



Curtin University of Technology  
University of South Australia  
RMIT University  
University of Technology Sydney  
Queensland University of Technology



# **Skill Build – Nation Build**

## **Meeting Australia's Research Workforce Needs**

### **ATN Position Statement**

August 2010

## **ATN UNIVERSITIES:**

**Curtin University**

**RMIT University**

**Queensland University of Technology**

**University of South Australia**

**University of Technology, Sydney**

### **Contact Details:**

Ms Vicki Thomson

Executive Director

Australian Technology Network of Universities (ATN)

GPO Box 2471

Adelaide SA 5001

Ph: 08 8302 9107

E-mail: [vicki.thomson@atn.edu.au](mailto:vicki.thomson@atn.edu.au)

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## **EXECUTIVE SUMMARY**

- Innovation and better economic and social outcomes for Australia can only be achieved by building our national intellectual capacity.
- An ongoing supply of quality researchers is essential for Australia's long term economic strength and positioning on an international scale.
- There is growing concern and evidence that under the status quo, demand for research-trained graduates will outstrip supply. Therefore there is an urgent need for action to address the future supply of the research workforce via expansion and review of Australia's higher degree by research (HDR) training mechanisms.
- Excessive delays to addressing our research workforce requirements will potentially halt Australia's forward economic momentum and international competitiveness.
- A shared partnership and understanding between universities and industry around the critical value of research graduates and the best ways to utilise their capabilities, must be addressed.
- A clear and consistent Australian Government policy, funding and supporting early career researchers and HDR graduates, is critical to retaining and developing the Nation's research workforce.
- It is critical that the Australian Government reassess immigration requirements for international HDR students and research-qualified graduates.

## **PRIORITIES FOR ACTION**

The shape and direction of Government policy that is urgently needed to address key issues is:

- An increase and improvements to Research Training Scheme funding.
- Improvements and changes to migration policies, including additional visa categories.
- A clear definition of "Government" responsibilities to ensure appropriate coordination within and between Government agencies.

## INTRODUCTION

The **Australian Technology Network of Universities (ATN)** represents a coalition of universities who are currently in a cycle of particularly strong growth in research activity and research training.

Our members currently train 7,200 research students and that number is growing 20% faster than the national average. We strongly believe that implementing measures to ensure an ongoing supply of quality researchers is essential for Australia's long-term economic strength and positioning on an international scale.

As such, in terms of its positioning in the context of an overall research and innovation policy environment, the ATN is strongly supportive of a comprehensive and inclusive Research Workforce Strategy which recognises the value of a strong research workforce to the nation's future.

The Australian Government has recently released a consultation paper: *Meeting Australia's research workforce needs*<sup>1</sup> as a first step in shaping a broad agenda to equip Australia with the skilled workforce necessary to face the economic and social challenges for the next few decades.

These challenges include the environment; demographic challenges of ageing and associated health and welfare provision; the need to provide for an internationally competitive innovation-led economy with a highly skilled and employable research workforce; and the need to provide education training to overcome general skill shortages and lift national productivity.

Australia will risk losing its way if inaction is the response to building our research workforce. The risk of inaction is too great and we require a concerted effort by all stakeholders to tackle these challenges head on. At risk is our future economic and social well-being.

The Australian research workforce is spread across all sectors of the economy, including industry and research commercialisation sectors; the public sector and semi-government authorities; the higher education sector; and research institutes.

The increasing demand for research trained graduates in the higher education and research sectors and business/industry is well established. **There is now evidence that under the status quo, demand for research-trained graduates will outstrip supply.**

There are a range of issues raised in the current Research Workforce Strategy that clearly need to be addressed if Australia is to build a strong innovation system with the quantity, breadth and depth of research-qualified individuals it requires. **If Australia is to meet its innovation goals, there is an immediate and pressing need for action to be taken on these issues.**

Quality researchers are not produced overnight and any excessive delay in addressing our research workforce requirements has the potential to arrest Australia's forward economic momentum and international competitiveness. While universities are a major employer of research graduates, shortages also affect business, industry and the community – not only directly with a lack of

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<sup>1</sup> Department of Innovation, Industry, Science and Research, *Meeting Australia's research workforce needs: A consultation paper to inform the development of the Australian Government's research workforce strategy*, May 2010  
<http://www.innovation.gov.au/Section/Research/Documents/ResearchWorkforceStrategyConsultationPaper.pdf>

research-qualified individuals to work in those settings, but indirectly via their role in training and educating the rest of our skilled workers. To this extent, the research workforce strategy must support a dynamic economy which will require graduates in new areas of innovation.

