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Facing Australia
to 2025
Summary of
a Scenario
Development Forum**

*Michael Keating
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Tel 02 6249 1788; Fax 02 6247 4335;

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Critical issues facing Australia to 2025

Summary of a scenario development forum

Michael Keating and Caroline Smith

1. Introduction

Work is central to our wellbeing – as a nation, as a community and as individuals and families. The future of work, the changes in employment patterns, and what skills will be required, will be intimately related to the changes over the years ahead in our economy and our technology, our natural environment, our demographic trends, our social mores and our social relations. Governments' response to these changes can also decisively influence the future nature of work.

Many of these factors affecting our future are, of course, inherently uncertain. Nevertheless, we can gain a better appreciation of the margins of uncertainty and what outcomes are more probable by considering trends in the key drivers of future change and their interactions. By comparing alternative scenarios, based on this analysis, it is possible to consider the common elements of our likely futures and the plausible magnitudes of areas of uncertainty; understandings which can then be used to inform policy development.

It was with this purpose in mind that in February 2011 Skills Australia¹ conducted a joint Scenario Development Forum (the Forum) with the Academy of Social Sciences (ASSA). This was the second Forum held jointly by the two organisations and was attended by senior academics and policy experts from a broad range of disciplines.

The Forum focused on identifying critical issues facing Australia to 2025. This was the first stage in a Skills Australia project to develop new scenarios to create potential future worlds for Australia to 2025. These scenarios will in turn influence economic modelling of the supply and demand for skills to 2025. The modelling will form a key plank of the second iteration of a national workforce development strategy, due to be published by Skills Australia in 2012. This paper sets out to:

- contextualise the proceedings of the Forum within broader policy challenges facing Australia in the area of skills and workforce development;
- record the event's outcomes in relation to particular critical issues facing Australia to 2025; and
- outline the next steps.

2. Background

2.1 The productivity, participation and skills challenges

The only OECD country not to have a formal recession during 2009, Australia performed comparatively well during the global financial crisis. This has generally been perceived as reflecting Australia's sound economic footing². However, there are a range of challenges that impact on Australia's capacity to continue to build its position in the global economy. These can be broadly characterised as the productivity, participation and skills challenges.

Australia's multifactor productivity growth has flat-lined and even experienced decline in recent years³. Labour productivity has continued to grow, although at a lower rate⁴. Why is this important? As noted in the 2010 Intergenerational Report, 'If Australia's productivity growth could be increased above the long-run average, the economy would be bigger, living standards would be higher and fiscal pressure from the ageing of the population would be reduced'⁵. This makes improving productivity an important issue from not only an economic but also a social perspective.

Skills Australia has also identified improving workforce participation as an important component of improving national output and social inclusion. Australia's workforce participation rate is 65.9 per cent⁶, which is higher than the OECD average. However, it is below that of comparable countries such as New Zealand, the Netherlands, Norway and Denmark, especially if allowance is made for Australia's relatively favourable population age structure. Australia also performs relatively poorly in relation to particular groups, such as working age males, women 25-34 years and older people⁷.

In Australia's case, at least, there is a clear association between the level of educational achievement and labour force participation. In 2008, some 86 per cent of 25-64 year olds with a non-school qualification were in the labour force, compared to 71 per cent of those without one⁸. The Council of Australian Governments (COAG) has committed to halving the number of people aged 20-64 without qualifications at the Certificate III level or above, and if this commitment is achieved it would be consistent with attaining an average participation rate of 69 per cent in 2025⁹.

If participation is increased to 69 per cent, as this is progressively realised, significant fiscal benefits will follow, making a substantial contribution to Australia's economic bottom line¹⁰. Improving Australia's workforce participation would also help alleviate the problems of an ageing population. Skills Australia estimates that by achieving a participation rate of 69 per cent we can almost halve the projected increase by 2025 in the level of dependency of older Australians on those in the workforce¹¹.

Having the right skills, in the right place, at the right time is a key challenge for Australia. Skills shortages regularly appear in newspaper headlines¹², yet this should be seen in context of the two million people who are unemployed, not in the labour force and would like to work, or who would like to work more hours¹³. Evidence from ABS data from 2007 indicates that the most commonly reported barrier to working among unemployed people is their lack of training, skills or experience¹⁴. Skills Australia has identified the need for a three per cent annual increase in enrolments in the tertiary sector to 2025 to deepen the skill levels of the workforce¹⁵.

2.2 The challenge of forecasting – facing uncertainty through scenarios

The first Skills Australia/ASSA policy forum held in 2008 discussed the limitations of forecasting the supply and demand for skills¹⁶. These difficulties relate to the uncertainty inherent in making projections about the future. In response to these discussions Skills Australia has adopted the scenario development approach, which

allows for alternative futures to be considered in economic modelling. Scenarios are alternative visions of the potential future, and provide a means to make decisions that take account of uncertainty¹⁷.

Scenarios provide a framework to assist with:

- analysing and understanding emerging complexities;
- exploring areas of uncertainty;
- assessing interdependence and coherence; and
- assessing 'what if' events¹⁸.

By comparing different scenarios we can better understand the scope of uncertainty and which factors are the key drivers of our future. In particular, it is important to recognise what the scenarios have in common and where they differ. Some messages seem to be essentially the same whatever the scenario, such as the basic direction of changes projected in industry structures and occupation profiles, the consequent need for up-skilling and adaptability and flexibility, with the differences between alternative futures being matters of degree rather than direction. In short, as one participant said, what we may learn from the development of scenarios is that, whatever the scenario, the basic conclusions for skills policy are broadly the same. This would of course be a very important conclusion, implying much more confidence in the policy prescriptions.

The joint Scenario Development Forum was the first stage in the development of the new scenarios. The following question provides the research focus for the development of the scenarios: *What are the key factors driving the demand for and supply of skills in the Australian labour market to 2025?*

The identified 'drivers' are:

- social, demographic and cultural trends;
- economic and financial trends and globalisation;
- labour force, industrial and workplace trends;
- science, technology and innovation;
- governance and public policy;
- sustainability (focus on water, energy, population).

These drivers reflect the 'STEEP' (society, technology, economy, environment and politics) model that is often used in scenario planning¹⁹, with the addition of 'labour force, industrial and workplace trends', which was included to help address the supply and demand for skills directly.

At the Forum, six experts presented papers on the topics above²⁰. This was followed by breakout sessions, where invited experts discussed the issues raised in the papers and identified key themes and processes within and between the drivers. Key components of the discussion involved the uncertainties facing Australia to 2025, initial consideration of how the drivers influence the supply and demand for skills, and the linkages between drivers. A summary of each of the papers and the discussion held in the breakout sessions follows.

3. Economic and financial trends and globalisation

3.1 Summary of paper

Dr David Gruen's core proposal was that the economic growth of China and India is likely to be the most important global economic development for Australia's industrial structure over the next 15 years. This has a range of important implications. Strong demand for mining and energy commodities is expected to be maintained and the present high prices are likely to continue. Australia is therefore projected to maintain most of the recent large gains in its terms of trade, with the appreciation of the dollar being largely sustained. The consequent demand for commodities would benefit non-tradeable industries and particularly the mining sector. However the high Australian dollar would be problematic for trade-exposed industries such as manufacturing. Dr Gruen noted that the services sector has seen the strongest employment growth and it is likely to continue to outstrip employment in mining and construction. He acknowledged the uncertainty in relation to the capacity of global commodity supply to meet increased demand, and whether economic or political events will impact on the growth of China and India.

Noting that productivity is particularly hard to forecast, Dr Gruen discussed the factors that will be relevant for labour productivity growth over the next 15 years. Because of capital deepening, labour productivity in Australia has been positive despite negative multifactor productivity in recent years. The current problem has been attributed to a lack of major economic reforms in recent years. He noted that the prospects for multifactor productivity growth over the next 15 years are not particularly positive. Plausible shifts in the industrial structure driven by the high terms of trade are only expected to have a small impact on the economy's annual rate of productivity growth. Dr Gruen also noted that well-designed initiatives to reduce greenhouse emissions would have a relatively small impact of 0.1 per cent on productivity, although alternative, less efficient, mechanisms could have a stronger adverse impact.

3.2 Key themes in discussion

There was broad agreement with Dr Gruen's core argument. Key impacts of the export boom were seen as: a multi-speed economy and increased exposure for tradeable sectors; effects on migration, employment and wages in the non-traded sector; and effects on productivity.

(i) Impact of export boom

The paper stimulated discussion of the 'Gregory effect' (also known as 'Dutch disease'), which occurs when an export boom causes an appreciation in the exchange rate. This appreciation makes imports cheaper, and the knock-on effect is damage to the competitiveness of other sectors. Some participants agreed this may be a challenge for Australia. It was noted that the inevitable reallocation of resources would

require careful handling, otherwise the resulting structural adjustment could impact on social cohesion.

