A Possible Journey to an Australian
Knowledge Management Framework

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Abstract: World wide there is a transition towards knowledge-based economies In order to foster them, many economies have built frameworks in conjunction with world forums that promote international cooperation. Our research focuses on Australia, an economy that has been named by the OECD as knowledge-based. Specifically, the paper appraises the transition towards knowledge economies in general. We then examine the Australian context through the implemented eEurope framework with the intent of providing suggestions to Australia in its transition towards building its knowledge management framework.

Keywords: Knowledge Economy, Australia, Europe, RQF, eEurope, Discourse Analysis

Introduction

WE LIVE IN an era known as the *Age of Enlightenment* (UNESCO World Report, 2005). Here demand exists for spreading knowledge among the global community. This demand has been fostered by the emergence of democratic economies in the Third World that now compete with existing economies. No doubt, inequalities do exist for obvious reasons amongst the economies. Seemingly, there has been acknowledgement that the diffusion of knowledge is the best way to address inequalities among economies and within these societies. Economies and global forums are working towards building *knowledge-based societies* that nuture diversity and capability. '*We are at the dawn of a new century – a new millennium, no less – one kind of economy is ending and another is struggling to develop. We find ourselves in an era that spans the end of industrial economy and at the beginning of the knowledge economy*' (Friedman, 2003:19).

The UNESCO World Report (2005), *Towards Knowledge Societies,* detailed this transition towards knowledge-based economies. It suggests that a new information revolution has occurred, resulting in knowledge-based societies with global character. Two key drivers in this creation include: *globalisation and the growth/diffusion of information communication technologies*. Globalisation, an ongoing phenomenon, was triggered by the need for economies to work together to address inequalities and foster a new cooperative world. Many authors have argued (see for example, Hirst and Thompson, 1996; Higgott, 1999; Castells and Kiselvova, 2000;

Clarke and Clegg, 2000; Rooney et al., 2003) that the concept of globalisation has built through decades and numerous revolutions. Thus, whilst not new, ongoing debate suggests that the contemporary theme of globalisation is different to that of previous decades (Rooney et al., 2003). Clarke and Clegg (2000) argued that the current era is characterised by significant economic internationalisation, more specifically, high levels of international trade, direct investments, collaboration among corporations, international capital flows and financial instruments.

Besides these economic indicators, Petrella (1996) suggests four processes characterising contemporary globalisation, warrant consideration. First, one must consider the diffusion of technology and related research and development into knowledge worldwide. This view is significant as it forms the backdrop for this research paper. Second, there has been a transformation of consumption patterns into cultural products in worldwide consumer markets. As Rifkin (2000:7) argues, '*We are making a long term shift from industrial production to cultural production. More and more cutting edge commerce in the future will involve the marketing of a vast array of cultural experiences rather than of just traditional industrial-based goods and services. Global travel and tourism, fashion and cuisine…electronic mediated entertainment of every kind are fast becoming the centre of a new hypercapitalism that trades in access to cultural experiences…a world in which each person's own life becomes, in effect, a commercial market.*'

The internationalisation of trade and other regulations; and the diminished role of national

governments in designing the rules for global governance are the third and fourth processes that specifically identify the current wave of globalisation (Petrella, 1996). Thus, although many of the dimensions of globalisation are difficult to measure quantitatively, they are significant and warrant consideration when thinking about knowledge-based economies (Rooney et al., 2003). Moreover, for knowledge-based economies to be fruitful, governments and industry need to work cooperatively to foster the concept of globalisation and in turn knowledge-based economies.

Growth and diffusion of information communication technologies, the second driver, has created new conditions under which knowledge societies emerge (UNESCO World Report, 2005). What is questionable though is whether ICTs are really fostering equal knowledge-based societies worldwide, or whether they are widening the digital divide both among and within nations. *Free access to information and knowledge can play a regulating role if economies seek the participation of all people in the society* (UNESCO World Report 2005:42). Although the diffusion of ICT may seem worldwide, its global character is tainted by unequal access to resources and infrastructure. The challenge of the digital divide remains an issue that is not addressed equally among developed nations. Although we are on the verge of an information age, exclusions and divides remain within each society. To address this issue a framework based on infrastructure and a fostered sense of innovation is necessary. '*The values and practices of creativity and innovation will play a major part in knowledge societies, if only through their ability to challenge existing models in order to better meet societies' new needs. Creativity and innovation also lead to promoting new types of collaborative processes that have already proven themselves to be particularly fruitful.*' (UNESCO World Report, 2005:19)

Visible in the media are examples that suggest world economies are being transformed into knowledge-based economies. For example, the European Union has expressed the ambition for "*Europe to become the most competitive and dynamic knowledge-based economy in the world by 2010*" (Europa, 2006). Conversely, forums such as UN and UNESCO have been working with governments to develop ways to measure knowledge-based economies. Some examples include the 'Knowledge Assessment Scorecard' (World Bank Institute, 2002); the 'Science, Technology and Industry Scoreboard' (OECD, 2001); European Innovation Scoreboard (European Commission, 2000); Towards Knowledge-based Economies in APEC (APEC Economic Committee, 2000) and of

late, the UNESCO World report (2005) – Towards Knowledge Societies.

In 2002, the lack of an internationally agreed framework prompted the Australian Bureau of Statistics (2002) to develop a framework with five dimensions: contextual; innovation and entrepreneurship; human capital; information and communication technology; and economic and social impacts. In this paper we focus on the *innovation and entrepreneurship* dimension, which includes research and the potential for knowledge creation. Based on the OECD indicators Australia is a knowledge-based economy. To justify this focus we provide the following arguments.