In particular, there is a strong need for action to be taken to address the future supply of the research workforce via expansion and review of Australia's HDR training mechanisms. The inherent delay involved in the recruitment, training and career development of the next generation of researchers means that immediate attention must be given to this issue, in order to supply our needs for the next decade and beyond.

In addition, with the immigration rate currently a subject of intense political debate, it is critical to ensure changes to Australia's immigration policies are not short-sighted and adversely affect pathways by which universities also supply Australia's research workforce – either through the recruitment of overseas academics, or via international students undertaking or transitioning to HDR degrees. These international research graduates represent a valuable potential resource and should be encouraged to study here through favourable visa arrangements.

While action in all aspects of the Research Workforce Strategy is urgent, the ATN sees these two issues to be of special priority. In the case of the former, the necessary changes will take years to show a result and must begin now. For the latter, delay risks reputational damage that we cannot afford in a global environment of strong and increasing competition.

## **SUMMARY OF ATN POSITION**

### **Employer demand for researchers**

#### Challenges

- The importance of universities producing research graduates who possess the required ‘associated skills’ to be effective and productive beyond conducting research itself must not be underestimated.
- Analysis of the impediments to researchers progressing their career is needed, and there must be a shared commitment and agenda between universities and business/industry.

#### Solutions

- Industry incentives which include tax incentives for HDR graduate employment should be considered.
- Consideration should be given to establishment of institutional and national programs for career and generic skills development for research trainees and for national innovation scholarships.

### **Supply of researchers to Australia**

#### Challenges

- Australia is competing globally for students, and international students are a valuable component of the HDR equation.
- The high quality of Australia’s emerging research in a diverse range of disciplines must be maintained.

#### Solutions

- The Australian Government must reassess immigration requirements for international HDR students and research-qualified graduates.
- Improvements to HDR funding mechanisms must be examined.
- The intention to extend the funding period for Australian Post Graduate Awards (APAs) to four years is strongly endorsed.

### **Research career pathways**

#### Challenges

- It is clear that universities’ capacity to provide productive career paths for researchers is intricately tied to the general funding flows to universities.

#### Solutions

- The opportunities identified to encourage researcher mobility should be brought together conceptually, and connected effectively and efficiently with researchers in the context of ongoing professional and career development.

## EMPLOYER DEMAND FOR RESEARCHERS

Building on the issues highlighted in the proposed Research Workforce Strategy, there are a number of aspects around employer demand for researchers that the ATN would like to expand on, as well as clear strategies that should be considered to address key challenges in this area.

### Challenges

**The importance of universities producing research graduates who possess the required ‘associated skills’ to be effective and productive beyond conducting research itself must not be underestimated**

**In particular, the prevailing opinion of business and industry is that these skills are not only vitally important, but that they are an area of concern when recruiting researchers.** As such, they are vital to driving Australia’s innovation agenda.

The desirability of these generic skills is well established, however embedding them into HDR training has been inconsistent across the sector. We believe that such skills can be embedded within the scope of a 4-year PhD program, without the need for additional time added to the RTS funded period for such a degree.

- **Analysis of the impediments to researchers progressing their career is needed, and there must be a shared commitment and agenda between universities and business/industry.**

In addition to the identified issues relating to changes in the scale, scope and nature of demand, it is important to recognise the challenges inherent in the contexts within which demand is created. While it is fair to say that the value of research-trained employees is well understood in the academic setting, such an understanding is not widespread in industry.

This has led to industry representatives over the past decade or more articulating some of the changes required in research training; and many universities have responded strongly to this agenda. However, industry is less clear about the changes required in an industry context to improve uptake of the skills and capabilities of research-trained employees.

The PhD as a ‘training through research’ as well as a ‘training in research’ is not well understood in industry more broadly. This means that industry-based employers underestimate the contribution PhD graduates can make to innovation and the bottom line. An analysis of more than 40 UK studies evaluating stakeholder feedback on research training presents an alarming picture of the misconceptions held by wide sections of industry about the capabilities of PhD graduates<sup>2</sup>.