The point was made that the commodities boom would lead to a multi-speed economy which would result in some states and regions having low growth, which would be politically challenging. This is consistent with the scenario put forward by Dr Gruen that there will be sustained structural pressure on the tradeable range of goods and services. In particular it was suggested that manufacturing, tourism and education industries could all suffer.

Some services are also becoming tradeable, and this could lead to parts of the services sector moving offshore, which has already occurred in the information communications technology (ICT) sector. Participants also noted the potential for significant consequences in the education sector. However, the potential growth in demand for services from developing countries could help keep sectors such as education sustainable.

It was agreed that macro stability is a core driver of the economy and that strong fiscal policy and higher savings could help ameliorate the exchange appreciation and the adverse effects of 'Dutch disease'. While prospects for the manufacturing sector were generally seen as gloomy, it was proposed that the manufacturing industry could respond by increasing its diversity. Germany, Japan and Korea have all had highly skilled manufacturing industries and have been able to ward off the detrimental effects of exchange rate rises.

The group considered a number of areas of uncertainty, particularly geopolitical and economic issues. A view was expressed that it is unclear when the commodities price boom will end. It was noted that a supply response to high commodity prices from other countries could limit the benefits flowing to Australia. However the general view was that the level of demand from emerging nations is high. It was also felt that the growth of China and India is likely to continue, although participants agreed that either country could be subject to internal political dissent or insurgency, which could interrupt development processes.

It was noted that if China's real exchange rate rose, as the country experienced rapid and sustained increases in inflation, social cohesion could be threatened. Another source of risk is a rolling financial crisis, possibly reflecting an accumulation of financial imbalances, if China failed to appreciate.

Participants also felt it was too optimistic to project the Chinese development story onto India because of the latter's governance issues and poorly developed infrastructure. It was noted, however, that even if India is not able to replicate Chinese growth rates, the country would still see strong growth continuing. Furthermore, India's comparative English language advantage compared to China has supported the outsourcing of IT and other business services – for example call centres – so India can be expected to continue to do well.

(ii) Migration, employment and wages in the non traded sector

One view presented during discussion is that Australia needs to increase its supply of skilled people in the long term. The case was made that this would increase the price of unskilled labour. The group agreed that services in Australia are relatively expensive, which is due in part to the present high exchange rate and the legislated minimum wage. Immigration mechanisms, such as 457 visas and overseas students, enable employers to obtain labour for service jobs. However, others argued that the impact on services of the wage structure in Australia is not clear.

Some participants contended that Australia cannot rely on migration as the politics have changed in favour of reducing migration. Further, it is expected that there will be increased competition for migrants in coming years, with skilled labour becoming increasingly mobile in order to obtain the highest wages. For example, Australians may want to go to Asia to further their careers as these economies develop. A counter view is that a strong exchange rate will continue to make Australia an attractive destination for migration.

It was also agreed that migration is important but not sufficient for economic growth. A fully employed economy puts more pressure on labour utilisation. In addition, increasing participation of low skilled workers previously un- or under-employed will be important. It was also noted that 'the elephant in the room' is the ageing of the population. Training sufficient numbers of suitably qualified people for the aged-care sector is a major issue for government, particularly as jobs in aged care cannot be outsourced to the tradeable sector.

(iii) Productivity

Some participants highlighted the crucial role that productivity growth plays in the economy. For example, a Productivity Commission paper of December 2010 underlined that growth in labour productivity accounted for around 80 per cent of the growth in per capita incomes of Australians over the past four decades, while multifactor productivity growth accounted for about 40 per cent ²¹.

Reflecting Dr Gruen's view, participants noted that the Productivity Commission has attributed the recent poor multifactor productivity growth to a dearth of economic reforms over recent years. Some participants concluded that the beneficial effects from economic reform are likely to be fewer in the next 15 years. The role of innovation and the speed of adoption of innovative technology were also discussed. One participant pointed out that innovation has fallen over the past decade, which may also have been a contributing factor in Australia's poor recent productivity performance.

According to one view productivity growth rates for developing countries such as China and India may prove to be a problem. The Australian experience in the 1950s to 1970s was that rapid population growth and urbanisation masked a period of deteriorating labour productivity growth. It was only after the 1970's oil shock that Australia embarked on a series of economic reforms that drove significant labour productivity

increases. Participants agreed that in the absence of economic reforms there is a risk that future growth in productivity might be jeopardised.

4. Social, demographic and cultural trends

4.1 Summary of paper

Professor Graeme Hugo noted that demographic, social and cultural drivers of change in the workforce over the next 15 years have varying levels of certainty. The ageing population is predictable, however the number of people available for the workforce is less certain given the influence of migration. Migration is a major determinant of differences in the anticipated rate of growth of the working age population. The balance between permanent and temporary migration is also important, particularly as market-driven temporary migration has increased since the 1990s. Most temporary migrants have been skilled workers, though Professor Hugo argued that not enough is known about their role in the workforce. Emigration from Australia is also a factor, as there has been a steady increase in permanent departures of Australian and overseas born populations.

Other demographic factors identified as important were: the changing role of women; fertility (the 2002-2008 increase in fertility will influence workforce numbers late in the period from 2011-2025); internal migration; and health factors (for example, obesity may compromise efforts to increase workforce participation).

Social drivers in Australia include the rising significance of work-life balance in Australian public discourse, particularly among Generation Y; increasing diversity in patterns of household and family formation; impact of generational differences in the workplace; social inclusion, with inequality exacerbated by gender, culture, ethnicity and location; discrimination in the labour market; and family-friendly initiatives. The paper noted that the current buoyant labour market presents 'the best opportunity in a generation to include subgroups in the mainstream workforce that have in the past been excluded'²².

The paper also identified a range of cultural drivers. One of the biggest transformations in Australia since World War II has been its emergence as one of the most culturally diverse of nations. However the implications for the labour market are complex. Participation rates for overseas-born people from culturally and linguistically diverse backgrounds are lower than for Australian born and those from mainly English-speaking backgrounds. With all other human capital factors held constant, migrants continue to earn less than their Australian-born counterparts. Migrant women often face particular difficulties due to poor English language skills, lower education and cultural factors. The paper also discussed the Indigenous population, currently estimated at 2.5 per cent of Australia's population, but increasing at around double that of the total population²³. Professor Hugo argued that increasing Indigenous labour force participation would have important social and economic outcomes.

4.2 Key themes in discussion

The following were identified as key themes: the ageing population; migration; participation; gender; the nature of work; innovation and adaptive capacity; health; and human and social values.

(i) Ageing and health, migration, and participation

The session agreed that the ageing population is the most certain of demographic trends for Australia. However, policy responses, such as the eligible age for accessing superannuation and pensions, are less certain. Health-related costs in an ageing population were raised as a concern, although there were differences of opinion about the extent of the problem. Mental health was also noted as a major issue, particularly given the relationship between mental health and disadvantage.

Research shows that Australians generally have a positive view about migration. It was argued that the current questioning of migration levels, particularly in relation to the consequences of unplanned population growth, is valid in the context of environmental and infrastructure issues.

It was noted that Australia's population is growing at the rate of one million people every four years. This led to a discussion about internal migration and the distribution of the population. It was agreed that there is a trend for both overseas and internal migrants to move to regional areas for economic and lifestyle reasons. These trends would continue without government intervention, however government could facilitate the process. Climate change also looms as an issue for internal migration. Ninety per cent of Australians live in areas that will have lower rainfall in the future. Governments may rethink where people should be living – for example, the recent floods and cyclones will likely raise questions about the appropriateness of residential and commercial development in certain areas. These decisions could also be directed through the market, for example with the introduction of higher insurance premiums for living in high-risk areas.

Participants noted that a high rate of migration leads to high economic growth, which in turn drives skills shortages. Some argued that the function of skilled migration has changed from topping up available skills to being the main avenue for filling skilled vacancies. There was concern that Professor Hugo's paper did not raise the issue of industry's responsibility to train.

It was generally agreed that more needs to be done to engage unemployed and underemployed people. This would help to address skills shortages and be beneficial from a social inclusion perspective. For many people who are not participating in the workforce, work-life balance influences decisions about entering and leaving work. Concern was raised that an underclass is developing, and that this issue is not being addressed. Policy support in this area was identified as an uncertainty. For example, will income support changes be used to lever greater workforce participation? Is additional support to encourage greater participation viewed as an unaffordable cost or an investment in improved employment outcomes? The role of industry needs to be

considered, including mechanisms to change employer attitudes and behaviour towards employing people with a disability, Indigenous people and other disadvantaged groups.