New growth economic theorists such as Paul Romer suggest that enhancing human capital is critical in growing the Gross Domestic Product. Similarly, the OECD highlights the importance of sustaining growth in knowledge workers whose competencies reflect the dynamics of technological change and globalisation. Whilst ongoing learning can be achieved through formal training or experience at work, the growth of knowledge workers (key participants in knowledge-based economies) is also dependent upon access to research and development. In fact, accessibility to research and innovation is one of the key indicators of knowledge economies in the OECD framework. Further, countries with high levels of research and development capacity may benefit more from reforms to public research institutions (universities etc…) that enhance industry-science linkages.

In September 2005 the Australian Government released an interim report for an *e-Research Strategic Framework* aimed at facilitating research and innovation within the economy. Through analysis of international experiences (for example, Hong Kong, UK, Germany and The Netherlands) we investigate Australia's attempt to create a framework for assessing research quality. Specifically in this paper we propose to examine this framework and its influential factors. From this review we provide an outlook that details potential strategies for improving the existing situation. At this stage the scope and limitations of the research will be presented. Given this paper is written at a time of transition in Australia with the actual framework poised to be implemented (and therefore the effects yet unknown), our findings could be considered pioneering. A secondary aim is to provide relevant insights to policy makers and related industry forums involved in the process.

Methodological Framework

This paper is written at a time when global transitions are rampant and the concept of emerging knowledge-based societies is still being widely debated.

Moreover, a framework for measuring the extent to which economies are knowledge-based is still under development. Presently there is a lack of empirical data and research about the effects of current implementations to their respective economies. Consequently, in this paper we chose the post modern philosophical approach of *critical discourse analysis* (see Locke, 2004; Blommaert, 2005).

Palmquist (2005), the developer of this approach, argues that post modern approaches regard the world as inherently fragmented and heterogeneous. Therefore, any sense-making system or belief is mere subjective interpretation. Further, such interpretation is conditioned by its social surrounding and the dominant discourse of its time (Palmquist, 2005). Thus, post modern approaches aim at "deconstructing" concepts, belief-systems, or generally held social values and assumptions (Palmquist, 2005). Although critical thinking, referred to also as reflective thought (Dewey, 1933:9), is not a post modern concept, the *post modern critical or discourse analysis* has the ability by applying critical thought to social situations to unveil hidden meanings within socially dominant discourses (such as interpretation of the world, belief systems etc).

Palmquist (2005) points out that critical discourse analysis does not provide definite answers, as it is not a "hard" science. However, it does provide insights based on continuous debate and argumentation. The author applied this approach to information sciences characterising it as a way of approaching an issue, by deconstructing reading and interpretation of the issue or text available. Hoenisch (2006) in extending this approach has traced the origins of discourse analysis to having emerged as a sub discipline of linguistics. This author argues that the approach is influenced by the prominent philosopher, Wittgenstein. Specifically, Wittgenstein (1958) focused on the meaning/interpretation of ordinary language in context, the indeterminacy of meaning, an antipathy to reductionism, and a focus on moves in a game (Hoenisch, 2006).

We chose this method for our research given its applicability to the modern speculative context, where there is continuous debate on building knowledge economies and furthermore, the present lack of significant reliable research to depend on. By applying this approach we expect that preliminary insights will be obtained that can be further developed using alternative suitable methods in the future. Additionally, as relevant, we draw upon literature to qualify our discourse- based analytical discussion. In exploring the Australian situation, our research and analysis is restricted as the strategic framework is only just being implemented causing a lack of empirical data. To counter this we took the view that an implemented framework in Europe might provide insights for the Australian scenario. Therefore, we present this European material to derive a preliminary outlook for Australia.

Specifically, the paper is organised as follows. We begin with an introductory section that highlights the motivation for this research. Subsequently, a methodological framework is provided and justified, followed by a contextual review of the transition towards knowledge economies. This review highlights the contribution of economic and other literature to the context of our research. In a further section we place Australia in the context – with subsections that present our findings. Then, taking a retrospective view, we introduce the European Frameworks that are expected to lend themselves to the Australian context. In this section, after exploring the European frameworks and strategies, we apply the material to Australian context. In the final section we synthesise broad summaries from this analysis and provide an outlook for the future.

Towards Knowledge Economies – a Contextual Review

As a prelude to our review of Australia and its initiatives, the concept of knowledge economies needs to be placed in context. We introduced the concept of knowledge economies as an emerging paradigm in the modern world as we enter the new era 'Age of Enlightenment'. Rodrigues (2003) argues that in the 1990s two buzzwords perhaps best capture the transition into this new age. The first term **'information society'** highlights the multiplication of technological innovations that have transformed everyday economic activities. The second term **'new economy'** captured a synergy between information technology companies, the Internet and financial markets. The transformation being experienced pervades all sectors, institutions, cultures and economies. And most important, '…*what is at stake is more than information: it is knowledge, which implies cognitive capacity, learning, cultural patterns and understanding – in a single word, people'* (Rodrigues, 2003:4).

