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Higher Education in Australia: Developing a New Data Framework and International Comparisons and Issues

A Report prepared for the
Business Council of Australia by
The Allen Consulting Group

BUSINESS
COUNCIL OF
AUSTRALIA

Foreword

Historically, Australia's universities have been critical contributors to the country's economic, social and cultural development. It is essential that the sector is able to continue this role effectively and efficiently in the future.

The Business Council of Australia has commissioned the Allen Consulting Group to undertake a research project aimed at providing business with a better understanding of the Australian Higher Education sector. This report reflects the findings of the Allen Consulting Group, and will be central to our contributions to the current examination of the Higher Education sector - "Higher Education at the Crossroads".

Australia's economic and social future will depend on a well-educated and well-trained community. Such a community is fundamental to our ability to succeed in a global economy, thereby funding the sort of lifestyle all Australians aspire to.

The BCA recognises that Australian business must be agile, innovative and intelligent if Australia is to develop and sustain a successful and growing economy and a country which is confident, stable, environmentally responsible, just and outward-looking.

Business, therefore, has a deep and enduring interest in maintaining and building a healthy and vibrant education system from schools through to university including vocational education and training.

There is no doubt that the Higher Education sector will continue to have a major role in the creation of both the leaders of the future and the research underpinning innovation and creative solutions. It is for these reasons the business community seeks to better understand the sector, its outcomes and aspects of its operations.

It is in the community's interest that higher education is relevant and is provided efficiently and effectively. Yet there is a lack of transparent, measurable outcomes data driving informed and contemporary decision making in education and training.

The Higher Education sector will be more likely to maintain and increase its support by the Australian community if there is a better understanding of the outcomes of research and development activity in universities. This will include a much better understanding of how university research contributes to innovation and opportunities for commercialisation.

The Council recognises the importance of both vocationally oriented training and higher education. The distinctive role and outcomes of both sectors must be recognised and encouraged. Successful enterprises will require the range

of capabilities and skills that come from both the Vocational Education and Training sector as well as the Higher Education sector.

The Council supports effective 'safety net' policies that allow Australia's best and brightest access to higher education and training regardless of their financial situation.

Finally, the Council recognises governance as a key issue for the Higher Education sector. The difficult issues facing many Australian universities are best addressed within each institution through the establishment of strong, independent and transparent governance processes. This may require changes to the legislative framework and to membership of university councils and senates.

The Business Council's aspiration is for Australia to be the best place in the world to live, to learn, to work and to do business. Education and training are key drivers of a higher standard of living. The leadership, skills, ingenuity and knowhow of our people will be the primary determinants of our social and economic success.

I commend this report to you. It provides a range of information and analysis that will assist in understanding how effective and relevant Australia's Higher Education sector is, and how it can best contribute to a safe, clean, fair, just and prosperous Australia.

John Schubert
President, Business Council of Australia

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Executive Summary

Reflecting the importance it places on the performance of the higher education sector, the Business Council of Australia commissioned The Allen Consulting Group to prepare two companion papers to evaluate current approaches to higher education performance measurement in Australia and overseas and to assess the performance of the sector and place this performance within an international context. These are presented here as Parts One and Two of this paper. Part Three raises a number of policy implications emerging from the research.

The debate regarding the future of the higher education sector in Australia has recently been dominated by talk of a "crisis" within the sector. However, it is unclear that current data relating to the sector is adequate to either confirm or deny the existence of a "crisis" in higher education. To properly assess sector performance and better inform the policy debate, reliable measures of the social and economic outcomes of the sector are needed.

The first part of this paper focuses on the issue of performance measurement within the higher education sector and questions whether current approaches to performance measurement are adequate to properly inform policy making. It identifies a dominant focus on measuring the inputs and throughputs of the higher education sector, rather than a focus on the social and economic outcomes generated by the system. This is a key weakness of the current approach to performance measurement.

Five performance areas are suggested as being the appropriate focus of performance measurement, namely: student learning, research, resourcing, governance and community interaction. The adequacy and sustainability of resourcing, while not a performance outcome in the same way as student learning or research, is nevertheless an important dimension to consider in this review of performance. Therefore, in this paper, the topic of resourcing is considered alongside the four performance areas of student learning, research, governance and community interaction

Current measurement of outcomes in these areas, in Australia and overseas, is then considered. A preliminary analysis of available data relating to these performance areas is then made and gaps in the current performance measurement system in Australia highlighted.

An overarching conclusion that can be drawn from this research is that much of the current policy debate surrounding the higher education sector is not adequately founded on credible and comprehensive data measuring the social and economic outcomes of the higher education sector. Until the outcomes of the sector are better measured, it is hard to see how problems can be correctly identified and appropriate corrective policy measures adopted.

Any model for outcomes measurement would need to include time series data providing information on following policy areas.

Student learning, as a key performance area, can be seen as including such outcomes focussed matters as:

- the extent to which students are acquiring the generic "soft" skills important to employability, such as critical thinking, problem solving and communication skills;
- the level of specific or vocational knowledge acquired by students and its relevance to the skills expectations of employers;
- the extent to which both student demand for higher education and employer demand for graduates is being met; and
- students' satisfaction with their learning experience.

Sound evaluation of research outcomes needs to reflect the wide diversity of objectives that may underpin research endeavours. The pursuit of public good outcomes, knowledge for its own sake and commercial outcomes can all provide valid justifications for some types of either pure or applied research activity. Research outcomes must therefore be assessed in terms relevant to the purpose for undertaking the research activities. For example:

- public good directed research, such as some types of medical or environmental research, should be assessed against the extent to which they contribute to the public good;
- non-goal oriented pursuit of knowledge should be assessed according to the quality of the outcomes of this pursuit;
- assessment of commercially focused research should include evaluation of the economic benefits that it generates for Australia.

For each type of research category it will be necessary to understand:

- what research is being undertaken; and
- what the outputs, and consequent economic and social outcomes, of this research activity are.

The governance systems of institutions should be evaluated in terms of how well they ensure such things as:

- strategic planning and decision making;
- institutional sustainability;
- institutional accountability to stakeholders;
- transparency of operations;
- the appropriateness of the level of governance obligations; and
- the extent to which they facilitate the efficient use of resources.

The degree to which individual institutions and the higher education sector as a whole meets community responsibilities will need to examine:

- institutions contribution to their surrounding communities.
- ethical standards in teaching and research; and
- occupational health and safety performance and environmental practices.

Appropriateness of resource sourcing can be taken to include issues such as the stability, sustainability and equity of funding arrangements and the efficiency and effectiveness of the application of these resources.

Measures of resourcing performance should therefore address:

- the adequacy of resources available to provide quality education for students;
- the adequacy of resources available to support quality research outcomes;
- the efficiency of resource use; and
- the stability and sustainability of funding sources.

While Part Two of this paper contains a more detailed assessment of international performance data, the key initial conclusions that can be drawn from the assessment of current performance measures for the sector in Australia in Part One of this paper are that:

- Performance measurement in Australia is predominantly focused on input and throughput measures, rather than on the collection of data regarding social and economic outcomes from the higher education sector. A similar situation can be observed in the USA and the UK. However various efforts are underway overseas to address this gap.
- The structures for improved performance outcome measurement appear to be in place with the new Quality Audit system and the annual self assessment reporting requirements currently applying to higher education institutions. However, more effort is needed to develop data sets focused on the measurement of outcomes, rather than inputs and throughputs, of the higher education sector and the information would need to be in the public domain.

Initial messages that may be drawn from current performance measures in each of the five suggested key performance and policy areas are:

- *Student learning* – Little is known regarding the quality of learning outcomes. Employment outcomes are indicated by the Graduate Destination Survey ie 83.6% of bachelor degree graduates attained fulltime employment within four months of graduation. Student satisfaction as measured by the Course Experience survey indicates that 68% of students are "broadly satisfied" with the quality of their course. What is not known is whether graduates are employed in their preferred roles; what the levels of generic skills of graduates are; and employer satisfaction ratings.
- *Research* – Against international benchmarks, outcomes such as patents, and academic publications appear to trail what would be expected given the level of inputs into higher education research and development;
- *Governance* – Information in this area is by its nature qualitative. Key tensions arise from the respective roles of the State and Commonwealth Governments and the "corporatisation" of governance and management structures; and

- *Community* – Engagement with surrounding communities to generate economic benefits has been growing but appears to be at sub-optimal levels. Universities' occupational health and safety and environmental performance do not appear to be an issue.

- *Resourcing* – Revenue per student levels are stable and the higher education research and development budget has rapidly expanded. Financing of higher education is shifting away from Government and on to students. Almost half of university revenue now comes from non-Government sources.

Part Two of this paper contains a more detailed assessment of the performance of the Australian higher education sector against international benchmarks. It seeks to establish how the Australian higher education sector is performing in comparison with other developed nations in the areas of student learning and research; and examines resourcing levels. The data analysis is primarily based on OECD data, although a selection of specific American case studies are also considered.

Part Three of paper discusses policy implications arising from these performance comparisons.

The major conclusions and policy implications, in the specific areas of student learning, research and resourcing are:

- *Student learning*
  - From the data currently available, it is not possible to clearly establish whether student learning outcomes are improving or falling over time or the position relative to other countries performance.
  - The introduction of systematic measuring and monitoring of student learning outcomes including the acquisition of generic or employability skills should be a policy priority.

- *Research*
  - Available data does not necessarily support the suggestion that simply providing more government funding for research in higher education institutions would be the best approach to improve research outcomes in Australia.
  - Better targeting of existing research expenditure to improve outcome productivity and promoting greater business expenditure on research and development may be more appropriate.

- *Resourcing*
  - Available OECD data does not appear to support the contention that the Australian higher education sector is on an aggregated sector wide basis badly under-resourced by international standards.
  - While resource levels are an important policy issue, it is also necessary for policy to focus on the efficiency of resource use.
  - The aspiration of having one or two globally ranked generalist universities would represent a significant funding challenge within the Australian context.

Table ES1 sets out a brief selection of the some of the key data relating to the performance of the Australian higher education sector in the areas of student learning and research and provides details of current resourcing levels.

It should be noted that comparing system wide average data, as the available OECD data does, presents a somewhat incomplete picture of the situation within a country's higher education sector. How resources are allocated, both between institutions and within particular institutions, will impact upon the performance of the sector.

Table ES1

KEY HIGHER EDUCATION PERFORMANCE DATA

STUDENT LEARNING

Student performance at exit level correlates with students tertiary entrance score – if you scored well at school you were more likely to score well leaving university.

Performance by students in some fields of study is across the board better than those of students in some other fields. For instance Medical students (who have high average tertiary entry scores) score better in every category of generic skills than do Humanities or Business or IT or Education or Engineering or Science or Nursing students.

The Course Experience Questionnaire is used across all universities to measure student satisfaction. The most recently available data is for those students completing their course in 1999. 68% of students indicated they were "broadly satisfied" with the quality of their course. (*Striving for Quality: Learning, Teaching and Scholarship* p22)

The Graduate Destination survey is a measure of the employment outcomes of the Higher Education sector. The most recent survey indicated that 83.6% of bachelor degree graduates available for employment were in fulltime employment within four months of completing their qualification. (*Striving for Quality: Learning, Teaching and Scholarship* p23)

According to OECD comparisons Australian's with university qualifications earn 36% more than those with secondary school qualifications. However the OECD average salary differential for university graduates is 60%. (*Education at Glance*, OECD, 2002)

A survey and focus groups conducted by ACNielsen in 2000 investigating employers' satisfaction with graduate skills, found that employers see the performance of new graduates as reasonable, with scores across 25 skill areas ranging from 3.2 to 4.2 out of 5. Skill areas where graduates rate lowest are creativity and flair, oral business communications and problem solving. 76.5 % prospective employers consider per cent of all new graduate applicants "unsuitable".

RESEARCH

University R&D expenditure as a percentage of GDP were 0.44% in Australia in 1998, compared with 0.22% in Singapore, 0.80% in Sweden, 0.49% in Canada, 0.26% in Ireland, 0.37% in the USA, and 0.37% in the UK. The average for Nordic countries was 0.58%.

Australia ranks 6th in terms of publicly funded R&D as a percentage of GDP and 5th in terms of expenditure on basic R&D as a percentage of GDP.

In 1998 business funded 5.2% of research in Australian universities. This ranked Australia equal 15th (with Norway) out of 28 OECD countries. Business funded higher education R&D was in Canada 8.8%, the UK 7.2% and the US 6.3%.

Australia's level of higher education researchers per 10,000 population is the highest in the OECD.

Australia ranks 19th in patents per 1 million population.

Australia, with approximately 48 citations per USD million of R&D funding ranked 13th of 27 OECD countries in 1998. By comparison, in terms of citations per USD million of R&D funding, NZ ranked 2nd, the UK 4th, Canada 8th, the US 12th, and Ireland 17th suggesting Australian research is not being referred to as much as research from some other countries

RESOURCING

Australian public expenditure on higher education as a percentage of GDP was 1.09% in 1998 versus the OECD average of 1.06.

Australian private expenditure on higher education as a percentage of GDP was 0.51% (4th behind USA, Korea and Japan) in 1998 versus the OECD average of 0.29.

The ratio of public:private expenditure of 2.1:1 was the fourth lowest in the OECD, behind Korea 0.21:1, Japan 0.72:1 and the USA 0.88:1. The OECD country mean ratio was 3.65:1.

Australian expenditure per student on a full time equivalent basis in purchase price parity (PPP) US$ terms in 1998 was US$12,089 for higher education students and US$8,184 for VET students (against an overall combined OECD mean of US$8,558).

The base operating grant from the Commonwealth including HECS contribution per full time student unit has remained between $12,777 and $11,515, ($12,052 in 2002) in 2001 dollars for the entire twenty year period 1983 to 2003.

Sources: See Tables 2, 3 and 4 and Appendix Two – Tables 1, 2 and 3 for complete source information regarding the above data.

It is also important to recognise that the more divergent the goals, institutional structures, relative significance of the public and private sectors in the economy, cultural expectations regarding the role of "The University" and so, the harder it becomes to make comparisons of higher education sector performance across different countries.

Therefore, in Part 2 of this paper Australian performance is compared against both the full range of OECD countries and a smaller subset of countries whose higher education sectors operate within a broadly similar context to Australia's.

PART 1

HIGHER EDUCATION IN AUSTRALIA: DEVELOPING A NEW DATA FRAMEWORK

1.1 Introduction

The Business Council of Australia recognises the central importance of education and training to Australia's economic and social development. Reflecting the significance the BCA attaches to this area, it is interested in understanding the performance of the Australian higher education sector and how it compares internationally.

In order to provide a solid basis for evaluating this sector, it is necessary to understand how performance can best be measured and to ascertain what data is required for proper performance evaluation.

Part one of this paper, prepared by The Allen Consulting Group for the Business Council of Australia, seeks to establish to what extent current performance data measurement in Australia is able to provide a sound basis on which to evaluate performance, assess performance against global benchmarks and inform debate on a range of key policy issues relating to the higher education sector. Preliminary lessons on Australian performance that can be drawn from existing data are considered and gaps in current performance measurement approaches highlighted. Finally, possible approaches to future performance measurement are discussed.

A key feature of part one of this paper's approach to performance measurement is that it views the analysis of the quality and quantity of economic and social outcomes generated by the higher education sector, rather than mere measurement of the inputs and throughputs of the system, as being the appropriate focus of a sound performance measurement system.

1.2 The Importance of Higher Education Performance

Australia, like many other countries, is engaged in the difficult process of transformation from an industrial to a knowledge economy. Under the old industrial economy paradigm competitive advantage was primarily built from physical assets, be they natural or man made. In a modern knowledge based economy these physical assets, while still important, are no longer as central to competitive advantage. Increasingly a country's economic and social development depends upon the ability of its people to generate, distribute, understand and apply knowledge. It is now recognised that human assets are central to building sustainable competitive advantage in the a global knowledge based economy.

Australia's Higher Education sector has been a critical contributor to economic, social and cultural development. It will continue to play a critical role in creating the leaders and knowledge to underpin Australia's growth.

Given the rising skills and innovation demands of the knowledge economy, the performance of the Australian higher education sector is becoming of even greater importance to Australia's future economic development.