The disconnect in understanding between universities and industry around the value that research graduates can add, and the best ways to utilise their capabilities, must be addressed. Beyond the

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<sup>2</sup>The Rugby Team, *Evaluating the impact of developing researcher skills. Employers’ views of researchers’ skills. September 2007. A Comprehensive review of the existing literature into employers’ views of the skills of early career researchers*  
[http://www.grad.ac.uk/downloads/documents/Reports/2007%20publications/Employers'%20views%20of%20researchers'%20skills%20\(pdf\).pdf](http://www.grad.ac.uk/downloads/documents/Reports/2007%20publications/Employers'%20views%20of%20researchers'%20skills%20(pdf).pdf)

increase in numbers needed, industry is generally not able to fully exploit the capabilities of those researchers they employ.

In universities, on the other hand, there is an issue with the low level of job security experienced by early career researchers. This has made it difficult to attract and retain HDR graduates in research careers. A growing reliance on casual and contract researchers at universities has limited the opportunities of HDR graduates to secure longer-term experience, and the ability to undertake the full range of research career activities, such as professional development, supervising HDR students and securing competitive grants.

Such analysis of impediments is equally important for industry. Industry must explore industry-related barriers to successful integration of research-trained graduates, and note that the work context for all research-trained employees must change if the full benefit of their skills and capabilities is to be derived at the enterprise level.

### **Solutions**

- **Industry incentives which include tax incentives for HDR graduate employment should be considered.**

Conversion from HDR completion to early career researcher is a critical step in the development of researchers. The opportunity for Australia lies in securing HDR graduates in the research workforce by offering attractive and internationally competitive early career research positions in academia, research organisations and industry. Many western countries have enjoyed a steady supply of researchers from countries such as China and India, especially in science and engineering disciplines. However, there is evidence that salary levels and research infrastructure in these countries are improving rapidly and there will be greater competition for such talent.

- **Consideration should be given to establishment of institutional and national programs for career and generic skills development for research trainees and for national innovation scholarships.**

### Institutional Programs

There are significant opportunities to value-add to a PhD candidature through development of both generic capabilities and specific workplace experiences which ensure that the PhD graduate is workplace-ready, whether that workplace is inside or outside academia. Is it time for Australia to invest in 'The Engaged PhD' as a means of building collaborations, partnerships and work-readiness across a broader spectrum of employment situations, whilst supporting the recruitment of a new generation of innovators and leaders to contribute to the future economic and social fabric of Australia? This model of a PhD does not trade excellence in the individual or project; it builds on the calibre of the student and the supervisor to drive the innovation agenda, an agenda that increasingly must value partnership with non-university organisations and the development of broader skills in the candidate.

An 'engaged' PhD would offer the doctoral student more formal opportunities through the course of their degree to engage in workplaces of direct relevance to their future career and require them to spend periods of time outside of their own institution. Opportunities could include engaging in the classroom as an 'academic in training', engaging with relevant industry organisations, government

departments and business partners, or engaging in international research and R&D environments. It should be noted that the elements of such programs are already in place for many CRCs, where students receiving financial support from the CRC often work in industry contexts, attend workshops with industry leaders and develop a network of employment opportunities in that industry for access on graduation.

Compact discussions between universities and DIISR would allow each university to outline which elements of engagement in its doctoral training program fit with its mission (regional, national and international), to specify the contribution of the institution to building Australia's research and innovation workforce and to explicitly describe the institutional strategy to include engagement opportunities for its doctoral graduates. In other words, institutions would be asked how they would change the focus of PhD training from *Excellence* to *Excellence<sup>plus</sup>* – excellence plus engagement, innovation, and relevance.

#### National Programs

HDR graduates are well networked and have a good understanding of the employment opportunities that are available both in Australia and internationally. However experience within the ATN shows that there is much benefit to HDR students from a systematic approach to the provision of career development advice during candidature, given the wide range of employment and career paths followed by research-trained graduates. The ATN's purpose-built 'Maximising Your Career' program for HDR students attracts hundreds of participants annually, and is a model which could be provided nationally.

The ATN Learning Employment Aptitudes Program (LEAP) is recognised as an exemplar in this area and, indeed is referenced as part of the development of a Research Workforce Strategy. This pioneering program, designed to add value to research training within the ATN universities by building a focus on careers, has been running collaboratively across the ATN universities for eight years; and has received the 2007 ALTC (then Carrick Institute) Award for Postgraduate Education.

LEAP is now delivered under the umbrella of the ATN's e-Grad School which was established with an advisory board with representation from the Business Council of Australia to focus on the employability skills of PhD graduates. The e-Grad School has provided commercialisation, project management, leadership and communication skills development for selected PhD students from 17 Australian universities over the life cycle of the Commercialisation Training Scheme. This venture has established a proven delivery platform that with adequate support from the Commonwealth Government could potentially underpin a national program of generic skills development.

