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**Market Coordination, Research
Management and the Future of Higher
Education in the Post-Industrial Era.**

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Market Coordination, Research Management and the Future of Higher Education in the Post-Industrial Era

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For much of the 20th century, science and democracy have been the main forces shaping the university. Now, however, a new set of ideas is beginning to win the attention of both academics and politicians. In time these may also come to have a large impact on both the structure and the spirit of the university. Grouped loosely under the heading “the knowledge society” and sometimes “the knowledge economy”, they portray the university not just as a creator of knowledge, a trainer of young minds and a transmitter of culture, but also as a major agent of economic growth: the knowledge factory, as it were, at the centre of the knowledge economy. In such an economy – one in which ideas, and the ability to manipulate them, count for far more than the traditional factors of production – the university has come to look like an increasingly useful asset. It is not only the nation’s R&D laboratory, but also the mechanism through which a country augments its “human capital”, the better to compete in the global economy.

The Economist 1997

Introduction

Higher education governance and management cannot be adequately understood outside the context in which they occur. This includes not only intra-institutional dynamics (each somewhat unique), but also the relationship between higher education institutions and the broader social environment. Many of the pressures with which academic managers must cope are not created by themselves, but originate from a number of external social, economic and political demands, often reflected in government policy. In Australia, probably in no other area is the macro-economic reform at the national level – particularly in making the nation more responsive to a global knowledge-based economy – so closely aligned with the micro-management reform at the institutional level than with respect to the management of research.

The increasing recognition of the importance of research and the training of a highly skilled workforce in positioning the nation in a global knowledge-based economy at once elevate the importance of higher education institutions and threaten many of their traditional values. The process is part and parcel of the advent of the post-industrial society and the commodification of knowledge – commodification taken here to mean ‘the phenomenon in which non-material activities are being traded for money (Lubbers 2001). Neave (2002: 3) explains:

Knowledge has always been power as well as a public good. Access to it and its role in innovation determine both the place of Nations in the world order and of individuals in society. But, commodification displaces the creation and passing on of knowledge from the social sphere to the sphere of production.

Displacing and reinterpreting knowledge under these conditions raise fundamental questions for the University above all, in the area of academic freedom and in the “ownership” of knowledge. They also pose questions about the ethical obligation to make knowledge freely available to those who seek it.

In the mid-1980s, Lyotard (1984: 5 cited in Roberts 1998: 1) hypothesised that ‘the status of knowledge is altered as societies enter what is known as the post-industrial age and cultures enter what is known as the post-modern age’. According to Roberts, knowledge ‘is becoming “exteriorised” from knowers. The old notion that knowledge and pedagogy are inextricably linked has been replaced by a new view of knowledge as a *commodity*’. Or as Oliveira (2002: 1) puts it, ‘there is an essential difference between “science as a search for truth” and “science as a search for a response to economic and political interests”’. Lyotard again (cited in Roberts 1998: 1–2):

Knowledge is and will be produced in order to be sold, it is and will be consumed in order to be valorised in a new production: in both cases, the goal is exchange. Knowledge ceases to be an end in itself, it loses its “use-value” ...

Knowledge in the form of an informational commodity indispensable to productive power is already, and will continue to be, a major – perhaps the major – stake in the worldwide competition for power.

This paper begins with a broad discussion of background trends and issues associated with the advent of the post-industrial era and the rise of the knowledge economy and society. This discussion will touch on aspects of the internationalisation and globalisation of higher education as well. The next section profiles the Australian higher education system and then turns to a detailed discussion of recent changes to research management in Australian universities. The analysis following this section draws on the Australian example to illustrate general arguments. This is not merely because Australian higher education is the one with which I am most familiar. Rather, Australia is an acknowledged leader with respect to reform of regulatory mechanisms and the coordination of higher education specifically and public sector management more generally (Harman 2003). Moreover, the consequences of reform are in several respects quite stark in Australia and hopefully other countries can learn from the Australian example. The lessons are neither totally positive nor negative, but in general indicate the dangers to planning when ideology dominates pragmatics. The conclusion speculates that, while the commodification of knowledge and the development of the knowledge economy and society are transforming higher education, the modern university is a resilient institution and likely to survive for sometime in a recognisable form.

Higher education in the post-industrial era

According to the OECD (1996: 3) ‘knowledge is now recognised as the driver of productivity and economic growth, leading to a new focus on the role of information, technology and learning in economic performance. The term “*knowledge-based economy*” stems from this fuller recognition of the place of knowledge and technology in modern ... economies’. Several writers have extended the concept, arguing that science and research are transforming the whole of the social structure, creating a knowledge-based society of

global proportions. Concepts depicting this transformation are formulated by Gibbons and his colleagues (1994) in terms of Mode-1 and Mode-2 science, and later Mode-2 society (Nowotny, Scott & Gibbons 2001). Etzkowitz and his colleagues provide the less ambitious conceptualisation of the 'triple helix', representing the complex interplay between universities, government and industry in the innovation framework (Etzkowitz & Leydesdorff 2001). We will return to these concepts later in the paper.

There is clearly a reciprocal relationship between the massive and unprecedented expansion of higher education during the second half of the 20th century and global economic restructuring based on the advent of post-industrial or 'knowledge' society. In post-industrial society, knowledge supersedes agriculture and manufacturing as the main means for wealth production, and becomes the primary resource of society. It is not that agriculture and manufacturing disappear, but rather that technology has made both agriculture and manufacturing so efficient that they demand the attention of only a minority of the workforce (Perkin 1991). However, it is wise to remember that post-industrial, knowledge-based society is not a phenomenon that has suddenly been sprung on the world with the advent of the new millennium.

The American sociologist Daniel Bell coined the term post-industrial society as far back as 1962, and predicted the replacement of factory workers by 'knowledge workers' as the primary producers of wealth.¹ About the same time, Clark Kerr in outlining *The Uses of the University* argued powerfully that the exponential expansion of knowledge was opening the academy to the broader interests of society in an unprecedented fashion that would transform the university forever. Since these early speculations the knowledge economy has indeed become a global reality. And, on a global scale, wealth and prosperity have become more dependent on access to knowledge than access to natural resources.

As the knowledge society continues to develop, market relations based on knowledge production increasingly permeate all aspects and institutions of society, and the university is faced with a growing number of competitors in both research and training. Also, the commodification of knowledge is impacting heavily on the internal social structure of the scientific community. What is at question is the continuing importance and centrality of the university as knowledge is increasingly brought within market and political exchanges.

According to Scott, former editor of the *Times Higher Education Supplement* and current Vice-Chancellor of Kingston University, universities 'have been absorbed into, been taken over by, market relations' (1997: 14). Or put another way: 'higher education systems are no longer simply "knowledge" institutions, reproducing the intellectual and human capital required by industrial society; they are becoming key instruments of the reflexivity which defines the post-industrial (and post-modern) condition' (Scott 1995: 117).

Scott indicates that the interesting sociological question is whether higher education institutions, universities in particular, will continue to be recognised as such as post-industrial society moves into the 21st century. Commentators such as Scott and Gibbons see the university losing its monopoly over knowledge production to the extent that the institution may eventually disappear as an identifiable form. Scott, for example, provocatively entitles a 1998 journal article 'The End of the European University'.

There can be no doubt that the different roles and functions ascribed to the university are becoming highly complex, and the academy will need to more effectively share some of its

¹ Daniel Bell presented the original formulation of the concept of the post-industrial society at a forum on technology and social change in Boston in 1962 (Bell 1974: xi).

key functions with other institutions in society. Partners and competitors will be found amongst private sector R&D companies, corporate training departments, for-profit private education providers etc. But again there is nothing new about this. In a 1967 publication prophetically entitled *Toward the Year 2000*, Daniel Bell, in arguing that the 'major new institutions of the society will be primarily intellectual institutions', listed the research university as only one example of research and intellectual entities of various kinds. However, he did go on to state that 'no single kind may dominate, though perhaps the universities may be the strongest because so many problems get thrown at them, and they are immediately available for the kinds of tasks that were not there before' (Bell 1967: 32). In another publication, Bell is more unequivocal: 'the university increasingly becomes the primary institution of the post-industrial society' (1974: 245–46).

