RECENT TRENDS IN AUSTRALIAN GOVERNMENT POLICIES FOR TECHNOLOGICAL INNOVATION*

Richard Joseph

This paper examines the rhetoric underlying policies for technological innovation in Australia over the past five or six years. The analysis is based on two approaches to policies for technological innovation which compete in the political arena: non-interventionism and economic nationalism. These approaches are completely general and aim to outline the scope of the rhetoric surrounding policies for technological innovation. Major policy statements and reports of the Liberal government prior to the federal election in March 1983 are analysed in terms of the two approaches, as is the Science and Technology Platform and pre-election statements of the Australian Labor Party (ALP). Recent policy initiatives taken by the Labor government are also reviewed. It is concluded that the rhetoric of the non-interventionist approach has dominated the development of policies for technological innovation up to March 1983. The ALP rhetoric is more in line with economic nationalism and this is seen to provide some challenges to the implementation and possible success of more direct measures to stimulate technological innovation. However, the most recent policy initiatives taken by the new government suggest that if the rhetoric of the ALP platform and pre-election statements is to be put into practice, much more needs to be done.

Keywords: Australian government, innovation policy, technological innovation

INTRODUCTION

Following the success of the Australian Labor Party (ALP) in the March 1983 federal election, Australian government policies for technological innovation have had a heightened political profile. The pre-election policy statements of the ALP emphasised the considerable promise offered by science and technology.[1] Existing industry could be revitalised and new high technology enterprises could be encouraged to generate wealth and compensate for the decline in jobs in the traditional sectors.

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This paper examines the rhetoric underlying policies for technological innovation in Australia over the past five or six years. The analysis relies on government policy statements and the recommendations of reports, and provides a means of comparing the rhetoric of the Labor government's policies with those of its predecessor, the Liberal government. This method has been chosen because statements and reports are not only convenient to use, but also provide a means of identifying important policy areas. It also provides an indication of how the federal government was prepared to act in specified circumstances. However, the analysis is complicated by the fact that different policy approaches to technological innovation exist. This is partly because economic theory does not provide clear guidelines on how governments can best stimulate innovation. As in other areas of government activity, this problem manifests itself as a difference between the rhetoric of policy and its practical implementation.

In this paper, the analysis of policy statements and recommendations of reports is based on two policy approaches which compete in the political arena: the non-interventionist approach and the economic nationalist approach. These two models are completely general and are not intended to represent ideal types, in terms of either opposing ideological or economic positions. Rather, they should be seen as overlapping parts of a spectrum of the rhetoric surrounding policies for technological innovation. The bi-partisan nature of policy is even more pronounced at the level of practical implementation than at the level of rhetoric. Because these models are completely general, they could be expected to cover economic considerations as well as perceptions of national identity, manpower and technological capabilities and national goals and priorities. For convenience, the models are described in this paper largely in economic terms, even though other descriptions based on, say, social goals or political aspirations could also be developed.[2] It is outside the scope of this paper to discuss the theoretical economic grounds for government involvement in technological innovation.[3] However, it is important to obtain an appreciation of what is meant by policies for technological innovation in order to describe the two approaches.

POLICIES FOR TECHNOLOGICAL INNOVATION

Governments have available to them a wide array of policy measures (for example, granting schemes and tax incentives) which can influence technological innovation. These measures may transcend many general policy areas (for example, financial, taxation and education areas). The following classification is based partly on one developed by the Organisation for Economic Co-operation and

Development (OECD), and for the purposes of this paper it should provide a guide to what is meant by policies for technological innovation.[4] There is an array of policy measures used to influence technological innovation and which are directed at the following objectives:

- the stimulation of technological innovation specifically,
- improving the climate in which innovation takes place,
- encouraging innovation in particular areas of technology, and
- encouraging competition and the rewards to innovation by ridding the market of imperfections.

