THE POLITICS OF HIGH TECHNOLOGY IN AUSTRALIA*

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The high technology debate in Australia since 1981 is analysed using one of the most prominent features of the debate — the political rhetoric and symbols used in the debate. This form of analysis emphasises both instrumental and expressive political activity. The high technology debate is seen as having a significant expressive component and function. Most of the advocacy for high technology came as a result of institutional pressures and efforts of the Minister for Science and Technology, Barry Jones. High technology became a 'maverick' term in political debate but it has now become an accepted part of current economic language. The paper draws a number of conclusions for policy from the analysis.

Keywords: politics, symbols, rhetoric, high technology, Australia.

INTRODUCTION

High technology has been a prominent term in political debate in Australia in recent years. It has been the subject of numerous government reports, hailed as the economic saviour of Australian industry and championed by prominent personalities, the most notable being the former Minister of Science and Technology, Barry Jones.

This paper aims to reveal more than would otherwise have been possible about technology policy in Australia by analysing the high technology debate using one of its most prominent features — the political rhetoric and symbols used in debate. The analysis is from a participant's perspective emphasising the role of federal government agencies and their Ministers.[1] It incorporates two complementary dimensions to political activity.[2] *Instrumental political activity* involves groups and institutions using the political process to gain tangible results such as money, special concessions or privileges from government or rival groups. Such activity is widely perceived as the purpose and outcome of politics and consequently, most political analysis has been

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undertaken in this area. For example, political activity reported in the news is often portrayed as battles between influential groups (e.g. employers against unions) over income, power or prestige. *Expressive political activity* takes account of the significant element of symbolism in politics (especially political language). Most people have neither the time, money, nor desire to be constantly involved in instrumental political activity. Consequently, politics is experienced by most 'second-hand' through newspaper reports, TV programs and commentaries on events which are remote, set apart, and not able to be influenced by individuals. Different forms of political language (e.g. symbols and rhetoric) can influence the way individuals and groups interpret and respond to political issues. The analysis attempts to capture this intricate interplay of instrumental and expressive political activity. Major events during the period from 1981 to 1986 are analysed. It was during this time that high technology was most prominent in political debate.

ANALYSIS

Liberal Government Politics and Institutional Power: 1981 — March 1983

In early 1981, economic questions dominated political debate in Australia. The Liberal Government promoted the belief that Australia was experiencing a 'mineral boom' and that the proper management of the economy required budgetary and fiscal restraint. The touchstone for much of the political discussion about industry and technology was the Liberal Government's 1977 *White Paper on Manufacturing Industry*.[3] The question of intervention was the pivotal issue. Within government, this debate on intervention focused closely on instances where the market failed to allocate resources optimally.[4] Antagonists of government intervention in the market argued that 'picking the winners' with respect to technology would not redress perceived instances of market failure. On the other hand, proponents of government intervention argued the opposite. In the case of science and technology, these proponents did not have a strong voice in federal Cabinet. In late 1980, the Department of Science and Technology (DST) was created. This Department became the main agency promoting science and technology in Australia and inherited parts of the former Department of Productivity. DST's role was not well defined. For example, its 1980-81 Annual Report emphasised the need to support research, transfer research results to industry and minimise the undesirable impacts of new technologies.[5] DST's Minister, David Thomson, took the view that the fundamental objective of the Department of Science and Technology was to maximise the benefits to society that can be obtained from science and technology[6]. The lack of clear definition in DST's role meant that it was open to many pressures, both internally and externally.

DST Forum on High Technology

One of the first major public activities undertaken by DST was the organisation of a forum in February 1981 on 'Creating High Technology Enterprises'.[7] The Forum provided the fledgling Department with an opportunity to show that it was strong enough to protect funding for its programs and so give it a degree of institutional standing. It did this by subtly shifting away from arguments for productivity improvement which were popular during 1978-80 and emphasising the Government's commitment to new industries, new technology based firms and Australian innovation.[8] By raising 'awareness of the influence of new high technology as a wealth and employment generator' the Department, no doubt, saw further opportunities for a new spectrum of assistance programs.[9] The Forum also 'took advantage of Professor Wayne Brown's presence in Australia'.[10] Brown, a University of Utah professor, entrepreneur and high technology company founder discussed his experience with high technology in the USA. He was brought to Australia by DST.

In addition to these instrumental gains, the Forum had a symbolic function. Participants began discussing and thinking about high technology in a way which symbolised it as a panacea for economic problems. For example, Thomson promoted high technology without saying what it was or how it would work the miracles he ascribed to it:

> High technology can be used to make the transition to a more competitive, outward and forward-looking industrial structure capable of providing the jobs required by a discriminating and highly educated workforce.[11]

The high technology symbol functioned as a political cue to evoke a range of beliefs and expectations in those groups participating at the Forum. The evocation of a set of beliefs or views about a political issue in people's minds in response to an action or statement can be termed a symbolic or political cue.[12] A political cue can originate from anywhere but quite often it comes from governments, which are often seen as one of the few institutions in society with the power and authority to alleviate future problems. Cues can be particularly persuasive when they are couched in political rhetoric which encourages uncritical acceptance of the viewpoint being put forward.

An example of uncritical acceptance comes from Hartnett, a famous Australian entrepreneur, who followed Thomson's beliefs about high technology at the Forum:

> I have always held the belief that the creation of new industries based on science and technology is vital to our economic and social future.[13]

Other speakers at the Forum, representing a range of educational and business groups expressed similar expectations that high technology would provide new employment opportunities.[14] Through the high technology rhetoric used at the Forum, diverse interest groups began

to see high technology as a beneficial thing. This must have strengthened DST's developing constituency by consolidating a common set of words and beliefs around which groups could rally.