The academy has never had a complete monopoly over the production or dissemination of knowledge and its 'traditional' approach to science as depicted by Mode-1 knowledge production (Gibbons et al 1994, see below) is itself a relatively recent phenomenon (Rip 2002). For example, historically in many countries some professions, like medicine in the United Kingdom and engineering in Portugal, had to fight protracted battles before being let into the universities. Moreover, at least in terms of the funding of basic research (particularly outside bioscience), there is evidence to suggest that in the United States the research universities have actually increased their dominance over the last couple of decades (Geiger 2000). And, while new technology is influencing the way we teach within universities, there is no evidence that the emerging 'virtual university' will replace the physical campus and its traditional function of socialisation of the next generation of social, political and scientific leaders.

Nearly everywhere, the university is required to find a new legitimacy while retaining essential traditions. As part of a wider agenda of public sector reform, new approaches to higher education steering and coordination have replaced government control with that of the market. Governments in promoting a climate of deregulation and decentralisation have introduced policies that stress the necessity of competition, user pays, and performance-based funding. The trend towards marketisation and privatisation of public sector higher education has been well established over the last decade or more and is clearly visible in the language of policy documents (students as customers and clients, knowledge as a product or commodity, price and quality relations etc.) and in their implementation: the introduction of tuition fees, performance-based funding and conditional contracting. The introduction of market-like mechanisms changes the relationships between the actors in higher education, and makes the environment in which universities must operate all the more fluid and turbulent.

Where, in the past, universities had a sense of shared intellectual purpose (at least to a degree), bolstered by the security of centralised funding and control, at present they are confronted by a much more complex, fluid and varied environment that articulates different, and sometimes conflicting demands, creating new realities. Consequently, new distributions of authority emerge, new accountability relationships arise, and a new dynamic within policy fields develops. But, before attempting to chart and analyse the ways in which Australian higher education has responded to these challenges, a few words will be said about the internationalisation/globalisation of higher education.

Globalisation and internationalisation

The terms globalisation and internationalisation of higher education are not easily defined and the two terms are often confused with one another. According to Altbach (2002: 1), 'globalisation refers to trends in higher education that have cross-national implications', such as student markets, internet-based technologies, the global knowledge economy and massification of higher education, while internationalisation 'refers to the specific policies and initiatives of countries and individual academic institutions or systems to deal with global trends', such as international student recruitment. However, for most practical purposes, it is impossible to keep the two phenomena entirely separate conceptually.

Green (2002: 1) maintains that 'international higher education' is an 'umbrella term for the various institutional programs and activities that are international in nature, such as student and faculty exchange, study abroad, international development activities, foreign language studies, international studies, area studies, joint-degree programs and comparative studies, among others'. Knight (1999) divides international higher education into four approaches: the activity approach (involving discrete activities along the lines described by Green); the competency approach (which stresses 'the development of skills, knowledge, attitudes and values'); the ethos approach (emphasising 'a campus culture that fosters internationalisation'); and the process approach ('the integration of an international dimension into teaching, research and service'). To this list, one could add the business approach (which emphasises the maximisation of profit from international student fees); and the market approach (with its stress on competition, market domination and deregulation). No one approach to international higher education dominates all the others. Even the market approach which has been so strong for a number of years is now being moderated by quality assurance concerns and a negative popular reaction to economic globalisation.

In its submission to the recent Higher Education Review, the Australian Group of Eight universities² (Go8 2002: 13) stressed that 'the development of new transport and communications technologies and the growth of global industry both enable and require universities to operate internationally as well as nationally and regionally'. The submission went on to state that:

It is essential for Australia that this country's universities are able to participate as effective, highly regarded players in the international education and research architecture that underpins the new global knowledge economy. Our best universities have established a well-justified international reputation for the high quality of their courses and graduates. They are significant players in international education in world terms. Similarly, our leading universities have established a significant international reputation for high quality research (p. 14).

The Go8 identified a number of benefits of international higher education:

- Australian citizens who participate in a range of student and academic exchange programs increase their understanding of other cultures and broaden their scholarship.
- Australian students and the broader Australian community benefit socially and culturally from the presence of overseas students in this country.

² Discussed in more detail later in the paper.

- Collaboration with international colleagues enhances the capacity of Australian academics to produce high quality research.
- Education is the key to social and economic development of all nations.
- The most frequently cited benefit of the internationalisation of Australian higher education is the export income generated by overseas students studying at Australian universities in Australia and abroad.

These benefits are of considerable importance. But international higher education is not without its problems either. With the rapid increase of international higher education, both in Australia and elsewhere, have come questions of the maintenance of a desirable level of quality. Also, clearly, some nations benefit much more than others from international higher education, fuelling tensions between the richer and poorer countries in this respect.

Until relatively recently, the dominating influence on international higher education in the second half of the twentieth century was aid to developing countries (Altbach 2001). This may appear to have changed with the rise of the highly lucrative international student market. But, still, the flow of international students is mainly from less to more developed nations, and underlying many of the concerns over international higher education is the continuation of the domination of the rich Western countries of the less developed nations of the world (Altbach 2002). Such concerns are motivating much of the disquiet over the actions of the World Trade Organisation and policies such as the General Agreement on Trade in Services (GATS).

The structure of aid to higher education in developing countries has changed dramatically over the last four decades, although many of the problems inherent in the donor/recipient relationship linger. 'It is problematic to separate trade from aid' (Phillips & Stahl 2000: 4). In an era of globalisation, we see many donor agencies having strong links to international corporations, such as the Ford Foundation. It is worth considering whether Carnegie, Ford, Rockefeller and other such foundations may become the 'watchdogs' of the higher education sector worldwide with their agendas and regulatory frameworks gaining dominance where there is weakening control of the nation state. The aid relationship has been internationalised, creating its own distinct problems. For example, the World Bank and the International Monetary Fund through their rules and regulations already determine much of the policy of higher education in many countries.

Higher education institutions have always encouraged international cooperation and the free flow of ideas and professional personnel between countries. They have appreciated that science and scholarship do not recognise national boundaries and that progress in research will be facilitated by effective international sharing of ideas and discoveries.

Curiosity still motivates a large number of students to seek study abroad but, in the latter half of the 20th century, international higher education endeavours have increasingly become tied to the development of global markets and worldwide economic restructuring. The internationalisation of higher education is expanding and, as the production of wealth increasingly becomes based on knowledge rather than mechanisation, it can be expected that the exploitation of international 'knowledge-markets' will assume even greater importance. In fact, exclusion of less developed countries from or subordination to international knowledge-markets will reinforce the so-called 'north-south' divisions.

Neave (2002: 1) argues that most experts analyse internationalisation by 'studying what is happening in the advanced economies – Northern America, Western Europe, Asia and

Australasia. These societies are relatively stable in their political, social and institutional make up'. For the developed societies internationalisation and globalisation generally, while singling dramatic change, also have the potential for bringing about substantial reward. Elsewhere, 'where the Nation State is less than half a century old, where rivalries – some ethnic, others about beliefs – are all too easily inflamed, the upheaval that stands in the offing would seem even more devastating. It threatens the stability needed to build well performing systems of higher education' (Neave 2002: 1). Altbach (2002: 1) too recognises the inequalities in the current trends in internationalisation in higher education:

A few countries dominate global scientific systems, the new technologies are owned primarily by multinational corporations or academic institutions in the major Western industrialised nations, and the domination of English creates advantages for the countries that use English as the medium of instruction and research. All this means that the developing countries find themselves dependent on the major academic superpowers.

Despite dramatic growth in student numbers, many commentators argue that the full potential of international higher education cooperation and the free flow of ideas is not being fully realised. More could be done to promote the free flow of scientific information and research findings, and to assist developing nations through fellowships and grants. The needs of the least developed countries, many of them small, are serious and the prospects for substantial change in these countries, at least in the short term, are limited unless the more developed countries are able to increase their technical assistance and other aid. There is clearly the Matthew effect at play in international higher education relations: 'Guidance comes from the Gospel according to St Matthew, more particularly from the Parable of the Talents ... "To him that hath, it shall be given. To him that hath not, it shall be taken away even that which he hath". A true Revelation, divinely inspired!' (Neave 2002: 3).

While the internationalisation of higher education and the way in which it is being institutionalised are tied directly to expansion brought about by the development of post-industrial society, this does not mean that there has not always been an international aspect to higher education. Nor does it mean that an international community is replacing local customs, cultural ties and traditions; the present nature of the world political order does not sustain such a conclusion. Nonetheless, competition amongst nations for the control and productive utilisation of knowledge is increasing. Moreover, the power to shape and influence the direction of internationalisation and cooperation in higher education clearly rests with the larger and more powerful institutions and systems of the advanced countries. These countries do not present a united front; they compete amongst themselves for foreign students, control of knowledge and influence in the international higher education arena. The developing countries are not powerless in this relationship, but the balance is tipped towards the more advanced industrialised nations.