ALTERNATIVE POLICY APPROACHES

The basic differences between the non-interventionist approach and the nationalist approach are derived mainly from opposing perceptions of the cause of poor innovative and technological performance. Consequently, there is no agreement on the appropriate policy measures seen to be necessary to overcome these problems. However, there are areas of common ground between both categories. For instance, both approaches have the aim of developing a strong indigenous innovative capability in manufacturing so that economic growth can be pursued and industry can take advantage of overseas technological developments. On the question of how to attain such goals, the two approaches offer different recommendations.

The Non-Interventionist Approach

The non-interventionist approach puts emphasis on market forces as the most powerful influence on the quantity and pattern of resources that society allocates to advancing technologies. In this approach, government intervention should aim at creating a suitable neutral economic environment for innovation. In such an environment firms are expected to be able to make balanced judgements of the appropriate level of investment in inventive activity. The circumstances justifying government intervention in the non-interventionist approach are few and it is argued that there are many instances where government intervention will not secure a better outcome than the operation of the market. The non-interventionist approach sees the solution to the present problems of slow economic growth and poor innovative performance as best achieved through orthodox economic measures and minimal government intervention in the economy. Current economic problems are short-term in nature and can be rectified by orthodox measures.[5] There are a number of implications for policies for technological innovation which arise out of this approach.

First, because the non-interventionist approach opposes measures which increase the role of government in the private sector (for example, the commercial development of specific innovations), the allocation of scarce resources to specific activities such as key technologies or key industries is not favoured. It is argued that resources could be drawn away from promising areas and that there can be no guarantee that areas nominated by governments will be the most promising. In view of this, government intervention is preferably restricted to the provision of the scientific and technological infrastructure (for example, government laboratories and universities) with involvement in commercial activities, such as venture captial and marketing information, left to the private sector. Policy measures tend to be indirect and broadly based (for example, depreciation allowances or taxation concessions).

Second, the non-interventionist approach, by emphasising the ability of the market to select the most promising areas, will tend to downplay government's role in overcoming problems associated with the uncertainty of technological innovation. Measures designed to overcome this uncertainty, such as government procurement policies which create demand, will be seen as unnecessary and costly. Likewise, long-term planning and co-ordination of measures to assist the technological effort of industry are also downplayed. One consequence of this emphasis on market forces is that low levels of national research and development (R&D) and innovative capability are seen as a manifestation of the comparative advantage enjoyed by some countries over others and therefore a natural outcome of the operation of the market.[6]

Finally, problems such as imperfect information flows in technical information, restrictive trade practices by multinational corporations and undue reliance on imported technology are considered not to be significant enough to require government intervention. Intervention to correct these problems is seen to be more disruptive than the operation of imperfect market forces.

The Economic Nationalist Approach

The economic nationalist approach accepts a far greater role for government intervention than the non-interventionist approach. Intervention is directly oriented towards achieving government policy objectives rather than simply regulating the economic environment. Market forces are not seen as sufficient to overcome perceived structural economic weaknesses.

The poor performance of manufacturing is understood in terms of fundamental long-term structural changes affecting both the world economy and national economies, including the technological

development of previously underdeveloped countries, the decline of mature industries in technologically advanced countries, and the importance of technological innovation in gaining new markets and lowering costs.[7] Economic nationalism argues that these fundamental changes require policies which are very different from traditional economic policy measures. Attention is focused on policy measures which will overcome perceived structural weaknesses. Structural weaknesses frequently identified by economic nationalists relate to, for instance, low technological capability, reliance on mature or low technology industry sectors, poor trade performance in high technology industries and in manufacturing generally, and a managerial group with little technical training.[8]

There are a number of implications for policy measures which arise out of this approach. First, there is a greater acceptance of intervention in all stages of the innovation process. Second, there is increased emphasis on policy planning and ensuring that policies for technological innovation are integrated and co-ordinated with other policy objectives. Third, emphasis is placed on encouraging areas of national importance or areas where an international comparative advantage could be developed.[9] This introduces a preference for those sectors of the economy, firms or technologies (for example, key technologies and key industries) which appear to be the most promising in terms of growth prospects or other identified national goals. Finally, there is preference for building up a strong national technological capability. Locally developed technology is also favoured because it is seen to carry more substantive benefits.[10] These benefits relate to, for instance, the importance of exerting national influence over the choice of technology, employment generation and benefits from 'learning-by-doing'. Although the importance of imported technology is still recognised in the nationalist approach, undue reliance is seen as structural weakness. Foreign subsidiaries of multinational corporations are seen as contributing to industrial weakness through their heavy reliance on overseas technology, low innovative drive and lack of concern for export markets.