Maintaining high quality standards across the sector as a whole and addressing the needs of the target audience for university education are significant challenges. How well universities assist the range of students with varying educational aptitudes and learning needs will impact significantly upon Australia's future economic performance.

It is accepted that education can play a major role in achieving equality of opportunity for work. The degree to which there is equality of opportunity to access higher education should be an important factor in any debate surrounding about higher education.

In the context of debate surrounding Commonwealth policy towards the higher education sector, the term higher education generally refers to the 37 public and two private universities (as well as five non-university institutions such as the Australian Maritime College). The activities of TAFE colleges and private education and training providers are not considered part of the higher education system, but rather are categorised as being part of the vocational education and training system.

Business recognises the importance of both vocationally oriented training and higher education. Successful enterprises will require a mix of both the vocational and generic skills that the vocational education and training and higher education systems generate. It is therefore important that the distinctive and differentiated outcomes of both sectors can be understood by the business community.

1.3 Key Policy and Performance Areas

Generating at least broad agreement on what areas of performance are important for the higher education sector would seem to be an important initial step that needs to be taken prior to tackling the major challenge of continuing the contribution of Australia's higher education sector to desired economic and social outcomes. While the following suggested key performance areas are clearly preliminary in nature and somewhat arbitrarily defined, they have been adopted in the remainder of this paper to provide a framework for an initial evaluation of Australia's higher education performance and its performance measurement system.

Clearly, a range of specific data sets may be useful in determining how the higher education sector is performing in achieving desired outcomes in each of these performance areas. The issues surrounding the development of appropriate data sets, and what presently available data sets tell us about the current performance of the Australian higher education sector, are the focus of the sections 1.4 to 1.7 of this paper.

The paper, *Higher Education at the Crossroads: Overview Paper*, released by the Minister for Education, Science and Training raises a number of the key performance, and therefore policy, challenges facing the Australian higher education sector. Drawing on this paper, and approaches to performance measurement overseas, the key performance areas for the sector can perhaps be categorised as falling under four major headings:

- Student Learning;
- Research;
- Governance; and
- Community Interaction.

The adequacy and sustainability of resourcing, while not a performance outcome in the same way as student learning or research, is nevertheless an important dimension to consider in this review of performance. Therefore, in this paper, the topic of resourcing is considered alongside the four performance areas listed above.

Student Learning

The extent to which students develop both the generic skills (such as communication, analysis and problem solving) and specific vocational knowledge that will allow them to thrive within a global knowledge economy is clearly of central importance when evaluating the performance of the higher education sector. Student learning, as a key performance area, can be seen as including such matters as:

- the extent to which students are acquiring the generic "soft" skills important to employability, such as critical thinking, problem solving and communication skills;

- the level of specific or vocational knowledge acquired by students and its relevance to the skills expectations of employers;
- the extent to which both student demand for higher education and employer demand for graduates is being met; and
- students' satisfaction with their learning experience.

Research

Our higher education institutions are major players in the Australian research and development system. Sound evaluation of research outcomes need to reflect the wide diversity of objectives that may underpin research endeavours. The pursuit of public good outcomes, knowledge for its own sake and commercial outcomes can all provide valid justifications for some types of either pure or applied research activity. Research outcomes must therefore be assessed in terms relevant to the purpose for undertaking the research activities. For example:

- public good directed research, such as some types of medical or environmental research, should be assessed against the extent to which they contribute to the public good;
- non-goal oriented pursuit of knowledge should be assessed according to the quality of the outcomes of this pursuit;
- assessment of commercially focused research should include evaluation of the economic benefits that it generates for Australia.

For each type of research category it will be necessary to understand:

- what research is being undertaken; and
- what the outputs, and consequent economic and social outcomes, of this research activity are.

Governance

It is incumbent upon higher education institutions to appropriately use the financial resources provided to them, whether they be by Government, industry, fee paying students or private benefactors. Governance frameworks are largely set through State Government legislation. At present there are both governance obligations linked to the entire operation of institutions and governance obligations linked specifically to how public resources are used by institutions. The governance systems of institutions should therefore be evaluated in terms of how well they ensure such things as:

- strategic planning and decision making;
- institutional sustainability;
- institutional accountability to stakeholders;
- transparency of operations;
- the appropriateness of the level of governance obligations; and
- the extent to which they facilitate the efficient use of resources.

Community Interaction

The higher education sector has a broad responsibility to the community. Each higher education institution has the potential to have major impacts on both the communities that directly surround them and upon the broader Australian and global community. Universities are expected to act ethically in their activities and operate in ways that meet public standards for health, safety, environmental sustainability and equity.

The degree to which individual institutions and the higher education sector as a whole meets community responsibilities will need to examine:

- institutions contribution to their surrounding communities;
- ethical standards in teaching and research; and
- occupational health and safety performance and environmental practices.

Resourcing

Resourcing here refers to both the adequacy of resources being provided to support student learning and research outcomes and the appropriateness of the sources of such resources. Appropriateness of resource sourcing can be taken to include issues such as the stability and sustainability of funding arrangements and the efficiency and effectiveness of the application of these resources.

Measures of resourcing performance should therefore address:

- the adequacy of resources available to provide quality education for students;
- the adequacy of resources available to support quality research outcomes;
- the efficiency of resource use; and
- the stability and sustainability of funding sources.

1.4 The Need for Performance Measures

In order to generate desired outcomes in each of the key performance areas outlined above, it is first necessary to understand current performance. Understanding performance across individual institutions and the sector as a whole is a necessary first step to identifying where change is needed and what change may be appropriate. An appropriate performance measurement system should:

- allow performance in each key performance area to be benchmarked both nationally and internationally;
- help identify performance problems in any key performance area;
- inform and guide constructive policy debate; and
- reduce the scope for the selective use of data to confuse debate or misrepresent performance.

Issues in internationally benchmarking performance

It should be noted that comparing system wide average data, as the available OECD data does, presents a somewhat incomplete picture of the situation within a country's higher education sector. How resources are allocated, both between institutions and within particular institutions, will impact upon the performance of the sector.

It is also important to recognise that the more divergent the goals, institutional structures, relative significance of the public and private sectors in the economy, cultural expectations regarding the role of "The University" and so on, the harder it becomes to make comparisons of higher education sector performance across different countries.

Therefore, while Part One of this paper looks at Australian specific data and some overall OECD data, the international performance comparisons made in Part Two compare Australian performance against both the full range of OECD countries and a smaller subset of countries with a broadly similar context to Australia's.

1.5 Current Approaches to Performance Measurement

Performance measurement, and particularly standardising performance measurement, is a contentious issue both in Australia and internationally. Comparing the performance of different institutions[1] and education systems against a fixed set of measures is inherently difficult given the varied profile of institutions and systems in terms of structure, governance, goals, resources, student backgrounds, location and so on.

The challenges inherent in designing a system that is responsive to such differences, while allowing for useful comparisons between institutions, regions and countries, has led to a number of different approaches being adopted both in Australia and internationally.

Another challenge in performance measurement is to ensure that it is establishing performance outcomes, rather than the easier to measure inputs. that are the current focus of measurement in the Australian system. In cases where outcomes, such as the contribution of graduates to the economy, are hard to measure directly, output indicators, such as the number of graduates quickly finding full time employment, levels of graduate salaries or graduate performance in skill assessment tests, may be useful proxies for the measurement of desired outcomes. What are less useful as proxies for outcomes are pure input measures, such as the number of students or expenditure levels per student.

International performance measurement approaches

Three international approaches to performance measurement of particular interest are those of the OECD, the UK and the USA.

OECD

The OECD collects a range of common data from OECD members which is published as *Education at a Glance* each year. The data sets primarily focus on measuring expenditure on education, participation in education and the impact of education attainment on employment and income levels. OECD data sets, and the associated rankings that can be drawn from them are widely quoted in other higher education focused literature.

Relatively recent data for Australia is included in almost all of the OECD measurement categories.

[1] This paper is primarily focused on the performance of the higher education systems, rather than individual institutions. In relation to institutional rankings, organisations such as the US News in the USA, The Times in the UK, Asiaweek in the Asian region and the Fairfax papers in Australia each periodically release institutional rankings tables. However, the methodology used in constructing these league tables is often somewhat questionable and they do not shed a great deal of light on the comparative overall performance of the higher education systems in different countries.

USA

The USA faces greater challenges than Australia in assessing higher education performance on a national basis. Funding and supervision of higher education is predominantly a State responsibility and different performance measurement approaches have been followed by different states. In many cases the state performance measurement systems are quite detailed. As in Australia, measurement of social and economic outcomes does not appear to be the primary focus of these systems. However, there has been a trend in recent years for many states to increase their monitoring of higher education sector performance. Thirty-seven states now use institutional performance measures (double the number in the early 1990s), with some states now explicitly trying to track economic and social outcomes from the sector[2].

The National Postsecondary Education Cooperative, which is supported by the US Department of Education's National Center for Education Statistics, has been active in trying to develop new performance outcome measurement approaches that are explicitly linked to policy issues.

There are also now a number of national performance measurement tools in use. Table 1.1 sets out the seven major student and alumni outcome measurement tools. These tools are administered to students at a variety of levels. Some test students upon entry to higher education while others test student at the sophomore and senior levels.

Table 1.1

NATIONAL STUDENT AND ALUMNI OUTCOME ASSESSMENT TOOLS IN THE USA

Instrument - Administrator	Information Collected
Collegiate Assessment of Academic Proficiency – American College Testing	Assessment of core general education skills, including writing, reading, maths, science reasoning and critical thinking.
Academic Profile – Educational Testing Service (ETS) and The College Board	Norm referenced and criterion referenced scores measuring college level writing, reading, maths and critical thinking.
Tasks in Critical Thinking - ETS	Measures college level inquiry, analysis and communication skills.
Major Fields Tests - ETS	Factual knowledge, ability to analyse and solve problems, ability to understand relationships and ability to interpret material. Available for 15 disciples.
Area Concentration Achievement Tests (ACAT) – Project for Area Concentration Achievement Testing	Discipline specific surveys cover agriculture, biology, criminal justice, geology, history, neuroscience, political science, psychology, art, english literature and social work.
Comprehensive Alumni Assessment Survey – National Center for Higher Education Management Systems	Employment and continuing education, undergraduate experience, development of intellect, achievement of community goals, personal development and enrichment, community participation, demographic and background information.
College Results Survey (CRS) – Peterson's, A Thomson learning Company	Identifies personal values, abilities, occupations, work skills, participation in lifelong learning, confidence and income for college graduates.

Source: American council on Education, National Assessments of Institutional Quality, 2001

In an attempt to measure performance against national benchmarks, the *Measuring Up 2000* project was undertaken by the National Centre for Public Policy and Higher Education. This project attempts to rank the higher education

[2] The State Higher Education Executive Officers/National Centre for Educational Statistics, *Network News,* November 2001

sectors of each state against a common set of performance benchmarks. The performance areas chosen for measurement were:

- preparation – assessing the adequacy of state preparation for education and training beyond high school;
- participation – assessing the opportunities for enrolment in education and training beyond high school;
- affordability – assessing the relative affordability of higher education for students and their families;
- completion – assessing academic progress, degree and certificate completion rates; and
- benefits – assessing state benefits from an educated population. This measure considers educational achievement, economic benefits, civic benefits and adult skills.

Data used to assess the benefits of higher education relies very heavily on proxy measures. For instance, results of the National Assessment of Adult Literacy test, which is used to assess adults mastery of high level literacy skills, is taken as a proxy for the contribution of tertiary education to adult skill levels. Similarly, levels of voting at elections and philanthropy in a state are used as proxies for the civic benefits generated by the higher education sector. However, the data does not distinguish between voting and philanthropic patterns of higher education graduates and non-graduates.

Measuring Up 2000 provides information on a State by State, rather than institution by institution basis, however there are a number of other rating sources that provide detailed evaluation on an institution by institution basis. One such rating sources is the Best Colleges guide prepared each year by the US News. The US News rates doctoral degree granting colleges[3], as a whole and by field of study, based on a weighting of seven performance areas:

- academic reputation;
- student retention;
- faculty resources;
- student selectivity;
- financial resources;
- graduation performance; and
- alumni giving rate.

In an attempt to strengthen its rating capabilities, the US News has been a supporter (along with three other publishers) of the development of a Common Data Set for evaluating University performance. The recently released Common Data Set approach, whose preparation has been overseen by an advisory board consisting of seven major higher education representative associations, surveys all institutions using a common survey instrument that is designed to collect detailed and comparable data that addresses each of the above broad

[3] The US News also separately ranks two year community colleges and colleges that do not grant post graduate degrees.

performance areas. Reflecting the target audience for this information, prospective students, the data collection is not focused on how higher education institutions contribute to economic and social outcomes.

United Kingdom

In the United Kingdom, like Australia, responsibility for the higher education sector largely resides with the central government. The Higher Education Funding Council for England, oversees the development of performance indicators that rate the performance of the 168 publicly funded higher education institutions in the UK against a common set of performance indicators. Data is collected by the Higher Education Statistics Agency, the Universities and Colleges Admission System and each of the Research Councils in the UK.

Performance data is focused on the areas of:

- access;
- student progression/retention/graduation rates;
- efficiency;
- research output; and
- employment outcomes.

The Times newspaper's annual Good University Guide is also influential in the rating of University performance in the UK. Each year Universities are ranked using a weighted set of indicators in the performance areas of:

- teaching;
- research;
- entry standards;
- staffing levels;
- library and computer spending;
- facilities spending;
- degree classification;
- graduate destinations; and
- completion rates.

The actual data sets that feed into the ranking calculations are drawn from a number of data sets compiled by government supported bodies such as the Higher Education Statistics Agency and the Research Funding Councils. In this respect The Times Good University Guide is similar to the Australian Good Universities Guide supported by the Fairfax newspapers.

Overall, the metrics used to assess performance in the UK are very similar to those used in Australia.

A common feature of each of the OECD, US and UK performance measurement approaches is that the primary focus is on recording inputs and

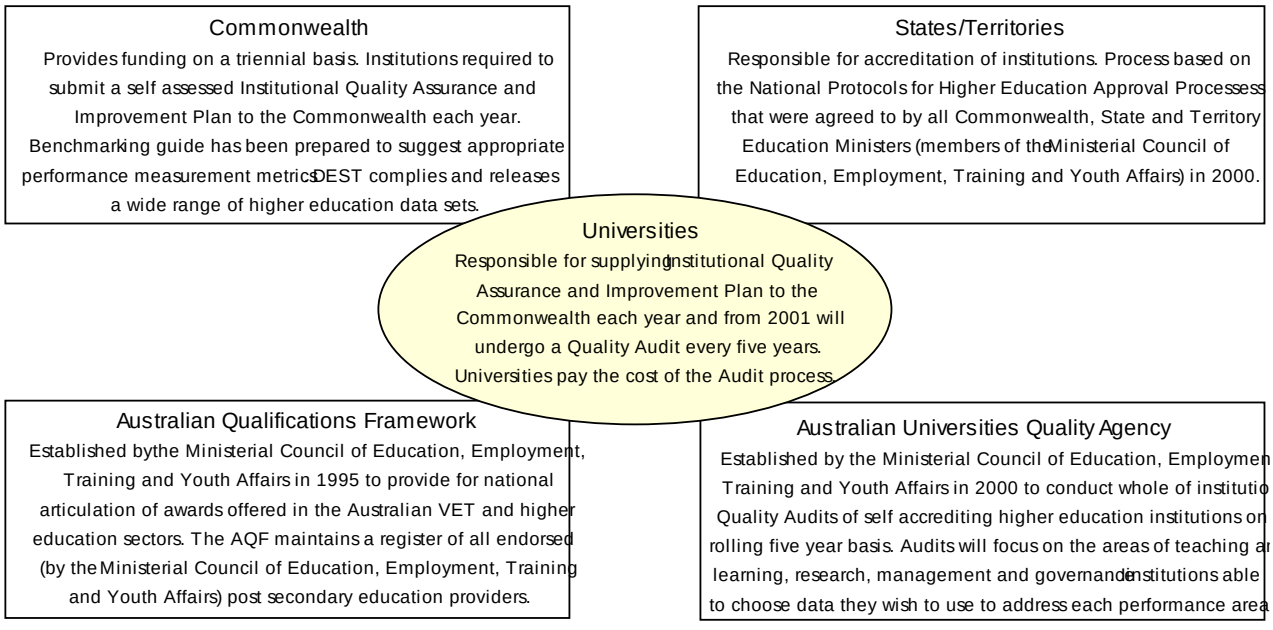
throughputs, with less coverage of economic and social outcomes. The primary tools for outcome measurement are employment and income levels for graduates and measurement of research publications or patents.