#### National Innovation Scholarships

It could be timely to consider developing a National Industry Innovation Scholarship Program which would include support for up to a total of 500 National Industry Innovation PhD Scholarships recruited during a 5 year period, with a \$30,000 p.a. stipend for each of 4 years, in areas designated as important for the future of Australian industry sector.

The National Industry Innovation Scholars would be supported as a cohort and would engage in industry-led or exploratory strategic projects supported by an Industry Innovation Scholar Professional Development Program designed to provide industry context, connection and the potential for employment on graduation. As an example, up to 50 of such Scholarships could be awarded in the automotive industry for students from a range of disciplinary backgrounds able to

contribute to the innovation agenda required to transform the automotive industry (such as in projects aligned with the Green Car Innovation Fund) and with a nominated university/public research agency and industry supervisor.

The final number of scholarships would be determined through research workforce road-mapping exercises within each industry sector. The exact way to allocate innovation scholarships needs careful consideration, but it is possible a companion scheme to ERA, Excellence in Innovation Australia (EIA), could be developed and scholarships allocated on this basis - or alternatively on JRE performance funding. The development of EIA could perhaps be informed by the outcomes of the now ongoing pilot project on Assessment of Impact that is being conducted in the UK or by the sophisticated work of the Leiden group that includes, amongst other things, the number of publications co-authored between university and industry employees.

## SUPPLY OF RESEARCHERS TO AUSTRALIA

**Increasing the pool of HDR students and ensuring the highest number of timely completions is a critical challenge for the Australian research community. As the fundamental issue on which meeting the other challenges for Australia's research workforce needs depends, the ATN sees this area as of particular importance.**

### Challenges

- **Australia is competing globally for students and international students are a valuable component of the HDR equation.**

The ATN sees international students as a pool of talented and qualified people that will greatly assist in the quest to meet Australia's future innovation needs. Of the 42,300 international higher education students who completed their course in 2004, 34% remained in Australia. Increasing the proportion of these students in our higher education system and encouraging them to participate in research programs will have a significant positive impact on Australia's innovation capacity, as well as assisting ensure our university sector continues to maintain a strong global focus.

- **The high quality of Australia's emerging research in a diverse range of disciplines must be maintained**

While the emphasis on 'critical enabling sciences and core disciplines' is acknowledged as important, it is vital to avoid the pitfalls of over-concentration of research training effort. Australian universities undertake research in a diverse range of disciplines and in interdisciplinary fields, which must be recognised. Likewise, the supply of HDR graduates needs to be increased across all fields. This must include emerging areas of research such as creative industries, nursing, journalism and others which are making profound contributions to contemporary society and the economy.

Furthermore, it is vital to recognise the importance of a nuanced approach to research workforce needs and priorities in particular fields. It is arguable for example that in the health and medical field, insufficient attention had in the past been applied by the NHMRC to research and research training in disease prevention and health promotion. Such examples, calling for a fine-grained understanding of niche areas to underpin investment, can be found in all fields.

### Solutions

Australia's growing demand for research trained graduates across the higher education and research sectors and business/industry is well established. There is growing concern and evidence that under the status quo, demand for research-trained graduates in areas both within and outside the higher education sector will outstrip supply.

The recent Allens Consulting Group *Employer Demand for Researchers in Australia* study has highlighted the high demand for researchers over the next decade. With 70% of respondents to the study anticipating growth in their demand for researchers, but half anticipating that demand will be greater than supply and a further 30% anticipating patchy supply of researchers, there is clearly a great deal of uncertainty amongst employers about our ability to maintain Australia's research and innovation capacity. The Access Economics report, *Australia's Future Research Workforce: supply,*

*demand and influence factors*, likewise outlines a number of scenarios where demand for researchers will exceed supply.

- **It is critical that Australian Government reassess immigration requirements for international HDR students and research-qualified graduates.**

As one of the avenues by which the supply of researchers will be addressed, immigration requirements for international HDR students and research-qualified graduates must be reviewed. This is particularly important when the current moves towards decreasing immigration as a whole are taken into account, and the visa changes that are likely to ensue as a result.

Australian universities are, by necessity, active recruiters of overseas staff and more needs to be done to support this activity. As the academic workforce ages and departs the sector in increasing numbers in the next 15 years, the university sector will increasingly rely upon international migration to staff its institutions (as it did in the academic staff recruitment crises of 1960s-1970s). It will be important to ensure that outstanding overseas students completing higher degree studies in Australia seek to remain and gain permanent residency and to increase the number of such students doing so.

