



## **OCCASIONAL PAPER**

# **THE DEVELOPMENT OF AUSTRALIA'S INNOVATION STRATEGY: CAN THE PUBLIC SECTOR SYSTEM ASSESS NEW POLICY FRAMEWORKS?**

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researcher | activist | futurist | thought leader | intelligence source

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## PREFACE

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### **REFEREED PUBLICATION\***

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\* The authors are grateful for comments and advice on earlier drafts from Glenn Withers, Alan J Jones, Evan Jones, Don Scott-Kemmis, Allan Fels, Narelle Kennedy and several anonymous sources.

## **ABOUT THE AUSTRALIAN BUSINESS FOUNDATION**

The Australian Business Foundation is an independent, non-partisan organisation undertaking evidence-based research to deliver fresh insights and practical intelligence to boost Australia's capabilities and global competitiveness.

For over ten years, the Foundation has been bringing together forward-looking business executives, policymakers, academics and opinion leaders to share knowledge, shape debate and incite practical action.

This has established the Foundation as a thought leader bridging academic scholarship with the realities and challenges of everyday business experience. The Foundation is now the centre of an active and informed community of common interest, undertaking research in partnership with expert scholars and practitioners both nationally and internationally.

For more information and background on earlier research reports, visit the Australian Business Foundation at:

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## FOREWORD

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The Australian Business Foundation's series of Occasional Papers features cogent and substantial presentations on key aspects of public policy or business strategy that advance knowledge and informed debate about the potent issues impacting on Australia's competitiveness, innovation and sustained prosperity.

The Foundation is delighted to present the first paper in this series, a retrospective analysis of the Innovation Summit held in 2000, its lead up and its aftermath.

In this paper, Ian Marsh and Lindy Edwards deliberate on two important questions:

- How well did the Australian policy system cope with the task of evaluating a new policy paradigm?
- What governance capacities are required to recognise, assess and, if necessary, adopt new policy paradigms of strategies?

It is extremely timely to reassess this significant event in Australia's innovation policy making. With its election in November 2007, the new Rudd Labor Government has embarked upon reviews in a number of significant areas of public policy, including one to address Australia's national innovation system. This Occasional Paper is a 'must read' for the Expert Panel conducting the Review of the National Innovation System, and for anyone interested in learning about deft policymaking that breaks new ground and makes discernible difference.

Marsh and Edwards have produced a well-grounded contemporary analysis of the policy-making process in Australia, and it challenges us to do better. Thus, the paper meets the Foundation's test for an Occasional Paper - it enunciates a well-argued case that provokes deeper thought and the groundwork for better informed and more nuanced debate.

As the Australian Business Foundation moves into our second decade as an activist and futurist researcher and thought leader, we invite you to be part of the community of interest concerned with Australia's capabilities and global competitiveness and to read, think and act on the ideas brought to you in this inaugural Occasional Paper.

Narelle Kennedy  
Chief Executive  
Australian Business Foundation

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## INTRODUCTION

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In recent years, innovation has been seen as an increasingly important base for economic dynamism and growth and thus has risen in priority as a concern for governments. But approaches vary significantly between states.<sup>1</sup> This partly reflects the complexity of the concept of innovation, which has come to involve two quite distinct concerns. One covers the development of science-based industries (like biotechnology or nanotechnology) and the other the upgrading of established industries through the dissemination of knowledge (Smith and West, 2005). Differences between states also reflect normative, technical and other issues concerning such factors as industry structure, research capabilities, circumstances, opportunities, and the role of government.

Innovation as a capability that yields benefits for the economy is one issue. No less important is a capacity for innovation in public policy: indeed this might be regarded as a special instance of the more general theme. Policy systems and processes need to be able to identify and assess strategic challenges. The public sector is an especially challenging context for such assessments. The well documented hazard of lock-in in large complex organisations is especially salient to a governmental policy system with its multiple interconnections and dispersed and divided authorities. Interdependence, on the one hand, between political and administrative structures and, on the other, between administrative organisations and agencies augments the potential for conflict. This can work perversely to suppress attention to issues or to constrain the range of solutions (March, 1999).

Different kinds of policy innovation also present challenges of differing complexity. Hall (1993) suggests three broad categories: first, shifts in a policy frame or paradigm; second, shifts in the means by which an existing objective is sought; and third, a shift in specific instruments. The first is of course the most exacting, but also the most significant. New paradigms can be associated with strategic challenges like water scarcity (Wentworth Group, 2003), global warming (Flannery, 2006), social policy (Esping-Andersen, 2002), funding strategies (Chapman, 2006), or, in the present case, innovation. Such synoptic challenges can also be expected to arise more frequently. A variety of factors, including complex interdependence,

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<sup>1</sup> See TrendChart for variations between states in Europe. For example, strategies that emphasise innovation systems have been adopted by Denmark, Ireland, Finland, and Sweden.

spillovers between outcomes, cost pressures, technological and social change, and globalisation are driving this outcome. Recognition and assessment of strategic challenges requires capabilities to scan environments, identify new features and evaluate their relevance. This exploratory activity needs to occur without jeopardising the effectiveness of existing 'operational' policy frameworks.

A case study of how effectively the Australian policy system assesses new paradigms was provided by the evaluation of innovation strategies that took place in the period roughly from 1997-2003. Whilst there had been a history of engagement with the issue, stretching back to the late 1980s, pressure from the major representative organisation of 'big business', the Business Council of Australia (BCA), brought the issue to a fresh head. The review process included a National Innovation Summit (in February 2000) and culminated in a new statement of government policy, *Backing Australia's Ability*, in January 2001. A number of subsequent reviews have since been undertaken. These have occurred within the broad policy frame that was adopted after the Summit. This broad approach was reaffirmed in a second major government statement *Backing Australia's Ability – Building our Future through Science and Innovation* (2005), which set forth a program for the ensuing seven years. Hence the decisions made in 2000-2001 continued to determine the broad approach to innovation policy.

As a case study, the evaluation of innovation strategies in the period 1997 to 2003 is particularly interesting for three reasons. First, the exercise was billed as a strategic appraisal and involved settings, like a Summit, that have become associated with this phase of the policy cycle. Second, following Peter Hall's taxonomy enumerated earlier, it concerned the most challenging kind of strategic assessment, namely that involving a new policy paradigm. Third, the policy paradigm in question concerned the sources of economic growth and productivity which are amongst the central domestic preoccupations of the state. As will be discussed later, it introduced perspectives supplemental to those of the then dominant paradigm. It thus presented an exceptional challenge both to policy learning and to policy processes.

In reviewing these developments, this paper asks two questions:

- How well did the Australian policy system cope with the task of evaluating a new policy paradigm?
- What governance capacities are required to recognise, assess and, if necessary, adopt new policy paradigms or strategies?

This paper is in three parts. The following section explores the settings for Australia's reappraisal. The subsequent section reviews developments from the initiation of the Summit to the government's policy statement *Backing Australia's Ability*. The third section assesses this experience and explores the lessons from the perspective of the capabilities of the governance system.

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## BACKGROUND

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This section reviews the context in which attention to innovation strategy was renewed at the end of the 1990s. One aspect involves the more general intellectual climate in which this reassessment occurred – in particular, developments in the academic literature. A second involves the development of policy for innovation up to 2000.

### INTELLECTUAL FRAMEWORKS

Starting from the early 1980s, the role of technology (or more simply knowledge) as a driver of growth came increasingly into focus. This was associated with attention to two older streams of theory. One concerned the role of institutions in the economy and the other the distinctive characteristics of technologically driven growth (e.g. Hodgson, 2002; Schumpeter, 1934, 1976). This provenance was evident in a number of literatures, notably that concerned with national innovations systems (NIS) (e.g. Nelson and Winter, 1982; von Hippel, 1988; David, 1991; Rosenberg, 1994; Lipsey, 1995, 1997, 1998; Lipsey et al, 2005). Endogenous growth theory also represented a departure from the neo-classical framing and it offered conclusions that generally paralleled those of NIS approaches (e.g. Dosi, 1987, 1997; Romer, 1986, 1994). Meantime, in 1992 Arthur published his pioneering work on positive feedbacks, first mover advantages and increasing returns to scale. Finally, Porter's work on national competitiveness shifted the focus from whole industries to niches where competitive advantage can develop, the clusters that foster this and the contribution of such factors as inter-industry trade and outsourcing (1989, 1998)

This work influenced neo-classical thinking about the scope of market failures. Where technology is concerned, externalities, sunk costs, asymmetric and imperfect knowledge and transaction costs were all recognised as sources of market failure. But other policy implications were at variance from those derived from the neo-classical model. For example, in this latter perspective selective policy (which was tantamount to 'picking winners') was dismissed as a sure recipe for failure. This became almost an article of faith at elite bureaucratic and political levels.

To understand the difference between these framings, it is worth spending a moment on their different premises. The neo-classical model originates in a mechanical imaging of physical and social processes. This was reflected in the assumption that equilibrium is the 'normal' state of the economy. This, along with subsidiary assumptions about knowledge, risk, choice and competition, made possible a model of the economy in which an optimal

result became the logical outcome of price mediated exchanges amongst independent economic actors. In common parlance, it is about the relationship between demand and supply, which is mediated by price.