Current Australian performance measurement

Figure 1.1 sets out the key elements of the Australian quality assurance framework for the higher education sector. As this indicates, there is a multi-layered set of reporting and monitoring requirements placed on higher education institutions.

Figure 1.1

AUSTRALIAN QUALITY ASSURANCE FRAMEWORK



Source: DEST, *The Australian Higher Education Quality Assurance Framework*, 2000

The Commonwealth Government has prepared a guide for institutions to follow when preparing their annual Institutional Quality Assurance and Improvement Plan. This benchmarking guide provides 67 suggested metrics (see appendix one for a list of the 67 metrics) for Universities to assess themselves against in the areas of:

- governance, planning and management;
- external impact;
- finance and physical infrastructure;
- learning and teaching;
- student support;
- research;
- library and information services;
- internationalisation; and
- staff.

Whilst there is a comprehensive range of measures relating the Governance, Resourcing and Community they are not generally outcomes oriented in the sense of measuring the economic and social contribution of higher education. Rather they tend to assess processes, structures, inputs and input sources.

In fact of the 67 performance indicators contained under these nine headings, only five explicitly relate to outcomes (rather than inputs, throughputs or outputs) in the areas of student learning and research. These benchmarks are:

- student satisfaction – based on Course Experience Questionnaire survey administered by the Graduate Careers Council of Australia. The CEQ is completed by graduates six months after completing their studies who are asked to rate their course experience in terms of: teaching quality; clarity of goals and standards; appropriateness of assessment; appropriateness of workload; and development of generic skills;
- employability of graduates – suggests this should be based on the Graduate Destination Survey administered by the Graduate Careers Council of Australia;
- research students experience – suggests this should be based on Post-Graduate Research Experience survey administered by the Graduate Careers Council of Australia to research students, asking them to rate the quality of research facilities and research supervision provided to them;
- weighted research publications per full time equivalent academic staff – suggests it should be based on the value of composite index weighted research publications divided by FTE academic staff; and
- impact of research – no proscribed measurement approach is given.

The audit director for the Australian University Quality Agency has recently stressed[4] that the Quality Audits are not going to be used to generate performance ranking tables and institutions will not be required to rate themselves using a proscribed common set of indicators. The divergence in measures adopted by various institutions may make performance benchmarking based on this data difficult. However, the process may yield a number of benefits, and it is possible that the generic process could be revamped to provide for more explicit benchmarking if this is seen to be desirable in the future.

It is likely that the data that will feed into the forthcoming Quality Audits will draw upon metrics suggested in the benchmarking guide. The data collected and published by DEST also largely surrounds metrics suggested in the benchmarking guide.

The Graduate Destination Survey, the Course Experience Questionnaire, and the Post-Graduate Research Experience survey appear to be the major widely used externally administered outcome measurement tools in the areas of student learning and research.

The Graduate Skills Assessment (developed by the Australia Council for Educational Research) may provide a further tool but currently it is used by

[4] The Australian Higher Education Supplement, 22/5/02, pg.34

only a small number of students. Community and employer awareness of the test also appears to be limited.

This base of information is supplemented by the conduct of one off studies such as the Employer Satisfaction with Graduate Skills study conducted by ACNielsen for the Evaluations and Investigations Programme within (now) DEST in 2000.

The general lack of assessment of the quality of student learning outcomes, i.e. measuring how much students have actually learnt at University, contrasts with the major internationally integrated efforts being made in secondary education to establish student knowledge levels in fields such as science and maths. The OECD lead Programme for International Student Assessment (PISA) and the International Association for the Evaluation of Educational Achievements Third International Mathematics and Science Studies (TIMSS) each involved testing students maths and science performance at a number of primary and secondary school levels in over 30 countries. The PISA and TIMMS programs highlight that it is possible to measure learning outcomes against a common standard if there is the will to do so.

Overall, the data collection and reporting requirements for Australian higher education institutions are similarly focused to those found in the UK and the USA. The Australian approach to performance measurement is similar to that overseas in that input and throughput measures dominate the available data sets. Measures of economic and social outcomes, due in part to the greater difficulty of outcome data collection and evaluation, tend to be restricted to graduate employment and income outcome measures and basic research output measures such as citation levels.

Any model for outcomes measurement would need to include time series data providing information on following policy areas.

Student learning, as a key performance area, can be seen as including such outcomes focussed matters as:

- the extent to which students are acquiring the generic “soft” skills important to employability, such as critical thinking, problem solving and communication skills;
- the level of specific or vocational knowledge acquired by students and its relevance to the skills expectations of employers;
- the extent to which both student demand for higher education and employer demand for graduates is being met; and
- students’ satisfaction with their learning experience.

Sound evaluation of research outcomes needs to reflect the wide diversity of objectives that may underpin research endeavours. The pursuit of public good outcomes, knowledge for its own sake and commercial outcomes can all provide valid justifications for some types of either pure or applied research activity. Research outcomes must therefore be assessed in terms relevant to the purpose for undertaking the research activities. For example:

- public good directed research, such as some types of medical or environmental research, should be assessed against the extent to which they contribute to the public good;
- non-goal oriented pursuit of knowledge should be assessed according to the quality of the outcomes of this pursuit; and
- assessment of commercially focused research should include evaluation of the economic benefits that it generates for Australia.

The governance systems of institutions should therefore be evaluated in terms of how well they ensure such things as:

- strategic planning and decision making;
- institutional sustainability;
- institutional accountability to stakeholders;
- transparency of operations;
- the appropriateness of the level of governance obligations; and
- the extent to which they facilitate the efficient use of resources.

The degree to which individual institutions and the higher education sector as a whole meets community responsibilities will need to examine:

- institutions contribution to their surrounding communities;
- ethical standards in teaching and research; and
- occupational health and safety performance and environmental practices.

Appropriateness of resource sourcing can be taken to include issues such as the stability, sustainability and equity of funding arrangements and the efficiency and effectiveness of the application of these resources.

Measures of resourcing performance should therefore address:

- the adequacy of resources available to provide quality education for students;
- the adequacy of resources available to support quality research outcomes;
- the efficiency of resource use; and
- the stability and sustainability of funding sources.

1.6 Evaluation of Current Australian Higher Education Performance

The following represents an initial review of current data relevant to the performance of the Australian higher education sector in each of the four identified key performance areas and the area of resourcing. Greater focus is given to the student learning, research and resourcing, which are more amenable to analysis and benchmarking than either governance or community interaction.

The mapping of available data against each of the performance areas, the results of which are set out in the three tables attached as appendix two to this paper, allows some preliminary conclusions to be drawn regarding performance in these areas. Part Two of this paper contains a more detailed international benchmarking of Australian performance against comparator nations and undertakes further analysis of Australian performance in the areas of student learning, research and resourcing.

Student Learning

Little is known regarding the quality of learning outcomes.

Reasonable employment outcomes and student satisfaction ratings have been cited but there is insufficient time series data to determine outcome trends.

The Graduate Destination Survey and Course Experience Questionnaire are the primary ongoing learning outcome measurement tools in Australia. The Graduate Skills Assessment has the potential to be further developed and used. These surveys are supplemented with "one off" measures such as the 2000 Employer Satisfaction with Graduate Skills survey. In general, these measures do not lend support to the contention of a "crisis" in higher education in relation to learning outcomes.

The Course Experience Questionnaire is used across all universities to measure student satisfaction. The most recently available data is for those students completing their course in 1999. 68% of students indicated they were "broadly satisfied" with the quality of their course. (*Striving for Quality: Learning, Teaching and Scholarship* p22)

The Graduate Destination survey is a measure of the employment outcomes of the Higher Education sector. The most recent survey indicated that 83.6% of bachelor degree graduates available for employment were in fulltime employment within four months of completing their qualification. (*Striving for Quality: Learning, Teaching and Scholarship* p23)

In terms of graduate skills, the situation is somewhat unclear. Skill indicators across disciplines vary considerably, as do employment outcomes. The measurement of generic skills has been limited.

Whilst the ACNielsen survey suggests reasonable average skill ratings have been given by employers, this is a one off survey, of a limited sample and the lack of time series data relating to graduate skills means it is not possible to

comment on whether graduate skills are improving or declining relative to past performance.

Input and throughput measures also do not necessarily point to a "crisis", with student numbers steadily increasing while university revenue per student has remained stable. It is noted though that some parties may take a view that this scenario does represent a crisis, arguing that cost structures are such that additional student loads are associated with rising average costs.

This is a complex area where it is difficult to make significant conclusions without in-depth analysis. Some of the changes that have occurred, and which impact on the nature of the judgement include:

- changing cost structures;
- changing technology in the way that lectures are given; and
- differing ways of delivering material, including evolving uses of tutorials and casual staff.

Table 1.2 provides examples of initial findings from the available data relevant to assessing student learning outcomes. Appendix Two - Table 1 provides a more detailed description of available outcomes data relating to student learning.

Table 1.2

STUDENT LEARNING OUTCOMES

Information Source	Characteristics of information source	Key messages in information source
ACER: Graduate Skills Assessment	Evaluates students (at both university entrance and exit levels) ability in areas of written communication, critical thinking, problem solving and interpersonal understanding.	Student performance at exit level correlated with students tertiary entrance score – if you scored well at school you were more likely to score well leaving university. Field of study impacts upon student performance. For instance: Arts students scored relatively highly in interpersonal understanding and relatively poorly in problem solving while the reverse was true for engineering students. Performance by students in some fields of study were across the board better than those of students in some other fields. For instance Medical students (who have high average tertiary entry scores) scored better in every category than did Humanities or Business or IT or Education or Engineering or Science or Nursing students.
EIP: Employer Satisfaction with Graduate Skills, 2000	Study, by survey and focus groups conducted by ACNielsen, of employers satisfaction with graduate skills	Overall the performance of new graduate was seem as reasonable with scores across 25 skill areas ranging from 3.2 to 4.2 out of 5. However, the performance of graduates that employers rejected were rated at between 2.9 and 3.9 across these skill areas. Skill areas where graduates rated lowest were creativity and flair, oral business communications and problem solving. Across all skill areas tested university graduates rated higher than TAFE graduates. The highest rating graduates overall either had humanities/social sciences or business/economics backgrounds. 76.5 per cent of all new graduate applicants were considered “unsuitable”.
The Good University Guide 2002	Ranks Universities, TAFEs and Private Colleges (but more data for Universities) by course and overall on a range of metrics.	Graduate destination survey for Universities shows that those who have studies in highly vocational fields (Medicine, Law, Accounting, Nursing, Dentistry, Pharmacy, Surveying) have the lowest levels of graduates seeking work four months after graduation (range of 0 to 9%) while graduates of other fields have a higher level of graduate still seeking jobs (range of 10 to 45%). Graduates of humanities/social sciences, languages, psychology, sports and leisure, sciences, and maths all have a high percentage (40 to 54%) of graduates going on to further study. These fields also have a high percentage of graduates still seeking jobs (17 to 31%). TAFE graduates have on average lower starting salaries than University graduates in similar fields but in general they have lower levels of graduates job seeking after four months, lower levels of graduates going on to further study and a higher proportion of graduates being employed in the private (rather than public) sector.
AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	Unemployment levels for tertiary graduates aged 25 – 64 is 2.9% (versus 6% for those without post school qualifications) and for ages 30-44 is 2.7%. Graduate starting salaries are about 85% of average weekly earnings (figure was in the low to mid 80s throughout the 1990s) the highest level since 1991. Relative to OECD norms, Australian graduates of VET get a significantly lower salary premium (relative to secondary school graduates) over working life than in most other countries. Salary premium for tertiary graduates is relatively higher but still lags behind the average OECD premium. Labour force participation rates for male tertiary graduates is 93% (aged 25 – 65) which is slightly above OECD average and much higher than for those with no post school qualifications.

Research

Against international benchmarks, outcomes such as patents, citations and academic publications appear to trail the overall aggregated level of inputs into higher education research and development in Australia.

Perhaps even more so than other measures of interest, determining and monitoring research outcomes is particularly difficult, especially for basic research activities. Conceptually, the outcome measures would include contribution to the economy, to the quantitative and qualitative improvements in people’s lives (health etc), number of spin–off companies, numbers of patents, etc.

Most of the available data is in terms of dollars of inputs into research and development activities, both within higher education institutions and across the

economy as a whole. There is some limited information on outputs such as patents. Australia is shown to be a relatively large public sector spender on research and development within higher education institutions, but results in terms of citations and patents don't appear to reflect this.

OECD data indicates that Australia ranks 1st in the OECD in terms of higher education researchers per head of population, 6th in the OECD in terms of publicly funded research as a percentage of research and development, but only 9th in terms of scientific and technical articles per head of population, 14th in terms of percentage of research performed in universities that is funded by business, and 19th in terms of patents per head of population.

The higher education sector's relatively high level of spending on research and development contrasts with economy–wide research and development spending, where such spending as a percentage of GDP is low compared to OECD and international averages. Business expenditure on research and development in Australia is well below international averages.

Again, it is important not to conclude too much from such input measures, particularly where the link between inputs and outcomes is somewhat involved. Issues such as a potential disconnection between the research and development focus areas of business and the higher education sector, the culture and incentives structures for commercialisation within universities, and the availability of early stage funding to support the commercialisation of research may all be contributing factors to Australian research outcomes performance.

While such issues were explored at the Innovation Summit in 2000, more work in this area may well be warranted.

Divergence in the goals, institutional structures, relative significance of the public and private sectors in the economy, cultural expectations regarding the role of "The University" and so, also make direct comparisons of performance across different countries difficult.

Table 1.3 sets out key examples of initial findings from the available proxy data relevant to assessing research outcomes. Appendix Two - Table 2 provides a more detailed description of available outcomes (or outcomes proxy) data relating to research.

Table 1.3

RESEARCH OUTCOMES*

Information Source	Characteristics of information source	Key messages in information source
AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	Shows that University expenditure on R&D has increased from $1.1b in 1988 to $2.6b in 1998. Share of funds provided by the Commonwealth Government has declined slightly from 91.3% to 87.7% over that period. Total industry and "other" funding increased from $108.6m to $280.3m over the period 1992 to 1999. Total funding allocated to CRC in 2000 was $5.8 billion, with $1.34 coming from universities. Higher education institutions in 1998-99 performed 84% of total expenditure on pure research, 48.6% of strategic basic research, 31.5% of applied research and 4.5% of experimental development research. Over the period 1988 to 1998, university spending on R&D has moved slightly away from pure research to applied research. Research outcomes are measured in terms of (i) higher degree research students (ii) research funding / expenditure (iii)research awards and research staff
AVCC Fact Sheet *University Research Income – All Sources – 1992 to 2000*	Published in February 2002. High level figures broken down by source of funding, but not by type of research.	Total university research income from all sources has more than doubled between 1992 and 2000, rising from over $457 million to around $972 million. Commonwealth sources of research funding is now 55 per cent of total, down from 65 per cent a decade ago. Income from private sector contracts has increased significantly, from $30million to $100 million. International funding has risen tenfold to $90 million. Donations, bequests and foundations has increased as a proportion, but still remains at 8 per cent of the total in 2000, in contrast to international universities – for example the US. Mention of the imbalance between funds for activity and funds for infrastructure, with the argument being that infrastructure investment levels are inadequate. Again, data is input focussed in nature. Data is very general, in that it is at the aggregate level, as opposed to assessing the priority areas for research and evaluating performance in those areas.
AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	University R&D expenditure as a percentage of GDP were 0.44% in Australia in 1998, compared with 0.22% in Singapore, 0.80% in Sweden, 0.38% in Canada, 0.26% in Ireland, 0.37% in the USA, and 0.37% in the UK. The average for Nordic countries was 0.58%. Staff costs as a percentage of R&D expenditure has fallen from 68.8% in 1988 to 52.2% in 1998. Spending as a percentage on "Other Capital" and "Land and buildings" has fallen at an even greater rate. Expenditure as a percentage of total on "Other Current" has risen from 19.8% to 41.0%.