It has been clearly demonstrated by modelling undertaken for government that the research workforce is a chronic skills shortage area. Given that these shortages will cripple our ability to both compete globally in the knowledge economy, as well as for universities to fulfil participation targets, recruitment of overseas staff and high-quality international students will be an important tactic to offset this shortage.

Relaxing entry regulations and reforming the visa process for these staff and students would greatly increase the attractiveness of Australia as a destination, in an increasingly competitive international market. For example, salaries for researchers in China and India are tending upwards, which will, over time, limit our ability to recruit from those countries.

As one example of difficulties in the current system, some immigrant researchers encounter difficulties when seeking to have their dependents join them in Australia. Given the relatively small numbers, as well as the high value to the Australian economy of such researchers, this process should be greatly streamlined.

In addition, currently the age threshold for Permanent Residency (PR) is 45 years, an age at which many academics are in their research and teaching prime. In fact, it is likely that the unique experience and expertise required by the sector would often be more readily found in candidates aged over 45.

**The ATN strongly recommends that consideration should be given to extending the age limit for permanent academic staff migration.**

Beyond modifications to existing visa arrangements, however, it is vitally important that more stringent vetting of international students and tighter immigration restrictions do not affect either the desirability of Australia as a destination for higher degree by research study, or impose unnecessary and frustrating processes in order to do so. We need to take steps to encourage these individuals to come to Australia.

**The ATN recommends that new visa categories be explored in order to streamline and facilitate the entry of both international HDR students and research-qualified immigrants.**

**We also call for a review of scholarship support mechanisms for international HDR students studying in Australia.**

- **Improvements to HDR funding mechanisms should be investigated in the near future.**

Strategies to improve HDR funding, primarily the scale of RTS funding and its mechanisms, must be a high priority. The long lead times for recruitment, training and career development of researchers mean that changes should be made immediately in order to begin making systemic changes over the next decade. They should not be a “medium term” priority.

#### The Importance of Building Capacity

In the face of a requirement to build the provision of research trained graduates there is a need to increase the capacity of existing providers of doctorate training. If Australia is to ensure that the provision of the next generation of research and innovation leaders is not limited to a narrow geographic region, specific institutional type or a limited range of disciplinary-focused research, a broad suite of universities must be engaged in PhD training. Importantly, it is indisputable that PhD training should only take place in high-quality environments. Institutions will therefore face strategic decisions about how to meet agreed requirements in specific research areas. This issue and that of geographical spread can possibly best be addressed through the concept of world class research concentrations.

A sustainable approach to building high class research training hubs to result in enhanced spill-over of global knowledge across Australia would be to aim to build up to 1000 world-class research concentrations, and ensure that national funding strategies do not discourage the emergence of such concentrations wherever they are located – either institutionally or regionally. Such world-class research concentrations could play a lead role in developing exemplar programs for the training of the next generation of research and innovation leaders.

It is inevitable that institutions will be differentiated by the number of world-class concentrations they can maintain and manage to build. Some institutions may manage to create only very few world-class concentrations, others perhaps readily in excess of 50. However, it is arguable that a dynamic system in which individual institutions can build such concentrations will create the best overall capacity for Australia in terms of innovative capacity, competitive drive to perform at the highest level and ability to differentiate.

#### The Importance of the Quality of the Research Environment

The majority of training will continue to happen in Australian universities and it is a legitimate question to ask how a PhD student, funders of higher education and future employers can and should ascertain whether a provider of doctorate by research training is appropriate for that task. While it should be absolutely clear that PhD training must be confined to high-quality research environments (as in world class research concentrations as defined above) and provided only by quality supervisors, the criteria for defining those require careful consideration if Australia is not to drastically limit its innovation potential.

Currently there is no accepted key criterion for where doctoral training should be performed and for how well it is likely to be performed. It has been suggested that measures derived from the Excellence in Research for Australia (ERA) exercise could help serve such a purpose. There is now broad understanding across the sector that, while ERA measures are likely to provide a view of research strength in specific disciplinary fields in different institutions, it has not been designed to focus on the full suite of features of a research environment which are important for high-quality research training, including multidisciplinary.