ANALYSIS OF AUSTRALIAN GOVERNMENT POLICY STATEMENTS AND REPORTS

Before analysing recent policy statements and reports in terms of the two approaches developed above, it will be instructive to outline the range of policy measures in existence in Australia. An illustration of this range is shown in Table 1. It should be stressed that Table 1 does not attempt to cover all policy measures influencing technological innovation. It is evident that policy measures in Australia have not

TABLE 1
MAJOR EXISTING POLICY AREAS AFFECTING TECHNOLOGICAL INNOVATION

POLICY AREA	POLICY MEASURE	INFLUENCE ON INNOVATION
Commercial	— Tariff — Non-tariff barriers	General environment through technology diffusion, market structures and competition.
Taxation	— R&D tax concessions — Investment and depreciation allowances — Tax agreements — MICs	General environment for innovation through cash flow and investment in new plant and equipment. Venture capital.
Legal and regulatory	— Foreign investment legislation (e.g., FIRB) — Patents — Trade Practices Act	General environment through firm behaviour, ownership, and foreign technology. Inventions. Trade practices.
Education	— Universities	General environment and specific innovation through trained manpower, knowledge infrastructure and research.
Science and technology	— Government laboratories (e.g., CSIRO, DSTO, AAEC)	General environment and specific innovation through science and technology infrastructure and R&D.
Procurement	— Purchasing policy — Offsets policy — Contracting-out policy	General environment and specific innovation by increasing the technological capability of industry, level of R&D and demand.
Financial	— Financial schemes (e.g., AIRDIS, EMDG, EFIC) — NERDDC — AIDC	General environment and specific innovation by providing finance for R&D, exports etc.
Information	— Special programs (e.g., Technology and Innovation Programs in DST, Technology Transfer Council, CSIRO)	General environment and specific innovation through dissemination of information.

Notes:
AAEC — Australian Atomic Energy Commission
AIDC — Australian Industry Development Corporation
AIRDIS — Australian Industrial Research and Development Incentives Scheme
CSIRO — Commonwealth Scientific and Industrial Research Organization
DST — Department of Science and Technology
DSTO — Defence Science and Technology Organization
EMDG — Export Market Development Grants Scheme
EFIC — Export Finance and Insurance Corporation
FIRB — Foreign Investment Review Board
MICs — Management and Investment Companies
NERDDC — National Energy Research, Development and Demonstration Council.

generally been directed towards the encouragement of innovation in particular areas of technology.[11]

It will also be instructive to obtain an overall view of the Liberal government's general policy approach. This is best obtained from the Liberal government's major industry policy statement, the *White Paper on Manufacturing Industry,* published in May 1977.[12] This is of particular value to the analysis as industry policy has traditionally had a major influence on policies for technological innovation in Australia.[13] One of the major thrusts of manufacturing industry policy in Australia has been to replace imports with locally manufactured goods. However, over the last 20 years, this general policy thrust has been qualified by notions of tariff reductions, greater industry selectivity and major consumer benefit from reduced prices.

The general position of the government on intervention expressed in the White Paper was:

> "The Government's role does not extend to direction of business decisions affecting the allocation of resources. The market mechanism, operating through the decision of consumers and of public and private enterprises, remains and should remain the principal determinant of the allocation of resources within the Australian economy."[14]

One of the most prominent features of the White Paper was the view that the government should not select key industries. Emphasis was on the attributes of new investments rather than on industries.[15] The White Paper also recognised the need for industrial development measures in areas such as research and development, exports, small business, management efficiency, productivity improvements and industrial financing and funding.[16]

In summary, some of the principles adopted in the White Paper include the following:

- market forces are the best guide for the allocation of resources
- support for key industries is unacceptable
- government intervention may be justified on certain grounds (with the tariff maintaining its position as the dominant industry policy instrument)
- industry development measures (such as R&D incentives) have a role.