* Due to the limited availability of actual outcomes data, data related to proxies for research outcomes is also included under the research outcomes heading.

Governance

Information relating to governance structures and performance is largely qualitative. Governance systems of institutions need to be evaluated in terms of how well they support a variety of objectives.

Key tensions arise from the role of State and Commonwealth Governments and the "corporatisation" of governance and management structures.

The 1995 Hoare Report, *Higher Education Management Review*, made a number of recommendations regarding governance structures. Establishing the extent to which these have been implemented and their impacts would be of interest. The extent to which they promote the provision of guidance for, and review of, decision making was seen as the key performance test for governance structures.

Both the performance benchmarks suggested by the Government for institutions to use in their annual Institutional Quality Assurance and Improvement Plans and the evaluation areas that will be part of the forthcoming

Quality Audits have a strong emphasis on Governance issues. However, reporting in this area does not lend itself to quantitative analysis.

The governance systems of institutions need to be evaluated in terms of how well they support a variety of objectives such as:

- strategic planning and decision making;
- institutional sustainability;
- institutional accountability to stakeholders;
- transparency of operations;
- appropriate levels of governance obligations; and
- the efficient use of resources.

Of the analytical publicly available material regarding university governance, *The Regulatory Environment Applying to Universities*, prepared by Phillips Fox for DEST in 2001 perhaps sheds greatest light on the legal underpinnings of university governance in Australia. This report reviewed:

- *Restrictions on the establishment of companies by universities* – In all but WA and SA (where such power is implied), establishing Acts for universities provide an express power for universities to establish new companies. However, this power is generally limited to the establishment of companies to promote the universities' objectives. This then raises questions as to how the proposed company supports the objectives and whether the objectives are still appropriate
- *Rules governing investments and borrowings* – Rules relating to investment power differ widely between states. For instance, universities in Victoria have very broad powers of investment whereas universities in NSW are very heavily regulated in this area restricting the types of and areas where investment can occur
- *Land use, acquisition and disposal rules* – Universities have the authority commercially to acquire and to develop land either directly or by a corporation. However, land use is generally restricted to "university purposes" and to be for the benefit of the university.
- *The treatment of intellectual property and the commercialisation of research* – All Australian universities have the right under general law to commercialise intellectual property that they own.

The more general literature relating to university governance points to an emerging trend of universities becoming more corporatised in their governance structures, with boards of governance no longer the sole province of academic staff and student representatives. Board members with corporate experience are increasingly becoming involved on university boards. Unsurprisingly, there are tensions arising due to the move from a "collegial" university paradigm to the emerging "entrepreneurial" university paradigm.

Some of the fundamental issues in the governance arrangements for universities include:

- whether it is appropriate that State Governments have, in the case of most Universities, a significant role in relation to governance while it is the Commonwealth Government who has a major role in providing funding and for monitoring institutional performance;
- whether governance systems have changed adequately to reflect the fact that the role and business of higher education has been changing; and
- whether governance arrangements allow for efficient decision making in the interests of the institution.

The 1995 Higher Education Management Report (the Hoare Report) considered in detail the performance of existing university governance structures from the perspective of how they were impacting upon the effective functioning of universities. The report examined a number of aspects of governance including:

- the role of the governing body;
- the role of the Chancellor and Vice Chancellor;
- the size and composition of the governing body; and
- the relationship between the governing body, the academic board or senate and the Vice Chancellor.

The review made a number of recommendations designed to improve the performance of university governance structure, in particular to improve the clarity of the role of governing bodies. It would be useful to explore to what extent the Hoare Report recommendations have been implemented and what effect this has had on university governance performance.

International literature on the issue of governance appears to be heavily focused on the tensions being created as universities move towards more "corporatised" governance and management structures and to what extent business should be involved in determining research priorities.

More work is needed to assess whether current governance structures appropriately facilitate strategic decision–making.

Community Interaction

Engagement with surrounding communities to generate economic benefits has been growing but appears to be at sub-optimal levels.

Universities' occupational health, safety and environmental performance do not appear to be a problem area.

Government recommendations on benchmarks for institutions to use in their annual Institutional Quality Assurance and Improvement Plans include several measures addressing the community outcomes of higher education institutions. In particular, there are suggested measures for strategic community service and exemplary community practices. However, in terms of available data on university performance in these areas, there is little quantitative or qualitative information publicly available.

While there has recently been some concern expressed (for example in the majority report of the Senate inquiry into higher education in 2001) into

breaches of ethical standards in teaching and research (the preferential marking of fee paying students has been a prominent allegation), there does not appear to be any literature examining either this area or the area of higher education institutions environmental and occupational health and safety performance. These areas are separately regulated by a raft of legislation, such as workcover requirements, OH&S regulations, etc. Given that universities do report on their performance in these areas, the absence of literature does suggest that this is not a "problem" performance area.

One area where there is more extensive material available relates to the social and economic impact that universities have on their surrounding regions.

DEST has released two related papers, *Creative Association in Special Places: enhancing the partnership role of universities in building competitive regional economies* (1998), and *Engaging universities and regions: Knowledge contribution to regional economic development in Australia* (2000), that explicitly examine the role of universities in regional social and economic outcomes.

These studies found that while there were some instances of strong regional engagement by universities and a general sense that parties were willing to explore greater engagement was identified, for the most part there is no concerted effort being made by either universities or communities to increase connections and capture potential economic and social benefits from close engagement. Obstacles to greater university/community engagement were not seen to be structural in nature.

Research in the UK (Centre for Urban & Regional Development Studies 1997 report, *Universities and Economic Development*) suggests that considerable benefits can be derived from increased interaction between universities and regional communities. However, it also reported that these benefits were not generally being captured.

In the literature surrounding the development of innovation clusters, leading examples cited of higher education institution/community engagement generating significant economic and social benefits include: Boston, where Harvard and MIT play key roles in the development of electronics and IT industries; Silicon valley, where Stanford has spun off many innovations; and more recently Cambridge, where industry clusters are now being generated that are heavily connected to research being conducted at Cambridge University.

Resourcing

Revenue per student levels have remained reasonably stable over the past decade while the aggregate higher education research and development budget has expanded considerably.

Financing of higher education is shifting away from Government and on to students. Almost half of university revenue now comes from non-Government sources.

The key trend identified in relation to the funding of higher education is that students are contributing a greater percentage of the cost of their education. HECS, upfront fees (mainly from overseas students) and other charges now

contribute over 30% of universities' revenues. At the same time the Commonwealth Government's contribution has declined to just over 50% of total revenues.

Given this trend it is important to note that the HECS system has not been shown to be a deterrent to entering higher education for student from low socio-economic status groups[5] and that the private financial returns to personal investment in higher education have been calculated as 2.07:1 (compared to a financial rate of return on public investment of 1.1:1)[6].

Figures relating to the relative funding contributions of different groups are sometimes represented differently, with the Commonwealth contribution being quoted as less than 45%. However, use of this lower figure fails to account for the fact that the Commonwealth government continues to fund a 33% shortfall in HECS revenue that is due to students paying HECS up front and the Commonwealth paying the universities for the 25% discount they receive. Combined with the fact that some students will never reach income thresholds for HECS repayments, this means that the Government may never be reimbursed for the money it provides up front to the universities.

Total university revenue will increase 21.5% between 1995 and 2003, when it will exceed $10 billion. Two thirds of the increase in funding will come from non-Government sources. Already, Australia is 4th in the OECD (behind Korea, Japan and the USA) in terms of the percentage of total university funds generated from private sources. However, public funding for higher education as a percentage of GDP still slightly exceeds the OECD average.

Another important finding is that the level of university revenue per full time equivalent student unit has remained quite stable over the past 20 years in real dollar terms.

Student to staff ratios have been rising considerably over the past decade. Whilst some commentators have suggested this may have a negative impact on learning, further research needs to be undertaken to assess this and the impact of new technologies on adult student learning.

In relation to the funding of research, OECD data indicates that Australian higher education sector research and development expenditure as a percentage of GDP, at 0.44%, is higher than in countries such as the USA (0.37%), Canada (0.38%), the UK (0.37%), Singapore (0.22%) and Ireland (0.26%). The level is, however, lower than that found in Nordic countries where the average is 0.58%.

Long term demographic trends and their implications for funding of higher education are briefly discussed in the recent Budget Intergenerational report. This limited analysis suggested that growth in demand from higher education places will gradually slow over the next twenty years, when demand will then stabilise until beginning to decline post 2035. However, an added complexity (which was not fully accounted for in the analysis) in forecasting future demand for higher education is the impact of increasing numbers of mature–age students, reflecting a growing emphasis in education policy on 'lifelong learning'.

[5] Department of Education, Science and Training, *Does HECS Deter?*, 1999
[6] B-HERT: Of Dollars and Cents, valuing the contribution of universities to the Australian economy, 2000

Table 1.4 sets out a selection of the initial findings from the available data relevant to assessing resourcing. Appendix Two – Table 3 provides a more detailed description of available outcomes data relating to resourcing.

Table 1.4

RESOURCING

Information Source	Characteristics of information source	Key messages in information source
AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	Base operating grant from commonwealth including HECS contribution per full time student unit has remained between $12,777 and $11,515, ($12,052 in 2002) fin 2001 dollars for the entire twenty year period 1983 to 2003.
B-HERT: The Knowledge Based Economy, Some Facts and Figures, 2002	Data draws mainly upon OECD data sets. Most of the figures quoted refer to 1997, 1998 or 1999 data.	Australia ranks 6th in terms of publicly funded R&D as a percentage of GDP. Australia ranks 14th in terms of the percentage of research performed by higher education that is funded by business. Australia's level of higher education researchers per 10,000 population is highest in the OECD. Australia ranks 5th in terms of expenditure on basic R&D as a percentage of GDP. Australia ranks 19th in patents per 1 million population. Australia ranks 9th in scientific and technical articles per million population.
Report to the Chifley Research Centre: The Comparative Performance of Australia as a Knowledge Nation	2001 report prepared by a group of academics. Is very much a political lobbying document rather than simple reporting of data.	Pointing to high costs associated with attracting private funding (marketing etc) relative to public funding, this report suggests that a lesser proportion of university funds are now being spent on teaching and research. DEST Finance statistics do indicate that the pattern of university operating expenses is gradually changing, with a decline in percentage spending on "Other institution purpose" from 16.7% to 13.8% and a rise in "Other expenditure" from 13.0% to 14.5% between 1996 and 1999. Spending on "Academic activities and research" has increased slight to 61.0% while spending on "Libraries and other academic support services" has also increased slightly to 10.6%.
OECD: Education at a glance 2001	Comprehensive range of educational statistics ranking OECD countries against a range of predominantly input or throughput measures.	Australian public expenditure on higher education as a percentage of GDP was 1.09% in 1998 versus OECD average of 1.06. Australian private expenditure on higher education as a percentage of GDP was 0.51% (4th behind USA, Korea and Japan) in 1998 versus OECD average of 0.29. Australian expenditure per student on a full time equivalent basis in PPP US$ terms in 1998 was US$12,089 for higher education students and US$8,184 for VET students (against an overall combined OECD mean of US$8,558).
B-HERT: Of Dollars and Cents, valuing the contribution of universities to the Australian economy, 2000	Report by the Institute for Research into International Competitiveness at the Curtain Business School. Looks at the direct economic impacts of universities, returns to investment in university education and spillover effects from university research.	Direct economic impact of Universities (expenditure, service exports, etc) calculated as $10.6b per annum for 1998 and direct employment of 79,300 persons. Total net exports were almost $1.8b in 1998. Estimates a private cost recovery ratio of 2.07:1 for individuals investment in their own higher education (factors in loss of income while studying, fees paid, difference in post tax income after graduation, etc.) Estimates a social cost recovery ratio of 1.1:1 for society's investment in higher education (the NPV of tax payable differential between a three year university degree graduate and a high school only graduate versus the public contribution to the cost of a three year degree). Estimates overall economic impact of universities as $22.1b per annum for 1998, consisting of $10.6b direct, $9.27b attributable to human capital formation and $2.23b attributable to spillover benefits of University research.

1.7 A New Performance Measurement Approach

Australia, as in other countries, has a higher education performance measurement system that is predominantly geared towards the measurement of inputs and throughputs rather than the explicit measurement of social and economic outcomes. Under such as system, any reduction in inputs is rapidly identified and used as a basis for calls for greater funding. However, in the absence of detailed time series outcomes data, there is no reason to assume that a fall in inputs has indeed led to worse outcomes. Making this assumption does not allow for the possibility that resource use in the sector can show efficiency gains.

While it should be acknowledged that the measurement of outcomes may be more difficult than input measurement, the development in Australia of measures such as the Graduate Skills Assessment indicate that efforts are being made. A number of states in the USA also provide useful examples of new approaches being developed to measure performance outcomes.

The structures for performance measurement in Australia are already strong, with the new Quality Audit process and annual reporting requirements ensuring regular data collection and performance evaluation. Within existing structures, it should be possible to develop some additional outcome focused data sets that would act to better inform policy making in regards to the higher education sector. In addition, the standardisation of data sets that institutions use in preparing annual performance reports and as responses to the Quality Audits would allow for streamlining of information reporting and better comparison of performance across institutions.

The standardisation of data sets and the introduction of some new outcome data measures would not necessarily lead to an increased administrative burden on institutions. These changes could be made in conjunction with a reduction in the number of data sets used to measure inputs and throughputs. Currently, multiple data sets are often collected to measure each input and throughput area.

PART 2

HIGHER EDUCATION IN AUSTRALIA: INTERNATIONAL COMPARISONS AND ISSUES

2.1 Introduction

This is the second part of the paper that the Business Council of Australia commissioned The Allen Consulting Group to prepare with a view to building a more solid understanding of the performance of the Australian higher education sector within the international context.

Part One of the paper considered how sector performance is measured, both in Australia and overseas, and how it could be measured in the future. The need for a performance management approach more oriented towards social and economic outcomes was a key finding of the paper. Part One also presented a brief analysis of Australian performance data relating to outcomes from the higher education sector.

Part Two of this paper seeks to develop an initial overview of how the Australian higher education sector is performing, in the important areas of student learning, research and resourcing in comparison with other developed nations. The paper also discusses some of the policy implications arising from these performance comparisons.

2.2 Key Measures of Higher Education Performance

Student learning, research outcomes and the adequacy and sustainability of resources are areas of significant interest in assessing the performance of the higher education sector. Each of these areas is amenable to quantitative assessment and benchmarking, though there are a number of complex issues involved.

Student learning as a key performance area, can be seen to include such matters as:

- the extent to which students are acquiring the generic "soft" skills important to employability, such as critical thinking, problem solving and communication skills;
- the level of specific or vocational knowledge acquired by students and its relevance to the skills expectations of employers;
- the extent to which both student demand for higher education and employment and employer demand for graduates is being met; and
- students' satisfaction with their learning experience.

In regards to research, for each type of research category (public good, commercially focused, etc) it is important to understand:

- what research is being undertaken; and
- what the outputs, and consequent economic and social outcomes, of this research activity are.

Resourcing refers to both the adequacy of resources being provided to support student learning and research outcomes and the appropriateness of the sources of such resources. Measures of resourcing performance should address:

- the adequacy of resources available to provide quality education for students;
- the adequacy of resources available to support quality research outcomes;
- the efficiency of resource use; and
- the stability and sustainability of funding sources.

Governance and community interaction were also highlighted in Part One of this paper as important performance areas. However, these areas require a largely qualitative rather than quantitative approach to performance assessment and for this reason are not readily able to be benchmarked.

Given the central importance of student learning, research and resourcing to the social and economic outcomes of the higher education sector, and the limitations on benchmarking governance and community performance, Part Two of this paper focuses on international benchmarking of Australian performance in the three areas of student learning, research and resourcing.