Furthermore, because of its decade-long 'shadow' of both retrospectivity and forward application, it does not allow the full view of the present or potential research strength of an institution that is relevant for research training. It is interesting to note that the RAE, after more than 20 years of application in the UK, has not been used to regulate the provision of HDR training except through the opportunities that increased RAE funding provides an institution for enhancing its PhD training capacity.

Any assessment of the quality of the research environment within which research training occurs has to be dynamic, and while elements of ERA almost certainly will be useful in contributing towards an understanding of what constitutes an appropriate training environment, it was not designed to serve such a purpose on its own.

A successfully executed ERA should be part of a basket of measures that we use to ensure that the inevitable growth in demand for HDR training is met by quality research environments only. However, it must be done in such a way that emerging areas in which universities decide to invest strategically to differentiate themselves are not caught out. In recent years there have been several examples of how individual areas in some newer universities have been developed into top national research concentrations of high international standing, because the respective universities have decided to invest in these fields. Areas at Swinburne University of Technology and at the University of South Australia, where recently an ARC Laureate Fellow and an NHMRC Australia Fellow respectively have been awarded, illustrate this point.

The existence of a number of institutions, including but not limited to ATN universities, that have been emerging over the past decade to quickly build research capacity and a strong researcher base, underscores this point. Many of these universities would have significantly improved research outcomes today than ERA will show, and this will be an ongoing issue.

In addition, HDR supervision must be recognised as one of the pillars of academic performance and institutional cultures built on research-led teaching. As such, quality research training should be acknowledged wherever it occurs. Noting that caveat, we support a review of the existing RTS which will result in increased funding availability for domestic students.

#### The Importance of the Quality of Research Training

High quality research training requires a focus on:

1. The quality and the capacity of the Institutional research environment and infrastructure:
2. The quality of HDR programs including methods training and the integration of and opportunities for transferable skills development in research degree programmes; international experience for HDR candidates. A set of PhD attributes could focus effort.
3. Assessment of the educational outcome:

In this context it may be useful to refer to the Quality Assurance Agency for Higher Education Code of Practice for the assurance of academic quality and standards in higher education published in the UK in 2004.

The ATN universities propose that in any reconfiguration of the RTS funding formula, there are four elements which should be incorporated:

1. **Quality of the Research Training Environment** – Recent success in attracting research funding through categories 1 to 4, prestigious fellowships and publication outputs are good starting measures. We also consider that, in relation to the quality of research training, there needs to be accountability in relation to key criteria (cited above). We consider that compact discussions may provide an environment in which these issues can be discussed.

At some point, consideration needs to be given to the role of ERA in assessing the quality of the research environment. Once ERA has the confidence of the sector, there is still the issue that it is retrospective and represents an institution's research capabilities and performance as they were for the period 2003 - 2008. Use of ERA outcomes without adjustment would be static until the next ERA exercise. However research investments by universities and staff movements will substantially change their performance over this time. Such use would stifle innovation. If the Australian economy is to be internationally competitive, we need to support the emerging innovation areas and provide the research workforce to match.

One possible way to adjust ERA results annually for use in the RTS formula might be to adjust the share of ERA by the change in the share of competitive grant income or publications by each university.

2. **Efficiency of Supervision and Support** – a significant emphasis on **completions** underwrites the internationally-recognised efficiency of the Australian system and continues a decade-long emphasis on reducing attrition and improving time to graduation
3. **Engagement with Industry and End Users** – while an immediate focus is the ageing of the research and academic workforce, Australia's ability to innovate and improve productivity will rely on increased levels of R&D activity in business. Such an increase necessitates that there is an alignment with research training and end user needs. A measure based on **Category 2-4 income** will incentivise universities to attend to this requirement. Alignment between production of HDR graduates and the needs of industry needs to be improved. This will underpin long term industry innovation through uptake of HDR graduates and will encourage greater business investment in R&D.
4. **Building Research Training Capacity** – Growth in research training capacity relies, to a significant degree on academic capacity, provided by academics with not just research only, but with teaching/research appointments. Therefore, there needs to be a degree of alignment between growth in research training places and overall academic capacity, otherwise the quality of research supervision will suffer. A measure for academic capacity could also take into account areas of national research training need which could be negotiated through the compact process.

**One potential modification of the system which might also be considered** is a mechanism by which **National Innovation Priorities** could be promoted as needed. If researchers in a particular area are identified as of particular priority, government could retain the right to award RTS places in those areas – separately from the main RTS pool.