The National Semiconductor Deal

In early 1981, an additional impetus to the high technology push came not from DST but from problems originating in Canberra. These problems stemmed from Canberra's reliance on government as a source of employment and a growing level of unemployment. At this time, National Semiconductor Corporation (Nat Semi) of the USA had been considering establishing a silicon chip manufacturing facility in Australia. Amidst competition from state governments, Canberra's local development agency, the Canberra Development Board, succeeded in interesting Nat Semi in Canberra.[15] The Federal Government announced in March 1981 that it was keen to attract Nat Semi to Canberra.[16] In August 1981, the Government offered to provide land and buildings to the cost of $19 million depending on a feasibility study to be carried out by Nat Semi itself.[17] In return, Nat Semi was expected to transfer technology to Australia relating to the application of micro-electronics, give Australia 'most favoured customer' access to Nat Semi products, allow CSIRO access to its production facilities and help train Australians.[18]

In terms of instrumental activity, the move to attract Nat Semi can be seen as a direct attempt at solving Canberra's employment problems by subsidising the private sector. Added to this was a strong symbolic element which was prominent during March — August 1981, when the Federal Government was deciding what form the incentives should take. Nat Semi was portrayed as having many desirable attributes associated with high technology in the USA. The Minister for the Capital Territory, Michael Hodgman, seems to have led the way in promoting the benefits of high technology via the Nat Semi deal. He claimed that the Nat Semi deal would:

> . . . lead to the establishment in this country, without any shadow of doubt, of an applications industry with a capacity to employ in excess of 100,000 people at the end of the decade.[19]

Hodgman made further claims. For instance, Nat Semi would be the nucleus for high technology development in Canberra, the Canberra environment and life-style would attract high technology and Nat Semi would seek well-educated employees.[20]

The symbolism surrounding the Nat Semi deal may have had a role in facilitating the Government's acceptance of the deal. Early 1981 was a period of considerable resistance by Departments such as Industry and Commerce (DIAC), Treasury and Finance to interventionist measures like the Nat Semi deal. The high technology nature of the

proposal may have helped to shift it out of the debate concerning key industries into local government issues. For instance, the promises about employment generation and the suitability of Nat Semi to Canberra's environment may have convinced Cabinet that they were dealing with something very special and that $19 million was a small price to pay to solve Canberra's problems. At an instrumental level, it may have been an opportunity to win back the seat of Canberra lost at the previous election.[21] Whatever the reason, the Government's decision to provide the incentives circumvented the established 'no key industry' line, or at least, the Nat Semi deal was somehow placed outside that policy debate.[22] DST was taken by surprise by the Nat Semi development and this suggests a lack of preparedness in the Department.[23] Senior departmental officers went in 'open-mouthed' at the prospects offered by the deal.[24] As the proposal developed, DST took special responsibility for the technology transfer aspects. An OECD consultant was engaged by DST to report on these aspects. While many issues about the deal remained unresolved (e.g. type of employment, control of technology), the consultant argued a line which was 'big on new technology venturing and "gung-ho" on technology'.[25] The local nature of the proposal (i.e. confined to Canberra) and perhaps the associated symbolism helped to win approval for the incentives.

The Nat Semi deal not only boosted the public profile of the high technology debate but also had an impact on developments in Canberra. For example, there is some evidence to suggest that Canberra's technology park was directly connected to the Nat Semi deal.[26] The Canberra High Technology Group was formed at the end of 1982 to lobby the Canberra Development Board for assistance to high technology industry.[27] The deal also seems to have been a political cue to state governments to take an interest in high technology, especially computing. There was a flurry of activity by state governments. For instance, in early 1981 the South Australian, Western Australian and Queensland Governments were all involved in encouraging computer manufacturing.[28] In April 1981, the Victorian Minister for Economic Development established a computer advisory group to advise on how to make Victoria the high technology centre of Australia.[29] The enthusiasm for high technology at this time drew some resentment from local computer manufacturers. They saw the Nat Semi deal as a boost for a US multinational ahead of more deserving Australian companies.[30] By early 1982, it became clear that the deal would not proceed.[31] Nat Semi had fallen into financial difficulties and other overseas sites for the semiconductor plant became more favourable.

The Nat Semi deal can be seen as primarily expressive political activity. After 12 months of deliberation, no substantial resources were committed. However, a frenzy of activity was stirred up at both the federal and state levels. This, if anything, testifies to the important role of expressive political activity. In this case, it centred around the symbolism of high technology as embodied in Nat Semi.

Pre-Budget Politics

During 1981 there were a number of Government actions which seemed to run counter to the spirit of the Nat Semi deal. For example, the Review of Commonwealth Functions or "Razor Gang" was set up in early 1981. As a result, DST productivity programs were to be cut back and later reviewed by the Kirby Committee.[32] The Government further dampened high technology enthusiasm with a non-committal response to the Senate Report on Industrial R & D.[33] The result was that in the lead-up to the 1981/82 Budget in August, the Government was proving to be a source of conflicting cues on high technology. This, at least, indicated that the Government was not monolithic in its treatment of technology.

At this time, the rhetoric on high technology stressed its attributes as an all purpose tool for solving Australia's economic problems. David Thomson, Minister for Science and Technology was a major proponent of this line.[34] High technology rhetoric seemed to have some impact on DST's constituency. Other groups began to follow Thomson's cues. Goddard, of the Australian Telecommunications Development Association noted that 'unless Australia cultivated a strong, highly advanced and viable manufacturing sector producing high technology goods, youth employment opportunities would continue to be bleak'.[35]

The high technology rhetoric also represented a symbolic shift away from a term which had been popular in the 1970s — research and development (R & D). R & D had become a tired and failed symbol as industrial support for R & D in Australia was continuing to fall. Thomson had begun to admonish Australian industry for not supporting R & D as well as high technology.[36] With high technology the scope that lobby groups had to articulate their claims became much broader. For example, calls for venture capital funding and key industry support became more pronounced.[37] High technology groups successfully lobbied the Government in granting special preference to high technology in purchasing policy in October 1981.[38] This decision rescinded an earlier decision to do away with preferences altogether.[39] The result was confusion and disappointment amongst high technology firms[40] with little apparent success for the policy as it was changed again in December 1983.[41]

DST acted to consolidate the growing interest in high technology. In early 1981, DST requested the Australian Academy of Technological Sciences (AATS) to study the problem of venture capital for high technology firms in Australia. This action can be interpreted as an attempt to gain credibility for its promotion of high technology and an attempt to seek the approval of the academic establishment. The growing interest in high technology by industry and the ALP was not reflected in instrumental terms.[42] High technology was not given special recognition in the 1981/82 Budget and Australian Industrial Research and Development Incentives Scheme (AIRDIS) funding was cut from $53 million to $49.2 million.[43] Federal funding for science and

technology in general and DST in particular did not fare well in the 1981/82 Budget.