Two crucial implications for policy followed. The first concerned the role of government in the economy: in a neoclassical perspective, its pre-eminent task involved the pursuit of allocative efficiency. In theory, this was the market condition in which resources were allocated in a way that maximised the net benefit attained through their use. Allocative efficiency was also defined as the production of that quantity that was most beneficial to society. For an individual firm, this was a situation in which price equalled marginal costs. In practice, this led to a focus on policies designed to extend market-style arrangements to new areas and to liberalise arrangements where the working of markets was inhibited by regulation. Any other approach was assumed to distort prices and thus to induce an outcome that fell short of the optimum.

The second implication concerned the scope of policy: in the terms of this model, targeted or specific policies would always yield less benefit than generalised policies that did not distort price signals. In other words, policies designed to correct market failures that were perceived to be associated with technological development should not be selective or focused. In practice, proponents were no doubt reinforced in this approach by the pragmatic judgement that the social returns from a non-discriminatory policy would be far greater than those that might be achieved through any alternative.

The frameworks associated with innovation theories involved quite different assumptions. Wholly different perceptions of 'reality' are involved. In NIS perspectives, at least three fundamental considerations separate issues associated with the pursuit of technologically driven growth (i.e. value-driven productivity growth) from issues associated with the pursuit of allocative efficiency (i.e. cost-efficiency driven productivity growth). These assumptions concern knowledge, uncertainty and competition.

In neoclassical theory, knowledge is generally conceived as a homogenous stock that can be augmented incrementally and that diffuses instantaneously. Knowledge externalities arise because a firm's production depends both on its own efforts and on the general stock. In this perspective, the state can influence the pace but not the direction of technological change. This can also be associated with a view of the innovation process as one that is linear in direction – with the flow from pure to applied research and then on to development and commercialisation. By contrast, evolutionary and NIS theories treat knowledge as 'lumpy' and diffusion as problematic. The most useful forms of knowledge often arise from problem solving at the

firm level. NIS approaches also assume that pay-offs vary between different kinds of knowledge and that feedback loops are critical. These premises license attention to the pace and the direction of technological change and to different sources of knowledge. In other words, they license a selective approach.

A selective focus is reinforced by a second difference which concerns the distinction between risk and irreducible uncertainty. Optimising behaviour under conditions of uncertainty requires agents who know all the possible outcomes of their choices and who have clear probability distributions about the likelihood of each outcome. Their decisions are thus characterised by risk but not by genuine uncertainty. The equilibrium frame then produces the optimising behaviour that characterises the neo-classical model. Introducing genuine uncertainty eliminates the possibility of an optimal or even a determinate end state. Two individuals with similar preferences and faced by similar choice sets are likely to select wholly different outcomes. This negates the possibility of an equilibrium outcome.

A third assumption dividing evolutionary and neoclassical approaches concerns the nature of competition. 'Passive price taking behaviour is not involved. Rather behaviour takes the form of active struggling firm against firm, each seeking a temporary advantage over others...Long run equilibrium analysis of the competitive process is not just irrelevant but misleading because firms that are competing will cause technology to change endogenously long before any long run tendency based on fixed technology and tastes is manifested in observed behaviour (Lipsey et al. p. 39).' How then is coordination accomplished? In the words of Dosi and Orsenigo (1988): "order in change" is generated by various combinations of (a) learning (b) selection mechanisms and (c) institutions.' (cited *ibid*). This provides a logic for attention to whole systems and to the effectiveness of institutions that mediate learnings of many kinds, including those associated with applied research, knowledge dissemination and feedbacks.

The differing policy implications of these competing approaches are profound. The most important concerns the way opportunities and key issues are evaluated and described. Evolutionary and NIS perspectives require analysis that focuses on sectoral industry structures, sectoral research capabilities and empirical assessments of opportunities.

Four other differences also deserve note. First, in neoclassical eyes, costs and prices are the critical variables. Selective policies which distort prices are always second or worst best. General tax relief or a general subsidy is always preferable to focused or selective support.

Second, attention to the properties of institutions other than markets is generally discouraged. The remedy to problems in non-market areas of state activity is to replicate the benign allocative properties of markets. For example, quasi-market remedies will improve the effectiveness of publicly funded research.

Third, the flow of knowledge is often imaged as linear from research, through development to commercialisation. This is a science push conceptualisation. It implies a primary focus on publicly funded research and on the extension of property rights. Feedback loops, learning, the adequacy of venture capital and organisational or other capabilities for commercialisation have lesser claims on high policy.

Finally, market failures pose less long run risks than government failure. The 'natural' mechanisms that work to identify and eliminate error in market exchanges are absent in the case of political exchange. Indeed, political choice processes are regarded as especially recalcitrant. This finding is based on another body of theory, public choice theory, which transposes neo-classical rational actor assumptions to politics. In this perspective, public choices are assumed to be mostly in liege to the representatives of sectional rather than general interests.

By contrast, evolutionary theories implied that choices focusing on technologically driven growth necessarily involve selective or focused approaches. Countries are not competitive across the full range of industries, or the full range of activities within industries. Technological infrastructure (universities, research institutions etc) is expensive and needs to be allocated to those activities that promise the highest returns. In other words, where technological development is the object, selective or focused policies are also first-best. They are no more or less effective *a priori* than general remedies. Further, there is no basis for a prima facie fear of one failure (government) more than the other failure (market). History and experience suggests government and market failure are equally possible with no *a priori* finding in favour of either. In a context of uncertainty, the task of the technology policymaker is akin to that of a central banker. At the end of the day, she must make a judgement, but one that is informed by both theory and evidence.

These findings are naturally hedged with appropriate cautions about the dangers of ill-conceived approaches. The literature lists a variety of criteria for distinguishing effective from ineffective institutions, processes and instruments (e.g. Rodrik, 2004; Lipsey, Carlaw and Becker, 2005, p.526-543; Porter, 1999, pp. 197-289, 2003).

The central point is the licensing of a fresh approach by the state: one that involves a special kind of leadership in governance and that can involve

action at the level of clusters, sectors, capabilities or activities. How effectively did the institutions of governance assess the applicability of these considerations to the Australian case? Before turning to this question, the evolution of industry policy needs to be briefly traced.

## **POLICY FRAMEWORKS**

The election of a Labour government in 1983 marked the beginning of a transformation of Australia's economic strategy, indeed this represented the most radical revision since the first decade after Federation in 1901. In the period 1901-1909, broad policy frameworks were established that provided the basis for economic governance until 1983 (surveyed in Kelly, 1992; Marsh, 1995). Elements included a manufacturing sector developed behind tariff barriers. The consequences included a distinctive Australian industry structure characterised by a large number of SMEs and few large firms outside the mining and energy sectors. Most large manufacturing firms were primarily market-seeking subsidiaries of MNCs.

By 1983, the major parties concurred both on the need for change and on its broad direction. Bipartisanship (mostly tacit) was thus the ground for swift and far-reaching policy action. On the domestic front, this involved so-called micro-economic reform under which tariffs were progressively reduced and government business enterprises corporatised. Other measures were introduced to liberalise international financial linkages (e.g. Conley, 2001). From the early 1990s, this policy frame was extended by privatisation and competition policy. Federal and State governments collaborated to make public utilities, and a range of other hitherto protected activities, much more responsive to market signals. New agencies – notably the Australian Competition and Consumer Commission – were established to superintend implementation; and older agencies – notably the renamed Productivity Commission – gained new roles.

Selective industry support programs were generally downgraded. For example, a report to the Australian Manufacturing Council in 1989 explored a potential new industry policy framework (Pappas, Carter, Evans and Koop, 1990). It argued for enhanced efforts to build capabilities at firm level, more attention to innovation and suggested 'platform' companies would be needed to promote global engagement. It was sidelined by government. However in the late 1980s, in the context of the general program of tariff reduction, sectoral programs based on government procurement were established in IT, telecommunications and pharmaceutical sectors. Sectoral programs to facilitate adjustment were also established for the textile, automobile and pharmaceutical industries. In 1989 the Prime Minister's Science and Engineering Council (PMSEC) was

established within the Prime Ministers Department, an inter-departmental coordinating committee on science and technology was introduced, and a full time position of Chief Scientist created. These latter steps all gestured to an increasing awareness of the importance of innovation.

Political imperatives in the early 1990s (particularly a deep recession and high unemployment) triggered new rounds of policy and new opportunities to advance attention to innovation. A modest array of programs was progressively introduced. These were embodied in a series of policy statements. Under the first, *Building a Competitive Australia* (1991), an Australian Technology Group was established to foster the commercialisation of research, a Pooled Development Funds scheme was introduced to aid small and medium sized firms, and a Cooperative Research Centres program was established to link researchers and commercial interests.