2.3 Issues in Internationally Benchmarking Australian Performance

When comparing the higher education sectors in different countries, variations in the structures of educational systems must be kept in mind. For instance, in the United States, obtaining a professional qualification in fields such as law and medicine requires the completion of a four year college degree prior to entering graduate school to study for particular professional qualifications. This system tends to extend the average number of years of study compared to Australia where students generally commence studying for a professional qualification directly from secondary school. The United States system of higher education also reflects in part the generally lower level of maths and science attainment of US high school students[7]. The first year or two of college study could arguably be seen as being remedial for the performance of the high school education system. Therefore, statistics showing higher average duration of higher education studies in the United States (which OECD data does indicate) do not necessarily imply that better student skill outcomes are being achieved.

In addition, the different definitions of the higher education sector used in various countries can hamper accurate benchmarking comparisons. For instance, in the United States, data relating to two year Community Colleges (which are somewhat analogous to TAFE colleges in Australia) is generally included within higher education data. The US system also includes universities that do not offer post graduate degrees and universities that do not offer doctoral degrees. Despite these differences, the US system does share enough structural and cultural similarities to the Australian system to allow performance comparisons to be made.

The more divergent the goals, institutional structures, relative significance of the public and private sectors in the economy, cultural expectations regarding the role of "The University" and so on, the harder it becomes to make comparisons of performance across different countries.

For the purposes of the benchmarking in this paper, Australia is compared against both a full range of OECD countries in each of the three key performance areas using available OECD data sets and also against a specific selection of five comparator countries that have a relatively similar context for their higher education sectors, namely:

- Canada;
- Ireland;
- New Zealand;
- the United Kingdom; and
- the United States.

[7] Poor maths and science performance by US high schools students was reported in the Third International Maths and Science Skills assessment, a major international skills assessment project.

In each of these countries, the role of the university and the higher education sector in general has evolved from the traditional English model.

In addition, a selection of case studies relating to United States performance in each of the three outcome areas have been prepared using a wider range of data sources.

The advantage of the OECD data sets is that significant effort has been made to maximise the comparability of country information. Nevertheless, the data sets are not perfect and need to be used cautiously.

For instance, OECD tertiary education data is sometimes split to reflect different types of tertiary education institutions, with Type B tertiary education being closely analogous with TAFE level education and Type A tertiary education referring to university level education. Where possible in this paper we have used and noted this disagregated data.

It should also be noted that comparing system wide average data, as the available OECD data does, presents a somewhat incomplete picture of the situation within a country's higher education sector. How resources are allocated, both between institutions and within particular institutions, will impact upon the performance of the sector.

Another issue with OECD data is that it tends to be issued with a considerable time lag. Therefore much of the data used for international benchmarking in this paper is two to four years old.

Institutional ranking approaches

Other ranking approaches of some interest are those used by the US News in the United States, The Times in the UK (each discussed in Part One of this paper) and Asiaweek for the Asian region. Each of these publications prepares annual rankings of higher education institutions. The actual data sets that feed into the ranking calculations of each of these publications are drawn predominantly from data sets compiled by government supported bodies, although in the case of the US News rankings, they have been involved in the collection of original data through the Common Data Set (see companion paper, *Higher Education in Australia: Developing a New Data Framework*, for more detail).

Each of these rankings is quite similar in approach to those produced for Australia in the Australian Good Universities Guide, which is supported by the Fairfax newspapers. However, they are each tailored to the specific higher education systems that they are measuring and as such do not use directly comparable data sets. For this reason they are not of great help in international benchmarking of Australian performance. It should also be noted that the underlying methodologies of these rankings have been the subject of considerable debate and criticism.

Within these overall limitations, the Asiaweek rankings are of perhaps most interest in benchmarking Australian universities' performance. The rankings of Asian universities do include rankings of the larger Australian universities. Ten Australian universities were included in the 77 universities ranked. Rankings are based on a combination of:

- academic reputation – derived from survey of universities;
- student selectivity – derived from number of students accepted relative to applications, enrolees compared with accepted students and student performance on university entrance exams;
- faculty resources – derived from full time teachers/researchers with PhDs, full time teachers/researchers with Masters and PhDs, median pay, per teacher university spending and student teacher ratio;
- research – derived from citations in international journals, articles in peer reviewed journals, papers presented in international conferences, published books, research funding and graduate students; and
- financial resources – derived from total spending per student, library spending per student, internet bandwidth and public computers and connection points.

Table 2.1 illustrates how Australian universities were ranked by Asiaweek in these broad categories in 2000.

Table 2.1

ASIAWEEK UNIVERSITY RANKINGS – AUSTRALIAN RESULTS

Performance category	Australian universities' performance
Academic reputation	4 in top 10, 8 in top half of rankings
Student selectivity	0 in top 10, 3 in top half of rankings
Faculty resources	1 in top 10, 7 in top half of rankings
Research	1 in top 10, 8 in top half of rankings
Financial resources	1 in top 10 (ANU ranked 1st), 7 in top half of rankings
OVERALL	3 in top ten, 8 in top half of rankings

Source: www.asiaweek.com

As this table indicates, Australian universities were rated by Asiaweek as relatively strongest in academic reputation, at a moderate level for faculty resources, research and financial resources, and lowest for student selectivity.

2.4 International Competitiveness: Student Learning

OECD comparisons

OECD data allows for a number of international comparisons of Australian student learning outcomes to be made. However, none of the available data sets *directly* measure the quality of student learning outcomes.

Below, Australian performance is analysed, relative to that of the OECD in general and the selected comparator countries in particular, for each of the main available indicators of relevance to student learning outcomes.

Table 2.2

INDICATORS RELATING TO STUDENT LEARNING OUTCOMES

Indicator	Relevance of Indicator	Data Analysis
Population that has attained tertiary education	Indicates the breadth of access to the higher education system.	Australia ranks equal 5th in OECD for percentage – 18% -of population aged 25 - 64 with University qualifications. However Australia ranks 9th, with 20%, for those aged 25 –34. Australia ranks equal 11th, with 9%, in terms of those aged 25 to 64 with Type B tertiary education (eg. TAFE, Community Colleges, etc) and equal 12th , with 9%, for those aged 25 – 34. Against the selected comparator countries Australia ranks equal 3rd in for percentage of population aged 25 - 64 with University qualifications, 6th for those aged 25 –34, 5th in terms of those aged 25 to 64 with Type B tertiary education and equal 6th for those aged 25 – 34.
Relative earnings of population with income from employment by level of educational attainment	Indicator of the extent to which tertiary qualifications valued by employers. (It is also influence by presence of minimum wage rates and other labour market issues)	Qualification levels impact relatively less on income levels of population aged 25 – 64 in Australia than the OECD average impact. Those with University qualification earn 36% more than those with secondary school qualification in Australia, compared to an OECD average of 60% higher income. Income impacts are lower than in Canada (52%), Ireland (65%), the UK (71%) or the USA (80%). No data is available for New Zealand.
Labour force participation rates by level of education	Detects whether higher level of education correlates with higher level of workforce participation.	As in the other OECD countries considered, higher educational attainment in Australia is correlated with higher workforce participation rates for both men – 79% for those not finishing secondary school versus 93% for those with University degree – and women - 54% for those not finishing secondary school versus 73% for those with University degree.
Unemployment rates by level of education	Detects whether higher education increases employability.	In Australia, for those aged 30 – 44, males with university education have unemployment rates of 2.7% compared to 9.6% for those who didn't finish secondary school and 4.6% for those who finished secondary schools and/or have some non tertiary post-secondary training qualifications. Rates for women are not as spread, being 3.2%, 8.2% and 6.0%. A similar pattern is seen in the other OECD countries considered, however, the penalty for not completing secondary school is relatively higher in Canada, Ireland and in particular the UK.
Graduation rates in tertiary education	Indicates extent to which commencing students complete their studies and gain qualifications.	Australian graduation rates are above the OECD average (27 versus 18.8) graduation rates, similar to those in Canada (26.9), Ireland (26), and New Zealand (29.5) but somewhat below those in the US (33.2) and UK (35.6).
Human capital growth in the total working age population and in the employed population	Indicates whether current system performance is generating a higher qualification workforce.	Between 1989 and 1996, percentage point change in the proportion of employed individuals with tertiary qualifications rose 3.58 points in Australia, a similar result to Italy 3.39 points, Norway 3.52 points, Denmark 3.89 points and the USA 3.91 points. However Australian growth lagged considerably behind the UK 7.47 points, Sweden 5.69 points, Canada 6.77 points, Finland 5.72 points, France 6.09 points and Ireland 7.74 points.
Distribution of graduates by field of study	Highlights whether the current system is focused on producing graduates in fields where skills are in demand by private sector.	Australia has a high percentage of graduates in fields of health and welfare - 15.6% v 10.5% for the five comparator countries - and close to the mean rates for all other disciplines. In Engineering, manufacturing and construction Korea (27.1%) and Japan (21.4%) and the UK (12.2%) differ significantly from Australia (7.9%), while Canada (8.2%), Ireland (8.1%), NZ (6.4%), and the US (6.9%) are similar.
Foreign students as a proportion of all students in tertiary education	Perhaps could be seen as a market assessment of the value for money of education being offered to fee paying overseas students.	Australia ranks second in the OECD at 12.6% (behind Switzerland 15.9%) in terms of overseas students as a percentage of tertiary students. This level exceeded the UK (10.8%), Ireland (4.8%), NZ (3.7%), and the US (3.2%).

Sources: OECD, *Education at a Glance – OECD Indicators,* 2001; OECD, *Benchmarking Industry-Science Relationships*, 2002; OECD, *Main Science and Technology Indicators*, 2001/02

Conclusions

Despite student learning outcomes being arguably the most important output of the higher education sector, direct measurement of student learning outcomes is poor both in Australia and across the OECD. Therefore, proxies for student learning outcomes have to be used to make comparisons of performance in this area.

From the little OECD data available, the signals regarding Australia's performance in student learning are mixed.

For instance, having university qualifications has a similar impact on unemployment rates in Australia when compared against the five other comparator OECD countries, suggesting that employers value university qualifications similarly to overseas. However, the impact of university qualifications on income levels is lower in Australia than the other OECD countries, perhaps suggesting employers valuing university qualifications relatively less than is the case overseas. It should be noted though that differing minimum wage rates and labour market structures between countries complicates interpretation of this data. Perhaps more rigid labour markets and higher minimum wage levels account for some or much of these differences.

The high percentage of overseas students in Australia could be an indicator that Australian education is highly regarded overseas, or it could simply reflect that Australia is convenient and relatively affordable for those in the Asian region seeking an English language education.

Overall, it is very hard to draw any firm conclusions in this areas due to a lack of data directly measuring student learning outcomes.

USA case studies

Lessons from "Measuring Up 2000"

Measuring Up 2000, prepared by the National Center for Public Policy and Higher Education, is the first common state-by-state report card for higher education that has been prepared in the US. It rated states performance in five categories: preparation for higher education; participation in higher education; affordability of higher education; completion rates; and the benefits of higher education (the benefits category relied on fairly poor proxy measures such as degree attainment rates and charitable contribution rates to measure the benefits of higher education).

Notably, a sixth performance category, learning, was intended to be included to rate how much students learn in college. However, every state was given an "incomplete" grade in this category as there were found to be no common benchmarks for student learning that would allow meaningful state-to-state comparisons. While some states (especially Arkansas, Florida, Georgia, South Dakota, Tennessee and Texas) were identified that do undertake reasonably broad based assessment of student learning outcomes, the lack of national data on student learning was identified as a key failing of the national education performance measurement system. However, a detailed discussion of this issue did highlight that development of a standardised national graduate skill assessment test would be difficult (particularly in a largely state based system of higher education funding and performance monitoring) and expensive to design and implement effectively.

A proposal to administer the upcoming National Assessment of Adult Literacy test (planned for 2002) to samples of college sophomores and seniors was pointed to as one of the few upcoming prospective sources of national information regarding student learning.

The conduct of Measuring Up 2000 demonstrated that problems in measuring outcomes of higher education are in no way restricted to Australia.

Case study: South Dakota student learning outcomes

Since 1997, in order to measure institutional progress towards the goal of improving academic performance, a series of assessments has been given to college freshmen, sophomores and seniors. Students are tested in the areas of science reasoning, mathematics, reading and writing skills. In addition to students at South Dakota universities, the test is administered to a national sample of students so that the performance of South Dakota students can be compared to a national average.

Through its testing procedures, the South Dakota Board of Regents is able to establish in what areas students outperform the national average – science reasoning, writing skills and reading – and where they trail the national average – mathematics. They can also track both high and low performance extremes by subject area.

2.5 International Competitiveness: Research Performance

OECD comparisons

OECD data allows for a number of international comparisons of Australian research outcomes to be made. These indicators do not directly measure economic and social outcomes such as the revenue, exports or employment associated with the commercialisation of university research efforts. However, measures of outputs such as patents and citations do provide better proxies for assessing outcomes than simple input measures such as dollars spent on research.

Below, Australian performance is analysed relative to that of the OECD in general and the selected comparator countries in particular for each of the main available indicators of relevance to research outcomes.

Table 2.3

INDICATORS RELATING TO RESEARCH OUTCOMES

Indicator	Relevance of Indicator	Data Analysis
Citations per USD millions of funding	Provides an indicator of the productivity of overall research and development activity, however does not isolate the productivity of higher education research and development.	Australia, with approximately 48 citations per USD million of research and development funding ranked 13th of 27 OECD countries in 1998. In terms of publications in the 19 most industry relevant scientific fields as a percentage of GDP, Australia ranked 8th. There appears to be little correlation between performance on this measure and the percentage of all research and development that is Government funded. In terms of citations per USD million of research and development funding, NZ ranked 2nd, the UK 4th, Canada 8th, the US 12th, and Ireland 17th. In terms of publications in the 19 most industry relevant scientific fields as a percentage of GDP the UK ranked 2nd, NZ 6th, Canada 9th, the US 14th, and Ireland 18th.
Spin-off formation in the 1990s per USD billion of research and development.	Provides another indicator of productivity of research and development. This time for publicly funded organisations (Australia) and Universities (USA, Canada).	Australian rate of 3.3 spin offs per USD billion R&D compares unfavourably with Canada's 7.4 and the USA's 12. However, Canada's figure may be inflated due to use of a broader definition of spin offs.
Percentage of higher education R&D financed by industry	An indicator of industry-higher education interaction and the extent to which industry considers higher education research to be useful.	In 1998 business funded 5.2% of research in Australian universities. This ranked Australia equal 15th (with Norway) out of 28 OECD countries. However, 14 countries rates clustered between 3.5% and 8% with the OECD average being 6.1%. Business funded higher ed. R&D was in Canada 8.8%, the UK 7.2% and the US 6.3%. Data for NZ and Ireland was not available.
Number of triadic patent families*	An indicator (quite dated though as based on 1996 data) of productivity of total R&D endeavours. Doesn't disaggregate higher education contribution.	Australia, with 191 triadic patent families in 1996, performed very poorly relative to population size when compared to other highly developed OECD countries. For instance, Sweden, with less than half Australia's population had over three and a half times as many triadic patent families (782). In 1996 the USA had 12,682 triadic patent families, Canada 379, UK 1,583 each significantly outperformed Australia relative to population size. No 1996 data was available for NZ or Ireland, but earlier data suggests they were slightly underperforming Australia relative to population size.
Patent applications per million population	An indicator of overall R&D output intensity. Doesn't disaggregate for contribution of higher education R&D.	Australia ranked 19th of 30 OECD countries in 1997 with approximately 30 patents per million population compared to Switzerland with 295, Sweden with ~220 and Germany with~195. The USA was ranked 12th with ~75.

* "triadic patent families" is a moderated measure of patenting activity used by the OECD to try an remove biases and inconsistencies in data and patenting practices used in different countries.

Sources: OECD, *Benchmarking Industry-Science Relationships*, 2002; OECD, *Main Science and Technology Indicators*, 2001/2002; B-HERT, *The Knowledge Based economy: Some Facts and Figures*, 2002 (uses OECD databases)

Conclusions

As with student learning, internationally comparable data directly assessing the outcomes of academic research is lacking. However, a range of proxies for research outcomes are collected by the OECD.

Each of the available indicators seems to suggest that overall Australia gets an at best average return on its investment in higher education research compared to other highly developed OECD countries.

Citations (a good proxy for the quality and influence of research outputs) per USD million funding shows Australia running 13th of 27 OECD countries while our rate of commercial spin offs compares unfavourably with the USA and Canada.