The Post-Budget Period

The period after the 1981/82 Budget was characterised by ongoing disputes between departments on technology issues. The Kirby Review of Productivity Programs in DST and the Industries Assistance Commission (IAC) Review of AIRDIS were the major mechanisms through which departments expressed their differences.[44]

At the instrumental level, these reviews can be seen as attempts to put debate onto a rational and informed basis. They can also be interpreted as a mechanism for frustrating DST. As Thomson put it:

> Every time I put something up that was new, the Treasurer would put up some new argument to block it . . . Treasury and Finance were experts at delaying tactics.[45]

At the expressive level, language was used as a weapon in debate by departments. DST continued to promote the symbolic view of high technology as an all purpose tool for solving economic problems. This symbol was not well accepted by the Departments of Treasury and Finance and the IAC. These institutions took the view that government had no role in promoting high technology as a special activity — it should not 'pick winners'. Opposition to 'picking winners' came from the Treasury:

> . . . the choice of particular technologies and characteristics to promote is an exercise in 'winner picking' by bureaucrats who have no special expertise or ability to devine the pattern of technological change. Basic economic considerations suggest that attempts by government to accelerate diffusion in these ways may generate more social costs that benefits.[46]

One outcome of this dispute between departments was the conflicting political cues helped to create a 'threat atmosphere' which enabled the Government to moderate the debate. Another outcome was that concepts within the rhetoric itself, especially that of market failure, were used as a weapon to exert political control.

A Threat Atmosphere

The threat atmosphere was created from different perceptions of the Kirby and IAC Reviews. To those groups advocating fiscal restraint, the reviews were a logical step in the process of reducing government financial commitments. To the beneficiaries of these support programs, these reviews were a threat. For example, the Kirby Review was seen as leading to 'reduced Commonwealth support for the promotion of efficiency and productivity in private industry'.[47] The IAC Review was seen as a direct threat to the future of AIRDIS.[48]

When making decisions about programs, the Government was in a good position to send out conflicting political cues to competing lobby groups. At a convenient time the Government could signal that it was non-interventionist while at a later time it could signal that it was prepared to intervene. In other words, it could create the impression that it had 'saved itself from itself'. The expectation had developed that cut-backs would be severe but from another perspective they were only cosmetic or partially implemented. For example, despite the considerable uncertainty about the future of AIRDIS, the scheme was left virtually unchanged. In fact, the decision not to abolish AIRDIS was even reported as a serious attempt to address Australia's falling research effort.[49] The result was that competing political groups were 'satisfied' and the debate moderated.

Market Failure Arguments

The economic concept of market failure was used as a weapon to exert political control. Its use was prominent in the Kirby Review and the IAC Review of AIRDIS. Joseph and Johnston have analysed the use of market failure arguments in these disputes:

> . . . we suggest that the market failure strategists have been able to exploit the shortcomings of market failure and combine it with the authority of the economics discipline as a whole to establish an 'economic' argument which is implicitly designed to oppose intervention . . . this can combine rather conveniently with the prevailing political ethos — minimal government intervention and reduced public expenditure. This is not to say the concept cannot be manipulated in the other direction . . . .[50]

One effective ploy which the economic agencies used to exert political control over their opponents (viz. DST) was to demand that the debate be carried out in economic terms. By setting up the free market as the ideal position from which interventionist proposals are judged, market failure strategists were able to use their 'professional knowledge' or 'superior understanding of how the market will allocate resources' to oppose intervention. This ploy was particularly relevant to debunking the 'picking of winners' as the IAC had argued:

> No guarantees can be provided that the nominated industries or technologies will in fact be winners in terms of their capacity to contribute to overall domestic growth and welfare.[51]

Another ploy was to put the onus of proof on the interventionists to prove that intervention would really improve overall welfare.[52]

The result was that it was not exclusively the arguments themselves which were crucial to the debate, but rather the additional authority they could bring to bear to strengthen the case of their proponents. In this way, language was used as a weapon in the debate.

High Technology Issues: Instrumental

At an instrumental level, many of the events of 1981 can be interpreted

as an attempt to put the debate on a rational basis. For instance, Thomson attended a ministerial level meeting of the Organisation for Economic Co-operation and Development (OECD) in March 1981 and brought back ideas and themes which were later stressed by DST.[53] DST used the OECD as an authoritative source to argue for a greater integration of science and technology with other policy objectives.[54] The Australian Science and Technology Council (ASTEC) produced a report on microelectronics which was that agency's contribution to the Nat Semi issue.[55] DST ran a major symposium on biotechnology in November 1981, the AATS convened a Symposium of Manufacturing Resources of Australia and the Australian and New Zealand Association for the Advancement of Science (ANZAAS) held a conference on venture capital.[56] The debate was bringing together different groups which were trying to work out a rationale for the problem.