In 1993, as a mark of the new priority accorded to industry strategy by the centre of government, an officer from the Prime Minister's Department was appointed Secretary of the Industry Department. A further statement in 1993, *Investing in the Nation*, expanded the Cooperative Research Centres program. The 1994 *Working Nation* statement introduced an endorsed suppliers program and assigned new funds to CSIRO for the dissemination of technologies. Thereafter an Innovation Task Force was set up to explore possible new policy settings. The Industry Department itself published a collection of papers reviewing evolutionary and NIS theory in 1994 (Welbourn, Wardrop and Bryant, 1994). This was followed in 1995 by another statement, *Innovate Australia*. Don Watson, then an adviser in Prime Minister Keating's office described the manoeuvrings that preceded this statement. In the process, he highlights the dominant roles of the Prime Minister's Office and the central policy departments (Prime Minister and Cabinet, Treasury and Finance) in the final approval of new policy:

'The statement...was small. Treasury fears about the budget making it into surplus overwhelmed months of work in the PMO (Prime Ministers Office) and DIST (Department of Industry, Science and Technology). Late in the piece (Minister) Peter Cook found \$200 million in his department, but Treasury would not countenance his claim that it was savings. There would be no venture capital fund, no super computer, no Essendon airport development, no significant new investment in IT based industry .....Treasury set rules and the Prime Minister thought he had no choice but to obey them....The statement aimed at generating more research and encouraging innovative businesses to manufacture and market new products...*The statement announced spending of \$150 million, but, through the cuts to tax and tariff concessions, saved more than twice that amount*' (p. 670 – our italics).

In 1996, Labour lost office and John Howard was elected Prime Minister. In its early quest for expenditure reduction (and in response to suspected abuse), the Research and Development tax concession was reduced to 125%. Three public enquires were also initiated. An ex-business executive, David Mortimer, was appointed to review the full range of industry programs. In his subsequent report, Mortimer strongly opposed sectoral programs. For example, he recommended abolition of the CRC program, reduction of the R&D tax concession to 100% and the introduction of a requirement for the CSIRO to attain 50% private funding. Two other reports considered opportunities in the IT sector (Cutler, 1997; Goldsworthy, 1997).

In the subsequent statement, *Investing for Growth* (1997), the government introduced an R&D Start program and Action Agendas. The former was a tiered grants scheme and the latter involved the establishment of joint government-industry review groups to assess regulatory or other impediments in particular sectors. The Pooled Development Fund survived and was progressively complemented by the COMET (Commercialising Early-stage Technology) Program and an Innovation Investment Fund.

Meantime, other official and non-official publications developed the case for attention to innovation. For example, in 1996, the Industry Department published a further collection exploring recent innovation theories (Bryant, 1996). In 1997, the Australian Business Foundation published a comprehensive report on economic strategy, *The High Road or the Low Road, Alternatives for Australia's Future* (available from [www.abfoundation.com.au](http://www.abfoundation.com.au)). In response to the reduction in the R&D tax concession, the Business Council of Australia (BCA) also launched a campaign for a reassessment of innovation strategies.

In its 1998 election manifesto, the Government declared:

‘A detailed stocktake and evaluation of Australia’s national system of innovation is required if we are to set the agenda for the future and develop policies to promote higher living standards’.

This led to the Government’s post-election decision (1999) to join the BCA in an Innovation Summit.

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## FROM INNOVATION SUMMIT TO BACKING AUSTRALIA'S ABILITY

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The Innovation Summit was delayed because of a change in Industry Ministers immediately after the election. The new Minister wanted time to assess priorities and the Innovation Summit was deferred until this was complete (interview 4<sup>th</sup> April 2006). However, in January 1999, a Steering Committee made up primarily of non-government stakeholders was established to organise the event. It established a policy working group and in May/June of that year it also created six working groups to develop background papers on different aspects of innovation. Over 70 submissions were made to the working groups by a range of individuals and organisations.<sup>2</sup>

The Department of Industry Science and Resources (DISR) also arranged preparation for six sectoral submissions to inform the summit. It also commissioned a Learned Group to produce a framework paper.<sup>3</sup> In June 1999 the Minister for Education also issued a white paper, *New Knowledge, New Opportunities*, which focussed on University based research.<sup>4</sup>

The Summit was held over three days, February 9-11 2000. Immediately after, an Innovation Summit Implementation Group (ISIG) was set up to progress the resolutions made at the Summit. The ISIG report *Innovation – Unlocking the Future*<sup>5</sup> was delivered to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) in August 2000. The Chief Scientist also initiated a post-Summit round of consultations, mainly with the Universities, and his report, *A Chance to Change* was also delivered to PMSEIC at the same time.<sup>6</sup>

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<sup>2</sup> Department of Industry Science and Resources, *ISR: National Innovation Summit*, viewed 24 May 2006. Available from [www1.industry.gov.au/archive/summit/index.html](http://www1.industry.gov.au/archive/summit/index.html)

<sup>3</sup> Department of Industry Science and Resources, *ISR: National Innovation Summit*, viewed May 2006. Viewed at [www1.industry.gov.au/archive/summit/index.html](http://www1.industry.gov.au/archive/summit/index.html)

<sup>4</sup> Department of Education, Science and Training, *New Knowledge, New Opportunities*, viewed at May 2006. Available from

[www.dest.gov.au/archive/highered/otherpub/greenpaper/index.htm](http://www.dest.gov.au/archive/highered/otherpub/greenpaper/index.htm)

<sup>5</sup> Department of Industry Science and Resources, *ISR: National Innovation Summit*, viewed May 2006. Available from [www1.industry.gov.au/archive/summit/](http://www1.industry.gov.au/archive/summit/)

<sup>6</sup> Robin Batterham, *Australian Chief Scientists Report : A Chance to Change*, as viewed at May 2006. Available from:

After this date, DISR prepared a Cabinet submission and this was considered and endorsed in December 2000. In January 2001 the Prime Minister issued a statement that responded to these developments entitled *Backing Australia's Ability*.<sup>7</sup> This set the framework for subsequent policy development. Indeed, this has persisted through a second iteration in 2004 which was designed to frame policy until 2010.<sup>8</sup> This framework is thus critical for determining the scope of Australia's interpretation of, and responses to, the challenge of innovation. The following analysis of the Innovation Summit in February 2000 explores in turn the interests and groups who were mobilised, the accounts or narratives that were proposed to guide deliberations, and the settings through which this process was advanced.

## **PARTICIPATION**

Approximately 160 organisations took on formal roles within the Innovation Summit process ranging from sponsoring the event, being represented on various committees, and making submissions. Participation was extremely diffuse, with many organisations taking on roles, but very few organisations involved in all of the steps of the process.<sup>9</sup> Participants can be divided into four major groups: Government, peak bodies, research institutes and universities, and individual firms. This provided representation for a range of the identities involved in the innovation system.

There were a large number of government participants. DISR was the central government institution in the process. In addition to DISR, other Federal government departments also took on roles in committees, working groups or they made submissions, including the Defence Science and Technology Organisation (DSTO); Agriculture, Forests, Fisheries Australia (AFFA); Department of Employment, Education, Training and

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[www.dest.gov.au/chiefscientist/reports/chance\\_to\\_change/Documents/ChanceFinal.pdf](http://www.dest.gov.au/chiefscientist/reports/chance_to_change/Documents/ChanceFinal.pdf)

<sup>7</sup> Department of Industry, Science and Resources, *Backing Australia's Ability*, viewed May 2006. viewed at:

[www.backingaus.innovation.gov.au/docs/statement/backing\\_Aust\\_ability.pdf](http://www.backingaus.innovation.gov.au/docs/statement/backing_Aust_ability.pdf)

<sup>8</sup>Department of Industry, Science and Resources, *Backing Australia's AbilityII*, viewed May 2006. Viewed at [www.backingaus.innovation.gov.au/info\\_booklet.htm](http://www.backingaus.innovation.gov.au/info_booklet.htm)

<sup>9</sup> This analysis of participants was based on an analysis of information that appeared on the Summit website. Department of Industry Science and Resources, *ISR: National Innovation Summit, Steering Committee and Working Groups*, viewed 24 May 2006. Viewed at: [www.l.industry.gov.au/archive/summit/scwg/index.html](http://www.l.industry.gov.au/archive/summit/scwg/index.html)

Youth Affairs (DEETYA); Department of Communications, Information Technology and the Arts (DCITA); Department of Foreign Affairs and Trade (DFAT); Department of Health and Aged Care (DHAC); and Department of Environment and Heritage (DEH).

Individual state governments also participated in the process. The State Government of Victoria was a summit sponsor, a member of the Steering Committee and was involved in policy working groups. The Western Australian Department of Commerce and Trade was on a working group and the Brisbane City Council and Queensland School Curriculum Council made submissions.

A wide range of peak bodies participated in the Summit process. The Business Council of Australia (BCA) was a central organiser of the Summit and was the only participant other than DISR to be involved at every stage of the process, although the Australian Chamber of Commerce and Industry (ACCI) was involved at most stages of the process. The Australian Industry Group was a sponsor and a member of the Summit Steering Committee. The Australian Information Industry Association, Australian Electrical and Electronic Manufacturers' Association, Australian Telecommunication Industry Association, the Sustainable Energy Industry Association, Federation of Australian Research and Technological Societies, National Medical Health and Research Council, and Engineers Australia, among others also participated at various stages of the process.