Interestingly, Polanyi (1944) had referred to the transition to knowledge-based societies. Whilst knowledge has always been present in human societies, perhaps the way it has been articulated and diffused among economies and societies has changed. Rodrigues (2003:5) suggested that, 'we *are entering a new mode of knowledge creation, diffusion and use influenced by three factors: their acceleration by information and communication technologies; the increasingly sophisticated procedures to codify, to learn and modify knowledge; the social perception*

of knowledge as a strategic asset of companies, nations and people (Rodrigues, 2003:4-5)'

Hutchins (1968) and Husen (1974) perhaps coined the term learning societies where old limits on where and when organised knowledge could be acquired no longer applied. With the emergence of knowledge societies (Drucker, 1989), life- long learning has almost become a norm with all that is needed is to know how to acquire the knowledge. Clearly, social awareness of the significance of acquiring knowledge is becoming apparent. Rooney et al. (2003:20) argue that '*the increased awareness of the place of knowledge in economic life is partly associated with the vast expansion of telecommunications and information technology, its associated effects on the transmission of information and data, and on interpersonal communication'*. Given this, it is relevant to briefly examine the socioeconomic relevance of knowledge in this context.

As early as 1890, in *Principles of Economics* Alfred Marshall argued that knowledge was a driving force of the economy. Machlup (1980) who developed this work argued that standard economic analysis could not yield much insight about how knowledge works in an economy. He emphasised the pervasive transmission metaphor for communication, for the diffusion of knowledge and information. Bell (1974) moved the discussion from economic dimensions of knowledge to reflecting upon knowledge societies. According to Bell (1974: 176) the knowledgeable society has its roots in epistemology and the logic of inquiry. Drucker (1993) focussed on knowledge and the increases in productivity it can achieve. '*Knowledge has become an instrument for getting things done…for organising and coordinating.*'

Graham (2000) observed that in recent times we have become less interested in using our knowledge and technology to dominate nature – instead we manipulate human nature and consciousness. According to him, the emerging knowledge-based environment is a *phenomenological system* that includes beliefs, knowledge and information as well as social identity and relations. Castells (1996) highlighted the role of communication, as it is increasingly an environment of *communication, meanings and relationships*. From this brief appraisal two key contributors to conceptualising knowledge economies emerge. The first is economic or quantitative measures. The second concerns acknowledgement of intangible sociocultural variables including the process of communication, which has been accentuated by the development of ICTs.

These arguments now bring us back to the term knowledge-based economies, which are broadly those who create wealth through intellectual activities (Rooney et al. 2003). The United Kingdom's Department of Trade and Industry (1998) defines a knowledge-driven economy as one where the generation and exploitation of knowledge play a predominant part in the creation of wealth. The OECD, which is one of the pioneers in developing knowledge-based economies, regards 50 percent of the GDP in its major member countries to be knowledge-based (OECD, 1996:9). Evident from this is that the measure is based on quantitative factors. The World Bank takes a similar perspective although it significantly includes transmission models of communication as well as levels of accessibility in infrastructure. To date, the focus has favoured developing nations rather than a generic view on 'knowledge-based' economies. New Zealand and Australian governments have scoped limits to their concept of knowledge economies. Rooney et al. (2003) criticises the Australian perspective by suggesting that although it has concerned itself with developing ways to measure itself as a knowledge economy, there is no evidence that these measures are being applied well or are suitable for other economies.

The OECD (1996) with a renewed interest in knowledge economies has defined them as those which are directly based on the production and use of knowledge and information. Further, two broad categories of indicators were developed to measure the production, distribution and use of knowledge: the first being indicators of structural change and the second of investment in intangibles. Together these were expected to provide a proxy measurement of the knowledge economy. The first indicator indicates a shift towards economic activity in the service sector, while the bulk of the indicators are in manufacturing and Research and Development. In the contemporary era, innovative services based on ICTs are becoming more relevant for measuring knowledge economies. OECD (2001) reflects a shift towards acknowledging that knowledge-based services are drivers for innovation and economic performance in advanced economies. However, a framework to measure and evaluate this is lacking. As Rooney et al. (2003) point out, keeping track of intangibles requires more suitable frameworks. This leads us to the focus of our research, namely evaluating an Australian framework that acts as a measure for assessing a knowledge-based economy.

Australia in Context

The need to compete as a knowledge-based economy has become imperative to all economies worldwide (UNESCO World Report, 2005). Initiatives exist to classify economies, based upon several parameters (see for example, the OECD indicators). However,

as already mentioned, the lack of an internationally agreed framework that measures the extent to which an economy is classified as knowledge-based or not, led the Australian Bureau of Statistics in 2002 to propose a generic framework comprising three core (*Innovation and entrepreneurship, human capital and information communications technology)* and two supporting (*context and economic/social impacts*) dimensions. Within each dimension were characteristics capable of being measured by indicators. As an example, for Innovation and Entrepreneurship, research performance, research conducted in relatively new fields and that conducted by small and medium enterprises are key characteristics. Knowledge creation and the sharing and dissemination of this within firms are equally critical (ABS, 2002). See Exhibit 1 (ABS, 2002: 22-23) below for indicators used to assess performance on this dimension.

Research base and potential for knowledge creation

- Total R&D expenditure by sector of performance (business, government, private non-profit, higher education), as a proportion of GDP
- Total R&D expenditure by sector of performance
- Expenditure on basic research by sector of performance (business, government, private non-profit, higher education), as a proportion of GDP
- Expenditure on basic research by broad discipline, as a proportion of GDP
- Business R&D expenditure by business size
- Number of scientific and technical publications, per capita

Knowledge creation with commercial potential

- Expenditure on applied research and experimental development by sector of performance, as a proportion of GDP
- Business R&D expenditure by broad industry and by technology intensity of industry
- ...