High Technology Issues: Expressive

At the expressive level, the different reports and conferences helped to generate political cues concerning high technology. For instance, the AATS Symposium raised the issue of key technologies and put some pressure on Thomson and his department to develop a policy on high technology.[57] Jones also challenged DST to do more about high technology.[58] By November 1981, Thomson had requested DST specifically to develop a policy for high technology.[59] This seems to have been largely a response to growing public interest in high technology (e.g. Nat Semi, Jones, ASTEC) but at the same time DST was continuing to fuel the issue by holding an international symposium on biotechnology in November 1981.[60] The rhetoric at this time also subtly helped to weaken the no key industry arguments which had been used so powerfully by non-interventionists. By emphasising special areas for government support because of their technological importance, such as microelectronics by ASTEC and biotechnology by DST, the selection process was going on without explicitly identifying the criteria for selection.[61] One outcome of this exercise in 'selecting but not picking winners' was that DST used the ASTEC report to force a meeting with DIAC on the key industry issue.[62]

The Key Technology Approach — 1982

The events of 1981 had put considerable pressure on DST to develop a coherent argument on high technology. In order to progress in the debate and not to lose further ground in the battle for resources, DST began to promote "key technologies". Thomson introduced the idea in a speech in March 1982:

> The principle of key technologies . . . should be explored in Australia . . . This should not be confused with the term key industry. By a key technology, I mean one which is fundamental to a wide range of industries, in which

> there is room for new developments, and where the development is suited to prevailing economic and institutional conditions . . . the description of silicon chips as 'the crude oil of the 1980s' is one clear pointer to a key technology.[63]

At the instrumental level, the move was a deliberate ploy to get around the key industry and picking winners arguments of Treasury. Without some way of circumventing the non-interventionist arguments, DST policy development on key technology would be perceived as "stalled". Thomson was well aware of the motives:

> Key technologies — they were an attempt to beat Treasury . . . I knew we wouldn't win on key industries. Key technology was a new word and they [Treasury] didn't know what it was about.[64]

The key technology line reflected similarities with the way market failure arguments operated to assist non-interventionists. Instead of appealing to economic theories and empirical results, key technologies drew their authority from the symbol of high technology as an 'economic wonder' and their implicit compatibility with government policy on fiscal restraint. The implication was that key technologies were already a part of the scene — it was a familiar and successful feature of high technology in Australia and all that was needed was for DST to systematise the procedure of selection.[65] Of course, the selection procedure was not spelled out by Thomson as this would have put the issue into the 'picking winners' arena explicitly. It can be argued that because of the overlap and confusion between high technology and high technology industry, the key technology argument was from the beginning an unrealistic attempt to get around an institutional barrier. By focusing on the technologies, it disguised the questions associated with support for key industries.

Throughout 1982, Thomson was active in trying to win over opposing factions within government on high technology. The issue was considered to be bi-partisan, with both Jones and Thomson acting together in the 'national interest' to promote technology:

> I used to help Barry Jones. Every two weeks I would brief Jones. I saw that technology was not a political football. We became good friends. I wasn't going to make political capital out of it — it cut across party lines.[66]

In August 1982, Thomson continued to lobby his Cabinet colleagues on technology and he invited them to a special dinner at his home:

> We started to thrash out a co-ordinated strategy . . . We got more support in Cabinet and that was when we started to look at the organisation of CSIRO . . . We started talking to the States. It was during the 1981/82 period that the States started to establish technology ministries. When the South Australian technology park was opened we knew we were getting somewhere . . . By the end of 1982, Queensland acted. We talked to the States because I believed that many things were not Commonwealth functions.[67]

Despite this lobbying and rhetoric on high technology by Thomson and DST, prospects for major government action seemed remote. The

1982/83 Budget was 'static' in terms of funding for science and technology. There were no special allocations to key technology or high technology areas. The AATS venture capital study commissioned by DST in March 1981 was continuing but there was little hope of anything positive coming from it.

Election Politics — 1983

The Australian Labor Party (ALP) had been developing policies for high technology and with the prospect of an early election in 1983, the Government had to move to counter any moves by the Opposition.[68] The work done by Jones over the previous two years was crucial in raising the high technology issue to the point where it could become an issue in the election. At this time, the Department of Industry and Commerce (DIAC) saw an opportunity to acquire the technology functions of DST.[69] The result of these institutional pressures was an announcement by the Prime Minister, Malcolm Fraser, that the Government was prepared to address the high technology issue directly.[70] This decision by the Prime Minister projected high technology into the broader public debate about the health of the economy and represented a switch away from the strong no-key industry line.[71] In the ensuing public debate, symbolism was used by both sides. High technology was portrayed as being highly beneficial and the party with the most coherent technology program deserved support as it was more correctly applying itself to Australia's future needs.[72]

A second symbolic function of high technology rhetoric during the election was its evocation of a "crisis" situation. Rhetoric describing an economic crisis can cue people to believe that the causes of the problem lie outside the control of the government (hence shifting the blame) or that minority groups will have to make sacrifices if the 'national interest' is to be preserved. The election itself was largely fought over economic issues but Hawke used high technology as a solution to the crisis. The ALP, through its high technology "sunrise" industries claimed to have the only realistic solution:

> Australia had missed many opportunities in this field. The technological base of Australian industry has barely changed since the 1950s while our industrial contemporaries (such as Japan, Singapore, Sweden) have undergone a revolution. It is a matter of urgency that Australia take steps towards developing new high technology "sunrise" industries as wealth generators, and to compensate for the long-term decline in employment in our traditional manufacturing industries.[73]

The rhetoric was particularly revealing. First, there was mention of "missed opportunities" which immediately shifted the blame for these onto the Liberal Government. Second, Hawke referred to the static nature of Australia's technological base and the great revolutionary progress made by Australia's trading partners. The implication was that not only had the Government neglected Australia's technological base but Australia has been by-passed by a revolutionary change. This

revolutionary change was immediately threatening to Australia. Economic growth in countries like Sweden and Japan was something that Australia should be aspiring to but it was not doing so because high technology had been neglected. The 'crisis' situation was strengthened by the revolution, the nature of change and the need for an urgent reponse. Finally, Hawke suggested that solution — sunrise industries. It was a term exclusively associated with the ALP and Jones' election rhetoric on high technology. Sunrise industries would generate wealth, as they had been symbolised as "good". It was only the ALP that could offer such a prospect for the future.