Research institutes exhibited a strong presence. The Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Research Council, several Co-operative Research Centres, Universities, the Australian Nuclear Science and Technology Organisation, medical research institutes such as the Monash Institute of Reproduction and Development and the Telethon Institute for Child Health Research, as well as others such as the Australian Institute of Marine Sciences were all actors in the process.

A very large number of private sector firms also participated. These firms, and to some extent the other major groups, can be further divided by their sectors:

*Resources and Agriculture:* Australia's traditional industries of natural resources and agriculture were well represented in the process. Players in these industries tended to be large well established companies with an international export focus. Participants included Rio Tinto, Western Mining Corporation, BHP Steel, Smorgon Steel, Comalco, Wesfarmers and BOC Gases. These organisations had substantial investments in R&D. Representatives of companies from these industry groups were involved at every stage of the Summit process. Robin Batterham from Rio Tinto,

wearing his additional hat of Australian Chief Scientist was present at every stage other than the Summit Steering Committee. Other companies took on various roles as sponsors and members of working groups.

*IT&T Industries:* Participants from the IT&T industries could be further divided into two categories. The first was large multinational firms, often foreign owned and tending to bring internationally developed R&D to Australia. These included IBM, Alcatel, Hewlett Packard and Ericsson. Telstra was an Australian based company that would also be included in this grouping. This cluster was less engaged in the summit process, with only Telstra participating at more than one stage.

The second group of IT&T companies was small Australian high tech start ups that were seeking to develop new technologies and then take them to market, often a global market. Examples included Endurance Electronics, Amicus Software, Treelectric and Sustainable Technologies Australia. These companies were quite active in making submissions but had only quite limited representation in the official Summit processes. However, their plight was also advocated by government and policy research organisations such as Strategic Industry Research Foundation.

*Medical Research and Biotechnology:* This is a strong area of scientific research in Australia. It had a strong presence in the working groups and the submissions. However, it did not have a significant voice on the Steering Committee, in sponsorship, or on the implementation committees.

*Manufacturing:* Companies involved in manufacturing figured heavily in the sponsorship of the Summit, but only took on quite limited roles on committees or in making submissions. Ford, Holden, Toyota, Fosters and Kraft were all sponsors of the Summit. Fosters was the only one of these companies to be a member of a working group, and Holden's position on the Implementation Group was the only representation on the major decision making committees.

*Omissions:* There were two notable omissions from major representation in the Summit process. The first was small and medium sized enterprises that were not directly engaged in R&D. The expert literature suggests these firms are an important focus for a non-science driven innovation strategy. Their role was championed by some academic and policy experts, but they did not represent themselves in this dialogue.

The second major omission from the Summit process was service industries. The service industries now make up substantial proportion of the Australian economy. Innovation in these industries is also likely to be driven by customer needs rather than scientific discovery.

## **ANALYTIC FRAMEWORKS**

There were two major accounts of the ‘problem’ of innovation as it specifically concerned Australia and both were relatively narrowly based. In the light of the emphasis given to the need for a national vision in a number of Summit submissions, this restricted focus was perhaps surprising. The first account focused on the relationship between business R&D expenditure and economic growth. In this perspective, countries with high R&D expenditure, such as the United States, experienced high growth. By contrast Australia’s business expenditure on R&D was quite poor in comparison to other OECD countries coming in 17<sup>th</sup> out of 24. Furthermore, while R&D spending was increasing among our trading partners, it had declined in Australia through the 1990s.<sup>10</sup>

The second assessment of the ‘problem’ of innovation focused on the importance of non-science driven innovation as the ground of international competitiveness. In this view, the identification of new products and the continuous improvement of production processes and delivery mechanisms was the essence of economic success. But too few Australian firms were engaged in this form of non-science driven innovation. In a context in which 98% of the world’s R&D was done outside Australia, firm capacities to pick up and adapt those innovations was more important to Australia’s economic performance than home grown R&D. Neither of these propositions was fully quantified and the scale of the opportunity was not addressed in other than general terms, particularly in the work of one of the Summit Committees, the Industrial Innovation Working Group.<sup>11</sup>

### ***Varying Accounts***

These different accounts of Australia’s ‘problem’ were intimately related to different and more broadly based accounts or theories of the sources and causes of innovation. These fell into three broad categories.

#### ***(I) Science Push/ Market Failure***

The traditional science push account focuses on new technology as the basis of innovation and growth. It takes a traditional market failure

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<sup>10</sup> This account appeared in a number of submissions to the Summit, was widely recounted in the media, and was reproduced in ISIG Report. See the ISIG report at Department of Industry Science and Resources, *ISR: National Innovation Summit*, viewed May 2006. Viewed at [www1.industry.gov.au/archive/summit/index.html](http://www1.industry.gov.au/archive/summit/index.html)

<sup>11</sup> Innovation Framework Paper - *Shaping Australia’s Future*, Commonwealth of Australia, October 1999.

approach to explaining a role for government in innovation. The argument is that technological developments create spill over benefits that cannot be captured by the company that invested in the research. The result is that if companies only invest in R&D until the company's marginal cost equals the company's marginal benefit, there will be a less than socially optimal investment in R&D.

This approach advocates government applying broad based R&D tax concessions. The concession accounts for the spill over benefit. The broad based nature of the reform leaves the market to allocate resources between competing innovators. The market remains the central co-ordinating mechanism for setting the path of innovation.

### **(II) Science Push/ Innovation System Failure**

The science push/ innovation system failure approach also sees scientific and technological discovery as the driver of innovation and growth. Like the approach above, it also considers that there is a role for government in supporting base level research.

This approach, however, considers that the path from invention to commercialisation is more complex. It considers that an innovation system includes original researchers, entrepreneurs, venture capital, other firms in related activities, economies of scale required for export, customers, intellectual property institutions and information flows amongst the different elements in the network. It argues that there is a role for government in ensuring that all of the elements of the system are in place and that there are well oiled linkages between them.

Barriers to efficient innovation that are identified in this approach include a lack of communication between scientists and entrepreneurs, difficulties raising venture capital, lack of economies of scale to achieve efficient innovation and an export focus, difficulties in creating collaborative networks with firms working in related areas, barriers to the adaptation of overseas developed technologies and a lack of use of patent arrangements.

This approach sees government has having an important leadership role in assisting the innovation system to function well.

### **(III) Applications Pull / Innovation System Failure**

The applications pull approach in to innovation emphasises the role of finding new ways of doing things, and new applications of technologies as being the central driver of growth.

This approach puts a firm's relationships with its stakeholders (e.g. customers, suppliers, advisers etc) at the middle of a complex web of

feedback loops. Its vision of the innovation system contains the same elements as the approach above. However, it entails considerably more backwards and forwards feedback among all the elements. It places particular emphasis on rich communication and collaboration between firms, firms in related activities, and customers as being central to the development of new products and systems for product delivery.

In this approach government has a role in fostering collaboration and co-operation between firms, and creating an innovation centred business culture.

### ***Prevalence of the Accounts***

The dialogue around the Summit contained all three accounts. The language of an innovation system was pervasive. It was present in almost all of the official summit background documents. The submissions and other documents written by government, academic policy specialists, and the major peak bodies (such the BCA and the ACCI) all included explanations of applications pull/innovation system accounts of innovation. Their accounts were clearly grounded in state of the art academic thinking at the time, and appeared to convey a degree of policy consensus around these ideas.

The Learned Group who produced a central background paper on innovation for the Summit also used innovation system ideas to suggest a major overhaul of existing innovation policy. They recommended that Australia re-orient research dollars away from the traditional natural resources and agriculture industries and towards new industries. They also recommended that government could get more 'bang for its innovation buck' by focusing on applications pull innovation. They went as far as to suggest that refocusing innovation policy in such a way would enable government to reduce R&D funding and produce higher levels of innovation and growth.<sup>12</sup>

However, the submissions to working groups and the media coverage of the Innovation Summit made it clear that the two 'science push' accounts were most prominent in Summit thinking. The prominence of dedicated R&D organisations in the summit process ensured that a significant portion of discussion assumed this approach. The Office of the Chief Scientist, the Australian Research Council, and the National Health and Medical Research

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<sup>12</sup> Innovation Framework Paper - *Shaping Australia's Future*, Commonwealth of Australia, October 1999. Available from:

[www.l.industry.gov.au/archive/summit/reference/learned\\_group/index.html](http://www.l.industry.gov.au/archive/summit/reference/learned_group/index.html)

Council were significant forces in the Summit process and all assumed a 'science push' approach.