From such a position, an efficient, specialised and internationally-competitive Australian manufacturing industry was expected to emerge. The philosophy behind the White Paper would appear to be generally in line with the non-interventionist approach. Although industry development measures (such as R&D incentives) were encouraged in the White Paper, the low priority placed on these by the

Liberal government suggests adherence to the non-interventionist approach.[17]

Although the government's preferred approach was non-interventionist, it still intervened extensively in the market through measures such as tariff protection. As mentioned earlier, the philosophy underlying government policy statements does not always agree with reality. This is particularly true for policies for technological innovation in Australia because of the influence of industry policy. Given this background, it is now possible to analyse recent Liberal government policy statements and reports in this area.

By looking at major areas of concern identified in these reports, it will be possible to gain some idea of what was considered important by the Liberal government. Policy statements in the form of responses to reports will give an indication of how the government was prepared to act.[18] The government reports which will be considered are:

- Study Group on Structural Adjustment (Crawford Report) — government response on 23 August 1979[19]
- Committee of Inquiry into Technological Change in Australia (Myers Report) — government response on 18 September 1980[20]
- Review of Commonwealth Functions (RCF) — government response on 30 April 1981[21]
- Report of the Senate Standing Committee on Science and the Environment (Jessop Report) — government response on 11 June 1981[22]
- Committee to Review Productivity and Innovation Programs (Kirby Report) — government response on 29 April 1982[23]
- Industries Assistance Commission (Report on Certain Budgetary Assistance) — government response on 19 July 1982[24]

It is difficult to compare reports directly because inquiries were set-up to consider different issues and problems. However, it is possible to identify recurring themes. Table 2 lists the main areas of concern of four recent reports. The Kirby Report and the Industries Assistance Commission (IAC) Report have not been included in this Table or in Table 3 because their terms of reference were directed towards specific government policy measures.

From Table 2 it can be seen that a prominent theme has been the rationale for government involvement in industry. Insufficient innovation and Australia's declining competitiveness are important and could be seen as being the justification for these reports in the first place. The Jessop Report was the only one which dealt with foreign ownership and technological dependence at all.

TABLE 2

AREAS OF CONCERN OF RECENT REPORTS

Area of Concern	Senate Standing Committtee on Science and the Environment	Myers Report	Crawford Report	RCF
Insufficient innovation	X	X	X	
Declining international competitiveness	X	X	X	
Balance of payments/import penetration	X		X	
Unemployment		X		
Declining growth rates			X	
Need for better quality goods				
Low productivity/industrial inefficiency	X	X	X	
Inflation				
Non-fulfilling/low-skill jobs				
Need for better public services	X	X	X	X
Foreign ownership	X			
Technological dependence	X			
Identification of key technologies				
Rationale for government intervention in industry	X	X	X	X
Need for greater science and technology policy co-ordination	X		X	X
Industry policy/protection/industrial development policies	X	X	X	X
Social effects of technology	X	X		

Source: The areas of concern are based on P. Stubbs, *'Technology policy and industry policy. Perceptions, possibilities and problems'*, paper presented to 52nd Australian and New Zealand Association for the Advancement of Science (ANZAAS) Congress, Macquarie University, May 1982.

Table 3 shows a list of the major policy areas discussed in recent reports. All major policy areas had been under review or had been subject to recommendations arising from reports. The science and technology infrastructure and measures dealing with information had been considered in all reports. AIRDIS has been reviewed on numerous occasions. None of the reports had recommended or undertaken a review of the Foreign Investment Review Board (FIRB), procurement policy or the offsets program. Recommendations in the

TABLE 3

MAJOR POLICY AREAS DISCUSSED IN RECENT REPORTS

Major Policy Areas Discussed	Senate Standing Committee on Science and the Environment	Myers Report	Crawford Report	RCF
Commercial (e.g., tariff)	X		X	
Taxation	X	X	X	
Legal and regulatory (e.g., FIRB)	X			X
Education	X	X	X	
Science and technology	X	X	X	X
Procurement	X			X
Financial (e.g., AIRDIS)	X	X	X	
Information	X	X	X	X

legal and regulatory area had focussed on the patents system or on minor changes to the Trades Practices Act. Major issues concerning the tariff and taxation incentives had been dealt with by the IAC and therefore are not prominent in Table 3.