(ii) Innovation, adaptive capacity and the nature of work

It was noted that innovation occurs on both a gradual and step-change basis. The importance of adaptive capacity in the labour market was recognised, and, that to achieve this, it is important to invest in broad-based skills. However it was argued that the education and training system is increasingly narrowly focused around a competency-based approach. In the past the public sector funded broad skills while industry paid for specific skills; industry is now pushing for government to pay for specific skills.

The observation was made that many people work non-standard hours, with 42 per cent engaging in some work between 7pm and 8am and over the weekend. There are implications for spending time with family and the ability to find time to retrain or maintain professional development. It was noted that in Australia the education and training system steers people towards their first degree or qualification but is difficult to return to the education system to update or continue learning, particularly for older people. It was also argued that patterns of precarious employment and the change in the design of jobs have intensified work. For example the use of ICT has meant that workers use technology to undertake a range of tasks that would previously have been undertaken by support staff.

(iii) Gender

The factors that affect the participation of women in the workforce raised in Professor Richardson's paper (see below) were acknowledged and supported. It was also noted that the area of greatest jobs growth is in services, which tend to be feminised occupations. However the areas of greatest employment decline such as manufacturing are characterised by high levels of male employment. An area of uncertainty in the future is whether gender roles will become less delineated with men taking on more domestic responsibilities and/or moving into traditionally female jobs. Also uncertain in relation to this issue, and a number of the other themes under this topic, is the difficulty of predicting and measuring the extent to which attitudes will change.

(iv) Human and social values

The fields of education, skills and employment could benefit by drawing from humanities and the arts, as economic and scientific analysis can only go so far and social research often drops off the radar. Programs need to take cultural differences into account. Failure to do so is a key reason for the collapse of some Indigenous programs. On the hand, where these issues are taken into consideration the degree of success is much higher; for example, the Argyle diamond mines have used anthropologists to help engage Indigenous people in the workforce.

5. Labour force, workplace and industrial trends

5.1 Summary of paper

Professor Sue Richardson's paper proposed that the purpose of work is to provide the means to achieve high levels of community wellbeing through material resources, quality of working life and its nexus with other aspects of life. Continued movement of women out of the home and into paid employment is a major change in the labour market. Women now comprise around 45 per cent of the labour force, which creates a challenge to integrate paid and home-based work. The next 15 years will see continuing attention to: how workplaces need to change so that people can support their families and be 'good workers'; care for baby boomers as they move into the higher dependency stage of life; and the balance between public support and the responsibility of employers.

The paper also outlined a number of important but more modest trends, including: growth in education requirements, decent work for those who want it, adaptive capacity and smarter industrial relations. On the issue of education requirements, Australia has 'seen an explosion in formal training over the past 50 years'²⁴. Further, the way people learn has shifted from informal to formal learning. Balancing long hours of paid work, family responsibilities and an increased need to upgrade skills is identified as a significant time stress. Over the next 15 years, we will continue to find strategies to reconcile the various time stresses.

Professor Richardson argued that global economic forces and technology are changing the structure of employment. Growth areas are in the services industry, both at low and high levels. The high level jobs require significant formal education; the low level ones reflect 'outsourcing' of domestic work and are largely done by women. The risk is that men with poor education will be left behind in the labour market. Over the next 15 years it is important that policies are in place to make it possible for low skilled men and women to find decent work.

The changing structure of the economy will require new levels of adaptability on the part of enterprises and their workforces. This will mean improving capacity to match workers and jobs; fully using existing skills; ensuring universal levels of language, literacy and numeracy; and promoting skills development in the workplace. Smarter industrial relations were seen to be of great social and economic interest. Employers will have the choice of either the 'high road' or the 'low road' in their approach to managing staff. The paper concluded by noting the potential for significant improvement in the capacity of management to engage productively with the workforce in ways that are more cooperative than adversarial, and which draw out and enhance employees' productive potential.

5.2 Key themes in discussion

The points raised in the paper were endorsed by the group and discussion largely centred on the paper's themes.

(i) *Women and paid work*

The group recognised the importance of women's increased entry into the labour market. It was noted that longer working hours impact not only on individuals but on households. This is important to recognise because the policy implications are different. In considering the issue of working hours, there is a question about the extent to which this reflects management styles/work demands or people's aspirations for higher material living standards.

(ii) *Growth in learning and relevance to returns from investment in education*

It was agreed that there had been a growth in formal learning requirements, though the group did not agree whether or not this was at the expense of learning on the job (informal learning is discussed below). It was noted that the cost of study has increased. However research shows that people have an aversion to risk, so costs may act as a barrier to formal study. It was noted that the cost of formal education is an important area for discussion. Costs should be broadly defined, and recognise time spent as an opportunity cost.

The return on investment in learning for individuals was discussed, particularly for VET students. It was noted that care must be taken when considering the returns on VET courses. When compared to year 12 qualifications there are no wage benefits to Certificate I and II and little for Certificate III, however they fare well compared to leaving school at 15. VET also makes a big difference in terms of access to employment for those without school qualifications (as shown in Education and Work 2010). Certificate III is more complicated, with more varied returns depending on the cognitive difficulty of the course and the occupational outcome.

A question was raised about returns on government investment over the next 15 years, whether through the school system or through VET. On the one hand it was argued that the main potential return could be gained by increasing investment in the early school leaver; on the other it was suggested that the biggest return might come through investment in high schools. However it was argued that social stratification is occurring within the school system due to increased funding for private schools.

It was also argued that there has been a reduction in employer investment in training, which is being substituted by public funding. The human capital model includes experience (informal learning) and schooling (formal learning), as well as general/occupational and sector/firm level human capital. This model assumes that general human capital, not firm-specific capital, is publicly subsidised. The question was raised as to whether or not it is a good thing to change this model.

(iii) Decent work for all: workforce participation, social inclusion and aspirations

The group discussed the implications for the workforce of the changing structure of the Australian economy, including the availability of good jobs. The decline of manufacturing, and growth in the resources and services sectors was considered, as was the impact of the tradability of sectors and high terms of trade. There was support for the principle that where jobs can be moved offshore, this will occur. While services can be tradeable, where proximity is required jobs will remain where they are and be remunerated at a higher rate.

Workforce participation is an issue, with 2.7 million people either unemployed, not in the labour force but wanting to work, or not working as many hours as they would like²⁵. By contrast, there are also labour shortages in the economy. Reflecting the points made by Professor Richardson, it was noted that alongside the decline in traditionally 'male' jobs, there are increasing jobs in the services sector, and these lower level jobs, for example, in the caring professions, have traditionally been done by women. These jobs are increasing with the ageing population and 'outsourcing' of caring roles.

The question is how you retrain men into these jobs. One way might be to make low level service sector jobs more attractive, for example through training opportunities, better pay, job gradation, work organisation and management. It was argued that men are going into some low level service jobs, particularly in the retail and hospitality industry, (for example, sports and fashion shops), however participation tends to be limited to middle class youths while working class youths are left out.

It was noted that the social aspirations of young people are fundamentally changing. Many people want degrees, and government policy feeds this aspiration. The question is whether or not this makes VET a viable sector. It was argued that a different attitude to the VET sector is needed – it is currently considered a 'poor relation' but it should be seen as a valued partner. The 'elephant in the room' of young people not knowing what they want to do was also raised, with some lacking social skills and having social problems. There are groups that struggle with labour market transitions.

(iv) The need for adaptability among enterprises and workers

The group also agreed with Professor Richardson's proposition about the importance of adaptive capacity. People learn productive skills while working. The ability to acquire adaptive capacity without formal training is a central element of skills development and facilitates the structural adaptation of sectors. It was argued that we cannot train for a predicted future, but rather should aim to develop the resilience to adapt.

While employer engagement is crucial, it was noted that we do not sufficiently understand the role of employers in the development of skills, formally or informally. For example there are differences between managers that need to be unpacked. While senior managers often recognise the value of training, frontline managers, who feel production pressures directly, can often subvert the strategies of senior management.

It was noted that governments avoid regulation and prefer to exhort employers to train. However given a lack of research in the area, we don't know what employers need or will respond to. It was also argued that public policy rewards the failure of employers to train. Policy settings such as temporary migration encourage employers not to train. An alternative view noted that employers sometimes need to access labour on demand. This wasn't agreed by the group, with the point being made that if employers are given 'a free ride', they don't train but poach from other employers that do.

One of the gaps in the themes is what will happen industrially. In other words, what is the nature of workplaces and the industrial settlement? Reflecting the points raised by Professor Richardson, skill utilisation was identified as important. It was also noted that a shift in management culture and work organization is needed. Will the intensification and fragmentation of work continue? This is an area where employer choice is very important, for example, offshoring.