Different industry groups also advocated different versions of the science push/ market failure account/innovation system account. For example, while most of the major natural resources companies did not make submissions to the working groups, Ernst & Young's submission defended the natural resources industries dominant place in the Australian R&D landscape. It opposed sectoral policies that might shift resources towards the IT&T and the biomedical sectors. It emphasised the importance of broad based measures that left the market to make decisions about allocations of resources between sectors. It envisaged market leadership and government followership. The submission focused on the R&D tax concession as the central policy instrument. The submission assumed a science push/market failure account of innovation.<sup>13</sup>

In contrast, the Sustainable Energy Industry Association (SEIA), an example of the small scale high tech start ups, clearly articulated a science push/innovation system account. Its submission assumed a linear process from the development of technologies through to their commercialisation. It argued that the concentration of government funding on the later stages of the process was problematic, as start ups faced difficulties in progressing through the early stages of the chain. In contrast to the Ernest & Young submission, SEIA also called for programs targeted at sectors of national strategic importance such as green technologies. They championed an active role for government in providing capital for R&D as well as extensive support through the commercialisation process.<sup>14</sup>

Many submissions exhibited a level of slippage between the accounts. Even the submissions above showed some slippage. This appeared to reflect the 'problem focused' or pragmatic approach of most participants. Where academic debates were sensitive to the coherence and consistency of underlying frameworks, most Summit participants were comfortable using different frameworks depending on the issues being discussed.

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<sup>13</sup> Ms Megan Bartlett, Ernst & Young, Submission to the Industrial Innovation Working Group, 10 Sept 1999. Available from

[www.l.industry.gov.au/archive/summit/reference/submissions/44-Bartlett.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/44-Bartlett.pdf)

<sup>14</sup> Ms Sylvia Tulloch, Sustainable Energy Industry Association, Submission to the Innovation Summit Steering Committee. Available from:

[www.l.industry.gov.au/archive/summit/reference/submissions/25-Tulloch.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/25-Tulloch.pdf)

Many participants also clearly adopted the philosophical position that was most conducive to their interests, as they saw them. Those with incumbency tended to urge the importance of 'market forces' and to seek broad based forms of assistance. High tech start ups and those in new industries had much stronger tendency to seek sectoral programs, and to use ideas of an 'innovation system' to seek support at all stages of the commercialisation process. Research organizations assumed a science push perspective. Only policy experts and a handful of consultants and manufacturers emphasised the applications pull approaches.<sup>15</sup>

## **INSTITUTIONS AND THE REFINEMENT OF FRAMEWORKS**

A variety of institutions mediated the various steps in the policy making process. They are reviewed serially.

### ***Summit Steering Committee***

The Steering Committee was initiated by the Business Council of Australia. It was chaired by Bob Savage, the former CEO of IBM Australian-New Zealand. It was composed of two business peak bodies in the BCA and ACCI, one business research peak body in the Australian Industry Research Group and one science peak body, the Australian Academy of Science. CSIRO joined IT start up Endurance Electronics, industrial chemist consultants Techview, and financial services Hambro-Grantham Management (now Colonial First State) on the Committee. There were only two government representatives on the Committee, DISR and the State Government of Victoria.<sup>16</sup>

*Working Groups:* The Steering Committee established the Policy Group to develop background papers for the Summit. This group was heavily dominated by bureaucrats and policy experts. These policy experts were well versed in applications pull/ innovation system approaches. DISR commissioned the Learned Group's report and several sectoral reports to provide background context to the Summit. The background reports were strongly influenced by Innovations System approaches.<sup>17</sup>

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<sup>15</sup> For example, Mr Kim Sweeny, Strategic Industry Research Foundation, Submission to the National Innovation Summit. Available from:

[www.l.industry.gov.au/archive/summit/reference/submissions/10-Sweeny.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/10-Sweeny.pdf)

<sup>16</sup> Department of Industry Science and Resources, *ISR: National Innovation Summit, Steering Committee and Working Groups*, viewed 24 May 2006. Available from:

[www.l.industry.gov.au/archive/summit/ISIG/isig.html](http://www.l.industry.gov.au/archive/summit/ISIG/isig.html)

<sup>17</sup> Ibid.

The Steering Committee also established six working groups, with stakeholder based secretariats, to develop background papers on key themes for the Summit. The working groups were:

- Industrial Innovation
- Managing Intellectual Property
- The Human Dimension
- Institutional Structures and Interfaces
- Innovation and Incentives
- Resource and Infrastructure Consolidation and Co-operation<sup>18</sup>

The submissions to these working groups enabled a wide range of perspectives. Different working groups attracted different contributors, and predictably, their different emphases lead them to different findings. The Human Dimension, Institutional Structures and Interfaces and Industrial Innovation groups attracted a greater emphasis on innovation system approaches.<sup>19</sup> Incentives and Infrastructure groups attracted a greater science push focus.<sup>20</sup> However all the groups had to navigate through conflicting accounts to some degree. The Incentives group that focused on R&D tax concessions also had to contend with demands that incentives should be opened up to reflect non-technology based innovation.<sup>21</sup> The Human Dimensions group not only focused on the network aspects of Innovation System approaches, but also was presented with submissions about the need for more science graduates.<sup>22</sup> The stakeholder base of the secretariats of the different research groups also

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<sup>18</sup> Ibid.

<sup>19</sup> Mr Kim Sweeny, Strategic Industry Research Foundation, Operational Excellence Submission to National Innovation Summit, viewed 24 May 2006. Available from:

[www.l.industry.gov.au/archive/summit/reference/submissions/10-Sweeny.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/10-Sweeny.pdf)

<sup>20</sup> Mr David Gelb, KPMG, Submission to National Innovation Summit, viewed 24 May 2006. Available from [www.l.industry.gov.au/archive/summit/reference/submissions/26-Gelb.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/26-Gelb.pdf)

<sup>21</sup> Dr Miriam Goodwin, Goodnews Marketing & Communications Pty Ltd, Submission to National Innovation Summit, viewed 24 May 2006. Available from:

[www.l.industry.gov.au/archive/summit/reference/submissions/12-Goodwin1.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/12-Goodwin1.pdf)

<sup>22</sup> Mr Michael Berry, Office of the Queensland School Curriculum Council, submission to National Innovation Summit, viewed 24 May 2006. Available from:

[www.l.industry.gov.au/archive/summit/reference/submissions/4-Berry.pdf](http://www.l.industry.gov.au/archive/summit/reference/submissions/4-Berry.pdf)

seemed influential in the tone of the reports.<sup>23</sup> Market failure and science push/innovation system failure approaches were evident in the submissions whilst innovation system approaches were pervasive in the Summit's background papers.

## **THE SUMMIT**

The Innovation Summit was held in Melbourne between 9-11 February 2000. There were 550 participants from government, the research sector, and business. Participation was weighted to the public sector, universities and research institutes. The business presence tended to be larger corporates, with a smaller number of small businesses in attendance together with industry and business groups.<sup>24</sup> The Prime Minister gave a speech at the Summit dinner committing his government to a substantial investment in innovation. It is worth noting that this commitment was made before any consensus was reached about what the problems were, and what was required to be done to fix them.

The Summit was organized around three themes namely, (i) a competitive environment (ii) investing in ideas and (iii) building industry research linkages.<sup>25</sup> These themes structured the program and the subsequent communiqué. They were strongly based in a science push/market failure model of innovation. The initial emphasis on the importance of 'a competitive environment' and getting market conditions right reflected a neo-classical view of government's role in facilitating economic performance. The second theme of investing in ideas reflects the neo-classical view that underperformance in innovation was primarily due to a market failure around the investment in ideas. The third theme gestured to the innovation system perspective in recognising the linkages involved in turning research into products, though the label of the theme again reflects a narrow view of the innovation system.

Individual sessions, however, placed more emphasis on innovation systems approaches. Many of these sessions were squeezed awkwardly into the

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<sup>23</sup> Department of Industry, Science and Resources, National Innovation Summit, Steering Committee and Working Groups, Working Groups Reports, viewed 24 May 2006. Available from [www1.industry.gov.au/archive/summit/scwg/index.html](http://www1.industry.gov.au/archive/summit/scwg/index.html)

<sup>24</sup> Department of Industry Science and Resources, National Innovation Summit – The Event, viewed 24 May 2006. Available from:  
[www1.industry.gov.au/archive/summit/event/index.html](http://www1.industry.gov.au/archive/summit/event/index.html)

<sup>25</sup> Department of Industry Science and Resources, National Innovation Summit – Summit Program. Available from [www1.industry.gov.au/archive/summit/event/TheProgr.pdf](http://www1.industry.gov.au/archive/summit/event/TheProgr.pdf)

themes. Of the five sessions in the Investing in Ideas theme, three were clearly based in application pull/innovation system approaches. Two centred on building networks, collaboration and linkages and the third centred on shifting the innovation focus onto applications pull approaches to innovation. Similarly, of the four sessions on the Building Industry-Research linkages theme, all could be seen to be consistent with an innovations systems approach.<sup>26</sup>

At the end of the Summit, the President of the BCA and the Minister for Industry Science and Resources released a communiqué based on the three Summit themes.<sup>27</sup> The communiqué claimed to “broadly outline the Summit findings and the way forward”.<sup>28</sup>

### **INNOVATION SUMMIT IMPLEMENTATION GROUP**

The Innovation Summit Implementation Group (ISIG) was established to progress the findings of the Summit. Their task was to consolidate the findings from the summit, identify concrete potential actions, and to prioritise and provide potential timelines for implementing those actions. They were to present their interim findings to the June 2000 PMSEIC meeting, and deliver their final report to PMSEIC in August 2000.