Other knowledge creation

- No indicators proposed at this stage

Knowledge networks and flows

- Business funding of R&D performed by other sectors as a proportion of total R&D expenditure
- ...
- International co operation in science and technology; proportion of patents with foreign co-inventors
- ...

Innovation

Entrepreneurial activity

Support for innovation

Exhibit 1: Indicators for the Innovation and Entrepreneurship Dimension, (Source: ABS, 2002:22-23)

With the lack of data to assess Australia regarding these indicators, it is interesting to see that information from the Australian Bureau of Statistics indicates Australia has made some favourable progress towards becoming a knowledge-based economy and society:

- *Support by venture capital funds for innovation and entrepreneurship activities increased by 21% in the funds drawn down by investors between 2001 and 2002;*
- *An increase of $1,315 million in gross research and development expenditure between 1998-99 and 2000-01;*
- *An increase from 10% to 18% in the number of working age people with a university degree in between 1992 and 2002;*
- *A 77% participation rate in education for young people aged between 15 and 19 years in 2002;*
- *A continued increase in the use of computers and the Internet by households, business and government; and*
- *An increase of 50% in government and business subscribers to the Internet between 2000 and 2002.*

In July 2004, the Department of Communications, Information Technology and the Arts released

'Australia's Strategic Framework for the Information Economy 2004-2006: Opportunities and Challenges for the Information Age'. The government outlined four priorities:

- *Ensuring that all Australians have the capabilities, networks and tools to participate in the information economy*
- *Ensuring the security and interoperability of 's information infrastructure and support confidence in digital services*
- *Developing 's innovation system as a platform for productivity growth and industry transformation*
- *Raising public sector productivity, collaboration and accessibility through the effective use of information, knowledge and ICT.*

(Source: DCITA, 2004).

These priorities were aimed at achieving Australia's vision where "government, business and society are all connected, can participate with confidence, are open to innovation and can collaborate to maximise the economic and social benefits" (DCITA, 2004). The development of these frameworks has been an important step, reinforcing Australia's commitment to being a knowledge-based economy. Research is seen as one mechanism for becoming an "innovative and economically prosperous nation". We note that in their original form, measures and indicators tend to be more numbers based than quality oriented (see Exhibit 1). In response recent work has focused on developing frameworks to assess quality.

Australia 's Research Quality Framework (RQF)

Acknowledging the role and importance of research in Australia's transition to becoming a knowledge-based nation, the Australian government developed what it termed a 'Research Quality Framework (RQF)'. In early 2006, the then Minister for Education, Brendan Nelson, said "The *RQF will provide a consistent and comprehensive approach to assessing publicly funded research. It will drive positive research behaviours, encouraging researchers and research organisations to focus on the quality and impact of their research*" (Commonwealth of Australia, 2005:3). This framework recognises the need for Australia's research to "*be of the highest international quality and standing*" (Commonwealth of Australia, 2005:3). Moreover, the Australian Government has announced that it is "*committed to ensuring that resources provided to carry out research are directed to areas of research excellence and public benefit*" (Commonwealth of Australia, 2005:3).

Essentially the RQF is expected to be a tool capable of measuring research quality in Australia. Whilst yet to be formally implemented, following the release of the first version many universities have begun conducting mock implementations as preparation. At this stage the plan is to assess research outputs over three time periods: 2000-2005; 2003-2008; 2009-2014. The RQF is important as there is a belief that knowledge not only increases economic growth, but it can also cause structural change in an economy and moreover in society (ABS, 2002). Whilst the RQF is incomplete, guiding principles include:

- Transparency – the need to be open and transparent to Government, stakeholders and taxpayers so results from public investment in research are clear.
- Acceptability – the RQF and its measures need to be acceptable to those to whom it will be applied (e.g. organisations and agencies). It also needs to meet government needs.
- Effectiveness – the RQF should not be burdensome in terms of implementation costs and administration.
- Encouraging positive behaviours – the focus is on improving the quality and impact of research (Commonwealth of Australia , 2005).

Obviously these principles are the result of much consultation, coupled with insights gleaned from a review of international experiences as detailed in the following sections.

International Experiences that have Influenced the Australian RQF

In development of the Australian RQF, research assessment models from around the world (UK-RAE, Hong Kong RAE, NZ-PBRF, Netherlands' National Evaluation System for Publicly Funded Research, and Germany's DFG) were reviewed. Lessons gleaned from this review included: '*the need to engage the support of the research community in undertaking research assessment…… the need to have clarity about the way in which the outcomes of research assessment will inform funding……the need for research assessment exercises to be sufficiently flexible to accommodate the breadth of different fields of study. In particular, it is important that excellence in the humanities and social sciences can be compared with that of the physical sciences on a level playing field. A 'one size fits all' approach is likely to be deemed inappropriate for dealing with the complexity of the research undertaken by Australia 's publicly funded research institutions* (Commonwealth of Australia, 2005:16)'

National Ranking Models related to Research Funding

The proposed RQF is seemingly linked to ranking models related to research funding. Two variations of research quality assessments that use this model include the UK-RAE (see Exhibit 2), and the Hong Kong RAE (see Exhibit 3). The UK-RAE has "*provided the basis for increased research funding and more comprehensive information on the quality of research being undertaken by subject area*". However, there have been concerns "*regarding the financial sustainability of research in some*

disciplines, inequitable workplace behaviours ('game-playing' related to determining 'active' research staff), administrative burden and costs, and a need to fully recognise all aspects of excellence in research" (Commonwealth of Australia, 2005:47). Hong Kong adopted the UK-RAE and is currently in its fourth round. **Their experience highlights the** "*need for greater transparency in funding outcomes, clarity of guidelines for assessors, and greater flexibility in what can be measured as a research output*" (Commonwealth of Australia, 2005: 49). Many of these attributes can be found in Australia's guiding principles provided earlier.