(v) Technology and role of the internet

The point was raised that the internet has not impacted on education at the same speed as other sectors of the economy. However this could provide an opportunity in the area of educational development. Information technology and the internet can inspire enthusiasm amongst otherwise alienated groups, especially young people; and this can provide opportunities for engagement and social inclusion. Learning often occurs through self or peer learning (eg, via social media) rather than formal education. This also applies to children, which presupposes that they have a level of language literacy and numeracy competence. However the importance of self-learning was not supported by the whole group, with some arguing that for there are people, particularly those from disadvantaged backgrounds, for whom it is better for learning support to be in place.

(vi) Understanding permanent and temporary migration

It was agreed that migration is a key issue. More needs to be known about the role of temporary migration, in particular 457 visas. When there is a temporary need for a particular set of skills, it makes sense to bring people into the country on a short-term basis rather than train locals in skills that will soon become redundant.

The integration of migrants into the labour market was also discussed. Poor English language skills could help explain why many highly skilled migrants work in low-level occupations. It was suggested that migrants in low-skilled jobs are direct competitors for jobs with resident low-skilled workers. However not all participants agreed that migrants potentially displace workers at the bottom end of the labour market. It was agreed that we need to know more about the interaction of migration flows (permanent/temporary) and residents (particularly the low skilled) and their access to job opportunities.

(vii) The relevance of training packages in the changing labour market

It was noted that the VET system is currently structured as 'one size fits all'. However, as the population grows, it will be increasingly unlikely for 'one rule' (ie training

packages) to be able to respond to the diversification of demand. There are pathways within training packages but they are premised on a competency-based approach. Training packages were devised for a particular moment in time in industrial relations and may not be as adaptable as the current environment requires.

6. Governance and public policy

6.1 Summary of paper

Dr Michael Keating and Professor Glyn Davis began by noting that, in a democracy, the role of government is to both reflect and shape the social, economic and technological relationships underpinning society. Therefore a government's influence in shaping the future is a function of the political environment and the effectiveness of the means available to it when responding to and seeking to shape that environment. The paper discussed the political environment in terms of trends and dichotomies; it examined means available to governments, and how they have responded to the changing political environment, and considered the implications for the supply and demand for skills.

The paper argued that a principal political tension has been between increasing material aspirations for consumption, evidenced by rising debt levels, and an increase in 'post-materialist' politics, for example rejection of changes affecting the environment and increasing concerns about work-life balance. Another important source of political tension is between an increasingly individualistic society and concerns for equity, cooperative activities and economic and social security. It argued that a variety of technological developments and women entering the workforce have led to a decline in the central role of the family and community. More individualised services are demanded, so government provision must be less uniform and more responsive to the needs of individuals. People are also more inclined to be critical and less trusting of authority. At the same time Australian society is less homogenous. In contrast to the individualists, other groups of citizens are seeking more government intervention to resist or compensate for the seemingly rapid change in society and its values.

On the issue of government capacity, the Australian government's fiscal position is relatively strong compared to governments overseas. However, the conditions underpinning this – favourable demographics, terms of trade and revenue increases through privatisation – are changing, so there is less fiscal confidence for the future. A particular fiscal pressure is the shift over the last 25 years away from equitable distribution of income through the wages system towards a greater reliance on government intervention through expenditure and taxation. In response governments have been reluctant to increase taxes despite evidence of support for higher taxes in return for improved services. Future demands on government finances are likely to outstrip the capacity to respond given current tax rates.

It was noted that Australia has historically supplemented the skills of its domestic labour force through migration. Temporary migration, with a mix of skilled and low-skilled migrants with working rights, has risen over the past decade. Public opinion has traditionally supported increasing migrant numbers, but this has softened in recent years. The debate is now more focused on broader population size issues, and the implications for environmental sustainability and the liveability of cities.

In discussing the two-party system in Australia, the paper argued that the electorate has become more fragmented, reflecting the political tensions described above, and the membership of major political parties is in decline. One consequence has been that recent elections at both state and federal levels have failed to produce a clear result. Nevertheless, the paper concluded that talk of the end of the two-party system appears premature. Perhaps a more important consequence of political uncertainty is whether or not Australia's adversarial political process will continue or change, and how this will impact on future policy development capacity. A related issue is how Australia's federal system will evolve, and whether COAG will prove capable of undertaking policy development and implementation in a sufficiently effective and timely manner.

The paper discussed four broad instruments for government intervention: regulation; tax and spend; managed markets; and facilitating cooperative networks. In response to changes in the economy, technology and society, governments have sought new combinations of these instruments to sustain or even improve their policy capacity.

In considering implications for the future, Dr Keating and Professor Davis articulated three possible scenarios: high and sustainable economic growth reflecting an open market economy, continuation of the present economic reform agenda, and reform of economic institutions of governance; or slow economic growth characterised by reform fatigue, dysfunctional institutions of governance, and crisis as low growth exacerbates distributional problems. A third scenario, comprising a mix of the other two, was also envisaged.

6.2 Key themes in discussion

The discussion considered the different elements of the political environment that the paper outlined. While there was general agreement with the main propositions, there were some concerns about whether they fully capture the complexity of today's political environment. In particular, the impact of technology on communications and the media has changed the nature of political discourse and decision-making processes.

The discussion led to a re-conceptualisation or 'clustering' of the critical issues within governance and public policy. These were articulated as capacities, and their associated uncertainties, within three broad areas: social influences; resourcing capacity; and governance capacity.

(i) Social influences

Social influences include materialism and individualism. It was agreed that a greater 'texture' of social complexity and cross cutting social issues should be recognised.

While materialism was identified as important, it was also noted that the current downturn in the retail sector, growth of savings, and focus on leisure time suggest an element of change towards a post materialist culture. Cross cutting forces across the political environment include the women's movement; gay liberation; Indigenous rights; and more recent political movements such as Get Up! Social media such as Facebook and Twitter also have increasing salience.

The central uncertainty pertaining to social influences is the degree of inclusion. People are increasingly educated, diverse, and untrusting of political parties and government. Generations X and Y are different from baby boomers, and it is uncertain how successful political parties can be in attracting a new generation. With around two million people in Australia either unemployed or not in the labour force but wanting to work, it was also noted that there is an emerging underclass²⁶. It was agreed that social unrest could be brought about through an economic downturn. In addition, the potential for a 'housing revolt' by young people who cannot afford home ownership was recognised. A generational divide on this issue could create political cleavage.

(ii) Resourcing capacity

Resourcing capacity depends on GDP growth. The discussion noted that Australia's fiscal situation is important for resourcing government capacity. 'Big' vs 'small' government provides theoretical alternatives, but, in reality, government spending has been remarkably constant as a percentage of GDP. It was agreed that a central issue for resourcing capacity is that market failure requires a public policy response. For example, there are structural adjustments that governments may need to pay for, such as in the energy sector. It was also noted that severe skill shortages would have a fiscal impact. It was agreed in discussion that migration is 'embedded' in fiscal capacity and doesn't necessarily stand alone.

Resourcing uncertainty was also identified as important given increased demands on government. This includes demands from other 'drivers' such as sustainability and economic and financial trends and globalisation. Issues include climate change; instability in the global economy; and over-reliance on mining. It was also agreed that an international security shock such as war or terrorism could lead to a 'look after ourselves' scenario. This could result in a return to government-owned and -operated services rather than marketisation. On the other hand, it was argued that the macro-economic policy levers employed over the last 25 years have proved more successful in managing change and could therefore be expected to manage the looming fiscal impacts of the future.

(iii) Governance capacity

Governance capacity has been affected by the increasing fragmentation of the polity. The decline in bi-partisanship with increasing politicisation and adversarialism makes it difficult to build a policy consensus. Government capacity also includes the dynamics of federalism. It was noted that there is often sufficient expertise and analysis but insufficient political will and cooperation. Nonetheless, it was agreed that demands for

economic growth would 'win out'. Social difference and complexity do not make as big an impact and are not a major driver of how and where economic growth occurs.

A number of other elements were identified as underpinning governing capacity. An important issue is the impact of advanced information and communication technologies on political discourse. This includes the advent of 24-hour news channels, the regular updates available via the internet and social media such as Twitter. This has created a tendency towards 'policy on the run' as political parties respond to news cycles. Other issues underpinning governing capacity include the extent to which politicians have life experience outside politics, and the capability of the public sector. The narrow scope of political messages was also raised.

Governance capacity uncertainty was characterised by some in terms of a greater fragmentation of the polity, and disaffection among voters. The viability of smaller parties was also mentioned, for example, in relation to uncertainty in leadership succession. The potential for a surge of populism was discussed. Alternatively, external shocks could strengthen respect for governments, providing more scope for leadership. Political 'gridlock' could lead to governments giving consensus-building roles to external experts such as advisory bodies.