The ISIG presented a notable break from the earlier stages of the process.<sup>29</sup> While much of the pre-Summit secretariat support had been provided by industry stakeholders, at this stage of the process it was moved into a more restricted group within DISR. The Secretariat was set up as a section within the Innovation Policy Branch, but largely excluded the policy officers who had prepared the background papers for the Summit. The membership of the Group also represented a break with earlier stages of the process. The Group was chaired by David Miles, Senior Partner of commercial law firm Corrs Chambers Westgarth. The group included the

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<sup>26</sup>National Innovation Summit, Summary of Breakout Sessions. Available from:

[www.industry.gov.au/errorhandler.cfm?url=http://www.industry.gov.au/archive/summit/ois/communique.doc](http://www.industry.gov.au/errorhandler.cfm?url=http://www.industry.gov.au/archive/summit/ois/communique.doc)

<sup>27</sup> Ibid.

<sup>28</sup>Innovation Summit Implementation Group, *Innovation - Unlocking the Future*, August 2000, p 34, viewed at 24 May 2006. Available from:

[www.l.industry.gov.au/archive/summit/index.html](http://www.l.industry.gov.au/archive/summit/index.html)

<sup>29</sup> Based on an analysis of information available at National Innovation Summit, Innovation Summit Implementation Group, viewed at 24 May 2006. Available from:

[www.l.industry.gov.au/archive/summit/ISIG/isig.html](http://www.l.industry.gov.au/archive/summit/ISIG/isig.html)

Australian Chief Scientist, Dr Robin Batterham who also had roles with Comalco and Rio Tinto. Other business representatives were from Holden, Ridley Corporation and Arthur Andersen. The research sector was well represented with participants from RMIT University and the Australian Academy of Technological Sciences and Engineering. The Federal Government was also more strongly represented with high level officials from DISR and DEETYA. The BCA and Arthur Andersen were the only members of the original Steering Committee who were represented on the ISIG. Only two other members of the ISIG had made submissions to working groups. Notably, however, a number of the organisations represented on the group had been sponsors of the Summit. In sum, ISIG was weighted towards the research community and Australia's traditional industries.

The ISIG Report championed policy continuity. The 'scene setting' elements of the report centred on the low level of Australian business investment in R&D. Its emphasis on R&D spending as the basis of innovation set the ground work for a science push approach. The organisation of the report accorded a much lower priority to innovation system conceptions. Analysis was organised in the same way as the Summit around three themes. The themes were altered only slightly from the Summit to be 'creating an ideas culture', 'generating ideas' and 'acting on ideas'. The report's big ticket recommendations were primarily for increases in funding through existing policies and instruments – for example, an increase in funding through the R&D tax concession, a doubling of ARC funding, a doubling of the Commercialising Emerging Technology (COMET) program and an increase in remuneration for researchers.

Other aspects of the report also reflected a neo-classical market failure view of innovation. One of the major themes of the report was fostering entrepreneurship. This was partly in the context of the need to build the business skills of researchers. This was matched with recommendations for a public relations campaign to encourage an entrepreneurial culture, a program to enhance entrepreneurial skills in young people, and a scholarship program to enhance teaching of entrepreneurial skills by giving teachers experience of innovative businesses. This was in place of the call by some Summit participants for a national vision as the foundation for wide business and community mobilisation.

However, it should be noted that while the recommendations and much of the text of the report would leave a reader with an entirely science push view of innovation, the details incorporated some innovation system thinking. The text around recommendations on 'acting on ideas' included

an awareness of the importance of networks and connections between firms in related fields, researchers and governments. The report did quote the OECD about the importance of networking and co-operation. However, it appears to have been absorbed as a minor additional insight into the innovation process rather than prompting an overhaul of innovation thinking.

## **THE PRIME MINISTER'S SCIENCE, ENGINEERING AND INNOVATION COUNCIL**

The Prime Minister's Science, Engineering and Innovation Council (PMSEIC) was renamed in 1997 to include innovation. The Council is the Australian Government's principal source of independent advice on major national issues in science, engineering and technology and their contribution to the economic and social development of Australia.<sup>30</sup> Its terms of reference imply a science based, linear view of innovation, an approach which is reinforced by the membership which is drawn almost universally from the research community. The ISIG report was delivered to PMSEIC, along with the Australian Chief Scientist, Dr Robin Batterham's report, *A Chance to Change*.<sup>31</sup> PMSEIC was given the task of responding to both reports to produce the government's major policy statement on Innovation 'Backing Australia's Ability'.

## **POLICY OUTCOMES**

The government's determination of the capabilities that needed to be developed to build Australia's innovation capacities was embodied in its major policy statement *Backing Australia's Ability (BAAI)*. This was launched on 29 January 2001.<sup>32</sup> It was presented as a \$3 billion dollar investment in science and innovation over five years. Again it was organised around three themes, two of which clearly echoed the Summit themes in 'Investing in Ideas' and 'Commercialising Ideas'. The industry push for improvements

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<sup>30</sup> Department of Education Science and Training, *The Prime Minister's Science, Engineering and Innovation Council*, viewed 24 May 2006. Available from:

[www.dest.gov.au/sectors/science\\_innovation/science\\_agencies\\_committees/prime\\_ministers\\_science\\_engineering\\_innovation\\_council/](http://www.dest.gov.au/sectors/science_innovation/science_agencies_committees/prime_ministers_science_engineering_innovation_council/)

<sup>31</sup> Dr Robin Batterham, *Australian Chief Scientist Report - A Chance to Change*, November 2000, viewed April 2006. Available from

[www.dest.gov.au/chiefscientist/Reports/Chance\\_To\\_Change/Documents/ChanceFinal.pdf](http://www.dest.gov.au/chiefscientist/Reports/Chance_To_Change/Documents/ChanceFinal.pdf)

<sup>32</sup> Australian Government, (2001) *Backing Australia's Ability - An Innovation Action Plan for the Future 2001*. Available from: [www.backingaus.innovation.gov.au/2001/statement/index.htm](http://www.backingaus.innovation.gov.au/2001/statement/index.htm)

in the R&D tax concession was also successful. A premium R&D tax concession of 175% was introduced, as was a rebate scheme for small companies. The statement replaced the ISIG theme of 'generating an ideas culture' with 'Developing and Retaining Australian Skills'. The big ticket items included providing \$736 million to double the ARC research grants scheme and \$155 million for research facilities. It also included a \$176 million boost to biotechnology and an ICT centre of excellence. As a result, the final policy statement was even more science push focused than the earlier stages of the process.

Initiatives under the 'Developing and Retaining Australian Skills' theme were also strongly aligned with a science push perspective. Twenty five new Federation Fellowships were announced. The number of Australian Post Doctoral Fellowships was doubled, and the remuneration of those positions boosted. Furthermore, 21,000 additional full time student places were to be created, with priority given to ICT, mathematics and science courses.

The price tag of the initiatives falling under the 'Commercialising Ideas' theme was more modest and a number of the initiatives were extensions of existing programs. The big ticket item was the \$227 million to expand the Co-operative Research Centres program. The COMET program was doubled at a cost of \$40million. A Pre-Seed Fund was extended to assist in commercializing public sector research at a cost of \$79 million, and \$100 million was provided for the Innovation Access Program that facilitates Australian access to overseas technology.

## **SUBSEQUENT MAPPING PROGRAMS**

Backing Australia's Ability set out a framework for Australia's innovation system to be mapped and benchmarked in subsequent annual reports.<sup>33</sup>

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<sup>33</sup> Department of Industry Science and Resources, Backing Australia's Ability – Innovation Reports, , Backing Australia's Ability: Real Results Real Jobs 2001-2002, viewed April 2006, <http://backingaus.innovation.gov.au/2001/statement/index.htm>

Department of Industry Science and Resources, Backing Australia's Ability – Innovation Reports, , Backing Australia's Ability: Real Results Real Jobs 2002-2003 viewed April 2006 <http://backingaus.innovation.gov.au/2001/statement/index.htm>

Department of Industry Science and Resources, Backing Australia's Ability – Innovation Reports, , Backing Australia's Ability: The Australian Government's Innovation Report 2003-04, viewed at April 2006,

<http://backingaus.innovation.gov.au/2001/statement/index.htm>

This process was initiated by the Education Department through its then Minister, Brendan Nelson, in 2002. This step also reflected significant machinery of government changes, with primary responsibilities for research programs transferred wholly to the Education Department. The Industry Department retained a secondary role – primarily in relation to venture capital and various firm-level programs. But prime responsibility for innovation strategy was now shifted to the Education Department and senior officers from policy sections of the Industry Department were accordingly transferred. This reversed a decision of the early 1990s to give lead responsibility to the Industry Department, a decision which was designed to recognise the primary role of firms in the innovation process (interview, Dr Paul Wellings).

The mapping process drew on the same three themes to structure its analysis and to measure Australia's performance in 'innovation'. For example, Australia's innovation performance was compared to the OECD average on the following indicators.