There was an interesting dynamic in operation. Certain well accepted beliefs about high technology (e.g. its revolutionary qualities, its economic potential) were used by Hawke as both an explanation of current economic problems and a solution to them. It strengthened the image that Hawke wanted to consolidate, that is, the nation had to work its way out of an economic crisis. The other side of the dynamic was that once an economic crisis was widely accepted as real, then special meaning could be attributed to high technology. It was not just high technology alone — it would be revolutionary, wealth generating sunrise industries which needed support urgently. In this way, a whole implicit political agenda about high technology had been introduced, all within the election climate.

The rhetoric for greater support for high technology was not only countered by rhetoric from the Liberal Government, but also a flurry of instrumental activity as well. Since the Government (and not the Opposition) was in a position to allocate resources, such a response seemed to be a normal institutional demonstration to the electorate that it was still in control of the debate. For example, Thomson announced a National Biotechnology Scheme only weeks before the election.[74] An additional $10 million was allowed to be committed to AIRDIS in the 1983/84 financial year.[75] Newspapers carried stories headed 'Millions pour into high technology', '$65 million package to boost business' and 'Research aid welcome'.[76] The Government also proposed to establish a tax-incentive scheme for high technology companies as a pre-election promise.[77]

Pressure on the Liberal Government just prior to the election came from other sources as well. The AATS's interim report on venture capital was sent to Thomson just before the election. The ALP had a similar proposal on venture capital and so the Liberals had to address the problem seriously.[78] The Australian Scientific Industry Association (ASIA), a lobby group of high technology companies, prepared a critical report prior to the election and this too put further pressure on the Liberal Government.[79]

The Labor Government: March 1983 — April 1984

The first 12 months of the Labor Government involved considerable activity in science and technology policy. The new Minister for Science

and Technology, Barry Jones, was elevated to the membership of some important Cabinet committees.[80] As well, there were new proposals in the 1983/84 Budget, the National Technology Conference was held in September 1983 and the draft of the National Technology Strategy was published in April 1984. During the first 12 months, the 'sunrise industries' rhetoric which had been popular during the election came under closer scrutiny. Jones' election promises on high technology had to confront institutional barriers and as a strategy against these delays, Jones continued to discuss high technology in terms of 'crisis' language.

'Sunrise Industries' under Scrutiny

Jones' election rhetoric was characterised by his definition of 16 sunrise industries.[81] Like his predecessor, Jones was sufficiently vague about precisely what this meant for Australia:

> We have got to make a transition towards newly developing high technology sunrise industries as wealth generators.[82]

The ALP's success at the election created the distinct possibility that Jones would be in a position to give instrumental effect to his rhetoric on sunrise industries. The variety of responses to the term was a testimony to its highly symbolic nature. Elements of the Labor Government had trouble with the symbol. The sunrise industries approach was seen by some Labor members as threatening traditional sectors of the economy.[83] Persistence with such policies may have threatened the Labor Government's ability to strike an accord with the union movement. This attitude may explain why Jones was refused permission to address the National Economic Summit in April 1983. The Summit was organised by the Labor Government and brought together governments, unions and employers to formulate a consensus on the best way to face national problems. Jones' exclusion from the Summit may have also been due to his unpopularity in Labor Caucus — it was a convenient way of slowing him down. The Metal Trades Industry Association (MTIA) saw sunrise industries as a threat to traditional support for the technological development of existing industries.[84] DST was quick to take note of this interpretation and in subsequent departmental speeches and reports, sunrise industries were associated with the support of new technologies in existing industries, not just the sunrise industries.[85] Within DST there was also no clear understanding of what sunrise industries meant or how they were defined.[86] The private sector too also had difficulty with the term.[87] Sunrise industries as a unifying idea had begun to break down once it was subjected to closer scrutiny by interest groups.

The First Labor Budget 1983/84

Shortly after the election, Jones announced a number of 'low cost' initiatives which created the impression that the Labor Government was

keen to act on its election promises.[88] Jones announced that he was preparing a funds 'menu' for Cabinet's consideration.[89] This evocative language suggested that there would be more than enough funds and schemes from which industry and researchers could choose. This rhetoric may have cued state governments to take further action on high technology. High technology had figured prominently in the Western Australian elections in February 1983 and four State Labor Governments (South Australia, Western Australia, NSW and Victoria) proceeded to set up administrative structures to support high technology.[90]

The pre-budget discussions resembled those of 1982 with the economic agencies (e.g. IAC, Treasury) opposing support for high technology on the grounds that it was 'picking winners'. This time, however, Jones was able to enlist the help of Senator John Button, Minister for Industry and Commerce, in Cabinet. Most of the debate centred around an inter-departmental committee established by the new Government to consider sunrise industry policy. For Jones, the major problem was to maintain the momentum that high technology had during the election campaign.[91]

One of the ways in which the authority of high technology was maintained was through a continuation of the 'crisis language' which pervaded the election rhetoric. By stressing that the economy was in crisis, Jones was able to imply that technology was essential to the solution and that government had a central role to play in this. His rhetoric acted to strengthen DST's claim on funds:

> The appalling rapidity of the employment collapse in our major industrial areas in 1982 suggests that we are entering a new era which will pose enormous challenges to social stability and our capacity to provide political leadership.[92]

> The point is that time is running out for Australia. We cannot rely on our natural resources to save us. Rapid technological change and the nature of new technologies is causing a fundamental change to our industrial structure. Australia must be in a position to participate in these changes, and get the best out of them. Failure to do so will cause serious problems.[93]