7. Science, technology and innovation

7.1 Summary of paper

Professor Anthony Arundel started from the premise that the concept of innovation is misunderstood. Until the early 1980s policy was usually based on a linear science-push model in which support for research and development, and scientists and engineers, led to new inventions, typically assumed to be for use by manufacturing firms. Yet, the most common and often neglected form of innovation involves implementation of new products and processes across all industries. Professor Arundel noted that 'many innovations that have resulted in major increases in productivity are the result of organisational changes, minor engineering, or a simple insight that required few if any technical skills'²⁷.

Australia performs reasonably well in international comparisons that focus on advanced technology innovation inputs such as research and development intensity, tertiary education levels, number of scientists and engineers, research institutions, patents, scientific publications and internationally authored papers per capita. Yet high technology manufacturing forms a small component of Australia's economy, though this is similar to other comparable nations, and economic prosperity depends mainly on the innovative capacity of other sectors, particularly services.

The paper made the case that the strength of the Australian innovation system lies in both the public and private sectors rapidly adopting productivity-enhancing innovations. It argued that the capacity to rapidly acquire useful knowledge and technology produced elsewhere is important. Firms in all sectors need knowledgeable and skilled

staff that can identify which technologies and organisational methods might be of use and adapt them to the needs of the firm. Specialised knowledge is created and maintained by the ability of the tertiary education system to conduct advanced research in the relevant fields. Diffusion and application of skills and knowledge is the primary economic function of universities.

Professor Arundel noted that technology push is an infrequent driver of innovation over the relatively short period of 15 years. The most common type of innovation is incremental change in response to demand from the market. Without government subsidy, innovation requires a market. The paper argued that the main driver of demand globally is the growing population of affluent consumers in developing countries. The second (potential) driver is action on climate change reflected in a rapid need to switch from fossil fuels to low and zero carbon energy.

The types of skills required in the future will depend on technologies that offer substantial productivity enhancing benefits and new business opportunities. Three main generic technologies with productivity enhancing benefits across many sectors were identified: information and communications technology (ICT), biotechnology, and nanotechnology. It noted that ICT has been the leading generic technology since the 1960s, and has applications in all economic sectors. Overall, the main impact of these three technologies will be through their applications rather than their direct effects.

Ongoing and incremental organisational innovation will require a broad base of skills – including good language literacy and numeracy skills among the largest possible percentage of the working age population. Innovation also requires many technical skills that do not require a university education, such as certificate level and vocational training. Even within R&D, PhD graduates account for less than 15 per cent of total employment, so the safest approach is to strengthen education in all science and engineering disciplines at all levels, while business management and organisational skills are also essential.

7.2 Key themes in discussion

(i) The nature of innovation

In general the group agreed with the issues raised in the paper. In particular, it agreed that, from a technology perspective, it is not anticipated that major breakthroughs will have a significant impact over the next 15 years. If there were new breakthrough technologies developed today, their impact would not be felt for 10-15 years. However it is often external factors like a financial crisis, lack of housing affordability, or climate change that call on technology for solutions.

The group identified the following issues that need to be further highlighted when considering innovation: the time horizons of technology; the variety of market drivers; and climate change. It also emphasised the role of the service sector. Non-technology innovations in management and organisational skills are fundamental to driving

improvements in productivity. Science, technology and innovation are enablers as well as drivers of change.

Innovation is not dependent on manufacturing. At present the key developments in technology lie in a number of areas. These include data analytics, where rapid increases in volume and speed of data mean more demand for the ability to analyse and use this data. Other developments lie in design and a focus on nanotechnology. In addition, there will be no physical limitations on what is possible. It was argued that the 'faster cheaper smaller' law will continue and have a big impact on future technologies.

(ii) Innovation drivers and barriers

It was noted that the paper makes a strong point about not depending on technology-push innovation, yet platform/general purpose technologies (such as ICT, nanotechnology and biotechnology) are essentially drivers of technology-push innovation. It was also noted that the ageing of the population will require huge growth in personal services, which amounts to a market force driving technology. People are living longer and have an expectation of a certain quality of life, which brings increased demand for preventative health, caring and personal services. Responses to this demand will be largely technology based, and this will bring pressures to professionalise the workforce and bring in life science knowledge to largely VET-trained personnel.

The group agreed that market forces are an important factor in how research can be utilised. General ethical and other debates also have a huge bearing on freedom to research and innovate. For instance, new knowledge can help alleviate the scarcity of food by increasing its nutritional value through genetic modification (GM) but this can bring potential dangers and is accompanied by much misunderstanding. Public opinion can therefore be a barrier to innovation. On the other hand, Australia has strong regulatory standards, which mean well developed clinical and ethical frameworks are in place. As a result there is a lot of European investment in genetic research carried out in Australia. This investment is not going to countries like China that do not have the restrictions on human trials that are in place in Australia.

(iii) Uncertainty and adaptive capacity

The key thing that Australia needs is the resilience to cope with uncertainty. There was an argument that Australia should focus on industries that appear to be strong or have a natural advantage, such as resources, agriculture and, possibly, education.

The implications of technology for skills development was discussed in some detail. The group agreed that, as we are for the most part adopters of technology, it is important to have more generic skills so that we can recognise the things we can do differently, particularly in relation to energy, food and water where we have a comparative advantage. A number of other key issues were raised, including: the need to make sure that the education system is preparing people to adapt; identifying the criteria/signals that something fundamental is about to change; and the link between research and adaptability.

The group also considered a number of areas of possible technological catastrophe that create uncertainty. This included scenarios such as whether or not the web or the power system will fail. The group expressed confidence in underlying technologies, but noted that in relation to power the issue is not technology but investment in technology. It was also noted that there are possible risks related to cyber security and data assets. Data assets are a core value and the extent and frequency of attacks are increasing. It would be destabilising if the integrity of personal data was undermined. Highly targeted attacks that involve intellectual property could prove a serious problem for an Australian company competing globally.

8. Sustainability (focus on water, energy, population)

8.1 Summary of paper

The central argument of Dr Kerry Schott's paper was that the increasing Australian and global population is resulting in increasing demands for water and energy. These demands are closely inter-related as the production, treatment and movement of water requires energy, and large amounts of water are used to produce energy. Another issue is that the world is at or approaching 'peak oil', the point at which oil production reaches its maximum. After this it is expected that there will be lower volume of oil available but at a higher cost. The paper also noted increasing food scarcity as an issue for sustainability – growth in food production is slowing at the same time that demand is increasing.

Dr Schott argued that the most important environmental challenge is climate change. Temperatures in Australia have increased since 1960, which have resulted in greater evaporation and less water runoff into storage. Rainfall variability is also expected to increase as a result of climate change; in eastern Australia there is likely to be more rainfall along the coast and less inland.

Intense storms along the coast combined with rising sea levels are expected to increase the risk of flooding and consequent property damage. Droughts will become longer and harder, with increased salination and lack of river flow, and a greater likelihood of bushfires. This will put pressure on agricultural production and drive up food prices.

The paper reflected Shell scenarios where responses to sustainability are either 'scramble', where nations go it alone to meet short-term self-interest, or 'blueprint' where nations agree on a united plan to tackle global sustainability problems. A 'realistic' scenario was also identified that would involve some combination of limited global coordination and individual national responses. These scenarios could also be applied in the Australian context, for example, 'scramble' would mean a lack of agreement on carbon targets, a carbon price or a sustainable policy. Under a blueprint scenario government would cooperate and nation-building projects would be put in place, for example, sharing of energy resources through improving energy grids. In

some areas water trading might be feasible, however, on the whole, transporting water is very expensive. The role of individuals was also considered: people could 'go it alone' under the scramble scenario, though this would be dependent on personal resources (including wealth). However, the majority would be driven by lack of affordability to move towards the blueprint model. The paper described how Sydney Water is working to support such a model.

8.2 Key themes in discussion

(i) Climate change

The group agreed that climate change is a key issue in relation to sustainability. It was discussed from a variety of aspects, including carbon pricing, adaptation, effects on biodiversity and agriculture.

It was also agreed that Dr Schott's paper is correct on adaptation and response. Adaptation is not a well-developed story but farmers are leading the way by facing adaptation issues now.

To achieve a reduction in emissions of five per cent below 2000 levels by 2020 would require a big shift in behaviour and major costs. The question is how big a shift is required to reach minimal targets. The group suggested the need for a more holistic approach to the relationship between economic growth and sustainability than narrow commercially focused net present value (NPV) analysis. There are widely differing attitudes to climate change in the community, arising from varying attitudes towards consumption, material aspirations and quality of life.