Australia also does not score highly in terms of business funding for higher education research, a measure that may indicate the extent to which business values research performed within higher education.

The area where Australia performs most poorly is in the number of patents being generated from research and development. However, as this measure does not disaggregate patents from private sector research and development and patents from higher education research and development, it is unclear whether this poor performance is most attributable to low rates of business research and development in Australia or to poor commercial relevance of higher education research and development.

While the 2000 Innovation Summit explored some of the issues surrounding the commercialisation of University research, it appears that more work in this area is needed. For instance, one issue for investigation could be the extent to which the current diversity of the Intellectual Property policies in place at different institutions impacts upon the commercialisation outcomes from multi-institutional research projects.

Greater research into universities commercialisation performance, similar to the survey undertaken by the US Association for University Technology Managers (see case study below), is needed to provide a better information base on which to draw conclusion regarding outcomes of Australian higher education research.

USA case studies

Commercialisation of US academic research

Each year the Association of University Technology Managers surveys its members, that represent more than 300 higher education institutions, regarding commercialisation of academic research. For 2000, the survey of technology managers showed that there were:

- 347 new products introduced to the market from academic discoveries;
- 454 new companies were created to commercialise university research. More than 80% of these companies operated in the academic institution's home state or province;
- 4,362 technology licences were granted to companies;

- 13,032 invention disclosures were reported; and
- 6,375 US patents were issued.

No similarly comprehensive survey that measures the commercialisation of university research was identified in Australia, however, it appears that the Australian Research Council is now overseeing such a study.

Case study: Outcomes of academic research in Massachusetts

Massachusetts is the leading US state in terms of per capita federally funded research and development expenditures at USD288 per capita in 1997 (total government financed research and development in Australia in 1998 was USD173 per capita). In 1997 federally funded research and development at non-profit research institutes in Massachusetts was USD1.76 billion.

In 1997 in Massachusetts there were 651 new patent applications by non-business research institutions and 1173 invention disclosures. MIT alone had 360 invention disclosures in 1997.

In 1997 the Bank of Boston released a study on the economic impact of MIT. It found that MIT graduates and faculty had founded over 4,000 companies, employing 1.1 million people and generating USD232billion per annum in worldwide sales. It found that each year an additional 150 companies were being founded by MIT faculty or graduates.

2.6 International Competitiveness: Resourcing

OECD comparisons

OECD data allows for a number of international comparisons of Australian resourcing adequacy, equity and sustainability to be made.

Again it should be noted that comparing system wide average data, as the available OECD data does, presents a somewhat incomplete picture of the situation within a countries higher education sector. How resources are allocated, both between institutions and within particular institutions, will impact upon the performance of the sector.

For instance, within two systems with the same average level of resourcing the level of resources available at particular institutions (or centres within institutions) that are focused on high end performance may differ considerably depending on the pattern of inter and intra-institutional resource distribution across the system.

Below, Australian performance is analysed relative to that of the OECD in general and the selected comparator countries in particular for each of the main available indicators of relevance to resourcing.

Table 2.4

INDICATORS RELATING TO RESOURCING

Indicator	Relevance of Indicator	Data Analysis
Expenditure on instruction, R&D and ancillary services in institutions as a percentage of GDP	Indicates the total level of resourcing of higher education relative to GDP. Ancillary services include housing, meals and transport.	Australia, with 1.59% of GDP in 1998 going to directly fund higher education, ranked above the OECD average of 1.31. Australia ranked 6th of 25 countries on this measure. However, indications are that Australia may have moved down this ranking since 1998. Australia trailed the US (2.29%) and Canada (1.85%) but exceeded Ireland (1.38%) and the UK (1.11%) on this measure. (No data available for NZ)
Change of expenditure on tertiary educational institutions	Index of change in public and private expenditure on tertiary education between 1995 and 1998.	Australia had a 5% real fall in public expenditure on tertiary education institutions, the second largest decline for the 22 countries measured (only 5 countries recorded falls). However, private expenditure rose 33%, equal 5th highest rise for the 17 countries with data. Overall expenditure rose 9% for the period, the 6th highest overall rise for the 19 countries with data.
Expenditure per student on instruction, R&D and ancillary services	Indicates level of resourcing per student – in USD converted using PPP rate.	Australia, with USD11,539 per FTE student in 1998, was above the OECD average of USD9,107. Australia ranked 5th of 24 countries on this measure. Australia trailed the US (USD19,802) and Canada (USD14,579) but exceeded Ireland (USD8,522) and the UK (USD9,699) on this measure. (No data available for NZ).
Cumulative expenditure per student over the average duration of tertiary studies	Shows total spending per student over the average study duration.	Cumulative expenditure per student over the duration of tertiary studies for OECD countries shows Australia spending US$29,194 per student, ranking Australia 11th of 19 countries with the spending mean being US$35,087. However, when dollars spent per student per annum is calculated, Australia's comparative performance improves, with Australia's US$11,678 per student per annum significantly above the OECD mean of US$8,558 per annum
Relative proportion of public and private funds for tertiary education institutions.	Indicates the balance of funding sources.	In Australia, in 1998 government expenditure as a percentage of GDP was 1.09, ranking Australia 11th of 30 countries. In contrast, with private expenditure as a percentage of GDP of 0.51, Australia ranked 4th of 24 countries with data. The ratio of public:private expenditure of 2.1:1 was the fourth lowest in the OECD, behind Korea 0.21:1, Japan 0.72:1 and the USA 0.88:1. The OECD country mean ratio was 3.65:1.
Total researchers per thousand labour force	Indicates the level of overall funding for R&D activities in the economy.	Australia, with 6.7 researchers per 1000 labour force in 1998 was above the OECD average of 6.0 and the EU average of 5.2. Australia ranked 4th of 18 countries for which data was available.
Higher education researchers as a percentage of national total	Indicates the relative size of higher ed. R&D within the overall R&D system. When combined with total researchers per 1000 labour force data allows calculation of higher ed. researchers per 1000 labour force.	Australia, with 60.7% of all researchers in higher education institutions, has a very high ratio compared to the EU, average of 35.9%, and other OECD countries. Only Turkey, 72.9%, Poland, 61.3% and Spain 57.3% have similar ratios. Australia therefore has 4.1 higher education researchers per 1000 labour force, a number over double the EU average of 1.9. Australia ranks 1st in the OECD in terms of higher education researchers per 1000 labour force.
Gross Expenditure on R&D (GERD) as a percentage of GDP	Indicates total level of support for R&D in a country relative to size.	GERD as a percentage of GDP was 1.5% in 1998 in Australia. This trailed the OECD average of 2.18%. Australia ranked 14th of 22 countries on this measure. Figures were higher in the US 2.6%, UK 1.87% and Canada 1.82% and lower (in 1997) in Ireland 1.39% and NZ 1.13%.
Percentage of GERD performed by higher education sector	Indicates the relative size of higher education R&D within the overall R&D system.	In 1998 in Aust, 29.2% of GERD was performed by higher education. This is high by OECD standards, average of 17.1%, and EU standards, average of 20.7%. Australia ranked 5th of 22 countries on this measure. Figures were lower in the US 14.2%, UK 19.5% and Canada 27.1% and (in 1997) in Ireland 19.2%. In 1997 the figure in NZ was higher at 36.4%.
Higher Ed expenditure on R&D (HERD) as a percentage of GDP	Indicates the level of funding for higher education R&D relative to economy size.	In 1998, HERD as a percentage of GDP in Australia was 0.44. This exceeded both the OECD and EU average of 0.37. Australia ranked 8th of 24 countries on this measure. Figures were higher than in the US 0.37, UK 0.36, Ireland 0.26 and (in 1997) NZ 0.41. Australia's figure was below that of Canada however which had 0.49.

Sources: OECD, *Education at a Glance – OECD Indicators,* 2001; OECD, *Benchmarking Industry-Science Relationships*, 2002; OECD, *Main Science and Technology Indicators*, 2001/2002.

Conclusions

Data relating to resourcing is clearly more extensive than that available for assessing student learning and research outcomes.

Available OECD data suggests that the Australian higher education sector is not badly under resourced relative to other countries, at least in terms of system wide average resourcing levels.

Overall expenditure on higher education as a percentage of GDP clearly exceeds the OECD average, with Australia ranking 6th of 25 countries. Australia trailed the US and Canada on this measure while exceeding resourcing levels in Ireland and the UK.

Government expenditure on higher education as a percentage of GDP also exceeds the OECD average (but to a lesser degree), with Australia ranking 11th of 30 countries. However, trends on this measure suggest that Australia is moving down towards the average level of government expenditure.

When both public and private expenditure is considered, Australia recorded the 6th highest rate of increase in funding of 19 countries between 1995 and 1998.

In relation to resourcing of student learning, expenditure per student in Australia is 26% above the OECD average, with Australia ranking 5th of 24 countries. Again, Australia trailed the US and Canada on this measure while exceeding resourcing levels in Ireland and the UK.

In relation to resourcing of higher education research, Australia spends a higher percentage of GDP on higher education research than the OECD and EU averages. Australia ranks 8th of 24 countries on this measure.

A striking finding in relation to the overall Australia research and development system is that expenditure is relatively heavily focused on higher education sector research and development, with 29.2% of all Gross Expenditure of Research and Development (GERD) performed by higher education institutions compared to the OECD average of 17.1%. Australia ranked 5th of 22 countries on this measure. In terms of the concentration of researchers within higher education the picture is even more striking - 60.7% of Australia's researchers are employed in the higher education sector, almost double the EU average. Indeed, Australia ranks number one in the OECD in terms of higher education researchers as a share of the labour force.

Such figures do not immediately point to greater funding for higher education research as being a cure-all for Australia's overall research performance problems.

In terms of the source of higher education funding, it is clear that the Australian balance of private versus public funding is relatively skewed towards private funding when compared to the OECD average. However, Australia is far less reliant on private funding than the three countries ahead of Australia on this measure – Korea, Japan and the USA.

USA case studies

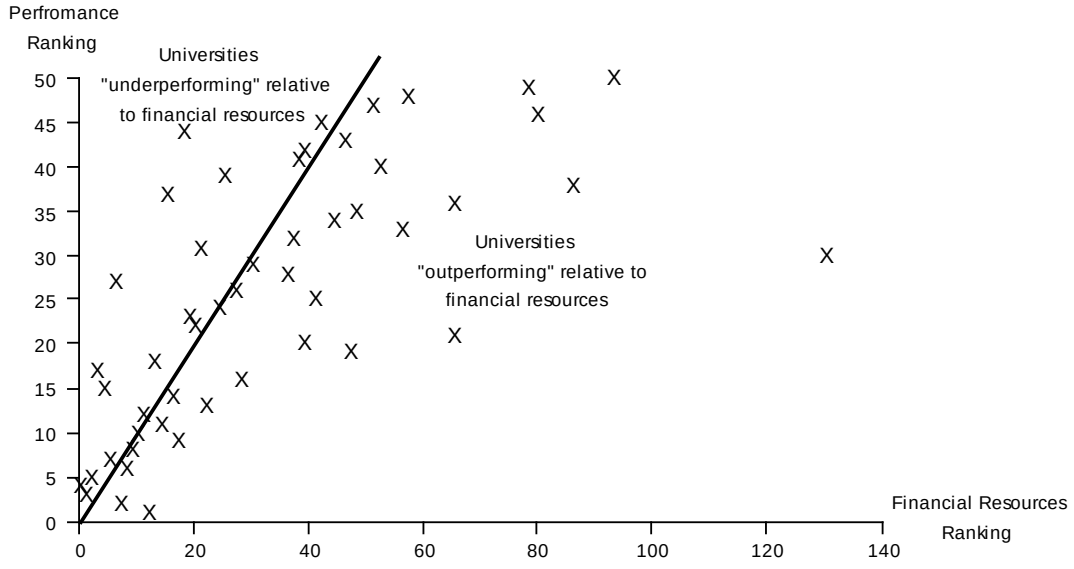
Linkage between performance and financial resources

A key question for Australian policy makers in relation to the higher education sector is to what extent focus should be on the level of financial resources available to higher education institutions and to what extent attention should focus on how existing resources are being used.

In answering this question, the issue of how closely higher financial resourcing and performance are correlated needs to be addressed. To shed some light on the linkage between financial resourcing and performance, the US News' annual ranking of US universities is considered below. The US News' overall university performance rankings for the top fifty US universities that grant degrees through to doctoral level is considered alongside how these institutions rank in terms of their level of financial resources[8].

Figure 2.1

US NEWS: OVERALL RANKINGS V FINANCIAL RESOURCES RANKINGS



Source: www.usnews.com/usnews/edu/college/rankings/natudoc/tier1/t1tables/t1natudoc1.htm

Figure 2.1 suggests that while resourcing levels do affect performance, and should therefore be of interest to policy makers, they do not fully explain performance. Clearly more than financial resources must be considered if optimal performance is to be achieved. For instance, Princeton, the number one performance ranked university, ranked only 13th in terms of financial resources.

This comparison shows that while the resourcing levels and performance levels are clearly correlated, this correlation is not perfect. The comparison also highlights that for every quintile of the top fifty performers, they "outperform" their average ranking in terms of financial resources (see Box 2.1 below).

[8] Performance rankings are based on a weighted basket of indicators. The indicators included are: academic reputation; retention rates; faculty resources; student selectivity; financial resources; graduation rate performance; and, alumni giving rate.

Box 2.1

US NEWS: OVERALL RANKINGS V FINANCIAL RESOURCES RANKINGS

1-10 performance ranked institutions have average resources ranking of 8.1 – expected outcome if there is perfect correlation is 5.

11-20 performance ranked institutions have average resources ranking of 17.7 – expected outcome if there is perfect correlation is 15.

21-30 performance ranked institutions have average resources ranking of 40.8 – expected outcome if there is perfect correlation is 25.

31-40 performance ranked institutions have average resources ranking of 45.9 – expected outcome if there is perfect correlation is 35.

41-50 performance ranked institutions have average resources ranking of 55.2 – expected outcome if there is perfect correlation is 45.

Source: www.usnews.com/usnews/edu/college/rankings/natudoc/tier1/t1tables/t1natudoc1.htm

An important limitation of such whole of institution rankings is that it does not allow analysis of the variation in funding and performance of particular centres within a given institution. For instance, it is possible that while overall an institutions resourcing levels and performance are average particular centres within the institution may be funded and/or performing at levels well above or below the level the overall institutions average funding and/or performance levels.

Case study: Comparing Revenues of the University of Michigan and the University of Melbourne

In recent months the suggestion that Australia needs to develop one or two universities that rank in the top 50 or 100 worldwide has received considerable attention[9]. The following case study investigates what, in terms of resourcing, a top university may look like.

The University of Michigan-Ann Arbor was rated in 2001 by the US News as the 25th performance ranked doctoral degree granting university in the United States (and was the third ranked of all US public universities). It represents an example of a university that would be expected to slot somewhere in the middle of the pack of a list of the top 100 universities worldwide.

The University of Michigan, with approximately 25,000 undergraduate students and 13,000 postgraduate students is of a similar size (in terms of student numbers) to the University of Melbourne which has approximately 27,000 undergraduate and 10,000 postgraduate students enrolled. The University of Michigan does however have a significantly higher number of full time academic staff than the University of Melbourne - 3,408 (excluding 564 clinical instructional staff in university hospitals) compared to 2,164 at the University of Melbourne. Casual academic staff numbers are similar, at about 450, at both institutions.

Table 2.5 compares the University of Michigan with the University of Melbourne, Australian winner of the 2001-02 Good Universities Guide award for international standing, in terms of the level and source of its financial resources.

[9] See for instance, The Australian Higher Education Supplement, 29/5/02, pgs. 30 and 31

Table 2.5

RESOURCING COMPARISON BETWEEN THE UNIVERSITY OF MICHIGAN AND THE UNIVERSITY OF MELBOURNE - 2000

	University of Michigan*	University of Melbourne
Total Revenue -USD**	$1,681m	$450m
Revenue from government (state and federal) including one-third of HECS revenue – USD	$716m (42.5% of total income)	$224m (49.8% of total income)
Revenue from fees (including two thirds of HECS revenues) - USD	$480m (28.6% of total income)	$90m (20.0% of total income)
Revenue from other sources (including grants, bequests, donations, investments, auxiliary operations, research income) – USD	$485 million (28.9%	$136m (30.2% of total income)

*University of Michigan figures exclude revenues associated with the university hospitals that are closely linked to the Medical School. Revenues for the university hospitals were USD1,519 million in 2000. Hospital revenues partly finance significant medical research, University of Michigan medical school research was USD202 million in 2000.