It is often the case with broad social movements that for every action in one direction, there is an 'equal and opposite reaction' in the other. With the collapse of the iron curtain and the former Soviet Union at the end of the 1980s, the victory of the free market was celebrated almost everywhere. With respect to education, Johnstone (1998: 4) writes that 'underlying the market orientation of tertiary education is the ascendancy, almost worldwide, of market capitalism and the principles of neo-liberal economics'. But the end of the 1990s and the beginning of the new millennium are witness to a growing, and sometimes violent, protest against the further ascendancy and globalisation of the market. These protests, such as those in Seattle in 1999, and later in Genoa (Italy) and Melbourne,

are directed at such programs as GATS in particular and the spread of the global market economy in general. It is not the place here to argue the rights and wrongs of these protests, but to merely point to them as at least partial evidence that world domination by market capitalism and the principles of neo-liberal economics may not be as inevitable as some have assumed. It is interesting to note that even the former Senior Vice-President of the World Bank, Joseph Stiglitz (in Rutherford 2001: 2) has recently argued that ‘the fact that knowledge is, in central ways, a public good and that there are important externalities means that exclusive or excessive reliance on the market may not result in economic efficiency’.

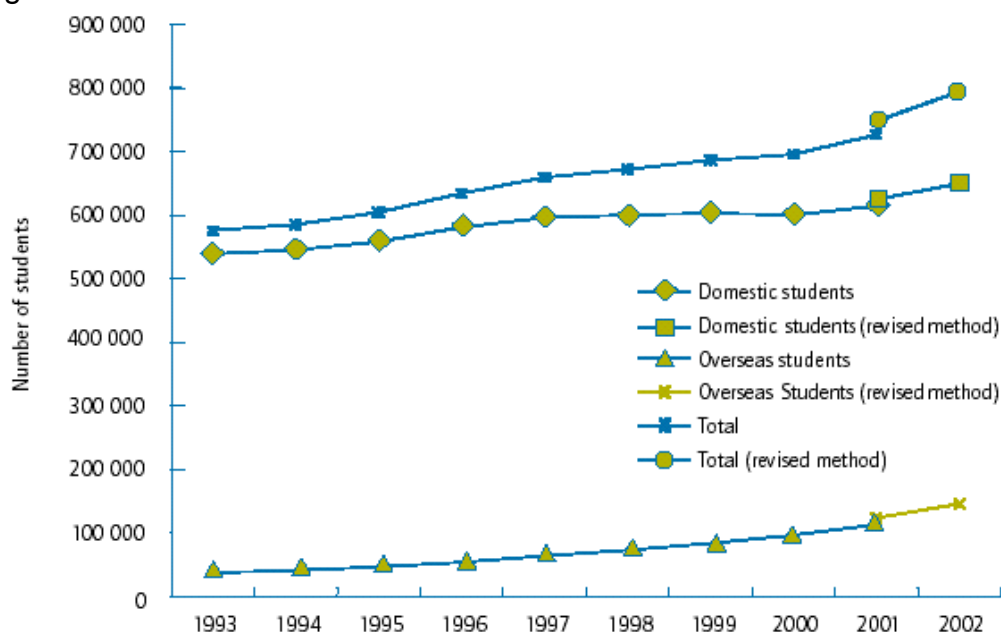
Nowhere is the debate between the public and private good of higher education more pronounced than in Australia. This debate has shaped the sector’s response to many issues concerning the internationalisation of higher education and the advent of the knowledge-based economy. The paper will now look at the Australian case in more detail.

AUSTRALIAN HIGHER EDUCATION

Sector profile

In a number of ways, Australia is THE example of marketisation and internationalisation of higher education. Out of the nations 896,000 students (2002 figures), 185,000 or about 21% were overseas students. The overseas student market is worth \$5.2 billion annually to Australia and makes it one of the nation’s largest export earners. Fees paid directly to higher education institutions from overseas students rose from \$627 million in 1997 to \$1.164 billion in 2001. Presently, overseas students contribute about 11% to the total higher education budget.

Figure 1: Domestic and overseas students 1993 to 2002



Source: DEST 2003b

Since the late 1980s, there has been substantial growth in Australian higher education, from about 485,000 students in 1990 to just about double that in 2003. However, in recent years, most of the student growth has been fuelled by overseas students (see figure 1). In the period 1995 to 2001, the number of commencing domestic students increased by 8.6%, while the number of commencing overseas students rose by 146% (Phillips et al 2002: 8).

The slow growth in domestic student numbers does not indicate a slacking in demand but lack of available places to meet demand. Phillips et al (2002: 14) note that:

While Australia ranks in the top ten OECD countries for participation in higher education, it went backward relative to other OECD countries over the period 1995 to 2000. The total enrolment in tertiary education in Australia rose over that period, but the proportional growth was one of the smallest in the OECD, reflecting the contraction in new domestic enrolments in higher education ... On the latest OECD figures, total tertiary enrolments rose by only 8% in this country from 1995 to 2000 compared with the OECD country mean of 24%. If changes in the size of the relevant age cohort are taken into account, the growth attributable to change in enrolment rates was only 6%, the second lowest in the OECD and less than a quarter of the average growth of 27% ...

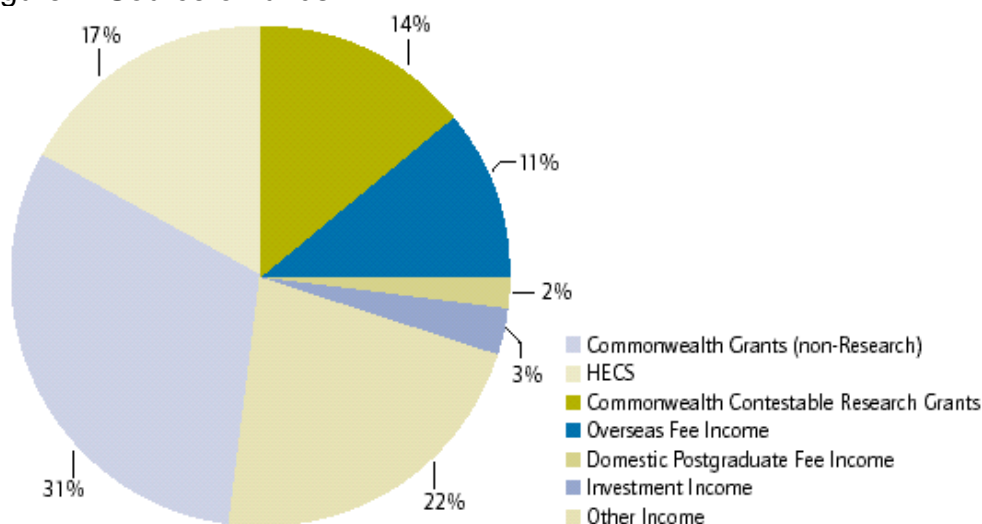
Funding of Australian higher education increased during the period 1995–2000 with respect to all sources of revenue (see table 1). However, direct public funding from the Commonwealth government declined by 11% in real terms. And, while total funding increased by 12.5% in real terms, total student load increased by 21% (Phillips et al 2002: 28). The government says itself that it no longer funds, but subsidises higher education (see figure 2). In the early 1970s, the Australian federal government assumed total funding of higher education, and in the process abolished student fees. At the end of the 1980s when nearly all funds for higher education came from the Commonwealth, the then Labor government recognised that it could not by itself fund the substantial expansion of higher education that was required.

Table 1: University revenue by source 1995–2000 (\$B) (adjusted by CPI to 2000 terms)

	1995	1996	1997	1998	1999	2000	% change
Commonwealth	4.7	4.9	4.7	4.6	4.4	4.2	-11.0
HECS	1.0	1.0	1.3	1.5	1.7	1.7	68.9
Fees	1.0	1.2	1.3	1.4	1.6	1.7	75.3
State	0.1	0.1	0.1	0.1	0.1	0.1	25.8
Other	1.5	1.5	1.4	1.3	1.3	1.6	7.9
Total	8.3	8.6	8.8	9.0	9.1	9.3	12.5

Source: Phillips et al 2002: 26

Figure 2: Source of funds



Source: DEST 2003b

In order to make higher education more relevant to national economic needs and priorities, in the late 1980s, the then federal Labor government initiated a dramatic transformation of Australian higher education which, amongst other things, led to the abolition of the binary distinction between universities and colleges of advanced education (CAEs) and the creation of the Unified National System (UNS) in which there is now a much smaller number of significantly larger institutions, all called universities.