Various shocks that could cause disruption on a national scale are possible, including a major oil spill or shocks related to climate change. It was noted that it is important to learn from extreme events and develop better incident management.

(ii) Water and energy efficiency

It was argued that it is important to optimise control systems to drive energy and water efficiency. A global blueprint would affect efficiency in Australia. The role of regulators in supporting efficiency and resilience would be important. For water efficiency, the appliances required to balance supply and demand have skills implications. There is a need to vertically disaggregate and compartmentalise competition in water supply. It was noted that it is economical for big buildings to install recycled water, but schemes that are effective in one place don't necessarily work everywhere.

There is a wide variety of potential alternative energy solutions. It is expected that coal would diversify as part of an energy mix in which gas will have a prominent role, with gas prices increasing. Australia might become more protectionist in relation to its gas reserves. Coal is currently used in 80 per cent of power generation, and would need to reduce to 40 per cent of the mix by 2050, assuming carbon capture and storage (CCS). A case was made to consider nuclear power, which is also a potential source of exporting service skills internationally. It was argued that wind is not currently a good

solution. There are long lead times to prove low emission technologies such as solar, geothermal and nuclear (in the Australian context).

(iii) Managing climate change

Uncertainties were identified in relation to whether or not the world will act on controlling emissions. In addition, it is uncertain how quickly the effects of climate change will occur. It was argued that the impacts of climate change are starting to appear, although they are likely to be felt primarily after 2025. It is also unclear where it will happen, how it will happen, and what the consequences will be. It was noted that it is important to separate the temperature effects, which are more certain, from other issues such as water availability, and extreme weather. They all have different implications for risk management. There is natural variability on top of climate change, and local effects are important. The group agreed there is the need for some science with granularity that can understand potential localised impacts.

There were different views about how much structural change would arise from a carbon price. It was agreed by most that nothing is likely to happen to tackle climate change until there is implementation of a carbon price. The cost of putting a price on carbon will be less than people expect as it will stimulate innovation. However, there are political sensitivities because the costs are not popular. Uncertainties such as the pace of change were also identified in relation to the carbon price. It was also noted that electricity prices are going up even without a carbon price.

It was pointed out during discussion that the paper didn't touch on the issue of biodiversity. Research from a Price Waterhouse Coopers international report found that small areas are more vulnerable under climate change than large areas. While biodiversity is not a driver, responses to climate change will require the withdrawal of more land from intensive agricultural production, which will help biodiversity. Farmers will need re-skilling to manage biodiversity (some are already doing this effectively).

9. Emerging key themes and linkages between drivers

During the discussions that took place in the concurrent breakout sessions, it was clear that there are significant linkages between many of the six drivers. There were a number of themes that emerged in common across all the groups. This section considers the linkages between the drivers. In other words, rather than looking at issues such as sustainability in isolation, its relationship to other drivers such as governance and public policy, technology and economic trends is considered.

(i) Migration and ageing population

Migration was identified as an issue by all the breakout groups. Three considered migration to be one of the most critical issues facing Australia to 2025 in the context of the supply and demand for skills. Migration, which can be viewed as falling within social, demographic and cultural trends, is strongly influenced by governance and public policy. Governments directly determine policy around migration and set the number of permanent migrants coming into Australia. The acceptability of large-scale

migration is also indirectly influenced by government decisions relating to the pattern of settlement and the provision of infrastructure.

Given this dependence on government and public attitudes, migration was viewed as an important area of uncertainty. The six-fold increase in temporary migration in recent years was noted²⁸. Under current policy settings, temporary migration is market-driven and linked to economic and financial trends. However government could decide to amend the policy. Another issue in this area is emigration, as rising numbers of Australian and overseas born people are leaving Australia on a permanent basis.

It was noted that migration has traditionally been a mechanism to boost the supply of skilled labour within Australia. This has a clear influence on labour force, workplace and industrial trends. Immigration was seen as important but not sufficient to meet Australia's skill needs, and we need to increase the participation of low skilled workers. Some concern was raised about whether or not increasing migration, particularly on a temporary basis, undermines opportunities for local workers. This was raised particularly in the context of unemployment and underemployment in Australia as well as increasing workplace participation.

Migration was also raised in relation to the issue of sustainability. It was noted that climate change could lead to an increase in climate change refugees. Again, the response to this issue will be influenced by governance and public policy.

In contrast to migration, the ageing population was viewed as a social demographic and cultural trend that is relatively certain. However, there is uncertainty in relation to public policy responses. Economic factors were identified as affecting the ageing population, for example, another share market shock would impact on superannuation. The views and attitudes of different generations towards public policy and engagement in the polity were identified as issues. There is also a relationship between an ageing population and technology; many ICT-based technologies can allow older people to stay home longer and enjoy a better quality of life.

The ageing of the population is linked to sustainability. With more retirees, who are likely to undertake more travel, we can expect to see an increase in emissions. Climate change was identified as having health impacts, particularly for older people; for example, heat waves can be fatal. It was also noted that the system is not sufficiently adaptive to shocks and that will affect emergency services. Moreover, emergency services are heavily reliant on volunteers who tend to be from an older demographic.

(ii) Climate change

Another area that emerged very strongly during the breakout sessions was the importance of climate change. It was noted by the social, demographic and cultural trends group that sustainability is the most important issue and a key source of both uncertainty and opportunity. The governance group agreed that climate-related events are the biggest wildcard facing Australia to 2025, noting the importance of capacity to develop and implement cost effective sustainability policy.

It was agreed that the interaction of environmental issues and growth will continue to be a major issue. From a governance perspective, despite environmental concerns, the major parties are likely to want to stay on a path of economic growth. There are political imperatives for maintaining growth as low economic growth typically has negative consequences for the governing party. The social, demographic and cultural trends group noted that growth and sustainability are both possible, though government must provide leadership rather than respond to populist views.

Potential major issues that Australia is facing include carbon pricing and reaching the peak oil capacity. It was noted by the sustainability group that there is an issue in relation to the emissions from Australia's coal exports. A shift away from coal would have a major impact. The ability to address the issue of carbon pricing could be hampered by concerns about the economic impact on the resources industry. Some members of the sustainability group questioned how much economic change a carbon price would drive. It was noted that losses in domestic black coal, power plants and aluminium are foregone growth but there will be gain through other sectors. The innovation group questioned whether or not Australia could use the money generated in the resources boom to fund the reduction in carbon emissions. Climate change can also be expected to create demand, which will encourage technological solutions.

(iii) Geopolitical

Dr Gruen's paper very clearly made a link between Australia's positive terms of trade and the economies of China and India. This was discussed in three of the other breakout sessions. For example, the social, demographic and cultural trends group identified future ongoing commodities demand from China and India as having significant implications for the demand for international migrants and intra-national migration in Australia.

The possibility of a political or an international economic/financial crisis was identified by a number of groups as a major source of future uncertainty, with the impact depending upon the event's uncertain duration.

The labour force group looked at the geopolitical situation, noting that Australian decisions do not occur in a vacuum and there is a need to consider occurrences overseas. Changes in the domestic Chinese economy, such as the development of intermediate manufacturing, may have an impact, as would the potential shift of location-free services (for example human resources and other professional services that have traditionally been based locally) to China. However there are also potential opportunities for Australia, for example in responding to the English language teaching skills deficit in Mumbai.

Sustainability was also raised as an issue. The impact of China and India is affecting the level of emissions growth internationally. An alternative scenario is that these countries could become more efficient and use less coal, which would also impact on the demand for Australian resources.

(iv) Structure of Australian industry

The structure of Australian industry links to all the other drivers. Much of the discussion focused on three areas: the strong resources sector, decline in manufacturing and the growth in the services sector. These basic directions of change in the structure of industry were agreed whatever the rate of economic growth.

The prospect of a 'three-speed' economy was discussed. It was agreed by the labour force group that there are many pressures on the structure of the Australian economy. These require enterprises, and their workforces, to be capable of responding to changing patterns of demand for their output and the technologies that produce them.

There was substantial discussion about the implications of a strong resources sector. It was argued that 'the resources boom is disguising structural deterioration of the economy'. It was noted that the mining industry accounts for only one per cent of total employment and the industry has no difficulty in attracting workers. However this creates problems for other industries and potentially wages inflation. It was also argued that the mining industry is a major user of skills generated in other industries yet it does not contribute significantly to the creation of skills.

The social, demographic and cultural trends group considered that growth in the mining sector could have implications for where people choose to work and live. It identified an opportunity to leverage mining for regional economic development. However the labour force group noted that most jobs related to mining are located in cities in occupations such as law and engineering. Of the remainder, the majority are involved with the construction of mining infrastructure, and these finish upon completion of the infrastructure. It was also noted that there is a close relationship between migration trends and high demand in the resources industry.