- Public expenditure on R&D
- Scientific and technical articles per capita
- US Patents
- Business R&D Expenditure
- % Labour Force with a Tertiary Education
- Number of Science Graduates aged 25-34
- Number of Researchers in the Labour force
- Venture Capital as % of GDP
- Number of Internet Users
- Investment in Equipment as % of GDP
- Foreign Affiliates in Manufacturing R&D

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Department of Industry Science and Resources, Backing Australia's Ability – Innovation Reports, , Backing Australia's Ability: The Australian Government's Innovation Report 2004-05

Viewed at April 2006, <http://backingaus.innovation.gov.au/2001/statement/index.htm>

Department of Industry Science and Resources, Backing Australia's Ability – Innovation Reports, , Backing Australia's Ability: The Australian Government's Innovation Report 2005-06, viewed at April 2006,

<http://backingaus.innovation.gov.au/2001/statement/index.htm>

- Strategic Alliances
- Innovation as % of Total Sales
- Multi-Factor Productivity Growth<sup>34</sup>

This benchmarking framework ensured that subsequent analysis of innovation would start from a science push base. It also ensured that there would be rich statistical information on which to base further claims for policy intervention on science push approaches to innovation.

In contrast, Australian performance on market pull, innovation system-based forms of innovation were to be left languishing on the periphery. The measures of Strategic Alliances and Foreign Affiliates did seek to measure the linkages in the national innovation system. However, they were very much at the margins of the analysis of innovation performance. The reporting on Australian innovation had little scope to explore broader approaches to innovation, or to measure how Australia was faring relative to its competitors on alternate measures of innovation.

## **BACKING AUSTRALIA'S ABILITY 2**

The on-going impact of these intellectual frameworks was evident when Backing Australia's Ability 2 was released in 2004. The \$5 Billion package took innovation policy out to 2010-11. The release was structured around the same three themes. The package reflected continuity in policy approach. The big ticket items were extensions of the same major items from BAA 1. It included boosts to CSIRO, ARC, NHMRC, increased research infrastructure spending and additional money for the Centres of Excellence. Again, there were more modest additions to commercialization programmes COMET and the Co-operative Research Centres.<sup>35</sup>

The Innovation Summit resulted in an innovation policy lock-in that is set to last at least a decade.

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<sup>34</sup> Department of Industry Science and Resources, Backing Australia's Ability – Innovation Reports, Backing Australia's Ability: Real Results Real Jobs 2002-2003, viewed at April 2006, <http://backingaus.innovation.gov.au/2001/statement/index.htm>

<sup>35</sup> Australian Government, *Backing Australia's Ability Information Booklet*, May 2004. Available from: [www.backingaus.innovation.gov.au/info\\_booklet/](http://www.backingaus.innovation.gov.au/info_booklet/)

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## DISCUSSION AND ASSESSMENT

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The framework used to analyse these developments assumes policy development splits broadly into strategic and operational phases. The former is an exploratory phase. Public sector institutions can facilitate such activity more or less effectively. In the present case, the test of effectiveness is not whether a new paradigm was adopted. That would be to prejudge its feasibility and fit. The test rather is whether an adequate assessment occurred. The present case focused on the capabilities for policy scanning and assessment within and between departments, external stakeholders and Ministers.

In public policy, the conceptual framework (or more simply the set of ideas) that ultimately becomes official thinking is critical. They justify designating a particular situation as a problem and they set forth the scope of remedial action (eg. Edwards, 2007).<sup>36</sup> They determine conceptions of reality, pertinent facts, and relevant causalities and (often tacitly) champion particular values. They determine which interests or identities have standing and define their role(s) in the relevant system. Choice between frameworks will be heavily influenced, if not determined, by deliberation amongst bureaucrats and between departments. This reflects the authority and standing of departments in the policy making process and the role of knowledge or expertise (e.g. Mintrom, 2003; Schumpeter, 1976). Interests quite properly continue to wield considerable power.<sup>37</sup> But the notion of

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<sup>36</sup> James Q Wilson describes the contribution of theorists in the following terms: '(They contribute) the conceptual language, the ruling paradigms, the empirical examples (note I say examples, not evidence) that become the accepted assumptions of those in charge of making policy. Intellectuals frame, and to a large degree conduct, the debates about whether this language and these paradigms are correct. The most influential intellectuals are those who manage to link a concept or a theory to the practical needs and ideological predispositions of political activists and government officials. The most important source of intellectual influence on public policy arises out of the definitions of what constitutes a problem....What intellectuals mostly bring to public policy debates is not knowledge but theory.....Some theories, if adopted, will make us better off. The problem is to know which ones.' *Public Interest*, 64, 1981, pp. 31-47.

<sup>37</sup> W J McKenzie: 'I have suggested that any explanation of the democratic process, which ignores the role of organised interests, is grossly misleading. I would add that it is hopelessly inadequate and sterile in that it leaves out of the account the principal channels through which the mass of the citizenry brings influence to bear on the decision-makers whom they have elected. In practice, in every democratic society, the voters undertake to do far more than select their elected representatives; they also insist on their right to advise, cajole and warn them regarding the policies they should adopt. This they do, for the most part, through the pressure group system.' cited Richardson, 1999.

an interest in itself an idea – it depends of perceptions of context and cannot be simply be read off from an economic, or any other, material base.

In the present case, pressure from the BCA stimulated fresh attention to the ‘problem’ of innovation. But its advocacy provided an opportunity for other actors within and beyond the formal system to introduce different or augmented understandings. As the process unfolded, policy makers and other participants were invited to consider three broad accounts or paradigms namely: a science push/market failure narrative; a science push/innovation system failure narrative; and a market pull/innovation system failure narrative. The latter could be further sub-divided into accounts emphasising science based industries and those concerning the use of knowledge to build the capabilities of established industries, with the latter judged by some as the most important domain for encouraging innovation for Australia (e.g. West and Smith, 2005). As we have seen, these varied approaches differed significantly in their analysis of situations, causalities, and relevant identities. How did the process of choice and assessment unfold?

The evidence reviewed earlier suggests that this developed through three overlapping phases. The first involved the decision to hold a Summit and the subsequent pre-Summit preparations, the second involved the Summit itself, and the third involved the post-Summit assessment of policy recommendations. These are considered in turn.

### **PRE-SUMMIT**

The pre-Summit phase involved extensive work at departmental and expert levels to introduce the new framings to a broader public sector constituency. The Industry Department itself published an important compendium of papers, having already tried to convene an innovation summit prior to 1996. Whilst initially resistant, the incoming Coalition government recognised the importance of innovation from a relatively early point. The formation of an Expert Group was approved at Ministerial level and, as noted earlier, its report championed the newer paradigms and challenged existing approaches.

The commissioning of this report was the fortuitous result of the retirement of Minister Moore in 1998 and his replacement by Minister Minchin. The latter wanted time to get across the issues and his departmental advisers suggested outreach to relevant external expertise.

The report of this expert group was included amongst the Summit documents but its authors had no special role in the Summit preparation or proceedings. The expert group lacked the power to project its views into the Summit proceedings in any authoritative way.

## **THE SUMMIT**

The second sub-process was represented by the Summit itself. The decision to establish this forum was the fortuitous result of BCA pressure. Ultimately, responsibility for arrangements was shared between a senior officer of the Industry Department and the Director of the BCA. These individuals progressively assumed more powerful gatekeeper roles both in defining Summit findings and in assessing their policy implications. As it happened, both individuals had formerly worked together in the Prime Minister's Department. One also had a background in the (then) Industry Commission and thus a strong socialisation in neo-classical thinking.

Other actors who had been prominent in the initial phase of the process progressively assumed subsidiary roles. The Innovation Branch of the Industry Department had provided the Secretariat for the pre-Summit working group. This group progressively disengaged from any involvement in post-Summit assessments. The Secretariat for the Summit was also composed of Departmental officers, but drawn more widely from other sections of the Department. The invitation list for the Summit was jointly formulated by the BCA Director and the Department.

Although, as noted earlier, there were gaps in the representation of particular interests (such as the States, small business, services etc), the Summit did engage a cross-section of the business and research communities. Participants were invited to submit papers and, as the earlier analysis indicated, many did. These varied in their intellectual genesis. Competing perspectives were exposed. The Summit and its associated processes involved a very considerable mobilisation both of stakeholders and perspectives. But the use to which these varied materials were put depended primarily on the decisions of the gatekeepers. From the perspective of policy making outcomes, neither their interests nor their preoccupations encouraged them to entertain new paradigms. The interests of the most powerful external protagonist (the BCA) were focussed on the R&D tax concession, and the consensus amongst the principal departments (Treasury and Prime Minister & Cabinet) was hostile to selective economic intervention, to intervention on grounds other than market failure, or to non-market-based coordination and dissemination processes (such as sectoral research institutes, industry clusters, industry associations).

Further, the science community had influential access through the Education Department and the government was already committed to extensive public sector investment, which was justified (in the perceptions of its neo-classically oriented advisers) on public good grounds.

The Summit process did not act as a 'forcing device' to induce a reassessment of basic policy frames by any of these protagonists.