The UK-RAE is the longest running comprehensive research quality assessment exercise. It aims to produce ratings of research quality for institutions. The ratings are used by higher education funding bodies in the UK to determine the distribution of research funding to institutions on the basis of quality. The UK-RAE was established in 1986 as an explicit and formalised assessment process to standardise the information received from existing subject-based committees.

In the iterations that followed in 1989, 1992, 1996, and 2001, the exercises became more transparent and more comprehensive. The next RAE is schedule to take place in 2008. The RAE is essentially a peer review process, in the form of an assessment panel, of research by subject area. The outcome of the assessment comes in the shape of a rating between 1 and 5* (seven points). The rating is then applied by the seven funding councils to distribute monies to the universities. There will be a number of changes implemented in the RAE 2008. The UK Government has agreed that metrics will be collected as part of the next RAE in 2008. They will be used to provide a benchmark on the informative value of metrics as compared to the outcomes of the full peer-review assessment.

For the RAE 2008, universities will make submissions in a standard format containing information about current staffing, details of publications and other forms of assessable outputs produced between 2001-2007, and data about research students and research income with a textual commentary relating to the 6 year assessment period. Submissions do not have to be directly related to administrative units, but must be related to a body of research activity within a unit, research or department. The submissions will be assessed in terms of a 'quality profile' for each unit of assessment. The quality levels are defined in five bands with the highest level being Four star quality that is world-leading in terms of originality, significance and rigour and the lowest level being 'Unclassified' quality that falls below the standard of nationally recognised work, or work which does not meet the published definition of research for the purposes of the RAE. There will be some 67 sub-discipline panels making the 2008 assessments. Other changes include: assessors sitting across discipline panels in cognate areas, and equal weighting for applied research and practice-led research with basic research.

Exhibit 2: The United Kingdom's Research Assessment Exercise, (Source: www.hefce.ac.uk/research, RAE 01/2005)

The Hong Kong RAE was established in 1993 under the auspices of the University Grants Commission (UGC). The initial reasoning behind establishing an assessment exercise was for greater accountability and a more "realistic" funding methodology for higher education institutions with different roles and missions. The aim was to develop a recurrent grants assessment methodology based on a more output- and performance-related model. RAEs have taken place in 1993, 1996, and 1999, at which point it was decided that future RAEs should be undertaken at 6-year intervals with the next RAE to occur in 2005-06.

For the 1999 RAE, institutions provided a self-assessment 'Research Strategy Statement' which includes a listing of research funding sources, distribution of research activities, and changes expected from the 1996 assessment. Other information to be submitted to the assessment panels includes a table of nominated staff and their outputs from the prior three years. Each eligible staff member may submit up to five best research output items that meet all the following criteria: "it contains an element of innovation, the output and the process involved contribute to scholarship; it is publicly accessible; and it is of interest to peers and is generalizable". The RAE panels then assess the submission as a whole and assign a score for the cost centre. These scores were not published and results were only made known to the individual institutions.

The RAE process and methodology was reviewed in 2004. Results from the review indicate that institutions support having an RAE but prefer a more comprehensive system to take account of the different roles and missions, research strategies and infrastructure of institutions. In response to criticism regarding a focus on basic/traditional research to the detriment of some discipline areas (Education, Arts & Humanities, Social Sciences and Business) and more applied research outputs, the UGC decided to reinforce the use of the Carnegie definition of scholarship. The 2006 RAE will identify and measure on the basis of outputs, the following kinds of scholarship:

(a)   Scholarship of discovery;

(b)   Scholarship of integration;

(c)   Scholarship of application; and

(d)   Scholarship of teaching.

Institutions determine which staff would be assessed in a given unit; however the assessment result would still be based on the total number of staff because the number assessed as research active is divided by the total number of staff.

Exhibit 3: Hong Kong's Research Assessment Exercise, (Source:
http://www.ugc.edu.hk/english/documents/papers/HKRAE_6.html, UGC, 2004)

National Ranking Models not related to Research Funding

The Netherlands and Germany have introduced research quality assessments/rankings focused on research excellence (Netherlands), or a ranking of research institutions based on proxy measures of quality (Germany), instead of funding (see Exhibits 4 and 5).

The National Evaluation System for Publicly Funded Research has three objectives with regard to research and research management:

1. Improvement of the quality of research through an assessment carried out according to international standards of quality and relevance;
2. Improvement of research management and leadership; and
3. Accountability to higher levels of the research organisations and funding agencies, government and society at large. (VSNU 2003, p. 5).

The evaluation system is a combination of retrospective and prospective analysis, with an emphasis on prospective. There is a triennial self-evaluation, followed by the external evaluation once every six years. The units of evaluation may vary between the universities, the Royal Netherlands Academy of Arts and Science (KNAW) and the Netherlands Organisation for Scientific Research (NWO), but all will be based on the definition of an 'institute' as "a group of researchers with an articulated shared mission operating under the same management". Each 'institute' will have a director, board and/or research leaders with final responsibility. It is possible that researchers are associated with more than one institute and one principle of the evaluation is that information about groups, programmes or parts of the institute evaluated in one evaluation be used in another.