- **The intention to extend the funding period for APAs to four years is strongly endorsed.**

The ATN applauds the recent commitments made by government to support HDR training, with the significant increases to both the number of APAs, as well as their value. These revisions, in combination with the intent to extend the APA funding period to four years, show a recognition of the need for universities to expand such training to provide for an increased research workforce.

As one way to take advantage of the increased APA duration, we suggest that it be coupled with a requirement for a **formal component** of generic skills development, embedding these into HDR training to address the very real concerns of employers.

In addition to the APA, all other Commonwealth-funded HDR scholarship schemes (e.g. NHMRC, APA(I), RRDCs) should be subject to the same funding extension and generic skills requirement.

## RESEARCH CAREER PATHWAYS

It is acknowledged that the concept of a research career is weakly defined in Australia. **A clear and consistent Australian Government policy, funding and supporting early career researchers and HDR graduates is critical to retaining and developing the Nation's research workforce.** The opportunities and challenges in this area have been well identified; however we would make the following observations.

### Challenges

ATN universities have worked hard to overcome the research workforce perceptions relating to job satisfaction, workload and career support. However, the interconnected and globalised nature of the research workforce ensures that a number of external factors impact on universities' ability to provide and maintain a productive and viable career path. An increasing reliance on short-term, project based research funding has not only made it particularly difficult to provide additional funding to support projects well-suited to HDR students, it also makes it difficult for research-qualified staff to build a track record in an area of expertise.

A major challenge in providing productive career paths for researchers relates to Australian universities' capacity to attract the best academic talent, particularly at the younger levels. Part of the attraction of a university for productive academics is the nature of the university community within which they and their colleagues work, including the nature of university-wide facilities and infrastructure.

- **In this respect it is clear that universities' capacity to provide productive career paths for researchers is intricately tied to the general funding flows to universities.**

Firstly, public universities remain heavily dependent upon government funding for their operating purposes, which is the source of the salary costs for teaching/research academics.

Secondly, while a number of universities have successfully sourced non-Commonwealth funding for infrastructure development, the recent Commonwealth investment in campus facilities and infrastructure must continue and also increase if researchers are to be attracted to, and retained in, university settings.

Ultimately, unless universities have adequate baseline recurrent funding and the flexibility to secure additional revenue streams, Australia's research, and research training capacity, remains at risk.

### Solutions

- **The opportunities identified to encourage researcher mobility need to be brought together conceptually, and connected effectively and efficiently with researchers in the context of ongoing professional and career development.**

ATN universities have collaborated to begin addressing this need. The online Master of R&D Management is focussed on building knowledge and capacity to support career movement from research to research leadership in and across public and private sector settings. Such course developments to support the professionalisation of research career paths, should be encouraged.

Courses of this nature could be mandated for Postdoctoral and other Fellows within the context of all Commonwealth-funded Fellowship, Program and Centre schemes.

ATN universities also support researchers moving between institutions to build appropriate experience at different career stages. However, universities are competing to secure the brightest and best researchers and it should be acknowledged that institutions invest heavily in attraction and retention strategies both locally and internationally.

Any Australian Government strategies which encourage and facilitate researcher mobility must not work counter to the strategies of individual universities, nor the interests of building a strong Australian-based research community. Importantly, the Australian Government approach to researcher mobility cannot create arrangements which disadvantage some universities, while benefiting others.

## **PRIORITIES FOR ACTION**

Whilst the activities and broad allocation of responsibilities proposed by *Meeting Australia's research workforce needs* are appropriate, the ATN would like to see some aspects developed more specifically, as well as the relative priorities of certain actions brought forward and emphasised more greatly. Specifically:

- **Implementation of increases and improvements to RTS funding must be made a high priority.**

The ATN strongly recommends that the priority action for Government be the development of a strategy which addresses HDR funding. This issue requires immediate attention due to the long lead times that exist for recruitment, training and career development of researchers and certainly should not wait to be implemented until 2014-2016 (as it is under the current priorities).

The supply of researchers is an area of serious concern for Australia and many more will be needed to alleviate that concern. While the ATN strongly welcomes the recent increases to the number of APAs and their stipend, current levels of RTS funding have not been increased significantly in the Budget going forward, from \$603m in 2009/10 through to \$673m in 2013/14 - \$70m over five years, a 2-3% increase per year.

The Access Economics report, *Australia's Future Research Workforce: supply, demand and influence factors*, recently outlined a number of scenarios examining the supply vs. demand for postgraduate research qualifications under a number of difference scenarios.