The reforms had several immediate effects, such as extensive consolidation of institutions through amalgamation. But, more importantly, the government set in train a number of long-term trends, that are still helping to shape the system today, such as:

- A shift in some of the costs of higher education from the state to the individual: the government has curtailed its financial commitment through the introduction of such mechanisms as the Higher Education Contribution Scheme (HECS — partial tuition payment through the tax system).
- Enhanced national and international competition for students and research income.
- Greater emphasis on accountability for the government dollar and some movement towards performance-based funding.
- Greater deregulation within the higher education sector through, for example, collection and retention of student fees, and the right to borrow money for capital works.
- An increased reliance on income gained from sources other than the Commonwealth.

With the change of federal government in March 1996, it became clear that the size of the task to which higher education must adapt had in fact substantially increased. The 1996 budget statement from the newly elected Liberal coalition government regarding higher education placed additional pressures and challenges on this sector. Key changes announced in the 1996 budget statement included:

- A reduction of operating grants by 5 per cent over three years.
- A lowering of the HECS repayment threshold; an increase in the level of HECS payments; and the introduction of differential HECS according to course of study.
- No Commonwealth supplementation of academic salary increases.
- Introduction of domestic fee paying undergraduate students.
- A phasing out of postgraduate coursework enrolments from Commonwealth funded load.

In the early 1980s, non-government sources of funding for higher education were negligible across the sector. Presently, a number of institutions (mostly the older, well established ones) receive over half of their operating revenue from non-government sources. 'The share of total university revenue contributed by the Commonwealth fell from 57.2% in 1995 to 45.2% in 2000' (Phillips et al 2002: 27). On average, about a third of university revenue is from earned income.

Australian higher education is predominantly public – there are only two, quite small private universities. However, in the schools sector, about one-third of the students attend private, non-government institutions. As an indicator of the government's ideological leanings and regard for higher education, it is interesting to note that while Commonwealth funds per university student fell by 19.2% over the period 1996–2000, they rose by 21.4% in non-government schools (Phillips et al 2002: 31).

Over the last decade, and particularly during the period from 1996 onwards, it has been the political will of government to shift the funding of higher education from the state to the consumer and to treat higher education more as a private than a public good. Little of this

could have been accomplished had it not been for the capacity of management within institutions to become much more corporate like and entrepreneurial in the running of individual institutions. But the sector now is in danger of moving so far in the direction of privatising public higher education that government policy and management's complicity in this process are resulting in an era of higher education mediocrity from which the system may never recover (Meek 2002a; Chubb 2001).

In one sense, Australia conforms to the international trend of increasing proportions of funding coming from non-public sources. But, elsewhere, while funding from private sources has increased proportionally to that from the public purse, Australia and New Zealand are the only OECD countries that reduced direct public expenditure on higher education during the latter part of the 1990s (Phillips et al 2002: 32). According to the OECD (2002: 187):

It is important to note that rises in private educational expenditure have not generally been accompanied by falls in public expenditure on education, either in primary, secondary and post-secondary non-tertiary education or at the tertiary level. On the contrary ... public investment in education has increased in most of the OECD countries for which 1995 to 1999 data are available, regardless of changes in private spending. In fact, some of the OECD countries with the highest growth in private spending have also shown the highest increase in public funding of education. This indicates that increasing private spending on tertiary education tends to complement, rather than replace, public investment.

Newman, Couturier & Scurry (2003: 14) provide a similar observation with respect to public higher education in the USA:

State appropriations to higher education actually increased over the last two decades ... even on an after-inflation and per-student basis. In the past decade alone (1993–2003), the amount spent on higher education by state governments has increased on average by 60.2 percent. What clearly is the case is that, even as state funding was expanding, colleges and universities were aggressively expanding other sources of revenue ...

With expenditure from private sources at 46.5%, Australia has the 'fourth highest rate of private contribution in the OECD after Korea (78%), Japan (55.5%), and the United States (53.1%)' (Phillips et al 2002: 33). Not surprisingly, students studying at Australian universities contribute a high proportion to the cost of their tuition by international standards (see table 2).

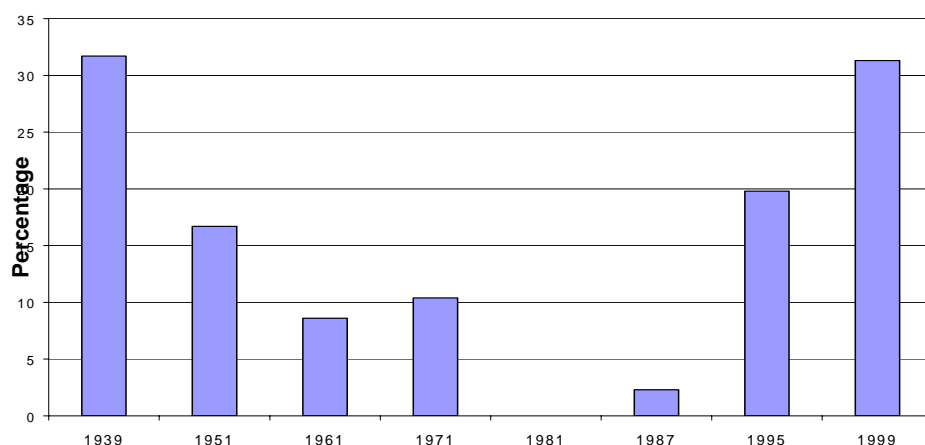
Table 2: Indicators of student contributions

Country	Indicator	Level in Country	Level in Australia
United States	% of revenue per student from tuition fees 1998	24%	20% (28% if overseas student fees included)
Canada	Tuition fees as a share of total university revenue 1999–2000	16%	22% (31% if overseas student fees included)
New Zealand	Share of university operating revenue from tuition fees 1998	21%	20% (28% if overseas student fees included)

Source: Phillips et al 2002: 33

It is interesting to note that the proportion of the cost of higher education currently borne by students is about the same as it was just prior to World War II (see figure 3).

Figure 3: Student financial contribution to higher education 1939–1999



The funding crisis facing Australian higher education has increasingly attracted public attention. Throughout 2002 the government conducted a review of Australian universities under the banner 'Higher Education at the Crossroads'. Despite a number of position papers and numerous submissions from the sector, government policy was merely announced as a *fait accompli* as part of the 2003 budget statement. Though there is promise of some new money, basically the policy continues the trend towards greater privatisation of higher education funding through increasing tuition fees, allowing institutions to set their own fees (within a range) and allowing institutions to enrol a greater number of full fee paying domestic undergraduate students. At the time of writing, the policies were to get through the upper house of the Australian parliament.

In 2000 and 2001, the government introduced a number of policies directly affecting research and research management, committing a substantial increase in research funding over a ten-year period – most of which was committed to take effect at the end of the period (see *Backing Australia's Ability* 2001). The next section of the paper examines some of the key issues associated with research management of Australian higher education.

Research management³

In Australia, as elsewhere, traditionally university research was performed mainly within a discipline-based structure, and was purported if not actually to be very much at the pure-basic end of the research spectrum. But certainly over the last decade or so, the relevance of university research has been questioned and pressure brought to bear to make it more economically and socially relevant. 'Trends in the public funding of higher education, pressures for commercialisation of university generated intellectual property, new approaches to research management within corporations, a changing culture of learning, and growth in small companies in high technology industries led to the emergence of new forms of research that required close working relationships between people from different disciplines and professions ...' (Department of Education, Science & Training [DEST] 2003a: 118).

³ This section of the paper draws on Meek 2003.

A recent DEST (2003a: 116) report notes that 'while Australian universities have been actively engaged in the creation of knowledge for around half a century, their roles in relation to the distribution and exploitation of knowledge have been less prominent until recently'. Moreover, Australia has a higher concentration of research in its universities than is typical for other OECD countries.

