Unlike other surveys which measure the level of earnings per person, this survey aims to measure the growth in wage rates. These data add to our knowledge about wages and provide a useful alternative to ABS measures of earnings per person; it is also a complement to the labour cost index.

Household saving and investment

The quarterly household saving and investment report presents survey findings on households' current financial position, saving behaviour, reasons for saving, preferred investments and debt position.

Inflation gauge

The inflation gauge estimates month to month price movements across a wide ranging basket of goods and services in the main capital cities of Australia and is based on the methodology used by the ABS in calculating the quarterly consumer price index. As such, it provides a more timely measure of inflationary pressures in the economy than the official quarterly measure of consumer price changes.

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IBM – Melbourne Institute Innovation Index of Australian Industry

The *IBM – Melbourne Institute Innovation Index of Australian Industry* tracks patterns in the rate of innovative activity among Australian businesses (including government trading enterprises but not the non-trading government sector such as education) since 1990. Innovation is defined as the introduction of new and improved ways of enhancing business productivity.

The Innovation Index is designed to record the intensity (i.e. rate of change) of a wide range of industry innovation in relation to goods and services, technical operations, and organisational, managerial and marketing functions. Six industry level data series comprising: research and development; patenting; trademarking; design registration; productivity; and organisational, managerial and marketing reforms; are included in the Index. Each series is divided by a measure of economic activity to give an intensity measure. Relative weights, which mimic each series' respective contribution to overall innovation, are used to add the series together.

The resulting integrated index is a comprehensive summary of the rate of innovative activity among businesses in Australian industry.

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