The non-interventionist approach received considerable support in a number of reports. For instance, the thrust of the Review of Commonwealth Functions (RCF) was to reduce government involvement in industry policy matters.[25] Consequently, many factors influencing policies for technological innovation were affected, including the range of programs designed to assist productivity and technology development. The Committee to Review Productivity and Innovation Progams (Kirby Report) in the Department of Science and Technology was set-up following the RCF.[26] A very prominent theme was the appropriateness of government intervention. The Committee concluded that:

> "Government intervention in industry matters should be restricted. It could be justified only on certain economic grounds or where the Government itself wishes to achieve a specific policy objective. In either case, the public benefits must exceed the public cost."[27]

In addition, the Committee developed guidelines for government involvement in productivity programs which required, among other things, that programs should facilitate rather than impede the operations of the market.[28] The Kirby Report represented a withdrawal by the Liberal government from involvement in productivity programs based on the view that government intervention in industry matters should be restricted.

The IAC Report on budgetary assistance meant yet another review of AIRDIS as well as of incentives for exports, and depreciation and investment allowances. The Liberal government accepted the IAC's advice that the Scheme should continue, but a severe reduction in the level of uncommitted funds probably reduced the Scheme's effectiveness.[29] The series of reviews to which this Scheme has been subjected suggests that the Liberal government had a degree of uneasiness with its existence. This is even more significant if it is recalled that the Scheme was the central feature of the Liberal government's direct assistance measures to industry to build up technological capability. Both the IAC Report and the Myers Report led to a greater tightening of the guidelines for awarding grants.

The Liberal government's response to the Jessop Report identified two areas where little action was taken. The first was the call for a national science and technology policy. The second dealt with the extent of direct foreign investment in Australia. Both of these areas are strongly related to the economic nationalist approach and the failure of the Liberal government to take action represented a distinct lack of interest in these areas.

Evidence of the economic nationalist approach in the reports is certainly not pronounced. For instance, the need for a strong national technological capability had been stressed by the Jessop Report and the Crawford Report, but the Liberal government's response to this situation had been to provide only general assistance measures and infrastructural support, and even to restrain direct measures (IR&D incentives). One feature of the economic nationalist approach is the adherence to a view that there is a structural weakness in the industrial base. The Crawford Report argued for structural change and the need to encourage Australian industry to become more internationally competitive. However, tariff barriers have remained in place, and this has protected national industry from international competition.

Both the Crawford and the Myers Report recommended the establishment of a body which would provide venture capital finance, but this did not eventuate. The Liberal government was considering calls for venture capital in the light of its consideration of the Report of the Committee of Inquiry into the Australian Financial System when it lost office.[30] Measures to provide venture capital could be seen as a positive move to support indigenous innovative firms.

The identification of areas where Australia may have a comparative advantage has not been pronounced in any of the reports. The Myers Report considered a number of technologies which appeared to exhibit promising characteristics. No recommendations were made concerning the selection of technologies that had good growth potential. Greater selectivity in areas where governments should support technological development was likely to be identified with a

key industry approach and would have been in conflict with the White Paper. This conflict goes a long way towards explaining why measures to assist technological development have been dominated by broadly-based policy instruments.

In conclusion, elements of economic nationalism had not been pronounced in government reports and policy statements dealing with innovation policy in Australia. The non-interventionist approach was the dominating influence up until the March 1983 federal election, when the Labor government took office.