## **POST-SUMMIT**

The third sub-process was represented by the post-Summit activity. Through this phase, findings and recommendations crystallised. This involved the ISIG group and the preparation of the Chief Scientist's report. Both documents were presented to the PMSEIC in November. Participation in these processes was quite confined. The ISIG group was dominated by interests associated with existing broad approaches. The Chief Scientist's report focussed totally on the publicly funded research system and its role as the originator of ideas that could later be converted to products. Meantime, PMSEIC was also dominated by people drawn from the research community and its secretariat was too small and not charged with brokering new policy possibilities. Its agenda was mostly too diffuse for impact and its members had mostly not been engaged by Summit processes. Its role was quite removed from that of agencies such as Forfas (Ireland), Vinova (Sweden) or Tekes (Finland).<sup>38</sup>

Over these three phases, control was progressively concentrated into the hands of a smaller group. Unlike the pre-Summit papers, and many of the Summit submissions, the reports of both the ISIG group and the Chief Scientist were informed by the science push/market failure paradigms. There is little evidence of the influence of other approaches in either document. Nor is there evidence that their merit was assessed and discounted. The science push/market failure paradigm subsequently underpinned the Prime Minister's statement *Backing Australia's Ability* and the measures that were then announced.

In hindsight, it is hard to avoid the conclusion that the Summit represented an elaborate process of search and engagement that sanctioned an outcome that was, in most respects, largely pre-determined. The Summit

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<sup>38</sup> These agencies, which are established at one remove from Ministries, undertake both research and interest mobilisation roles. In relation to research, they also cover both overall strategies and cluster-level developments. They engage relevant interests in these strategic discussions. They also regularly undertake program evaluations, manage technology forecasting etc.

itself seems to have been a largely decorative activity. Its outreach and deliberations were seemingly designed to mobilise industry and media attention and to communicate the government's commitment. But there is no evidence that it exercised any substantive influence on policy development.

The obstacles confounding any other outcome are also, in hindsight, very considerable. At the outset of this paper, two powerful inhibitors of strategic thinking were noted. One involved the lock-in associated with a present 'successful' strategy. The other involved the constraints on policy choices associated with multiple veto points. Both factors were arguably powerful influences in this present case – indeed both factors seem unavoidable as constraints on strategic thinking in public sector settings.

This is a particular issue in the public sector because of the requirements for effectiveness in medium term or day to day activity. Consensus at elite bureaucratic levels on a medium term policy frame (in this case neo-classical economic strategies) made it easier both to fend off special pleading by 'rent seeking' interests and to drive policy development. Consensus meant divisions between powerful departments could not be exploited for sectional advantage. Consensus facilitated coordination between departments. But consensus can also create lock-in that involves (at best) resistance and (at worst) blindness to new empirical developments or new theoretical perspectives. This would doubtless be compounded by the pressures on senior officers. Those faced with assessing and/or resisting complex day to day claims would hardly have time for the more reflective or open minded assessments associated with strategic deliberation.

At least three conditions might have helped alleviate these effects.

First, Treasury and the Prime Minister's Department could have been engaged at a much earlier phase of the policy cycle. This is because of the critical role of these departments as gatekeepers of policy orthodoxy. If new thinking about innovation strategy was to be contemplated, officers of at least one of these gatekeeper departments needed to be engaged in processes of assessment.<sup>39</sup> They were not part of pre-Summit or Summit

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<sup>39</sup> Michael Keating (2004) observes: 'PM and C (Department of Prime Minister and Cabinet) probably represents the best hope of keeping abreast of longer term issues. The Department's role would be to establish the validity of an idea or issue and much of the work can be forwarded to the responsible Minister (s) for his/her department to follow up. PM and C has the advantage of being reasonably close to the Prime Minister and can borrow that authority to ensure that the necessary work is initiated. If properly led and disciplined, PM and C could establish some detachment from the hurly burly of the daily

processes. Secondments or attachments may have been one remedial device. Other infrastructure would have been needed to engage more senior officers, for example cross-departmental interest groups at senior levels.

A second condition concerns the framing of this strategic assessment. The process of assessing innovation paradigms could have been partially decoupled from that associated with evaluation of immediate policy priorities and incentive arrangements. This is partly because quite different considerations are involved in each exercise. In the former case, the relevance of an ends-means paradigm; and in the latter, an assessment of particular means and/or instruments to achieve an agreed end.

The need for separation is reinforced by literature on comparable situations in business. It is also suggested by Irish practice, which also involves a Westminster-style governance system. Here attention to strategic issues is partially decoupled from day to day responsibilities. A separate agency, Forfas, is responsible for the former activity. Similarly, in the private sector, the difficulties in gaining attention for radically new ideas where a successful product or process already exists are extensively documented (Nonaka, 1995; March, 1999). The remedy proposed for companies also involves a partial separation between strategic and operational activity with infrastructure to engage top decision makers at key points in both processes (Bryan and Joyce, 2005).

Third, it is not clear that the available institutions were up to strategic assessment. For example, two key springboards leading up to the Innovation Summit - the decision to commission an expert groups and the decision to establish a Summit - were fortuitous events. They were not elements in a routine strategic scanning and assessment process.

More generally, the array of institutions and organisations involved in this case study included a branch in the Industry Department, other sections of that Department and a variety of other departments, an external Expert Group, the Summit and its associated ad hoc committees, the post Summit ISIG group, PMSEIC and the Cabinet. The processes linking their deliberations were not geared to strategic assessment. All these bodies were heavily engaged in day to day activity and they were doubtless primarily motivated by these preoccupations. Only the Industry

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political issues, which can then largely be left to the PMO (Prime Minister's Office). Of course, this system for coordinating longer-term thinking through PM and C will only work if the PM wants it, but that is probably equally true of any other possible system' (p. 172-173).

Department branch had a specific mission to scan and assess new developments. This was mixed with its day to day tasks. But interested policy makers from other departments and agencies were not joined to these processes. They were apparently not considered important at senior levels. Even if linkages had been established, they would most likely not have mediated reflective and imaginative assessment. The broader climate of opinion was uncongenial. The post-Summit transfer of primary authority for innovation to the Education Department (noted earlier) is evidence of this latter point. No doubt it also reflects the dominant influence of the science establishment.

The assessment of new policy paradigms in present bureaucratic and political settings presents a considerable challenge. The intellectual task involves a complex range of theoretical and factual assessments. Uncertainties are chronic. There can be a wide range of pertinent bureaucratic actors and, depending on the domain and the paradigm, a wide potential range of external interests. This case study suggests that the present Australian policy system lacks adequate institutional structures for these crucial tasks.

There are a number of pointers to possible remedies, and naturally there is no single or simple organisational or institutional solution (e.g. Marsh and Yencken, 2005). Responding to a similar imperative, the Cabinet Office in the UK has established a Strategy Unit to act as a gatekeeper in filtering new policy thinking and projecting it to appropriate departments and individuals. This Unit publishes survey papers, convenes meetings and conferences, arranges speakers etc. Like the Green papers of an earlier era, the Strategy Unit's documents explicitly proclaim their exploratory role and their independence from executive thinking. Yet the existence of the unit is itself an important symbol. It signifies openness to new policy thinking at the top levels of government.

The establishment of a separate unit also recognises the distinctive character of strategic policy work. But such activities depend on a wider infrastructure of strategic research organisations, conversation and interaction. Its own paper on innovation in public management points to its dependence on think tanks and other research bodies as sources of ideas (Mulgan, 2003).

These challenges are distinctive in public sector settings, but they are not unique. A large diversified multi-national corporation faces analogous pressures. Competitor positioning, products, political situations, technologies and opportunities can all move rapidly. Large multi-divisional organisations dispersed across a number of countries exhibit numerous organisational veto points and a disposition to lock-in to present

'successful' strategies. To escape organisational gridlock, management specialists recommend a sharper division between strategic and operational roles. 'As one executive we know put it, you don't want people who are engaged in hand-to-hand combat to design a long-term weapons system' (Bryan and Joyce, 2005, p. 3). Organisational innovations such as focussed scanning, scenario planning, knowledge and talent market places have all been proposed (van der Heijden, 1996; Bryan, 2004; Johnson et al, 2005; Beardsley et al, 2006). More generally, Crouch (2005), argues innovation is associated with the existence of redundant organisational capabilities. This creates the free play that allows adaptive strategies to be imagined.

There is clearly no one organisational solution to the seeding of new thinking in public sector settings. Top down, bottom up and outside-in arrangements may all have a place. A variety of factors, including complex interdependence, spill overs between outcomes, cost pressures, technological and social change, and globalisation are all driving the need for fresh attention to innovative capacity, most of all at the paradigm level.

This present case study of deliberations in a particularly challenging but critical policy domain suggests the present Australian policy system is inadequately equipped for the task. There is no sign that the implications of the new thinking were adequately assessed. Meantime, short of such an assessment, present approaches are intended to continue until 2011.

The avoidance of lock-in and decision failure/paralysis, and the formation of constructive linkage between new knowledge and policy action, is a considerable problem. The Australian policy system is designed to superintend liberalisation and deregulation, a phase in policy development that is now virtually fully implemented.

A new agenda of domestic social and environmental issues and a new set of economic challenges call for new capacities for strategic assessment and coalition building. Such infrastructure is now conspicuously absent.

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