In 1998–99, some 29.4 per cent of Australia's research expenditure occurred in the higher education sector, up from 25.5 per cent in 1990 ... By comparison, universities in the European Union performed 20.4 per cent of their nations' research effort by the late 1990s, and universities in the United States accounted for only 14.1 per cent ... The share of research performed by business in Australia, while growing over the decade remained relatively low by international standards, accounting for only 46 per cent of the total research effort, compared with around 70 per cent across the Organisation of Economic Cooperation and Development ... As a result of the relatively modest contribution by the business sector, Australia's total expenditure on research and development in 1998 accounted for 1.49 per cent of the nation's gross domestic product compared with 2.18 per cent for the OECD as a whole ... (DEST 2003a: 125; and see OECD 2001).

The Australian government's approach to knowledge production is largely a utilitarian one, with a concentration on commercialisation and economic return. University research managers by and large tend to translate government research policy directions and priorities into institutional practices. Research management as it is presently evolving has the potential to at once divide institutions and the sector as a whole into 'research haves', and 'teaching have-nots'. To fully understand the implications of present policy and research management practices, it is necessary to go into some detail about how they work.

Research Funding Policies. Most operating resources provided by the Commonwealth to the higher education sector are allocated by DEST as block operating grants based on student enrolments. For well over a decade, however, federal governments have encouraged competition amongst institutions, particularly with respect to research funding. The White Paper stated that 'concentration and selectivity in research are needed if funding is to be fully effective' (1988: 90). The then Labor government's policies were put into effect in a number of ways. First, at the system level, an increasing proportion of recurrent grants was 'clawed back' from institutions and given to the Australian Research Council (ARC) for competitive re-allocation. This included the ARC Large Grant scheme funded directly by the ARC and the ARC Small Grant scheme funded in proportion to the institutions' success in winning ARC Large Grants and administered by the institutions themselves. Second, individual institutions were compelled to formulate research management plans for the competitive allocation to academic staff of research funds available within the institution. Third, institutional research performance was competitively assessed for funding purposes through the so-called Research Quantum (RQ). The RQ, representing about 6% of total operating grants, was based on quantitative performance indicators: number of competitive research grants attracted (80%), publications (10%) and postgraduate completion rates (10%). Fourth, institutions were provided with Research Infrastructure Block Grants (RIBG) on the basis of a formula with allocations reflecting the relative success of each institution in attracting competitive research funds.

With the intention of increasing competition over research funding even further, in June 1999 the Liberal coalition federal government released a discussion paper on research and research training entitled *New Knowledge, New Opportunities*. The paper identified several deficiencies in the existing framework which were considered to limit institutional capacity

to respond to the challenges of the emerging knowledge economy. These included funding incentives that do not sufficiently encourage diversity and excellence; poor connections between university research and the national innovation system; too little concentration by institutions on areas of relative strength; inadequate preparation of research graduates for employment; and unacceptable wastage of resources associated with low completion rates and long completion times of research graduates. A particular concern was with research training and the funding of PhD and research masters students.

The government released its policy statement on research and research training, *Knowledge and Innovation: A Policy Statement on Research and Research Training* in December 1999. Major changes to the policy and funding framework for higher education research in Australia were identified in the policy statement. The principal ones were:

- a strengthened Australian Research Council and an invigorated national competitive grants system;
- performance-based funding for research student places and research activity in universities, with transitional arrangements for regional institutions;
- the establishment of a broad quality verification framework supported by Research and Research Training Management Plans; and
- a collaborative research program to address the needs of rural and regional communities.

The policy statement re-introduced the requirement for formal submission to DEST of Research and Research Training Management Plans. Core elements that institutions were expected to report on annually include research strengths and activities; details of research active staff; graduate outcomes both in terms of attributes and employment; linkages to industry and other bodies; and policies on commercialisation (Wood & Meek 2002a, 2002b).

These changes have been put into effect by two new performance-based block funding schemes. The approaches are intended to 'reward those institutions that provide high quality research training environments and support excellent and diverse research activities'. The Institutional Grants Scheme (IGS) supports the general fabric of institutions' research and research training activities. The scheme absorbs the funding previously allocated for the RQ and the Small Grants scheme.⁴

Funding for research training is allocated on a performance-based formula through the Research Training Scheme (RTS). Institutions attract a number of funded Higher Degree Research (HDR) places based on their performance through a formula comprising three elements: numbers of all research students completing their degree (50%); research income (40%); and the revised publications measure (10%). The values for each element will be the average of the latest two years' data. The key aspect of the RTS is that it is essentially based on *quantitative criteria* (Wood & Meek 2002b).⁵

⁴ Funding under the IGS is allocated on the basis of a formula. The components and weightings are as follows: success in attracting research income from a diversity of sources (60%); success in attracting research students (30%); and the quality and output of research publications (10%). The government considers that institutions are likely to be more outwardly focused in their research when research income from all sources is equally weighted, unlike pre-2002 arrangements which gave greater weight to Commonwealth competitive research grants schemes.

⁵ The RTS replaces the Research HECS Exemptions Scheme. It provides Commonwealth-funded HDR students with an 'entitlement' to a HECS exemption for the duration of an accredited HDR course, up to a maximum period of four years' full-time equivalent study for a doctorate by research and two years' full-time equivalent study for a masters by research.

Commonwealth changes to research funding have required Australian universities to rethink much of their approach to the management of research and research training. High on the agenda has been the need to identify priorities, concentrate research effort, and develop a set of performance indicators and sophisticated research management information systems (Wood & Meek 2002b).

Coupled with the introduction of new research funding mechanisms has been government intervention in the setting of research priorities. At the beginning of 2002, the government announced, as a result of a 'consultation' process that was far from transparent, that a portion (33%) of the Australian Research Council's (the largest non-medical research funding agency in Australia) funding would be targeted to research in the following four priority areas: nano- and bio-materials, genome/phenome research, complex/intelligent systems, and photon science and technology.

In May 2002, the government announced its intention to further set national research priorities for government-funded research. According to government, the priorities 'will highlight research areas of particular importance to Australia's economy and society, where a whole-of-government focus has the potential to improve research, and broaden policy outcomes' (DEST 2002: 1). The priorities were announced at the end of 2002 and, while broad in scope, they were 'hard-science' oriented and mainly emphasised areas of immediate economic relevance.⁶

Concentration and selectivity remain the key issues in research. This means that universities have to identify strengths and make hard decisions about allocating resources to some areas and not to others. It is fairly obvious that those areas best able to commodify their intellectual wares are the ones to stand to gain the most from the new funding regime. It is also fairly obvious that these areas are not randomly distributed across the academy. And it is just not science and technology who are the winners, but those sub-fields that can lay claim to short- to medium-term economic return on their efforts. There is a danger that basic science will be further ignored, and in particular those disciplines traditionally associated with basic research, such as chemistry and physics, will go into further decline.

Under the new research funding formula for research students, universities earn income not only through student load but also through rates of completion. This presents particular difficulty for faculties in the humanities and social sciences that often have a large number of research students who traditionally study part-time, take considerable time to complete their degrees and have low completion rates compared to other disciplines. While absorbing a large amount of initial RTS load allocation, such areas may lose their student load in the future if completion rates are outside the formula guidelines. In protecting its overall share of the national research student quota, a university may decide that some

⁶ It is interesting to note that state governments have also gotten into the act of research priority setting in the expectation that targeted research funding, particularly in such areas as biotechnology, will enhance their economic competitiveness. For example, the Queensland government in 1999 formulated a four-year innovation strategy, *Innovation – Queensland's Future*, designed to stimulate innovation and technology across universities, business, industry and the wider community. In accordance with this strategy, the Queensland government earmarked \$270 million for biotechnology ventures over a ten-year period. The New South Wales government has tied its recent initiatives in the science and technology areas specifically to the field of biotechnology, even more so than Queensland. In 2001, the New South Wales government released *BioFirst*, a five-year strategy that sets out the government's initiatives to promote biotechnology in New South Wales. Similar initiatives are being promoted by state governments in Victoria and Western Australia and, to a lesser extent, the other states and territories (Meek 2002b).

subjects in the arts, humanities and social sciences are ones that it can ill afford (Wood & Meek 2002b).

Either wittingly or unwittingly, management within universities is playing the research concentration and priority setting game with the potential result of segmenting academic staff into research haves and teaching staff have-nots. By directing research funds and infrastructure to priority areas, non-priority areas will have fewer resources to conduct research. This appears to be exactly what government intends:

It seems timely to challenge the assumptions of the academic model of much of the past century, and validate alternative academic career paths. Some academics may choose to specialise in teaching, and become “teaching-only” academics. Some academics may choose to specialise in research (*Striving for Quality* 2002).