This crisis atmosphere implicitly helped to create a favourable environment for the Espie Report on venture capital which was released by Jones in April 1983. This report argued that the Government should provide tax incentives to create a venture capital market in Australia. The Report's acceptance must have been made easier because its central arguments agreed nicely with the more widely believed 'crisis' atmosphere.[94]

Groups such as ASTEC, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Australian computer industry added their voices to calls for more funding.[95] CSIRO also came under increasing criticism for not giving enough emphasis to commercial development.[96] CSIRO's response was to treat Jones' efforts to promote sunrise industries with disdain and proceed to establish its own priority high technology areas.[97]

DST must have felt that at this stage it was in a strong position with regard to high technology, especially against its traditional opponents such as the IAC[98]. In fact, DST argued in one submission that 'the concept of market failure provides only limited guidance for policy and program development'.[99] This highlights the flexible and negotiable way that the market failure concept was used in the debate. This flexibility in language also comes through with an active attempt by DST to recast the sunrise industries symbol popular with Jones into the key technology argument which the Department used before the election. The aim was to lessen the political problems that had arisen by the association of sunrise industries with key industries or 'picking winners'. By incorporating 'sunrise industries' into key technologies. Tegart, DST Secretary, argued that it was technological priorities which were being selected, not industries:

> The Labor Government's commitment to identifying "sunrise" industries suggests that such arguments will receive considerable attention. The challenge facing us now is to relate technology support measures to Labor's industry strategy. I believe that the concept of selective support for technology fits neatly with the Government's industry policy. The selective approach has often been likened to the identification of certain "key technologies" . . . .[100]

This re-casting of "sunrise industries" may have helped DST in Cabinet. However, it also seemed to have weakened Jones' credibility. Former allies, such as Senator Button were increasingly sceptical, and his department continued to move slowly on high technology issues.[101]

The 1983/84 Budget, at first glance, provided instrumental gains for high technology: increased support for AIRDIS; a broadening of the powers of the Australian Industry Development Corporation (AIDC); and the direction of CSIRO into key technology areas.[102] The Management and Investment Companies (MIC) scheme, recommended by the Espie Report, received approval shortly after the August budget because of resistance from Treasury and Finance.[103] The 1983-84 Budget was well received even though overall budget outlays increased by 16.4 per cent whereas DST's allocation increased by only 4.9 per cent.

The National Technology Conference — September 1983

Barry Jones was the driving-force behind the National Technology Conference which was held in Canberra in September 1983. It involved representatives from private enterprise, unions, industry organisations, academia, research organisations, professional societies and government. David Thomson was moving to hold a national symposium on technology issues in late 1982 but that idea was dropped because of the election.

At the instrumental level, the Conference can be seen to be a result of the bi-partisan approach taken by both Thomson and Jones to technology.[104] It was a genuine attempt to get greater discussion on

technology in the community, to involve expert groups and to promote technology as a national political problem. As Jones put it:

> The primary aim of this Conference was to achieve the 'shock of recognition' of where Australia was placed in the dramatic sweep of technological change.[105]

The implicit assumption behind Jones' remarks was that new technology had to be confronted as a national issue and challenge. Jones' 'crisis' rhetoric used both during and after the election promoted the view that there was a common threat from new technology. The notion of a common threat requiring a common response glossed over deeper political divisions. For instance, by this time, the Liberal Opposition Leader, Andrew Peacock, had reverted to the Liberal's old aversion of 'picking winners' and arguing that technology was best left to business.[106]

At the expressive level, the Conference provided an opportunity for continued emphasis of the 'crisis' facing Australia. High technology had to be supported in the national interest to overcome this problem. The Prime Minister, Bob Hawke, stressed this belief at the Conference:

> The effectiveness with which we use new technology will determine whether we can reverse the long downward slide in our living standards relative to other countries — from one of the highest per capita incomes . . . to one of the lowest of the industrial countries . . . .[107]

The rhetoric at the Conference also symbolised technology as an area requiring special attention. For instance, Hawke gave technology special status by claiming that it was a central feature of the Government's policies for national reconstruction:

> . . . our commitments to technological change, to economic growth and to the equitable distribution of the benefits of growth are part of the one great program of national economic recovery. Your special concern here today, technology, is of central importance to that program.[108]

This status-raising exercise for technology provided an opportunity for governments and other institutions to consolidate their positions.[109] The Conference also signalled a strong political cue to the state governments to take similar action — to develop a notion of consensus and agreement around technology issues. The States followed Jones' view that the Commonwealth should develop a Draft National Technology Strategy following the Conference. Both Queensland and South Australia released draft technology strategies shortly after the National Technology Conference advocating a consensus approach to technology.

The Draft National Technology Strategy — April 1984

At the National Technology Conference, Jones made a commitment that a Draft National Technology Strategy (NTS) would be formulated from the Conference discussions. As it eventuated, this draft document was formulated within DST in isolation from the rest of the bureaucracy.[110] Key technologies formed only one of the themes in the draft strategy.

At the instrumental level, the development of the NTS can be interpreted as a bold attempt by Barry Jones to crash through the institutional barriers which had hampered his Department. The fact that the NTS was released without prior agreement of other Departments suggests that it might have had this role. Perhaps Jones had calculated that technology issues had been given enough discussion publicly and that the timing of the NTS was right to make best use of this. With the backing of the Prime Minister (providing the Foreword to the NTS) followed by a round of discussions and consultations with interested groups about the NTS, Jones may have thought that the NTS would by-pass the normal political processes. On the other hand, the development of the NTS without reference to other departments could be seen as an oversight by DST's higher management. DST had always remained a junior position within the Cabinet hierarchy. This is not to suggest that DST was to blame for the outcome of the Strategy or the way it was presented. The task set for the Department by its Minister may have been just too great.