**University of Melbourne figures converted to USD at a rate of A$1=USD0.60, the exchange rate as at 1/7/00. Given purchasing power parity issues this conversion rate probably results in the size of Melbourne University revenues relative to University of Michigan revenues being slightly understated.

Sources: University of Melbourne, *Annual Report 2000*; University of Michigan website, www.umich.edu

From this it emerges that the University of Melbourne funding source profile is quite similar to that of the University of Michigan. Government funding in Australia, in part due to the Government meeting the HECS self-funding gap, as a share of revenue is somewhat higher while fee revenue is somewhat lower.

The striking different between the institutions, which have very similar numbers of students, is the size of their revenues. The University of Michigan (excluding revenue from its hospitals) has revenues 3.7 times those of the University of Melbourne. Given the presence of at least some correlation between financial resource levels and performance, this revenue gap suggests that resourcing a top generalist university would represent a significant funding challenge in the Australian context. Perhaps a focus on having a number of world class centres of excellence in particular disciplines within individual universities may be a more appropriate goal.

However, it should be noted that the revenue and cost structures at the two universities may differ due to both different service provision structures and differing academic pay rates. Such factors may mean that not all of the additional revenue at the University of Michigan necessarily translates to higher levels of student learning or research resourcing or performance[10]. Issues such as these highlight the problem associated with focusing to heavily on input measures such as funding levels rather than on output performance measures.

[10] For instance, given the higher live in rates of students in the USA, reflected in the fact that spending on ancillary services (housing, meals, transport) is higher as a share of total tertiary education spending in the US (6.5%) than in Australia (5%) [OECD, Education at a Glance, 2001], it would be expected that additional money would be raised from, and spent on, residential services (residential fees are ~US$6,000 per annum at the University of Michigan), at the University of Michigan relative to the University of Melbourne. Faculty salary scales are also higher in the USA, with pay for full year full time professors being US$152,000 per annum at the University of Michigan, a figure well in excess of general rates at the University of Melbourne.

PART 3

IMPLICATIONS FOR POLICY ACTION

Implications for Policy Action

A number of initial implications for policy action can be drawn from the brief international comparisons and data analysis contained in Parts One and Two of this paper.

Student Learning

Firstly, there is a glaring lack of information regarding the student learning outcomes associated with the higher education sector. Such information should be central to an informed debate regarding future policy for the sector. Key questions must be answered such as the extent to which:

- our higher education institutions improve students generic skills;
- our higher education institutions improve students knowledge in specific fields;
- employers are satisfied with graduate skills; and
- students are satisfied with their educational and employment outcomes.

If we cannot answer these questions it is hard to see how performance problems within the sector can be identified or how the impact of new policy approaches can be assessed.

Introduction of systematic monitoring of student learning outcomes should be a policy priority. From the data currently available, it is not possible to establish clearly whether student learning outcomes are improving or falling over time and relative to other countries performance.

Research

Again, greater assessment of research outcomes, rather than inputs, is needed to fully inform policy making in the area of research.

From available data, it would appear that the outcome productivity of research undertaken in the higher education sector in Australia is at best average when compared to other OECD countries.

When combined with the fact that the Australia research and development system is already relatively heavily skewed towards the undertaking of research within higher education institutions, the available data would not suggest that simply providing more aggregate government funding for research in higher education institutions would necessarily be the best approach to improve research outcomes in Australia.

Focusing policy on improving the outcome productivity of existing research expenditure and on promoting greater business expenditure on research and development may in fact be more appropriate.

Resourcing

Data in the area of resourcing is relatively more comprehensive.

Available OECD data suggests that the Australian higher education sector is not badly under resourced by international standards, at least in terms of system wide average resourcing levels. Specifically the data shows that:

- overall expenditure on higher education as a percentage of GDP clearly exceeds the OECD average, but mid pack amongst selected comparator countries;
- in relation to resourcing of student learning, expenditure per student in Australia is 26% above the OECD average;
- in relation to resourcing of higher education research, Australia spends a higher percentage of GDP on higher education research than the OECD and EU averages; and
- in terms of the source of higher education funding, the Australian balance of private versus public funding is relatively skewed towards private funding when compared to the OECD average[11].

Analysis of the US News rankings of American universities suggests that there is a link between financial resource levels and institution performance. However this correlation is not perfect. This suggests that while resource levels are an important policy issue, it is also necessary for policy to focus on the efficiency of resource use.

A comparison of the financial resources available at the University of Michigan and the University of Melbourne suggest that the recently raised aspiration of having one or two globally ranked generalist universities would represent a significant funding challenge within the Australian context.

A focus on having a number of world class centres of excellence in particular disciplines within individual universities or groups of universities may be a more appropriate goal.

Overall conclusions

The clear overarching conclusion that can be drawn from parts one and two of this paper is that much of the current policy debate surrounding the higher education sector is not founded on adequate credible, comprehensive, social and economic outcomes oriented data.

Until the outcome performance of the sector is better measured, it is hard to see how problems can be correctly identified and appropriate corrective policy measures adopted. The concept of what an "internationally competitive" higher education sector actually entails also needs to be properly defined prior to performance benchmarking.

Given the difficulties involved in performance measurement, a continuing focus on institutional design and whether relevant parties have appropriate performance incentives to deliver desired outcomes would appear prudent.

[11] In relation to the equity of funding sources, it is important to note that a higher proportion of students from higher socio economic backgrounds actually enter university in Australia. The degree of equity of access to a university education is relevant when considering the level of financial contribution towards the cost of higher education that should be born by students.

Appendix One

The table below lists the 67 performance indicators (grouped by nine major performance areas) contained in the benchmarking manual for Australian Universities.

Table A1

KEY BENCHMARKING INDICATORS

Performance category	Benchmarking elements
Governance, planning and management	• Governance and leadership • University wide planning • Strategic change initiatives • Equity planning • Clearly defined lines of responsibility and decision making • Core business systems • Risk management • Teaching and research expenditure ratio • Corporate information systems • Organisational climate
External impact	• Reputation • Competitiveness • Academic staff qualifications • Exemplary community practices
Finance and physical infrastructure	• Operating result • Diversity of revenue • Liquidity • External debt • Quick ratio • Academic salaries expenditure trends • Commercialisation: Net return on equity • Strategic asset management • Recurrent maintenance funding • Facilities maintenance backlog • Space management • Central teaching space usage and effectiveness • Large equipment utilisation • IT&T infrastructure
Learning and teaching	• Learning and teaching plan • Course establishment processes • Scholarly teaching • Teaching environment • Effective academic review processes • Fitness of courses • Student progress ratio • First to second year retention trends • Equity quantitative success • Student satisfaction • Employability of Australian graduates
Student support	• Student administrative services • Student services • Effectiveness of services
Research	• Research and research training planning • Proportion of academic staff holding NCG OPS, or industry research grants • Proportion of academic staff with direct involvement • Research students' experience • Research higher degree completion rates and times • Research incomes trends • Research higher degree completions per FTE academic staff • Weighted research publications per FTE academic staff • Impact of research
Library and information services	• Effectiveness of information planning processes • Contributions to teaching and learning • Provision of support for research • Effectiveness of collaborative alliances
Internationalisation	• Internationalisation strategy • Culture of internationalisation • Balanced onshore international student programme • Financing the international student programme • Students' exposure to international experience • Management of offshore diversity • Overseas links and activity
Staff	• Strategic human resource planning • Management of workforce • Workforce diversity • Career development/staff effectiveness

Source: DETYA (2000), Benchmarking, A Manual for Australian Universities

Appendix Two

Table 1

STUDENT LEARING: KEY PERFORMANCE DATA

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
Student "soft" skills acquisition and resulting employability.	ACER: Graduate Skills Assessment	Evaluates students (at both university entrance and exit levels) ability in areas of written communication, critical thinking, problem solving and interpersonal understanding. Detailed data methodology is recorded and explained. First study was conducted in 2000 (exit) and 2001 (entry). Further studies are planned.	Student performance at exit level correlated with students tertiary entrance score – if you scored well at school you were more likely to score well leaving university. Field of study impacts upon student performance. For instance: Arts students scored relatively highly in interpersonal understanding and relatively poorly in problem solving while the reverse was true for engineering students. Performance by students in some fields of study were across the board better than those of students in some other fields. For instance Medical students (who have high average tertiary entry scores) scored better in every category than did Humanities or Business or IT or Education or Engineering or Science or Nursing students.
	NCVER: Review of research, Generic skills for the new economy	Focuses on generic skills development in the VET sector. Looks at US, UK and Australian approaches to generic skills formation.	Recommends a broad approach to skills that moves beyond specific key competencies (such as those developed by The Mayer Committee) to embrace "personal mastery" of generic skills clustered around: learning, thinking and adaptability skills; interpersonal skills; enterprise, innovation and creativity skills; and work readiness and work habits. Cites international research showing that generic skills are highly valued by employers. Cites research showing that vocational qualifications have only slightly lower social rates of return to academic qualifications. Has a focus on changing education practices to deliver the skills that new work practices demand.
	ERIC, Higher Education Trends (1999 – 2000), Teaching and Learning	A literature review of key trends in teaching and learning focused research.	Highlights active collaborative and co-operative learning approaches as the most frequently discussed, and most likely successful, technique for building teamwork and knowledge construction skills in students. Highlights that a link has been established between having a diverse student body increases learning in areas such as critical thinking and cognitive development.
	EIP: Employer Satisfaction with Graduate Skills, 2000	Study, by survey and focus groups conducted by ACNielsen, of employers satisfaction with graduate skills	Overall the performance of new graduate was seen as reasonable with scores across 25 skill areas ranging from 3.2 to 4.2 out of 5. However, the performance of graduates that employers rejected were rated at between 2.9 and 3.9 across these skill areas. Skill areas where graduates rated lowest were creativity and flair, oral business communications and problem solving. Across all skill areas tested university graduates rated higher than TAFE graduates. The highest rating graduates overall either had humanities/social sciences or business/economics backgrounds. 76.5 per cent of all new graduate applicants were considered "unsuitable".
Student "hard"	DEST, Selected	Detailed breakdown of number of	Gives a very detailed profile of who is studying what

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
knowledge acquisition and its relevance to employers.	Higher Education Statistics, Students 2000	students by course, institution, personal status, etc.	and where but no output information regarding what is being learnt and how relevant it is to employers.
	The Good University Guide 2002	Ranks Universities, TAFEs and Private Colleges (but more data for Universities) by course and overall on a range of metrics. These include: education experience rating (based on Course Experience Questionnaire data), graduate starting salary, graduate destination (public sector, private industry, private practice, overseas, further study), getting a job (finding full time employment within 4 months, based on Graduate Destination Survey), and total graduate outcomes.	Graduate destination survey for Universities shows that those who have studies in highly vocational fields (Medicine, Law, Accounting, Nursing, Dentistry, Pharmacy, Surveying) have the lowest levels of graduates seeking work four months after graduation (range of 0 to 9%) while graduates of other fields have a higher level of graduate still seeking jobs (10 to 45%). Graduates of humanities/social sciences, languages, psychology, sports and leisure, sciences, and maths all have a high percentage (40 to 54%) of graduates going on to further study. These fields also have a high percentage of graduates still seeking jobs (17 to 31%). 24% of university computing and IT graduates are still job seeking (versus 22% of TAFE IT and computing graduates). ~16.7% of all enrolled university students are studying business and management (versus 37% of TAFE students). 19% of these students are still job seeking after 4 months (versus 9% of TAFE graduates in this field). 61% of employed graduates are in private industry (versus 74% of TAFE graduates in this field). ~15.1% of all enrolled university students are studying humanities/social sciences (versus 4.9% of TAFE students). 24% of these students are still job seeking after 4 months (versus 22% of TAFE graduates in this field). 39% of employed graduates are in private industry (versus 44% of TAFE graduates in this field). ~7% of all enrolled university students are studying engineering and tech. (versus 19.4% of TAFE students). 11% of these students are still job seeking after 4 months (versus 11% of TAFE graduates in this field). 64% of employed graduates are in private industry or private practice (versus 75% of TAFE graduates in this field). TAFE graduates have on average lower starting salaries than university graduates in similar fields but in general they have lower levels of graduates job seeking after four months, lower levels of graduates going on to further study and a higher proportion of graduates being employed in the private (rather than public) sector.
	EIP: Employer Satisfaction with Graduate Skills, 2000	Study, by survey and focus groups conducted by ACNielsen, of employers satisfaction with graduate skills	Overall the performance of new graduate was seem as reasonable with scores across 25 skill areas ranging from 3.2 to 4.2 out of 5. However, the performance of graduates that employers rejected were rated at between 2.9 and 3.9 across these skill areas. Skill areas where graduates rated lowest were creativity and flair, oral business communications and problem solving. Across all skill areas tested university graduates rated higher than TAFE graduates. The highest rating graduates overall either had humanities/social sciences or business/economics backgrounds. 76.5 per cent of all new graduate applicants were considered “unsuitable”.
The extent to which both student demand for higher	AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is	Unemployment levels for tertiary graduates aged 25 – 64 is 2.9% (versus 6% for those without post school qualifications) and for ages 30-44 is 2.7%.

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
education and employer demand for graduates is being met		included.	Graduate starting salaries are about 85% of average weekly earnings (figure was in the low to mid 80s throughout the 1990s) the highest level since 1991. Relative to OECD norms, Australian graduates of VET get a significantly lower salary premium (relative to secondary school graduates) over working life than in most other countries. Salary premium for tertiary graduates is relatively higher but still lags behind the average OECD premium. Labour force participation rates for tertiary graduates is 93% (aged 25 – 65) which is slightly above OECD average and much higher than for those with no post school qualifications who have a participation rate of 69.6%. Higher education award course completions in 1999 were 164,423, compared to 145,339 in 1996, 107,662 in 1991 and 66.246 in 1981. Median starting salaries for postgraduates was highest for Masters by coursework ($53,000) followed by Master by research and PhD which were both $50,000.
	DEST: Higher education Triennium Report 2001 - 2003	Quotes results from the Course Experience Questionnaire conducted by the Graduate Careers Council of Australia	In 2000, 83.6 per cent of bachelor degree graduates who were available for full time employment were in full time employment within 4 months of completing their degree, the highest level since 1990.
Student satisfaction with their learning experience	The Good University Guide 2002	Information based on the Course Experience Questionnaire conducted by the Graduate Careers Council of Australia	On average (across all fields of study) TAFE and university students have similar course satisfaction levels (~3 out of 5 stars).
	DEST: Higher Education Triennium Report 2001 - 2003	Quotes results from the Course Experience Questionnaire conducted by the Graduate Careers Council of Australia	Bachelor degree graduates' overall satisfaction with their courses has been slowly rising since 1995. Satisfaction ratings in 2000 remaining at levels found in 1999.