Even more recently, Australia’s chief scientist, Robin Batterham, has called for ‘greater separation of teaching and research funding’, and is reported as saying that ‘good teachers do not have to be leading researchers ...’ (Illing 2003: 21). In a similar vein, with respect to the UK situation, Willmott (1998: 1) argues that the ‘significance of the Research Assessment Exercises ... does not reside primarily in their rationalisation of resources for research or in securing improvements in accountability for their expenditure, but, rather, in their contribution to legitimising the restructuring of higher education which has included the withdrawal of research funding from an increasing proportion of academics and departments’. In both countries, the intention is not merely to decouple research from teaching, but to simultaneously tie research more closely to the needs of industry and the economy while reducing unit cost.

Analysis

There is not sufficient space to comprehensively analyse the Australian case. But two areas appear to be of particular relevance: appropriate levels of public financial support and diversification of higher education functions in a knowledge-based society.

Appropriate levels of public financial support

As indicated in the introduction to this paper, higher education has an important and special role to play in the knowledge-based economy and post-industrial society. ‘While the relationships between knowledge creation, innovation and economic growth are complex, there is widespread acceptance that the creation, distribution and exploitation of knowledge can lead to jobs growth and better standards of living’ (DEST 2003a: 115–116). The size and level of national participation in higher education is determined by, amongst other things, the rate of return on investment in higher education. Phillips et al (2002: 21) note that ‘internationally, views on this issue have been strongly influenced by the emergence of the global knowledge-based economy’. In support of this, they refer to the 2001 Innovation Summit (*Backing Australia’s Ability* 2001).

We are in the midst of a revolution from which a new order is emerging. The solutions of past decades will not suffice in the new knowledge age. Intangible assets – our human and intellectual capacity – are outstripping traditional assets – land, labour and capital – as the drivers of growth. If we are to take the high road, a road of high growth based on the value of our intellectual capital, we need to stimulate, nurture and reward creativity and entrepreneurship.

In a recent policy analysis, the OECD (2002:135) reports on the relative importance of human capital and education in economic growth. The report states that:

The accumulation of physical capital and human capital is important for economic growth, and differences between countries in this respect help significantly to explain the observed differences in growth patterns. In particular, the evidence suggests that investment in education may have beneficial external effects that make social returns to schooling greater than private returns ...

And, further on, the report maintains that ‘the improvement in human capital seems to be a common factor behind growth in recent decades in all OECD countries ...’ (p. 136), and states that:

The magnitude of the impact on growth found in this analysis suggests that the social returns to investment in education may be larger than those experienced by individuals. This possibly reflects spill-over effects, such as links between levels of education and advances in technology, and more effective use of natural and physical resources, and implies that incentives for individuals to engage in education may be usefully enhanced by policy to reap maximum benefits for society as a whole (p. 137).

Another OECD publication (1998: 7) reports that:

Investment in human capital is at the heart of strategies in OECD countries to promote economic prosperity, fuller employment, and social cohesion. Individuals, organisations and nations increasingly recognise that high levels of knowledge, skills and competence are essential to their future security and success.

Drawing on these and other analyses of the relationship between human capital and economic growth, Phillips et al (2002: 22–23) argue that:

In this context, Australia’s relative decline compared with other OECD countries in tertiary enrolments between 1995 and 2000 appears particularly stark, as does the decision to reduce public investment in tertiary education over this period.

The OECD has developed a measure of national investment in “knowledge”, defined essentially as the sum of expenditure on education, spending on software and expenditure on R&D [OECD 1999]. On this combined measure Australian investment in knowledge as a per cent of GDP was 8.0% in 1995, 11th out of 13 countries for which the measure was calculated, and significantly below the average of 9.2%. While it could perhaps be argued that this reflects our resource-based industry structure, that argument provides no support for the trend decline in Australia’s relative position on this type of measure that is evident from 1993 to at least 1998 [Considine et al 2001: 9].

A decline in public investment in tertiary education could perhaps be justified if there was evidence of negative social rates of return, but this is not the case in Australia or in any other country. Tertiary graduates, including higher education graduates, remain in demand in the labour market, and despite concerns about possible credentialism, graduates still enjoy substantially higher rates of earnings than the general population (approximately 50% higher in 1999 [OECD 2002, Table A13.1]). Overall, the OECD reports that both the private and social internal rates of return to tertiary education are “generally well above the risk-free real interest rate”, ie tertiary education represents a good investment for both individuals and society as a whole.

While these considerations do not lead to a specific “desired size” for Australia’s higher education system, they do support the views that substantial and sustained growth in participation and investment levels in tertiary education would be sound economic and social policy for the nation.

One lesson to be drawn from this analysis is that the full potential of a higher education system to contribute to both the social and economic welfare of the nation cannot be achieved through the nation abrogating its ‘duty’ to adequately support it. As noted above, a common trend internationally is for sources other than from government to assume a greater proportion of overall higher education funding. In most countries, however, all financial sources of support have increased, including those from the public weal. While in the latter half of the 1990s, there was a shift towards increasing private expenditure on higher education in several OECD countries, as previously indicated, ‘only two countries, Australia and New Zealand, reduced direct *public* expenditure over this period’ (Phillips et al 2002: 32). It is as if the Australian government, particularly in recent years, has wanted its cake and to eat it too – wanted a higher education system to contribute to the growth and prosperity of a knowledge-based society and economy, while increasingly getting others to pay for it.

The Australian case also suggests that market coordination of higher education is not necessarily deleterious per se. The problem rests not so much with the introduction of such measures as competition, user pays, budget diversification and entrepreneurial incentive, as with how these policies are actually constructed and implemented. The introduction of HECS and policies that encouraged institutions to find alternative sources of income in the late 1980s and early 1990s probably allowed Australian higher education to modernise and achieve a level of growth that would not have been possible otherwise. But from the mid-1990s and under a different political regime and ideological imperatives, many of the same general policies were used, intentionally or otherwise, to substantially stunt the development of the sector. As Phillips et al (2002: 45) note, the government has yet to front the key issue of ‘the level of funding per student required for a high quality system, and the extent to which the trend toward increasing private contributions can and should continue’. The problem in a public system of higher education like Australia is not the encouragement of private investment, but the abrogation of public responsibility for the health of the system, rather than equitably sharing the financial burden amongst all stakeholders. The Australian case also raises the question of when does decline in government funding responsibility reach the point where government no longer has the ‘moral’ authority over national higher education policy.

Diversification of higher education functions in a knowledge-based society

As mentioned above, Gibbons and his colleagues observe the transformation of the modern university in terms of the transition from Mode-1 to Mode-2 knowledge production. Mode-1 is traditional science, hierarchical, strongly disciplinary based and elitist. Mode-2 is much more mass-oriented, democratic and dispersed, characterised by ‘weakly institutionalised, transient and heterarchical organisational forms’ (Johnston 1998), and by

fluidity, changing research teams, distributed research more generally; discovery in the context of application and transdisciplinarity; ... irrelevance of traditional disciplines; new forms of quality control ...; contested expertise and (social) robustness as the new ideal; and the needed recontextualization (in society) of science and the institutions of science (Rip 2002: 46).

The thesis of Mode-2 knowledge production has been criticised as 'simplistic in its projections', establishing a somewhat false dichotomy (Rip 2002: 45); ignoring the importance of past applied research (Godin 1998); and ignoring 'analyses that have highlighted the variety of functions played by disciplinary knowledge and discipline-based research training' (Henkel 2002: 59). Henkel notes that Rip (2000) argues that 'the concept of Mode 1 can be seen as a "lock-in" that exaggerates the rigidity of boundaries in which academic research practices are pursued and so threatens the heterogeneity required for advancement of knowledge that can tackle social as well as scientific problems of the future'. Moreover, according to Henkel (2002: 59)

While it may be true that in some fields such as biological sciences interdisciplinary collaboration has proliferated and is an important driver of innovation, it has even there been concentrated within a relatively limited framework. It is most obviously explained by reference to the striking changes in these sciences themselves, triggered by the discovery of DNA and all that has followed from that. Again, such developments and the increased policy emphasis on inter-disciplinarity have not prevented many academics from continuing to see their discipline as having a critical role in their normative and epistemic identities (see also Grigg, Johnston & Milsom 2003).