The institute provides a self-evaluation document containing qualitative and quantitative information for the preceding five years and current year. This includes information about funding, research staff, research training, processes of collaboration, analyses of academic reputation, research culture and climate and external validation.

The assessment criteria used in the evaluation are:

1. Quality (international recognition and innovative potential);
2. Productivity (scientific output);
3. Relevance (scientific and socio-economic impact); and
4. Vitality and feasibility (flexibility, management and leadership).

These criteria are scored by the evaluation committee on a five-point scale of excellent to unsatisfactory. The boards of the research organisation (university, Academy, etc.) organise the evaluations autonomously and publish a schedule of evaluations. The boards are also responsible for selecting the evaluation committee. Every step of the evaluation, including the reports, is made public. The only exceptions to this occurs when the reporting involves sensitive personnel information and commentary.

There is no funding attached to this process and the key driver is the impact of the reports on reputation. Criticisms of this process are that it is expensive and time-consuming. The three research organisations (universities, KNAW and NWO) are aiming to have a national research information system to store all relevant data, but at the time of the last evaluation this was not in place.

Exhibit 4: The Netherlands' National Evaluation System for Publicly Funded Research, (Source: www.vsnu.nl, www.nwo.nl, www.knaw.nl)

Every three years the German Research Foundation (DFG) presents a report on the distribution of funding for universities and other research organisations knows as the "DFG ranking". The 1997 and 2000 reports focused on the distribution of funding approvals. The 2003 ranking measures have been broadened to include details on the reviewers, international research including numbers of visiting scholars and institutional collaborations as well as third-party funding. Bibliometric analyses are also included. The rankings are not related to funding. Choosing to rank institutions according to their funding receipts is "justified because the financial resources of the DFG are awarded only to those scientists and academics, who with their projects, join in the ever-intensifying competition between the best ideas and in some programmes also between the best structures for research and the training of young researchers" (DFG Ranking Foreword, p. 5).

More recently, the DFG has approved a proposal from the German Science Council for a rating system for Germany's publicly funded research institutes. The ratings will be carried out by "independent experts" rating research laboratories/departments in up to 50 disciplines, on a seven-point scale. The ratings are expected to be carried out every five to six years. Ratings are also expected to affect future funding decisions, but are not meant to become the decisive factor. The highest mark will be given only if more than 50% of a department's research activities are considered to be of international quality; the lowest mark will be awarded if the outputs are below 'national standards'. The indicators will be used in a weighted fashion varied according to the discipline being measured.

Exhibit 5: The German Research Foundation Funding Ranking, (Source: DFG, 2004)

Whilst it's unclear what proportion of these frameworks have influenced the RQF as a whole, we infer that Australia appears to be inclined towards the funding based model. If this tendency is correct, then it is imperative that industries and other related forums are actively involved in further development and refinement of the RQF.

A View through the European Lens for Australia

In this section we look retrospectively at the recommendations made by UNESCO World report (2005), which suggests governments, private sector and civil society need to be involved in fostering knowledge economies. The recommendations emphasise the quantitative investments to be made in innovation, research and scientific advancements. For example, there is a recommendation that a substantial share of the GDP should to be earmarked for education and research. Non-government and private sector organisations have been urged to participate in the growth of knowledge economies through funding of and investment in research and through establishing collaborative partnerships.

A key highlight of the recommendations is to increase the access to information communication technologies, so to effect better knowledge sharing. To achieve this there is an enhanced need for fostering entrepreneurship and innovation as well as enabling policy development. Conversely, the report highlights the need for measures that focus on education, culture and communication – these would assess whether economies measure up to being knowledge-based. Our inference is that innovation and entrepreneurship are key dimensions and need to be fostered by economies in building a suitable framework. In light of this we examine the European framework for key learnings that may be relevant to the Australian context.

In March 2000 the Lisbon European Council defined a strategic framework to prepare Europe for the transition to knowledge-based economies. The focus was on structural reforms to foster competitiveness and innovation and to introduce better policies aimed at investing in people – these modernised the European social model (*which was characterised by more stable jobs; opportunities for reskilling; regular wage increases; regular and shorter working hours; improving working conditions; diversified social protection against various risks; collective bargaining, information and consultation rights*, Rodrigues, 2003:106) and combated social exclusion. In developing this, an open method of coordination was elaborated. There is a European policy for employment which gets adjusted at national levels. Keeping due regard to national differences, a process of cooperation was introduced to bridge the social divisions (Rodrigues, 2003).

In total a list of 36 structural indicators were presented in the European Commission Report (COM, 2001) that followed the framework. Innovation and research investments were emphasised, as was social cohesion by including all genders and age groups in employment. These aspects appear to correlate as the accessibility of communication was fostered by venture capital funding for innovation in ICTs. Progress made up to January 2003 (Rodrigues, 2003) indicated that ambitious developments concerning innovation policy had been submitted by the European Commission, and since been approved. Another highlight concerned the multi-annual Program for Enterprise and the European Charter for Small Enterprises, which formed the basis for the benchmarking exercise on enterprise policy by the European Commission (EC 2000a). The Innovation 2000 initiative launched by the European Investment Bank supported a wide range of projects in member states (European Investment Bank, 2000). From this appraisal we derive that:

- To achieve the capabilities of a knowledge economy, the European strategic framework identified the need to foster innovation and entrepreneurship. These were expected to help address social exclusion and inequalities in terms of employment, participation in the civic society and imbalances among member states of the European Union.
- To foster the culture of innovation and entrepreneurship, investments into public education from the , funding for scientific research and policies that enable equal access, were introduced. Moreover, venture capital investments were fostered.