The results of that analysis showed that under those scenarios where Australia is performing particularly strongly, there will be a shortage of researchers and that this occurs in the immediate period from 2011. The high growth scenario, with strong international collaboration and export markets, and the innovation economy scenario, with R&D activity rising in line with the government's aspirations, both see a significant shortage of qualified individuals to drive that activity.

It is clear, therefore, that if Australia is to realise its aspirations both for a more highly educated populace, and for a vibrant, innovation-driven economy, universities will need to significantly increase the numbers of HDR students they are educating. Such an increase will clearly require greater government investment in research education if universities are to supply the researchers that will be required for Australia's future requirements.

Delaying this until 2014-2016 seriously underestimates the challenges faced currently by universities seeking to contribute to growth in the HDR cohort. At current levels of funding domestic HDR training is a marginal activity, and with a growth strategy in mind this can only further dilute the available funding resources. A strong and relevant funding structure will effectively contribute to the overall success of the strategy.

While examination of the cost of research training is specified as a "Medium Term Action" (and this is welcome), a commitment to a growth - driven increase in total RTS funding is urgently needed and would reduce existing pressures on universities, who currently support additional students via

unsustainable practices, such as cross-subsidisation of research training from funds dedicated to other purposes and a reduction in the resources made available per HDR student.

**An increase in RTS funding is critical if there is to be a further increase in the supply of doctoral graduates in the next decade to meet the foreshadowed increase in demand from a growing knowledge based economy.**

The proposed Research Workforce Strategy highlights the issue of the aging research workforce. The implications of this must be kept in mind, along with the time needed for a researcher to develop in his/her career, which is not a short process. It is critical that new researchers are funded now to ensure that at the 2020 time horizon Australia has appropriately qualified and experienced high-quality researchers who are actively participating in and contributing to the economy.

- **Improvements and changes to migration policies, including additional visa categories must be made a high priority.**

While “Examination of the impact of migration policies on the research workforce and opportunities for improvement” has been identified as an ongoing action in the short, medium and long terms under the current proposed timeline of action, the ATN strongly recommends that strategies to streamline and facilitate the flow of overseas research students and staff be pursued aggressively in the near future.

Beyond steps under the current system that could be taken to assist in this area, given the likely trend in the near future for tighter restrictions on immigration in all forms, it is crucial to ensure that any policy changes do not impose unwanted restrictions on this important source of future researchers and academic staff. Recruitment of overseas staff and high-quality international students is vital to help offset our pending research workforce shortage.

Australia faces increasing competition from other countries in the recruitment of research staff and students from overseas, while simultaneously it is becoming increasingly attractive for many of those individuals to remain in their home countries. Delayed action on these matters will put us in a weak competitive position going forward and will result in both a loss of researchers who might otherwise have come to Australia, during the ‘examination’ period, as well as an erosion of Australia’s image as a desirable destination. This would then have to be recouped.

New visa categories that streamline and facilitate the entry of both international HDR students and research-qualified immigrants should be explored as a matter of priority. The relatively small numbers of applicants that would be seeking entry or residency under these categories would allow significantly shorter delays in processing times, ease of entry and provide an avenue for Australia to demonstrate to these highly-desirable individuals that we value and desire their presence.

- **“Government” responsibilities must be more clearly defined.**

The solutions to the challenges outlined in this Paper require a ‘whole of government’ approach nationally. They will need action and coordination within and between a numbers of bodies, in particular across Federal Government agencies. Responsibility for the actions to be undertaken needs to be clearly defined at agency and, where appropriate, divisional level.

## **CONCLUSION**

Ensuring that Australia has a high-quality research workforce of a scale sufficient to meet the needs of public sector research and education, as well as supporting the increasing needs of a private sector where we aspire to grow innovation, is of vital importance to ensure that Australia maintains and further develops a strong economy fuelled by globally competitive companies with a well-educated and productive workforce.

A comprehensive and inclusive Research Workforce Strategy will underpin the way that we address this supply over the next decade and equip Australia with the skilled workforce necessary to face the economic and social challenges we face going forward.

It is vital, however, that action not be delayed while we attempt to find the ‘perfect’ solutions for the range of issues we face. Expansion and review of Australia’s HDR training mechanisms, and making Australia an attractive destination for overseas researchers and research students are areas that we should be making a particular priority.

The demand for research trained graduates is increasing, with demand already predicted to exceed supply in the near future. With years required to recruit, train and develop the careers of new researchers, an immediate and concerted effort by all stakeholders is vital if Australia is to build the strong innovation system required to support our economy as a whole.