Nonetheless, as Rip (2002: 46) states, while one can have doubts about the overall Mode-2 knowledge production thesis, 'many of the changes that are identified are important to take into account'.

The proponents of Mode-2 science and society draw the interesting parallel between Mode-1 knowledge production and the elite university and Mode-2 knowledge production and the mass university. 'If true, this has important implications for the university. Its social and scientific roles, instead of being in tension (whether between the stasis of the elite university and the dynamics of progressive science, or between the open engagement of a democratic higher education and the disengagement of "disinterested" science), may also be starting to overlap' (Nowotny, Scott & Gibbons 2001: 82). They argue that the scientific and social roles of the university, rather than being mutually exclusive, are actually mutually sustaining under a Mode-2 environment.

The development of higher education and research policies in many countries has been based on the belief that it is necessary to insulate the scientific functions of the university from its social functions, often equating the former with "elite" and the latter with "mass" education. The intention often has been to create a clearer separation between research, in which the elite university still plays an important but no longer exclusive role, and the higher education ... of mass student populations where such a separation either does not exist, or to reinforce it, where it does exist, by encouraging the emergence of more differentiated systems (Nowotny, Scott & Gibbons 2001: 84–85).

The proponents of Mode-2 argue against institutional differentiation, particularly that based on past conceptualisations of 'academic' or 'vocational' and 'scientific' or 'professional'. Nowotny, Scott and Gibbons (2001: 87) argue that 'high-profile attempts to maintain, or promote, differentiation between research-led and access-oriented institutions have not always been successful because of the political difficulties such attempts create'. It is difficult to segregate research-led universities from access-oriented higher education institutions in open, democratic societies, which may 'help explain the tendency to seize on quasi-market, or actual market, solutions' (p. 88). As a consequence, 'not only has the number of "researchers" within higher-education systems increased as a result of the

expansion of these systems since 1960; research is now undertaken in a wider range of non-university settings which extend far beyond free-standing research institutes or dedicated R&D departments into government, business, community and the media' (Nowotny, Scott & Gibbons 2001: 88).

Clearly, 'the old division of labour between fundamental and applied or problem-oriented research has almost disappeared, and with it, the functional distinctions between universities, public labs and industrial and other private research' (Rip 2002: 46).⁷ Moreover, there can be little dispute that many societies have become more knowledgeable and that with the advent of the World Wide Web and other forms of modern telecommunications, access to knowledge has become more widespread and nearly instantaneous. At the same time, society has successfully challenged the elite position, autonomy and exclusivity of many professions, including academic researchers. The knowledge society is simultaneously more dependent upon science and less trustful of it and its proponents – 'enhanced understanding [of science] tends to diminish rather than increase public confidence' (Henkel 2002: 60; and see Wynne 1995, Bauer, Durant & Gaskell 1997).

Nonetheless, differentiation both within and between institutions remains an important policy question and, contrary to the Mode-2 thesis, the empirical evidence strongly suggests that research remains the primary differentiator.

No country can afford to fund all of its universities as world class research universities, and institutional emulation often results in second rate imitations. Moreover, those institutions that emulate research universities without sufficient resources to adequately do so, cannot provide their students, particularly their research students, with appropriate tuition. Emulation of research universities also diverts institutions away from engaging in extensive programmatic diversity which appears imperative for mass higher education (Meek 2000). In many countries, the numbers and quality debate about higher education has led to the conclusion that 'quality can be protected by creating a hierarchy of institutions catering to different sections of the market' (*Economist* 1997). The important question is how to foster diversity by preventing institutions from converging on a single preconceived 'gold standard' of what is proper higher education.

Nowotny, Scott and Gibbons (2001: 89–90) argue that:

Under Mode-2 conditions, the distinction between research and teaching tends to break down. This happens not only because the definition of who now qualifies as a research actor must be extended far beyond the primary producers or research, but also because the reflexivity of Mode-2 knowledge production transforms relatively closed communities of scientists into open communities of "knowledgeable" people.

Much of the argument plays on the meaning of research and knowledge. If we adopt a fairly traditional definition of research (publications, grants, patents etc.), then questions of differentiation of function both within and between institutions remain important concerns. Australia is a good case in point.

As mentioned above, the Australian government has adopted a position of concentration and selectivity with respect to research funding. Almost by definition, these policies will differentiate research from teaching functions both within and between universities.

⁷ According to Rip (2002: 47) 'The contrast between fundamental (and scientifically excellent) research ... and relevant research ... is not a principled contrast. It has more to do with the institutional division of labour, than with the nature of scientific research'.

However, this will probably only help give official imprimatur to a situation that has existed for some time.

Under the previous binary structure of higher education in Australia, it is estimated that about 95% of all research took place in the universities rather than the CAEs. However, 'even among the pre-1987 universities, resources and activity tended to be concentrated in a smaller grouping. Karmel (1992: 144) noted that just nine universities enrolled two-thirds of research students, seven universities conducted two-thirds of all research activity and only nine or ten universities had significant research libraries (DEST 2003a: 120).

With the creation of the UNS at the end of the 1980s, all higher education institutions were called universities. On achieving their new status, the new universities (former CAEs) were put under strong pressure to develop a research profile and to build a research culture.

Underpinning this activity were the motivating factors of prestige and financial rewards. In an academic context, prestige is strongly linked to perceived research performance. Ramsden (1999, p. 342) has suggested that "somewhat paradoxically, in an age of mass higher education, research performance is possibly the most important factor for assessing the standing of the modern university". Slaughter and Leslie (1997) argued that universities and individual academics are "prestige maximisers" and that success in attracting external research funds, whether from government or industry, is a crucial factor in enabling institutions and individuals to acquire prestige and differentiate themselves from others. Research performance is acknowledged through success in winning externally derived research income and also provides one of the few opportunities for universities to grow their revenue stream (DEST 2003a: 123).

While the academic aspirations of the former CAEs has been quite strong, research funding has remained concentrated primarily in the older, more prestigious pre-1987 universities – what is referred to in Australia as the Group of 8 (Go8).⁸ In 2002, the Go8 universities attracted about 70% of all research money allocated by the National Health and Medical Research Council, and nearly 65% of the funds from the major funding agency for the non-medical disciplines – the Australian Research Council. Table 3 is a breakdown of research activity between Go8 universities, the five universities that belong to the Australian Technology Network (ATN),⁹ regional universities,¹⁰ and a collection of other higher education institutions.¹¹

⁸ The Go8 universities are: The University of New South Wales, The University of Sydney, The University of Melbourne, The University of Queensland, The University of Western Australia, The University of Adelaide and The Australian National University.

⁹ ATN (Australian Technology Network) universities are: University of Technology, Sydney, Royal Melbourne Institute of Technology, Queensland University of Technology, Curtin University of Technology and University of South Australia.

¹⁰ Regional pre-1987 universities are: The University of New England, The University of Newcastle, Deakin University, James Cook University, University of Tasmania, University of Wollongong and La Trobe University; regional post-1987 universities are: Charles Sturt University, Southern Cross University, University of Ballarat, Central Queensland University, University of Southern Queensland and Northern Territory University.

¹¹ The 'other' category contains the following pre-1987 universities: Griffith University, Macquarie University, Murdoch University, The Flinders University of South Australia and Bond University; post-1987 universities: University of Western Sydney, Swinburne University of Technology, Victoria University of Technology, University of the Sunshine Coast, Edith Cowan University, University of Notre Dame Australia, University of Canberra and Australian Catholic University; and a few quite small non-university institutions that do not have a research mission. If these latter institutions were excluded from the 'other' category, then the averages for this category would be much the same as for the ATN and regional universities.