At the expressive level, the NTS provided a further opportunity for DST to promote publicly the symbolism of technology it had built up over the previous 12 months. The distinction between industries and technologies was not made clear but nevertheless the implication was that selective support for industries was not favoured. Sunrise industries were given only a brief mention in the Draft NTS. Sunrise industries and key technologies had been absorbed into a broader policy framework, making them less spectacular than they were in political debate some 12 months earlier. The subtle change of keywords and definitions from high technology sunrise industries to key technologies seems to have been one of the outcomes of the continual disputes with Treasury and Finance on the 'picking winners' theme. The Strategy was the last step in a highly symbolic process which had had its genesis before the 1983 election. The problem which was portrayed as a 'crisis' situation concerning new technology had to be confronted by a courageous minister and a progressive government. The key issues had been defined, experts had been consulted (National Technology Conference) and after a period of rational assessment the solution had been reached (Draft NTS). The message was that the Government was in control and the problem was being addressed. For Jones, the process beginning in September 1983 with the National Technology Conference and continuing well past April 1984 (Draft NTS) helped to keep his political interests alive when they might have faded out altogether. By promoting a 'crisis' atmosphere, Jones was able to hold his constituency together to some extent.

A Period of Restraint: April 1984 — 1987

The period since April 1984 has been one of restraint. It was a period in which much of the uncertainty and 'maverick' elements of the high

technology debate were subdued. High technology was incorporated into the established way of managing the economy and was hardly mentioned during the November 1984 or July 1987 federal election campaigns. The focal point for technology issues in the 1984 election was tax incentives for industrial R & D. A further indication that the high technology rhetoric of previous years had lost its momentum was that Barry Jones lost the technology component of his Ministry to Senator John Button who became Minister for Industry, Technology and Commerce. Jones was left with a collection of minor programs in the Department of Science. Jones' fall from grace also heralded the demise of the draft NTS. However, the incorporation of technology into Button's Ministry could be interpreted as a rise in importance for technology matters within Cabinet. In July 1987, Jones' influence was further diminished when the Department of Science was abolished and its policy functions transferred to DITAC. Since then, the Department of Industry, Technology and Commerce (DITAC) has undergone considerable internal turmoil with science policy functions being severely reduced.

The Demise of the National Technological Strategy

Following the release of the NTS in April 1984, DST moved quickly to consolidate the ground it had gained over the previous year. Over 8000 copies of the NTS were distributed to interested groups and the Department received over 250 written submissions from many groups on how the NTS could be improved.[111] DST also sought further public approval for the NTS as it organised a forum at the May 1984 ANZAAS Congress in Canberra on the Strategy.[112] At the instrumental level, things were clearly not going well for Jones. In the 1984/85 Budget, increases awarded to science and technology were lower than in the previous year. DST's increase in appropriation was only 1.6 per cent higher than the previous year.[113] This poor budget resulted in extensive criticism from the scientific community and also attracted criticism of the Government by Jones himself.[114] There was a general feeling within DST that its Minister could not argue successfully for funds in Cabinet and that he was becoming somewhat of a liability.[115] Thomson passed this judgement on Jones' handling of his old portfolio:

> Jones increased expectations on the key technology issue. He was talking it up but to an extent that he wouldn't be able to achieve his goals. Jones had to start from scratch with Cabinet and he couldn't argue in Cabinet.[116]

The failure of Jones in Cabinet following his extensive efforts to formulate a Strategy highlights the apparent unimportance of trying to 'prove' something in politics to the point where there is unanimous agreement. The NTS was popular only while the 'crisis' atmosphere prevailed. By the time the 1984/85 Budget came around, the arguments it had contained apparently lost their authority. The 'proof' had been reinterpreted in a different context and it was no longer so compelling. Conventional measures of treating the problem of technology were deemed to be adequate.

At the expressive level, there was also a clear indication that high technology was being seen as something less spectacular. For example, Hingley of the Australian Council of Trade Union (ACTU) saw the 'high tech' revolution as involving the traditional problem areas of wealth and power distribution:

> Ultimately the ideals of the Strategy for a rapid increase in Australia's capacity to develop new 'high tech' industries, and that such development must be *democratic* and *equitable* demands a significant shift in power in Australian society. Those who own and/or control production processes, who advise government and direct capital investment, must radically change their perception of the nature of human progress.[117]

This much more critical and sceptical appreciation of high technology is perhaps an indication that the high technology symbol was losing the unifying force that it had in early 1983.

Another factor at the expressive level was the different way technology issues were symbolised in the November 1984 election. The Labor Government had opted for an early poll and it fought the election of the grounds that its economic policies were gradually getting Australia out of the mess it had been in. The emphasis was on management and control of the economy away from the crisis situation in the Prime Minister's election speech:

> Our nation was then in deep crisis — the worst economic crisis for more than fifty years . . . But now, my fellow Australians . . . you are called upon to make a very different decision, in very different circumstances, for very different purposes . . . not, this time, to restore positive economic growth from negative; but to ensure that the benefits of our economy — now the world's fastest-growing economy — are fully and fairly shared by all sections of the community.[118]

The central technological symbol in this 'management' context was R & D and not high technology. This concept of management was portrayed in the ALP's election speech through a 150 per cent tax deduction scheme for company R & D, the MIC Scheme for venture capital and AIRDIS. The suggestion was that the appropriate mechanisms were in place and these mechanisms operated on business in ways which influenced industry's financial operations (e.g. taxation). High technology, normally associated with 'crisis' and spectacular developments had to give way to a symbol (e.g. R & D) which was more appropriate for the context.