While there was general agreement that the resources boom and the high terms of trade are likely to continue over the next 15 years, issues were raised about the uncertainties and risks of this scenario. It was noted that while supply is low, prices are high, which could encourage other countries to accelerate supply. Resource prices are also particularly susceptible to any threats to the reliability of supplies.

The extent to which the profits generated during the boom will have lasting structural benefits for the Australian economy was also raised. Failure to lock in these benefits will impact, for example, on investment in innovation. It was also suggested that green tariffs (border tariffs from European countries against imports from countries without a carbon price) may erode Australian coal prices.

The continued decline in the manufacturing sector was discussed, and it was argued that some industries, such as automotive manufacturing, are likely to be lost to Australia. However some groups noted that the loss of manufacturing is not a given as there are policy choices that could be made. If manufacturing does continue to decline many of the men involved may not be readily re-employed elsewhere. It was also noted that the high value of the Australian dollar is having an impact on tourism and education, and that some of these services are being outsourced.

There was also discussion about the growth in the services sector, for example in aged care. From a governance perspective, the burgeoning service economy raises questions of who will provide the service and who will pay for it. There are implications for the mix of skills required by the health and caring workforce as a result of increases in longevity and the new models of care required to look after an ageing population. Workforce projections in the health sector indicate a shortage in every occupational category, and a further risk of shortages in the next five years. The increasing availability of sophisticated technology will result in greater demand for specialised skills and teamwork; high quality Skype and broadband mean significant changes to the way health work can be carried out, which also has important implications for the labour force and work practice flexibility and adaptability. It was also noted that services that were once localised can now be moved easily given the increased use of ICT, for example, digital scanning and radiology can be done anywhere in the world.

In the area of sustainability, it was argued that there is potential to export services in sustainability and water technology. If the world reaches an accord on climate change there will be spin off effects for exports. A carbon price of \$150/tonne would drive carbon capture and storage, which is currently in development. In this instance the use of gas would expand and there would be additional growth in renewable energies. However, this would be likely to affect Australia's competitiveness, and increase energy prices.

(v) *Governance and public policy*

Governance and public policy influence all other drivers. Much hinges on governments' capacity to provide leadership and forge a policy consensus in response to changing scenarios. An argument was made that this is perhaps the most important driver of all, as governments have a particular influence in responding to and shaping the changing nature of the economy and society. For example, in an area such as sustainability, government leadership is crucial.

The risk of policy inflexibility was discussed in relation to economic and financial trends. It was suggested that the Australian political system makes it difficult to make structural adjustments in the context of a global downturn. It was added that we are going into a less reformist era, for example, parallel importation reforms for books was stopped, and the Henry Review Tax Reform and, in particular, the mining tax were largely rejected. There is disillusionment in the two-party process given the focus on short-term thinking.

Drawing together governance, technology and social trends, the phenomena of Get Up! Wiki Leaks, and other networked groups that make use of the internet, was discussed. Are these developments different from traditional methods of organising? Interest groups are becoming better at stopping policy change, rather than advancing necessary changes, and it can be difficult to propose change because people can more easily veto it through savvy use of the media. It was argued that governments are slow to catch up with change and social change in particular. The innovation group

noted that our systems of governance are designed for another era. Governments are now struggling to respond to civil unrest encouraged by the networks and information created via the internet. A recent example is in Egypt where the government closed down the internet to stop the use of social media.

Nevertheless, as the governance group noted, there are reforms to our political institutions and the various tools of government that have allowed government to effectively pursue reform agendas in the recent past. Sometimes policy changes are easiest when a crisis occurs that demands a response, and this can provide the opportunity for political leadership. But more generally, where there is the necessary political will to tackle problems, governments are not totally without the means.

(vi) Values, work-life balance and quality of life

Another link can be made between post-materialist values such as work-life balance and material aspirations, and Australia's economic and social development. The desire to find a balance between family, home and work relations is becoming increasingly important. Better gender equality in the allocation of caring responsibilities may also influence the extent of both male and female workforce participation and the demands upon governments. It was noted however that expectations of a higher quality of life and more time at home may impact on Australia's competitiveness. Global trends are also significant, as there is a tension between our ethos of work-life balance and our capacity to compete with economies that do not have this aspiration.

(vii) Participation and social inclusion

The importance of increasing workforce participation was agreed by many of the groups, particularly in the context of social inclusion and skills shortages in the economy. Governance and public policy influences social inclusion; for example employability is critical to employment participation, while marginal tax rates and the availability of child care can influence people's decisions about whether or not to enter the labour force. Structural adjustment and the decline in manufacturing were also cited as a potential source of social exclusion, especially for male workers. The spectre of an Australian underclass was also raised in discussions about the structure of the economy and challenges in achieving 'decent' work.

It was argued that there is a link between social inclusion and innovation. A recent speech by President Obama, which stated that innovation is central to addressing social inclusion and income disparity, was noted. For example, wage restraint in the US over several decades has meant that working families have not been able to generate sufficient demand for products that come from innovation.

(viii) Innovation and adaptability

There are also a range of linkages between innovation and other drivers. For example, responses to a financial crisis, lack of housing affordability, or climate change can all be expected to call on technology for solutions. This means that science, technology and innovation can be considered enablers as well as drivers of change.

It was noted that there are also social innovations, for example in the way we organise work, such as working from home. Innovation occurs in all sorts of ways, not just through technology. Changes in family structure could also be considered an innovation. Future technology also creates uncertainty. On the one hand some technology can replace jobs, on the other hand if we have adaptive capacity, technological changes can offer a range of new opportunities.

10. Emerging issues relating to the supply and demand for skills

(i) Importance of general education and cognitive skills

The strongest theme in relation to the supply and demand for skills was the need for generic skills. If workplaces need to build adaptive capacity, to respond to uncertainty across a range of different drivers, then generic skills are required.

It was noted that there is a danger of focusing too much on specific skills, especially because of their rapid rate of obsolescence. We are moving to more generic capabilities in order to apply the platform technologies of ICT, biotechnology and nanotechnology across multiple sectors and industries.

There was general agreement regarding the importance of incremental innovation, which would require a broad base of skills over the next 15 years. This includes good language, literacy and numeracy skills among the largest possible percentage of the working age population. Firms in all sectors need knowledgeable and skilled staff who can identify which technologies, including new organisational methods, might be of use and be able to adapt them to the specific needs of the firm. The labour force group suggested this implied the need to lift the broad education of the workforce, and to raise opportunities for all, including through basic language, literacy and numeracy.

The importance of flexibility and adaptability, regardless of the scenario, was identified by the governance group. Generalised skills are required at all levels. In other words, there is less investment and focus needed in highly specific skills in both VET and higher education. The innovation group identified the importance of raising core skills if we are to take full advantage of what science, technology and innovation can offer the world of work and the economy. It was also noted that a competency-based approach to training may get people job ready but not career ready and this is a concern.

The generic skills needed were summarised by the sustainability group as:

- flexibility;
- adaptability;
- communications;
- social skills.

The sustainability group also noted that the interaction of different climate scenarios will affect skills. They identified a need for a broader range of skills, and ability to work with/across disciplines. This is about broadening skills not increasing specialisation.

(ii) Investment

Ensuring sufficient funding for education and skills was also raised as an issue. The innovation group suggested that the overall level of funding in education and skills may be insufficient. This group articulated a potential risk to innovation if the VET sector is not properly resourced.

There was also discussion about the balance of responsibility between government, industry, and the individual in paying for skills. It was argued that education and training is an investment rather than a cost, but that those who benefit most should pay the premium. Two groups addressed this issue by considering human capital theory. In other words, where education and training is generic, it should be the responsibility of the state to pay; where education and training is firm specific, then the cost should be borne by the employer. It was argued in the labour force group that employers are increasingly seeking public funding for firm specific training. However, the existing investment of employers in skills was also recognised.

The governance group also discussed the role of the individual. It was argued that a higher proportion of private contribution could be enticed for higher levels skills. However, individuals are not likely to be prepared to make a significant contribution to VET. The labour force group also discussed the return on investment to VET: when compared to year 12, the returns are not high at low and intermediate levels.

(iii) Engagement and participation

It was recognised during discussions that education is an important factor in social inclusion. For example, the governance group noted that mechanisms are needed to engage and retrain people, for example in language, literacy and numeracy skills. It is important to understand who doesn't participate in the workforce and why. It is difficult to engage people if they are lost to the system.