Table 3: Summary of research performance measures by broad university groupings 2001

	Broad university groupings (% of number of staff in each group in brackets)				All (national average brackets)
	Go8	ATN	Regional	Other	
Research income	\$775m	\$92m	\$162m	\$130m	\$1,160
Number of staff who generated research income	5,275 (34.9%)	1,208 (26.2%)	1,933 (27.7%)	1,523 (23.5%)	9,939 (29.9%)
Number of staff who generated publications	11,025 (73.0%)	2,458 (53.2%)	3,621 (51.8%)	3,327 (51.4%)	20,341 (61.3%)
Number of staff eligible to supervise HDR students	11,911 (78.9%)	3,590 (77.8%)	5,018 (71.8%)	4,333 (66.9%)	24,852 (74.9%)
Number and share of academic staff and HDR students (per cent of national in brackets)					
Academic staff	15,105 (45.5%)	4,616 (13.9%)	6,989 (21.1%)	6,477 (19.5%)	33,187
HDR students	15,181 (51.1%)	3,983 (13.4%)	5,488 (18.5%)	5,075 (17.1%)	29,726
HDR commencing students	3,730 (50.7%)	955 (13.0%)	1,565 (21.3%)	1,106 (15.0%)	7,357

Source: DEST 2003c

What is interesting about table 3 is not only the Go8's domination of research funding, but the fact that only just over one-third of Go8 academics generated research income. Or put the other way, in the Go8 universities, nearly two-thirds of staff are not attracting external research money, while in the other Australian universities the corresponding figure is about three-quarters of staff. A higher proportion of staff in all categories generate publications and supervise Higher Degree Research students. Nonetheless, it is quite apparent that funded research activity not only between but within institutions is concentrated on a minority of the academic staff.

From a research management point of view, it does not appear that research is a democratic, widely dispersed activity, and one might question the nexus between teaching and research – at least in terms of research that generates external funding. A case probably can be made that all university staff should be engaged in scholarship at a high level, which means staying informed about the latest research in their areas of expertise. However, with respect to research itself, concentration and selectivity appear to be the order of the day.

This issue is not so much the separation of teaching and research. The evidence suggests that this occurs regardless. What is important is the policy context that structures the way in which the boundaries between teaching and research are created and maintained. It is probably true, as suggested in a recent DEST report (2003a: 115), that 'economic growth is affected not only by the quantum of funding but by the way funds are allocated (for example, in terms of the institutions, fields and industries to which they are directed, and the mechanisms used to finance research) and by knowledge dissemination and research

commercialisation practices that are adopted ...'. But, as indicated previously, the Australian government has taken a rather narrow view of what research deserves public financial support, and has focused on priorities in areas likely to bring about more or less immediate economic reward. There is nothing wrong with priority setting per se, but a narrow and overly utilitarian approach to public support for research may in the long term be counterproductive. Henkel (2002: 64) cites investigations that suggest that 'since outcomes of inquiry are often wholly unpredictable, imposing limits in terms of future relevance or applicability is likely to reduce rather than enhance the social or economic benefits it may generate'.

Contrary to the Mode-2 thesis, the research university is unlikely to disappear, though it is being transformed as it interacts with an increasingly complex and turbulent environment. According to Rip (2002: 49) 'the key challenge is to diversity and recombine its components, both cognitively and institutionally, into what I call a post-modern university. Such a university will include overlaps and alliances with Centres (of excellence and relevance), public laboratories of various kinds (themselves on the move!) and various private organisations managing and performing research. The boundaries between the university and the outside world are porous, and such "porosity" is sought explicitly'.

While the boundaries between the university and the outside world may be becoming more porous, this does not necessarily mean the comprehensive dissolution of the normative structures that maintain scientific communities specifically and academic organisations generally. According to Henkel (2002: 60), the extent of category collapse implied in such theses as Mode-2 knowledge production is questionable, although 'it is not necessary to subscribe wholesale to a post-modern perspective to perceive a variety of ways in which the boundaries between academic and other worlds are being blurred and to conclude that this is a growing trend'. Even Mode-2 proponents recognise that the university, though under mass conditions of higher education, must remain relatively stable in order to continue to fulfil two primary functions: the production of the next generation of researchers and generator of cultural norms (Nowotny, Scott & Gibbons 2001: 93).

Conclusion

Bertelsen (2002: 1) observes that 'the commodification of higher education to serve the market is revolutionising our entire practice, from institutional image through to management, jobs and curriculum'. She goes on to state that:

once they have conceded that knowledge is a commodity to be traded, universities become subject ... to the full and ruthless protocols of the market. Time-honoured principles of truth and intellectual rigour are rapidly superseded by cost-effectiveness and utility, and market rules are systematically applied. First, research is only done if it creates new products, and courses which don't feed job skills are a waste of time. So managers dutifully prioritise "core business" and eliminate "peripheral" activities, and funding becomes an investment decision based on short-term production goals.

While Bertelsen may overstate the case, there is nonetheless still a good deal of truth in what she has to say. In Australian universities, management in many institutions strongly promotes those areas of the enterprise that appear to turn a profit, while shedding investment in less lucrative activities, such as the humanities, ancient and some modern languages etc. Given the decline of public funding and rising student numbers in a highly

competitive and volatile market, institutional leaders may well indeed argue that they have no other choice.

It appears that the modern university has shifted its orientation from social knowledge to market knowledge and that the 'development of a market oriented university supersedes academic decision making' (Buchbinder 1993: 335). According to Newson (1993: 298), 'These new forms of decision making fundamentally undermine a conception of the university as an autonomous, self-directing, peer-review and professional-authority based institution, and thus changes the politics of how academic work is accomplished'.

There is a view that in responding to market opportunities in a highly competitive global economic environment 'traditional governance often works against making decisions fast enough to capitalise on new opportunities and avoid threats' (Green, Eckel & Barblan 2002: 9). In a similar vein, the Australian higher education review document *Meeting the Challenges* (2002: ix) states that 'at present many universities feel constrained in the extent to which they can respond to, and capitalise on, business and innovation opportunities in timeframes appropriate to the commercial world. Governments ... need to consider the regulatory regime imposed on universities to provide more freedom to pursue commercial opportunities ...'.

In the past, academic loyalty was first and foremost to the discipline and to disciplinary norms concerning the definition and production of knowledge (Gouldner 1958; Becher 1989; Clark 1983). With the commodification of knowledge, that loyalty has come under challenge from powerful groups both within and without the academy demanding loyalty first and foremost to the institution – that is, to the corporation that pays the bills (Meek 2003). 'Science policies, national and international have, in different degrees, been eroding academic autonomy since the early 1970s' (Henkel 2002: 58). Henkel goes on to state that the 'landmark here is the Brooks Report for OECD (1971) which laid down the principles that governments rather than scientists must set over-riding research priorities and that the key driver of science policies must be the achievement of social and economic goals'. In a similar vein, Slaughter and Leslie (1997: 5) argue that:

Participation in the market began to undercut the tacit contract between professors and society because the market put as much emphasis on the bottom line as on client welfare. The *raison d'être* for special treatment for universities, the training ground of professionals, as well as for professional privilege, was undermined, increasing the likelihood that universities, in the future, will be treated more like other organisations and professionals more like other workers.

However, as both Slaughter and Leslie (1997) and Henkel (2002) note, neither the academy in general nor the scientific community specifically have been passive participants of these changes. Probably science has transformed society more so than governments have transformed the university. Clearly, the commodification of knowledge has led to new types of relationships within the academy based on what Slaughter and Leslie (1997) refer to as academic capitalism, and the academic capitalist professor has become a powerful position within many universities. According to Henkel (2002: 60), 'academic scientists and the institutions in which they work have become more or less willing actors in a range of markets and so in the commodification of scientific knowledge'. She goes on to state that 'capacity for profit making sits alongside intellectual reputation as high value currency in an increasingly competitive academic labour market'. But this does not mean that the university is being transformed out of all recognition.

Many of the scenarios applied to the future of the university, where they are not outrightly speculative (such as the replacement of the traditional campus by the 'virtual university' or the disappearance of the academy altogether), display a regrettable element of ungrounded exaggeration. What should be treated as empirical questions requiring rigorous examination, such as the replacement of Mode-1 science with Mode-2, tend to remain at the level of normative assertions. There can be little doubt that post-industrial society and the knowledge-based economy will demand even greater diversity from higher education institutions and systems. Society will impose new roles, pressures and demands on higher education while simultaneously expecting the preservation of key traditional functions (Neave 2000). Higher education institutions in turn will help shape the very society that generates these new and traditional expectations. The university has a vital role to play in what Barnett (2000) refers to as a world of *supercomplexity* — a situation where 'our very frameworks for making the world intelligible are in dispute'. The university simultaneously helps generate supercomplexity and is asked to assist in resolving the uncertainties it creates. The modern university may be a victim of its own success. However, the university over hundreds of years has proved to be quite a resilient social institution. One hopes for a heightened awareness, particularly amongst governments, of both the importance of understanding the changing role of higher education in society and of the critical contribution higher education makes to shaping a nation's future, both economically and socially.

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