Further, we examined the eEuropean Action Plan (EC 2000b), better known as e-Europe, which aimed to develop an information-based society and knowledge-based economy. The main objectives of the eEurope were to: enable a cheaper, faster, and more secure Internet; invest in people and skills; and stimulate the use of the Internet through acceleration of eCommerce, government online access to citizens, health online and intelligent transport systems. In the EC (2002) report, written two years after the action plan, some relevant progress was visible. Internet penetration in households had doubled. A telecom framework was in place. Internet access prices had fallen significantly. Almost all schools and organisations were connected. Indeed, Europe had the world's fastest research backbone network. From this brief we derive that the:

- European framework enabled better access and participation by all its members to participate in the knowledge-based economy.

Focusing on the research dimension that has been highlighted in the growth of knowledge economies in the European context, the framework identified that fostering joint research is one way to bridge the divide and social exclusions. One approach to facilitate this is to network existing centres of research excellence by using virtual methods. The interdependency of fundamental and applied research has been particularly regarded by the European Framework. For example, fundamental research undertaken by educational institutions can be translated into applied research in industries. This concept has been given due weighting by the EC framework. The key is to increase the participation of businesses in applied research by collaborating with universities and funding the research. From this we derive that the:

- European framework has been relatively successful in addressing the research dimension that is prominent for knowledge-based economies through fostering collaboration between educational institutions and industries.

The recent innovation scoreboard for the European Union (EC, 2001) reveals that EU leads the supply of new science and Engineering graduates, public research and development, and information communication investments. In the new objectives for educational policies, the European Council proposed an annual increase in per capita investment in human resources. The emphasis on transparent formal diplomas and certificates has heightened, as has the need for formal life long learning. Furthermore, the social model in the framework has been revised to address social exclusions. From a preliminary assessment the employment growth in 2000 was the strongest in the past decade, with nearly three million jobs being created. The key driver in achieving this was the knowledge intensive sectors. From this we derive that:

- Using this framework reasonable progress has been noted in addressing social exclusion, which is a key deterrent to knowledge economies.

Considering Australia has not finalised an equivalent framework to eEurope, the RQF can only be regarded as part of this larger framework. The following issues from our research should be considered for the RQF and possibly, for a future knowledge economy framework.

- Enhanced attention to collaboration between fundamental and applied research, through enabling policies from the European framework. Although not as diverse in nature, the same principles could foster innovative research in .
- The policy of investing in public health, education, social inclusion and nurturing entrepreneurship is a key theme for .
- Given that the Australian framework needs to be effective in fostering the knowledge economy, a vital lesson concerns sourcing qualified funding for research and fostering industry-education partnerships. The knowledge dissemination possible via this exercise is invaluable.
- Compared to , lacks human capital, human resources and the infrastructure to promote collaboration within society. The population is small and resources are scarce. Although through immigration is a multicultural nation, it imposes a common language for communication. This aspect could be leveraged upon for fostering knowledge-sharing within the economy, without ignoring the enrichment possible from its multicultural population.
- As evident from the success of the EU framework, the digital divide and social exclusion need to be addressed via policies and industry collaboration.

Outlook

In this research we have briefly examined the framework policies that enable fostering of knowledge-based economies. Our focus has been on Australia where it was found that the innovation dimension has been highlighted for building this nation into a knowledge-based economy. Whilst the recently released framework has yet to be implemented, its parallels to the European framework gave credence to examining the lessons learnt which could be applied to Australia. Our preliminary appraisal suggests the heightened need for a policy framework that fosters relevant infrastructure. This is possible via industry- and education-related linkages that foster applied research. Consequently, we propose that the RQF framework should closely consider funding innovation and facilitating applied research.

Since the Australian framework itself is emerging, we propose further research and a closer examination at various stages during implementation. This work has the potential to provide timely strategies for enhancing Australia's journey towards building a knowledge framework.

References

ABS, *1377.0 - Measures of a Knowledge-based Economy and Society , Australia - Electronic Delivery*, URL: http://www.census.gov.au/Austats/abs@.nsf/Previousproducts/1377.0Model%20Release12003?opendocument&tabname=Summary&prodno=1377.0&issue=2003&num=&view=, 2003.

ABS, *Indicators for Innovation and Entrepreneurship Dimension*, pp 22-23, 2002.

APEC Economic Committee, Towards Knowledge-based Economies in APEC, *APEC Secretariat*, Singapore., URL: http://www.apecsec.org.sg, 2000.

Bell D,*The Coming of the post industrial society: A venture of social forecasting*, Heinemann, London, 1974

Blommaert, J,*Discourse*, Cambridge University Press, Cambridge, 2005.

Castells M and Kiselvova E, 'Russian federalism and Siberian Regionalism, 1990-2000', *City: Analysis of Urban Trends, Culture, Theory, Policy, Action*, Volume 4, pp 175-178, 2000.

Castells M, *The rise of network society*, Blackwell Publishers, Malden, 1996.

Clarke T and Clegg S,*Changing Paradigms: The transformation of Management Knowledge for the 21 st century*, Harper Collins Business, London, 2000.