THE LABOR GOVERNMENT'S POLICY APPROACH

The Labor government's policy approach can be best appreciated from the ALP Platform and the ALP's major pre-election statement, the *National Recovery and Reconstruction Plan.*[31] The Platform incorporates many aspects of the economic nationalist model.

- The ALP declares that Australia must assert its own technological sovereignty and reverse the declining capacity of individual nations to determine their own economic goals in a global economy. Foreign investment guidelines must be amended to ensure transfer of technology to Australian control and to expand Australia's capability to produce technologies at the leading edge of development.
- The ALP declares that the introduction, ownership and control of high technology should not be left to market forces alone.
- The ALP rejects the colonial model of technology transfer which has been adopted in Australia in which high technology is overwhelmingly under foreign ownership.
- A Labor government will establish new industries based on scientific and technological innovation.

Emphasis in the ALP Platform on technological sovereignty, the inadequacy of market forces, foreign investment and the support of emerging industries demonstrates that the Labor government's rhetoric towards policies for technological innovation is based on the economic nationalist approach.

The ALP's major pre-election statement, the *National Recovery and Reconstruction Plan,* also gives a very clear commitment to aspects of economic nationalism. The most prominent was support for 'sunrise' industries. The Plan stated:

> Australia has missed many opportunities in this field [sunrise industries]. The technological base of Australian industry has barely changed since the 1950's 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 . . . A priority for the Labor Government will be identification of the "sunrise" industries for the 1980's and 90's, and the channelling of investment to them.[32]

In another pre-election statement, 16 sunrise industries were identified, though the criteria on which these were selected or how the policy would be implemented were not made clear.[33] The economic nationalist rhetoric running through the ALP approach is pronounced; the decisions taken in the 1983-84 Budget and shortly after give an indication of this rhetoric in practice.

THE LABOR GOVERNMENT'S POLICY INITIATIVES: SUNRISE INDUSTRIES

Since taking office, the Labor government has taken a number of initiatives in the general area of science and technology policy. The full range of these will not be discussed here. The government's policy for technological innovation revolved around support for sunrise industries. The major initiatives were:

- — increased support for AIRDIS,
- — broadening of the powers of AIDC,
- — establishment of Management and Investment Companies, and
- — direction of CSIRO to research key technology areas.

The question of how closely these initiatives relate to the ALP rhetoric remains to be answered. The government has argued that AIRDIS (finance for R&D), AIDC (equity capital) and MICs (venture capital) are crucial to its intention to support sunrise industries and revitalise Australian industry.[34] However, in achieving these ends, decisions about where resources should be placed are left to the market or at least made at arms-length from the government. For instance, Harry Edwards, Opposition spokesman on science and technology, was able to comment on MICs that,

> . . . the scheme gives effect to the tax deduction while minimising Government involvement and leaving to the private sector and the market place where it belongs, the picking of winners and losers in this area, the selecting of investments and the risk taking.[35]

The purpose of the MIC legislation is to encourage the formation of businesses which utilise innovative technology, have the potential for rapid growth, are skill intensive, export oriented, internationally competitive, and significant generators of employment in Australia.[36]

Sunrise industries are not identified and the definition of eligible companies is fairly broad.

The AIDC has also been required to place greater emphasis on the strengthening and restructuring of existing industry and on promoting new industries with good growth prospects.[37] However, AIDC's operations will continue to be independent and commercially based. Again, the emphasis here is not on picking specific industries, but on leaving investment decisions to the market and keeping decisions at arms-length.

In the case of AIRDIS, the government did not substantially alter the relevant Act. Sunrise industries, or even specific key technologies, were not identified for support. However, Barry Jones, Minister for Science and Technology, commented that the Australian Industrial Research and Development Incentives Board (AIRDIB) would be expected to give full effect to the government's intention to use the Scheme as its primary instrument in directing investment to the development of sunrise industries.[38] Once again, the importance of arms-length decision making is of significance.