The Rise of the Department of Industry, Technology and Commerce

Jones' failure in Cabinet and the shift in economic climate to one where high technology was not such a prominent symbol heralded the abolition of DST in late 1984.[119] The responsibility for technology was taken over by DITAC, a Ministry which had a history of being fairly conservative in its outlook. This administrative change represented the absorption of high technology into the more established and manageable aspects

of economic life. There was no longer the spectacular rhetoric of the Jones era to accompany the debate. DITAC and its Minister, Senator Button began to talk about technology in a way which no longer highlighted its spectacular or transforming nature. An added dimension of this notion of management of the problem was the extensive review process that DITAC became involved in with its technology programs. The Offsets Scheme had been reviewed and in July 1986 a review of purchasing policy in the high technology sector was announced. Even the software industry which was quite vocal in 1981 was the subject of a study by DITAC to review its needs. Throughout 1986 and 1987, DITAC maintained an extensive review process of most of its technology programs. The 1986/87 Budget provided no new initiatives for high technology because of the overall atmosphere of spending restraint.[120]

Since the establishment of DITAC, technology (and indeed high technology) was no longer seen as a special element in the economy. DITAC was a much more powerful, main-stream department. Technology, being part of its activities, naturally took on some of that importance. The elevation of technology within the hierarchy of Cabinet was to some extent a tribute to Jones' efforts in 'talking-up' the issue but it also reflected the absorption of technology into the establishment. A good indication of just how well high technology issues had been incorporated into more general economic language comes from the Economic Planning and Advisory Council (EPAC). A 1986 EPAC discussion paper on technology did not emphasise high technology (rather R & D) but it put technology clearly back within the normal institutional constraints (e.g. the IAC review process):

> Before undertaking any new programs, the Government should assess whether public funding is necessary. As a general rule, publicly funded research is to seek to fill gaps which are unlikely to be filled by private research and development.[121]

EPAC was, however, working on a special report on high technology at this stage. EPAC's emphasis in the 1986 discussion paper was on the more conventional instruments of government intervention (e.g. R & D assistance, university-industry interaction, general economic management).[122]

The rise of DITAC as a more powerful and business oriented department, coupled with changing economic circumstances, has influenced the way high technology was symbolised. High technology had become part of a much more general emphasis on technology in the economy. It is difficult to say whether this change in emphasis translated itself in terms of increased funding for technology. DITAC seems to have improved the level of their increases in funding compared with total Commonwealth outlays in the 1985/86 and 1986/87 Budgets.

The abolition of the Department of Science in July 1987 further emphasised the extent to which high technology had been incorporated into mainstream economic and industry rhetoric. The influence of Barry

Jones had been almost totally eroded. However, in late 1987, Jones (as Minister for Science and Small Business) had begun to speak glowingly of the prospects for a high technology city (or multi-function polis) in Australia which would be established with Japanese support.[123] DITAC moved enthusiastically to establish a feasibility study involving federal and state governments. The political process surrounding this development and that of the 1981 Nat Semi deal would appear to be remarkably similar. This points to a further symbolic evocation by Barry Jones. In the case of the multi-function polis, the names have changed but the political processes are the same.

CONCLUSION

One of the most outstanding features of high technology politics in Australia since 1981 has been the important function of expressive political activity. High technology gave meaning to a 'crisis' situation of falling living standards and also provided a vision of what life might be like in the future if sacrifices were made now. In the Australian political debate high technology had a symbolic dimension which enabled political objectives to be furthered during a period of fiscal restraint where there was great resistance to instrumental action.

The Department of Science and Technology (DST) and its Minister, Barry Jones, used high technology as a lever to raise the status of this Department to gain authority for their cause and to attempt to set the political agenda. Jones turns out to be a key actor in the fortunes of high technology and DST. Without his rhetoric it was unlikely that the instrumental gains made in the 1983/84 Budget would have been otherwise possible. However, the high technology push was based on the 'crisis' atmosphere generated during the election. High technology was a maverick, uncontrollable idea to more traditional parts of the bureaucracy. Jones' attempts to use it to crash through the institutional barriers came unstuck because the political climate had changed and the issue was really too big for DST, a junior department. The result was the demise of DST and the absorption of high technology into the establishment. It is now an accepted term within DITAC and it is largely symbolised in terms of how it contributes to the economy. The numerous DITAC programs which assist high technology define its 'managed' nature.

High technology gained its strength through a variety of mechanisms. 'High Priests' such as Wayne Brown were brought to Australia by DST to translate overseas experience into a call for Australia to act likewise. The changing political climate in Australia also played a role. For example, Jones linked high technology 'sunrise industries' to the perceived economic 'crisis' during the 1983 federal election to further his interests. Numerous conferences and symposia such as the National Technology Conference in 1983 and the Biotechnology Conference in

1981 all helped to generate political cues. State governments in particular responded to these cues. These policies gave even further strength to the rhetoric on high technology. By virtue of the fact that it was government institutions promoting high technology rhetoric, it was not surprising that this rhetoric both reinforced the institutions themselves and also emphasised the role of government in promoting technology.

At a more general level, the reality of technology policy-making in Australia is far removed from the text-book optimality analysis of all possible outcomes. Technology policy in Australia has been formulated within an environment characterised by political expediency and politicians and public servants who are not adequately aware of the multi-faceted political dimension of technology. More importantly, the analysis questions the extent to which the issue of Australia's technological performance has been seriously addressed by the Federal Government. On the one hand, the considerable effort devoted to analysing and reporting on Australia's level of technological development can be seen as a rational attempt to clarify and 'solve' the problem. On the other hand, the debate may be seen as a calculated distraction. High technology can be interpreted as a policy problem which was created in order to be solved. The deep-seated problem of Australia's technological performance was long-standing and not new. The policy problem became that of how best to encourage high technology in Australia. This simplification left many important issues unaddressed. When this problem resurfaced in 1981 and during the 1983 federal election it was redefined in terms of high technology. Evidently, high technology must be seen, in part, to be a tool for managing an ongoing political problem as well as a possible vehicle for solving that problem. However, the political process and indeed the political system itself may prevent a realistic approach from being seriously considered.

The task ahead for policy analysis must be to search deeper than the prevailing rhetoric to extract a meaningful interpretation of events and issues that fundamentally underpin problems in society and the economy.

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