(iv) Importance of labour utilisation/management and leadership

It was noted in the innovation discussion, and supported elsewhere (eg labour force, workplace and industrial trends) that management and leadership skills are important, as good management can lead to broad-based innovation and productivity. We need to pay attention to management structures and their relationship to the workforce. Management's capacity to encourage the full creative potential of the firm's workforce is important and universities need to spend more time training the next generation of managers properly.

It is also important to recognise that those supplying skills do not control the environment in which skills are used. Innovation policy and skills policy are dealt with in different areas, when in fact a whole-of-government approach is needed, with private business also included.

(v) Qualifications, informal learning and up-skilling

There was some discussion about the extent to which qualifications are fit for purpose. The responsiveness of formal qualifications to changing demand was raised as an

issue by the governance group. The labour force group noted that the qualification content of VET qualifications has not been adjusted to take account of the increase in year 12 participation. This is particularly problematic at Certificate I and II. Also there has not been a move beyond the earlier notion of competence to a broader cognitive context. It was argued that Certificate I and II do not take account of different industries, the content is too low, and implementation is low quality.

It was argued that employers will always take on those with skills and those who can get up to speed quickly. Informal learning on the job is important, but having an educated population to take full advantage of this is a prerequisite. Informal learning also influences the capacity to adapt. However we do not have a sufficient understanding of informal learning and how it adapts itself. The governance group identified that formal training is a high cost route compared to on-the-job training.

The sustainability group noted that continuous up-skilling is required. Sustainability will require the whole workforce (including managers and professionals) to change its understanding to grasp broader implications.

(vi) Role of research institutions, universities and VET providers

Anthony Arundel's innovation paper argued that specialised knowledge is created and maintained by the ability of the tertiary education system to conduct advanced research in the relevant fields. The diffusion and application of skills and knowledge is the primary economic function of universities. In discussion the innovation group questioned whether the focus on skills development for innovations should be expanded to include VET as well. A key question is how do we make sure that the education system is preparing people to adapt? The governance group also noted that flexibility and adaptability of the education and training system is needed.

(vii) Specific occupations

While there was a strong articulation of the importance of generic skills, many of the groups also discussed the requirement for specific skills. For example, the sustainability group identified that more engineers are needed across more disciplines. This includes electrical, chemical, mechanical and process engineers, as adaptation requires infrastructure. The sustainability group also noted there will be more demand for microbiologists, environmental engineers and environmental scientists. A key issue is explaining complex science, and uncertainty in contentious areas, to communities. Project management was also felt to be key, as well as skills around systems integration. Other areas of need include decision makers, skilled regulators and people able to make the case to regulators. The importance of cross-sectoral skills was raised, for example, engineers need to communicate with economists to finance projects.

The innovation group identified that the three generic technologies of ICT, biotechnology and nanotechnology require a mix of skills at the certificate, bachelors, masters, and PhD levels. It was noted that these technologies span almost all fields of scientific and technological study, which suggests that the best approach is to

strengthen education in all science and engineering disciplines. Other areas requiring skills development include technology design, data analytics and nanotechnology.

11. Conclusion and next steps

The Forum brought together key thinkers in Australia across a broad range of disciplines. This project will be ongoing during 2011 and will incorporate expert interviews, secondary research and workshops that will result in the creation of realistic scenarios for Australia to 2025.

The discussion also highlighted considerations for the development of scenarios themselves. For example, it is important not to get caught up with a tendency to think of scenarios as 'good, better, best or worst, or somewhere in between'. This runs the risk that people make a choice in favour of their preferred scenario, which, in effect, means a return to forecasting. These are lessons to be considered during the ongoing work on this project.



Dr Michael Keating, AC, FASSA, is a member of the Board of Skills Australia. Previously he was a Visiting Fellow in the Economics Program in the Research School of Social Sciences at the Australian National University and an Adjunct Professor in Public Policy at Griffith University. For most of his career, Dr Keating was a senior economic adviser to governments, and was involved in the preparation of many Commonwealth Government Budgets. Dr Keating was Secretary of the Departments of Employment and Industrial Relations (1983-86), Finance (1986-91) and Prime Minister and Cabinet and Cabinet Secretary (1991-96).



Dr Caroline Smith is the Director of Skills and Workforce Development Policy at Skills Australia. Dr Smith was formerly a senior policy advisor for the Trades Union Congress in the United Kingdom. She worked in a range of research and policy roles for the Commonwealth Department of Employment, Workplace Relations and Small Business, and also in the Department of Prime Minister and Cabinet. Dr Smith has held a number of academic research and teaching positions in Australia and the United Kingdom and completed a Doctorate in international industrial relations at the University of Strathclyde, Glasgow in 2007.

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- ¹ Skills Australia was established in 2008 to provide advice to the Australian Government on Australia's current, emerging and future workforce skills and development needs. Skills Australia's work covers a range of areas that affect the demand for and supply of skills. This includes migration, tertiary education and the effective use of skills in the workplace.
- ² OECD (2010), *Economic survey of Australia 2010*.
http://www.oecd.org/document/36/0,3746,en_2649_34569_46255013_1_1_1_1,00.html, accessed 25 February 2011,
- ³ Productivity Commission (2010). *Annual Report 2009-10*, Commonwealth of Australia: 59.
- ⁴ Productivity Commission, 'Long term trends',
<http://www.pc.gov.au/research/productivity/estimates-trends/trends>, accessed 28 February 2011 and ABS (2010). Australian System of National Accounts, 5204.0
- ⁵ Treasury, *Australia to 2050: Future challenges*, Commonwealth of Australia: 22.
- ⁶ Australian Bureau of Statistics (2011). *Labour Force Survey*, Cat. 6202.0, January 2011.
- ⁷ OECD data comparisons from December 2009 show that the participation rate of Australian women (25 to 34 years) was the tenth lowest of OECD countries. For men of prime working age (35 to 54 years), Australia ranks 21st out of OECD countries. The participation rate of older Australians (55 to 64 years) remains short of the performance of New Zealand, Japan and the United States (Online OECD employment database accessed 21 March 2011).
- ⁸ Skills Australia (2010). *Australian Workforce Futures*: 30.
- ⁹ It assumes that the newly qualified people would then have a participation rate equal to that of the other qualified people in their age group. See Access Economics, *Economic Modelling of Skills Demand*, 2009: 11.
- ¹⁰ Skills Australia (2010). *Op cit*: 3.
- ¹¹ *Ibid*.
- ¹² See for example 'Staff crisis looms as demand set to soar', *The Australian*, 21 January 2011.
- ¹³ Australian Bureau of Statistics (2010). *Underemployed Workers*, Cat. 6265.0, Sept 2009 and Australian Bureau of Statistics (2010). *Persons not in the Labour Force*, Cat. 6220.0, Sept 2009.
- ¹⁴ Australian Bureau of Statistics (2008). *Australian social trends, 2007*, Cat. 4102.0.
- ¹⁵ Skills Australia (2010). *Op cit*: 5.
- ¹⁶ Lewis, P (2008). *The Labour Market, Skills Demand and Skills Formation*, Academy of Social Sciences of Australia Occasional Paper, 6/2008.
- ¹⁷ Saliba, G and Withers, G (2009). 'Scenario Analysis for Strategic Thinking', in George Argyrous (2009). *Evidence: A Practical Guide for Policy and Decision Making*, UNSW Press.
- ¹⁸ *Ibid*.
- ¹⁹ *Ibid*: 131.
- ²⁰ All papers presented at the Forum can be found at:
<http://www.skillsaustralia.gov.au/SocialScienceAust.shtml>
- ²¹ See Banks, G (2010). *Successful Reform: Past Lessons, Future Challenges*, keynote address to the Annual Forecasting Conference of the Australian Business Economists, Sydney, 8 December 2010.
- ²² Hugo, G (2011). *Social, Demographic and Cultural Trends*, paper to Skills Australia/ASSA Scenario Development Forum: 10.
- ²³ See Australian Bureau of Statistics (2009). *Experimental Estimates and Projections*, Aboriginal and Torres Strait Islander Australians, Cat. 3238.0: 34.
- ²⁴ Richardson, S (2011). *Labour Force, Industrial, and Workplace Trends*, paper to Skills Australia/ASSA Scenario Development Forum: 2.
- ²⁵ See Australian Bureau of Statistics (2009). Cat. 6265.0, *op cit* and Cat 6220.0, *op cit*.
- ²⁶ See Australian Bureau of Statistics (2009). Cat. 6220.0, *Ibid*.
- ²⁷ Arundel, A (2011). *Skills for an innovative Australia to 2025*, paper to Skills Australia/ASSA Scenario Development Forum: 2.
- ²⁸ See Productivity Commission (2010). *Population and Migration: Understanding the Numbers*, Productivity Commission Research Paper, December 2010: 34.