In the case of CSIRO, the Budget allocated $23 million from CSIRO's new operating funds to be spent on sunrise industries identified by the government.[39] These sunrise industries took the form of such technologies as information technology, biotechnology, generic technologies and new industrial materials. Even though specific technologies were identified, the classification was very broad. The difficulty of directing CSIRO has also been acknowledged by the Minister for Science and Technology.[40]

Both AIRDIS and AIDC were in place well before the Labor government came to office. The actions taken with respect to these were largely to improve their performance and effectiveness. AIRDIS was severely restricted by the Liberal government in its financial operations and the AIDC had been criticised for being ineffective and also severely constrained by the Liberal government.[41] The MIC legislation was a new initiative taken by the Labor government. Previous recommendations of reports advocating the need for government intervention to establish an Australian venture capital market had not been acted on by the Liberal government.[42]

Support for sunrise industries has become confused with a policy based on government support for specific or key industries. The Department of Science and Technology has gone to some trouble to clarify the difference and to argue that the government does not wish to interfere in firms' commercial decisions.[43] There is little doubt that the government's initiatives have been directed to establishing a suitable financial climate and to signalling areas of fertility, without supporting specific companies or industries.[44]

The government's actions in the area of policies for technological innovation do, to some extent, fall short of the rhetoric of its platform and pre-election statements. While direct support for individual sunrise industries has not been forthcoming, there has been some attempt at signalling areas of promise. Where decisions are required, they are made at arms-length from the government (for example, through AIRDIB, AIDC or MICs), focussed on technologies which are not industry specific, or left to market forces. In practice, both Liberal and Labor policies have a great deal in common. In terms of rhetoric, there are substantial differences.

Overall, it is probably too early to say just how well policies for technological innovation will fare under the Labor government. Changes have been made to AIRDIS and AIDC in order substantially to improve their performance. MICs, a new initiative, have also been established. AIRDIS obtained a real increase in funds of 15 per cent to $71.6 million and the AIDC obtained additional capital of $12.5 million in the 1983-84 Budget. However, while total Budget outlays of the government for 1983-84 increased by 15.8 per cent, the Department of Science and Technology's allocation increased by a mere 4 per cent.[45]

Under the Labor government new initiatives have been taken, but it is also evident that the changes have not been as far reaching and interventionist as the rhetoric of the ALP platform might have suggested.[46] In fact, some of the measures taken to date have been justified by using the policy rhetoric of the Liberal government (that is, creating a favourable economic climate for technological innovation without directly intervening in the market). It remains to be seen how successful the Labor government will be in reorienting the considerable array of policy measures available to it into a coherent mechanism for meeting its policy objectives.

CONCLUSION

Policies for the stimulation of technological innovation in Australia appear to have been strongly influenced by the government's industry policy. Over the past five or six years (up until March 1983), when the Liberal government was in power, this influence was manifested through the rhetoric of the non-interventionist model. However, shortly before the federal election the Liberal government had undergone a late conversion from a non-interventionist approach to an economic nationalist approach by considering the need to provide special support for high technology industries.[47]

The dominance of industry policy has determined the nature of many policy measures used to stimulate innovation. Direct assistance measures for technological development (for example, AIRDIS and

DST's Technology and Innovation Programs) were extensively reviewed. Broadly-based schemes, such as the investment allowance and the depreciation allowance, were dominant. In fact, key areas of policy which were of great significance to technological innovation were either inadequately dealt with by reports or not influenced by policy. For instance, a consequence of non-intervention has been a reluctance on the part of governments to deal with foreign investment. Any problems arising out of such investment are compounded by the effect of tariff protection. The non-interventionist approach tended to consolidate structural weaknesses in the economy. Indeed, structural weaknesses were not declared to exist in such a model. In addition, a reluctance on the part of government and the bureaucracy to develop policies which could be directed towards the development of key industries or technologies has to some extent hindered the development of an adequate information base on which to make such decisions and this is likely to affect the success of further policy development.[48]