Table 2

RESEARCH OUTCOMES: KEY PERFORMANCE DATA

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
Research being undertaken	DEST: Selected Higher Education Statistics, Research Expenditure	Looks at 1998 data (published in 2000 by the then DETYA). Data collection primarily based on ABS returns for its *Survey of Research and Experimental Development*. Collection conformed to OECD definitions.	Information provided about a number of research related activities, including: • How much spent ($) and the source of the funding; • The nature of the spending (for example, whether on equipment, salaries, etc) • The breakdown of expenditure between institutions; and • The fields of research. Overall, in 1998 the research and experimental development was $2.6 billion. Of this, 46.8 per cent was for direct labour costs, 40.9 per cent for other current expenditure, 5.6 per cent for other capital expenditure, 5.6 per cent for scholarships and 1.3 per cent for land and buildings. The expenditure is split between the research fields as follows: medical and health sciences (22.8%), social sciences (19.5%), biological sciences (12.0%) humanities (7.6%), general engineering (7.0%), ICT (5.3%), agricultural sciences (6.6%), earth sciences (4.3%), chemical sciences (4.7%), physical sciences (4.1%), applied sciences and technology (3.8%). In terms of classification into socio-economic 'objectives', the following figures are given. Defence (0.2%), economic development (23.2%), society (27.3%) environment (7.2%), advancement of knowledge (42.0%).
	ARC: Annual Report 2000–2001	Information collated by the ARC in relation to the funding and grants that they administer.	The document notes changes to the operation of the ARC including the additional $736.4 million in funding committed over five years for programs administered by the ARC, a doubling of existing funds. This increase resulted from the Government statement *Backing Australia's Ability: An Innovation Action Plan for the Future*. A new legislative framework contained in the *Australian Research Council Act 2001* allows for the ARC to be established as an independent agency. Key highlights of the year included recommendations for funding of $117.5 million: • 661 Large Research Grants; • 484 industry research grants (of which 216 were projects for the benefit of regional and rural Australia) and 75 research infrastructure grants; and • 432 research training awards (comprising Australian Postdoctoral Fellowships, Australian Postgraduate Awards (Industry) and Australian Postdoctoral Awards (Industry)); The document provides a number of tables which break down the types of grants by institution, and research area. It also provides success rates (i.e. approved versus applications) by discipline area.
	ARC: *Mapping the Nature and Extent of Business–University Interaction in Australia* (2001)	Consultancy document prepared for the ARC. Mainly qualitative discussion.	The paper notes the changing and evolving interaction between business and higher education providers. In particular, it notes the movement away from businesses seeing Universities simply as recruiting grounds, but are now viewed as partners providing specific expertise and R&D involvement beyond the scope of the business operations. The paper notes the trend toward allocating a growing proportion of business R&D investment to

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
			university-based projects.
	AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	Shows that University expenditure on R&D has increased from $1.1b in 1988 to $2.6b in 1998. Share of funds provided by the Commonwealth Government has declines slightly from 91.3% to 87.7% over that period. Total industry and "other" funding increased from $108.6m to $280.3m over the period 1992 to 1999. Total funding allocated to CRC in 2000 was $5.8 billion, with $1.34 coming from universities. Higher education institutions in 1999 performed 84% of total expenditure on pure research, 48.6% of strategic basic research, 31.5% of applied research and 4.5% of experimental development research. Over the period 1988 to 1998, university spending on R&D has moved slightly away from pure research to applied research. Research outcomes are measured in terms of (i) higher degree research students (ii) research funding / expenditure (iii)research awards and research staff
	Considine, Marginson, Sheehan & Kumnick (2001) *Comparative Performance of Australia as a Knowledge Nation*	Report to the Chifley Research Centre. Draws on OECD data primarily. Also some DETYA information re student participation. Looks at the OECD conception of investment in 'knowledge' across the economy as a whole.	OECD measure of investment in knowledge comprises (i) spending on education (ii) spending on software and (iii) expenditure on R&D (excluding physical inputs used in the R&D process Report concludes that Australia applies relatively less of its GDP toward investment measured in this way, and that in the period 1992 to 1998 the proportion has declined. This conclusion applies to Australia as a whole, and no figures are presented in relation to the higher education sector as a whole. For example, investment in R&D in Australia was 1.59% of GDP in 1992, 1.76% of GDP in 1995, and 1.49% of GDP in 1998. In 1998, the OECD average was 2.25% of GDP, and the USA has spending at 2.74% of GDP. The report also notes that Australia has a very high investment in fixed assets relative to other OECD economies. Extremely input focussed in nature. Presumes a one–to–one relationship between dollars of spending and the amount of output, unlikely to be the case.
	AVCC Fact Sheet *University Research Income – All Sources – 1992 to 2000*	Published in February 2002. High level figures broken down by source of funding, but not by type of research.	Total university research income from all sources has more than doubled between 1992 and 2000, rising from over $457 million to around $972 million. Commonwealth sources of research funding is now 55 per cent of total, down from 65 per cent a decade ago. Income from private sector contracts has increased significantly, from $30million to $100 million. International funding has risen tenfold to $90 million. Donations, bequests and foundations has increased as a proportion, but still remains at 8 per cent of the total in 2000, in contrast to international universities – for example the US. Mention of the imbalance between funds for activity and funds for infrastructure, with the argument being that infrastructure investment levels are inadequate. Again, data is input focussed in nature. Data is very general, in that it is at the aggregate level, as opposed to assessing the priority areas for research and evaluating performance in those areas.
Resources available to	DEST: Selected Higher Education	Provides data on where R&D funding comes from, how much	The Group of 8 accounted for 61% of total Australian higher education sector expenditure on R&D in

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
support desired research outcomes.	Statistics, Research Expenditure	money is spent on R&D, by whom, and on what.	1998. ANU had highest expenditure level, $275.2m. [This compares with the highest UK spender on R&D, Oxford, which spent 129m pounds in 1999. The highest eight spending universities in the UK spent 859m pounds on R&D in 1999. However, in the USA, the research budget at MIT for the engineering department alone was US$190m in 2000.]
	AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	University R&D expenditure as a percentage of GDP were 0.44% in Australia in 1998, compared with 0.22% in Singapore, 0.80% in Sweden, 0.38% in Canada, 0.26% in Ireland, 0.37% in the USA, and 0.37% in the UK. The average for Nordic countries was 0.58%. Staff costs as a percentage of R&D expenditure has fallen from 68.8% in 1988 to 52.2% in 1998. Spending as a percentage on "Other Capital" and "Land and buildings" has fallen at an even greater rate. Expenditure as a percentage of total on "Other Current" has risen from 19.8% to 41.0%.
	B-HERT: The Knowledge Based Economy, Some Facts and Figures, 2002	Data draws mainly upon OECD data sets. Most of the figures quoted refer to 1997, 1998 or 1999 data.	Australia ranks 6th in terms of publicly funded R&D as a percentage of GDP. Australia ranks 14th in terms of the percentage of research performed by higher education that is funded by business. Australia's level of higher education researchers per 10,000 population is highest in the OECD. Australia ranks 5th in terms of expenditure on basic R&D as a percentage of GDP. Australia ranks 19th in patents per 1 million population. Australia ranks 9th in scientific and technical articles per million population.

Table 3

RESOURCING: KEY PERFORMANCE DATA

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
Resources available to provide quality education for students.	AVCC: Survey of applicants for higher education places	Raw data comes from State tertiary admission centres. AVCC approach to estimating "true" unmet demand is not explained.	The level of unmet demand for higher education places is calculated by trying to correct DEST raw data. Methodology used is not very transparent, but a figure of about 20 to 30% of the raw DEST figure is generally arrived at – in 2001 the DEST figure was 44,500, the AVCC arrived at a figure range of 9,400 to 15,250, or 4.4 to 7.1% of all eligible applicants.
	B-HERT: The Knowledge Based Economy, Some Facts and Figures, 2002	Data draws mainly upon OECD data sets. Most of the figures quoted refer to 1997, 1998 or 1999 data.	Australia ranks 5th in OECD in terms of amount of money spent per student for tertiary level education.
	AVCC: Fact Sheet 4	Simple student staff ratio time series.	Student Staff ratio has increased from 12.9 in 1990 to 18.8 in 2000. Student staff ratios are highest in the fields of admin/business/economics/law at 28.3, mathematics/computing at 25.2 and education at 22.5. OECD data for student staff ratio for higher education lists Australia as 11.8 in 1999 versus an OECD mean of 16.2 in 1999.
	AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	Base operating grant from commonwealth including HECS contribution per full time student unit has remained between $12,777 and $11,515, ($12,052 in 2002) fin 2001 dollars for the entire twenty year period 1983 to 2003.
Resources available to support desired research outcomes.	DEST: Selected higher education statistics, Research expenditure	Provides data on where R&D funding comes from, how much money is spent on R&D, by whom, and on what.	The Group of 8 accounted for 61% of total Australian higher education sector expenditure on R&D in 1998. ANU had highest expenditure level, $275.2m. [This compares with the highest UK spender on R&D, Oxford, which spent 129m pounds in 1999. The highest eight spending universities in the UK spent 859m pounds on R&D in 1999. However, in the USA, the research budget at MIT for the engineering department alone was US$190m in 2000.]
	AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	University R&D expenditure as a percentage of GDP were 0.44% in Australia in 1998, compared with 0.22% in Singapore, 0.80% in Sweden, 0.38% in Canada, 0.26% in Ireland, 0.37% in the USA, and 0.37% in the UK. The average for Nordic countries was 0.58%. Staff costs as a percentage of R&D expenditure has fallen from 68.8% in 1998 to 52.2% in 1998. Spending as a percentage on "Other Capital" and "Land and buildings" has fallen at an even greater rate. Expenditure as a percentage of total on "Other Current" has risen from 19.8% to 41.0%.
	B-HERT: The Knowledge Based Economy, Some Facts and Figures, 2002	Data draws mainly upon OECD data sets. Most of the figures quoted refer to 1997, 1998 or 1999 data.	Australia ranks 6th in terms of publicly funded R&D as a percentage of GDP. Australia ranks 14th in terms of the percentage of research performed by higher education that is funded by business. Australia's level of higher education researchers per 10,000 population is highest in the OECD. Australia ranks 5th in terms of expenditure on basic R&D as a percentage of GDP. Australia ranks 19th in patents per 1 million population.

SUB PERFORMANCE AREA	MAJOR INFORMATION SOURCES	CHARACTERISTICS OF INFORMATION SOURCE	KEY MESSAGES IN INFORMATION SOURCE
			Australia ranks 9th in scientific and technical articles per million population.
Efficiency of resource use.	Report to the Chifley Research Centre: The Comparative Performance of Australia as a Knowledge Nation	2001 report prepared by a group of academics. Is very much a political lobbying document rather than simple reporting of data.	Pointing to high costs associated with attracting private funding (marketing etc) relative to public funding, this report suggests that a lesser proportion of university funds are now being spent on teaching and research. DEST Finance statistics do indicate that the pattern of university operating expenses is gradually changing, with a decline in percentage spending on "Other institution purpose" from 16.7% to 13.8% and a rise in "Other expenditure" from 13.0% to 14.5% between 1996 and 1999. Spending on "Academic activities and research" has increased slight to 61.0% while spending on "Libraries and other academic support services" has also increased slightly to 10.6%.
	ERIC: Higher Education Trends, Finance 1999-2000	Educational Resource Information Center review of literature examining trend in the financing of higher education. Has a predominantly US focus.	In 1999, for the first time in over a decade, US State appropriations to higher education increased as a share of total State general fund budgets – rising 6.5% to US$52.8 billion. Appropriations per student returned to 1978 levels. However, the rise in public spending was accompanied in 34 States by greater accountability requirements and the introduction of some form of performance based funding.
The stability, sustainability and equity of funding sources.	B-HERT: Of Dollars and Cents, valuing the contribution of universities to the Australian economy, 2000	Report by the Institute for Research into International Competitiveness at the Curtain Business School. Looks at the direct economic impacts of universities, returns to investment in university education and spillover effects from university research.	Direct economic impact of Universities (expenditure, service exports, etc) calculated as $10.6b per annum for 1998 and direct employment of 79,300 persons. Total net exports were almost $1.8b in 1998. Estimates a private cost recovery ratio of 2.07:1 for individuals investment in their own higher education (factors in loss of income while studying, fees paid, difference in post tax income after graduation, etc.) Estimates a social cost recovery ratio of 1.1:1 for society's investment in higher education (the NPV of tax payable differential between a three year University degree graduate and a high school only graduate versus the public contribution to the cost of a three year degree). Estimates overall economic impact of universities as $22.1b per annum for 1998, consisting of $10.6b direct, $9.27b attributable to human capital formation and $2.23b attributable to spillover benefits of University research.
	AVCC: Key Statistics 2001	Uses a range of DETYA (now DEST), OECD and AVCC data sets. A comprehensive set of measures is included.	Base operating grant from commonwealth including HECS contribution per full time student unit has remained between $12,777 and $11,515, ($12,052 in 2002) fin 2001 dollars for the entire twenty year period 1983 to 2003. Base operating grant from commonwealth minus HECS contribution per full time student unit has fallen from $12,777 in 1983, to $10,519 in 1994, to around $9,700 for each year since 1999. Commonwealth Government higher education expenditure as a percentage of total commonwealth government outlays is 2.42% and is projected to fall to 2.37% by 2005. Commonwealth Government vocational and other (non-school) education expenditure as a percentage of total commonwealth government outlays is 0.77% and is projected to rise to 0.78% by 2005

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			University revenue by source in 1999 was: Commonwealth government grants 44.8% (not including Govt meeting HECS self funding shortfall of 33% of HECS payments so this figure should really be more like 51%), State government 1.1%, Student HECS contribution 19% (really closer to 12.5% as Govt meets to self funding shortfall in the HECS system), Fees and Charges 17% (largely paid by international students), Investment income, donations and bequests 3.2%, Other sources 9.8%. Key trends in past 10 years regarding funding sources are the declining share from Commonwealth grants and the increasing shares from HECS and Fees and Charges.
	DEST: Higher Education Triennium Report for 2001 – 2003.	Draws upon DEST data sets to provide an overall report on the directions for higher education sector over the triennium period.	Between 1995 and 2003 total equivalent full time student units will increase by 27% to 582,100 EFTSU, due to an 11% rise in domestic student load and a 200% rise in international student load to 117,000 EFTSU. Total university revenues (in 2001 dollars) will reach $10.1 billion in 2003, a 21.5% (or $1.8 b) increase over 1995 levels. Two thirds of the revenue increase comes from sources other than Commonwealth government grants and HECS. Domestic fee paying students as a percentage of all domestic enrolments is projected to be 8% in 2003, up from 3% in 1995. Over the period 1995 to 2001 Commonwealth fully funded places has risen 6%.
	DEST: Selected Higher Education Statistics, Finance, 1999	Details revenue sources and expenditure items by institution and by state.	Accumulated funds (operating result plus extraordinary items plus accumulated funds at beginning of year plus net transfers) as a percentage of operating revenue various widely between institutions and States. Across Australia the ration is 1:1, but in Victoria for instance it is 0.56:1 while in WA it is 1.94:1.
	OECD: Education at a glance 2001	Comprehensive range of educational statistics ranking OECD countries against a range of predominantly input or throughput measures.	Australian public expenditure on higher education as a percentage of GDP was 1.09% in 1998 versus OECD average of 1.06. Australian private expenditure on higher education as a percentage of GDP was 0.51% (4th behind USA, Korea and Japan) in 1998 versus OECD average of 0.29. Australian expenditure per student on a full time equivalent basis in US$ terms in 1998 was US$12,279 for higher education students (against OECD mean of US$9,063) and US$8,341 for VET students.
	DEST: Does HECS Deter?	Paper released in August 1999 examines the factors effecting university participation by low socio-economic status groups.	There has been little recent movement in the participation rates of people from low SES groups. The HECS system appears to be a very minor (or indeed zero) factor in determining participation rates for the low SES group.
	DEST: Demographic and Social Change, Implications for Education Funding	Paper released in May 2000 that explores the impact of demographic change on education funding over the next 20 years.	Key pressures on education funding will be from an aging population which will see more resources diverted to health, marginally higher education participation rates (partly due to growth in lifelong learning) and increases in the duration of study that will see student demand rise. Overall a real increase in higher education expenditures

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			to 2021 is projected, however, higher education spending as a percentage of GDP is expected to decline slightly, reflecting the older demographic profile of the population. Given rising pressures for health and other aging related government expenditure, it is likely that public funding for higher education will fall as a percentage of GDP and as a percentage of government outlays.
	2002-03 Budget Paper No 5: Intergenerational Report 2002-03	Projection of Government finances over the next forty years.	There will be growth in the number of students participating in higher education over the next twenty years, however the rate of growth will be steadily slowing. Between 2021 and 2035 the level of student numbers will be steady. From 2035 the number of students will decline. Commonwealth spending on higher education is projected to fall as a percentage of GDP from 0.67% in 2001-02 to 0.60% in 2042. Commonwealth spending on VET is also projected to fall as a percentage of GDP from 0.23% in 2001-02 to 0.21% in 2042. Commonwealth expenditure per student (including HECS) is expected to increase throughout the forecast period.