COM, European Commission, Structural Indicators, COM (2001) 619 final, 30th October, 2001

Commonwealth of Australia, Research Quality Framework: Assessing the quality and impact of research in Australia, Issues Paper, March, 2005.

DCITA, 'Australia's Strategic Framework for the Information Economy 2004-2006: Opportunities and Challenges for the Information Age'*,* URL: http://www.dcita.gov.au/ie/framework, 2004.

Dewey, J, *Experience and Education*, Macmillan,New York, 1933.

Drucker PF, *Post Capitalist Society*, Butterwoth Heinemann, Oxford, 1993

Drucker PF, *The new realities: In Government and Politics, in Economics and Business, in Society and World View*, Harper and Row, New York, 1989

EC, 'Commission staff working paper, 2001', *Innovation scoreboard, SEC 1414*, 14th September, 2001

EC, 'eEurope 2002 An Information Society for All', *Action plan prepared for Feira European Council*, 14th June, 2000b

EC, 'eEurope benchmarking report', *ref.COM 62 final*, 05th February, 2002.

EC, *1842 Benchmarking Enterprise Policy- First results from the scoreboard*, SEC (2000), 1842, 27th October, 2000a

Europa, *Education and Training 2010, Diverse Systems, Shared goals*, URL: http://europa.eu.int/comm/education/policies/2010/et_2010_en.html , 2006.

European Commission, *European Innovation Scorecard: Innovation and Technology Transfer*, Special Edition, 2000

European Investment Bank, 'Innovation 2000 Initiative', *Council of the European Union, 6442/00*, 15th March, 2000

Friedman, K, 'Leaders for the Knowledge Economy', in *Intelligent Management in the Knowledge Economy*, Junghagen S and Linderoth HCJ (eds), Edward Elgar Publishing, UK, pp 19-35, 2003

Graham P, 'Hypercapitalism: A political economy of Informational Idealism', *New Media and Society,* Volume 2, pp 131-156, 2000

Higgott R,'Economics, Politics and (International) Political Economy: The need for a Balanced Diet in an Era of Globalisation', *New Political Economy*, Volume 4, pp 23-36, 1999

Hirst P and Thompson G,Globalisation in Question: The International Economy and the Possibilities of Governance, Blackwell Publishers, Cambridge, 1996

Hoenisch, S, A Wittgensteinian Approach to Discourse Analysis, *Critisicm.com*, URL: http://www.criticism.com/da/lw_da.html, 2006

Husen, T, *The Learning Society*, Methuen Publications, London, 1974

Hutchins R, *The Learning Society*, Penguin Publications, London, 1968

Locke, T, *Critical Discourse Analysis*, Continuum, London, 2004

Machlup F, Knowledge: Its creation, Distribution, and Economic Significance, Princeton University Press, Princeton, 1980

OECD, Policy frameworks for the knowledge-based economy: ICTS, Innovation and Human Resources, *OECD Global Forum on the Knowledge Economy*, 16-17 SEPTEMBER, BRASILIA, Issues Paper, 2002

OECD, *Science, Technology and Industry Scorecard: Towards a Knowledge-based Economy*, Paris, 2001

OECD, The Knowledge Economy- Science, Technology and Industry, *Outlook*, Paris, 1996

Palmquist, Discourse Analysis, *Courses,* URL: http://www.ischool.utexas.edu/~palmquis/courses/discourse.htm, 2005.

Petrella R,'Globalisation and Internationalisation: The dynamics of the Emerging World Order', in *States against markets: The Limits of Globalisation*, Boyer R, Drache D (Eds), Routledge, London, 1996

Polanyi M, *The Great Transformation*, Beacon Press, (reprint in 1980), Boston, 1944

Rifkin J, *The Age of Access: The New Culture of Hypercapitalism Where All of Life is a Paid-for Experience*, JP Tarcher Publishing, New York, 2000

Rodrigues M J,*European Policies for Knowledge Economy*, Edward Elgar Publications Limited, UK, 2003

Romer, P M, Increasing Returns and Long-run Growth, *Journal of Political Economy*, Volume 94, Issue 5, pp 1002-1037, 1986

Romer, PM, EndogenousTechnological Change, *Journal of Political Economy* 98(5), pp. 71-102, 1990

Rooney D, Hearn G, Mandeville T, Joseph R, *Public Policy in Knowledge-based Economies: Foundations and Frameworks*, Edward Elgar Publishing Limited, UK, 2003

Schiermeier, Q, 'Grade expectations for German research institutes', *Nature*, 18th November, p. 260, 2004

UNESCO World Report, *Towards Knowledge Societies*, Electronic publication of United Nations Educational, Scientific and Cultural Organisation, Paris, URL: http://www.unesco.org/publications, 2005

United Kingdom Department of Trade and Industry, Secretary of State for Trade and Industry, *Our Competitive Future :Building the Knowledge Economy*, Volume Cm 4176, London, 1998

Weiss, G and Wodak, R (Eds.), *Critical discourse analysis - Theory and interdisciplinarity.* Palgrave Macmillan, Houndmills, UK, 2003

Wittgenstein, L, *Philosophical Investigations*, trans. G.E.M. Anscombe, 3rd ed, Macmillan, New York, 1958

World Bank Institute, *Program on Knowledge for Development, Knowledge Assessment Methodology and Scorecards*. URL: http://www1.worldback.org/poverty/scapital/, 2002

World Bank, World *DevelopmentReport 1998/99: Knowledge for Development*. Washington: World Bank, URL: http://www.worldbank.org/wdr/wdr98/ contents.htm, 1999

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