The Labor government's rhetoric concerning technological innovation can be clearly identified with the economic nationalist model. However, this change in emphasis will have to overcome two problems if dynamic policies for the encouragement of technological innovation are to be successful. The first is the dominance of industry policy over policy measures to support technological innovation. Industry policy in Australia is to a very great extent influenced by historical dependence on tariff protection. Such an approach tends to protect traditional industries from competition whereas the more interventionist philosophy of the ALP platform in using government to encourage high technology growth industries seems to be in conflict with this. It is, therefore, reasonable to ask whether industry policy is itself conducted in terms of an approach which is not strictly in accord with either of the approaches discussed above. If this is the case, a detailed study of the approach taken in Australian industry policy could explain, to some extent, the mix of policy measures used to stimulate technological innovation and the relative importance placed on different measures. This would also give some indication of the relative success of past policies in encouraging technological innovation in Australia.

The second problem relates to the implementation of more interventionist policies for technological innovation within an environment of financial restraint. The range of policy measures which have been used over the past five or six years to encourage technological innovation has been influenced by non-interventionist rhetoric. If more interventionist policies are to be put in place by the Labor government, there will be a need to ensure that they are not dominated by non-interventionist measures and forms of policy

advice which are in conflict with the government's approach. The recent debate concerning the government's review of the IAC and the IAC's discussion paper, *New Technology and Industry Assistance*, highlight an ingrained resistance to the Labor government's approach which is still evident in some parts of the federal bureaucracy.[49] This could contribute to the disparity between rhetoric and reality in Australian innovation policy.

These two problem areas are key issues in the further development of policies for technological innovation in Australia. They represent a major challenge to the government in its task of integrating policies for technological innovation with other policy areas. As the Labor government's policies for technological innovation develop, it will be interesting to observe how well it adheres to the economic nationalist approach advocated in its Science and Technology Platform. Given financial constraints and resistance from powerful parts of the bureaucracy, there may be pressure on the government to take a more non-interventionist approach.

The policy initiatives which have been taken by the Labor government so far reflect more an eagerness to get existing schemes and programs operating more effectively rather than a radical departure in the form of a much more interventionist policy line. The legacy of the non-interventionist position which had been adopted by the Liberal government seems to be the constraints placed on, and lack of confidence in, policy measures which are in existence. This has seriously weakened the impact of some programs. The Labor government's actions so far have been aimed at redressing this problem, but much more will have to be done if the rhetoric of ALP policy is to be put into practice.

NOTES AND REFERENCES

1. Australian Labor Party (ALP), *National Recovery and Reconstruction Plan*, mimeo, 1983 and ALP, *ALP Platform, Constitution and Rules as Approved by the 35th National Conference, Canberra 1982*, ALP, Barton, ACT, 1982.
2. It would be possible to develop a framework in terms of a perfect market versus a command economy. While the choice of the terms 'non-interventionist' and 'economic nationalist' reflects some reliance on economics, it needs to be stressed that the approaches developed here are general in nature and are not meant to represent ideal types. See, for example, the broad range of issues discussed in Barry Jones, *Sleepers, Wake!*, Oxford University Press, Melbourne, 1982.

3. The theoretical grounds for government intervention are based on neo-classical economic studies which argue that a market economy would tend to underinvest in inventive activities such as basic and applied research and technological innovation. If it can be established that the rate of return from innovation to society exceeds the private rate of return (to firms and individuals), there exists a case for government intervention in the market for the support of innovation. Further, if it can be established that the social return from indigenous research exceeds the social return from imported know-how, there is a case for giving some sort of preference to the former. See, for example, R. Nelson, 'The simple economics of basic scientific research' in N. Rosenberg (ed.), *The Economics of Technological Change,* Penguin, 1971; K.J. Arrow, "Economic welfare and the allocation of resources for invention' in D.M. Lamberton (ed.), *Economics of Information and Knowledge,* Penguin, 1971; C. Tisdell, 'The international realpolitik of science and technology policy', *Prometheus,* 1, 1, 1983, pp. 127-43; and Industries Assistance Commission (IAC), *Certain Budgetary Assistance to Industry,* Australian Government Publishing Service (AGPS), Canberra, 1982, p. 63.
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14. Australian Government, *op. cit.,* p. 17.
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16. *ibid.,* p. 26.
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