

STRATEGIC ALLIANCES IN THE INTERNATIONALIZATION OF AUSTRALIAN INDUSTRY

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1. INTRODUCTION

The internationalization of Australian industry and in particular the development of specialization in internationally competitive industries with high export growth is the central challenge of industry and technology policy in the 1990s. The experience of the past five years shows that there are no simple or rapid solutions. The long overdue re-industrialization will require a process of structural and attitudinal change and capability accumulation *throughout* the economy.

Various forms of interfirm cooperation have been common in many industries, but the recent surge in cooperative agreements signals a radical new development. In the domain of technological innovation they represent the most important development in the organization of knowledge generation since the spread of corporate R&D laboratories in the early 1900s. They also represent a new phase in the coordinated production of goods and services, responding both to the systemic characteristics of much modern technology and to the ineffectiveness of market mechanisms and (vertical or horizontal) integration. In the area of marketing they are establishing a network of cooperative relationships and channels of access that complement competitive relationships and arms-length customer-supplier links. In this regard cooperative marketing agreements respond to the increasing integration: of innovation, production and marketing activities; of previously distinct industries; and of national markets. The norms of the 1970s and 1980s are increasingly inappropriate guides to corporate and public policy in the 1990s.

Growing cooperation among firms in other countries is strengthening their competitiveness and raising the barriers to entry for Australian firms. Inter-firm could have an important role in developing international competitiveness in Australian industry and in facilitating entry to export markets.

This paper summarises the key findings of a study by TASC, under contract to the Commonwealth Department of Industry, Technology and Commerce, of international alliance activity by Australian firms. It outlines the lack of internationalization of Australian industry; and focusses on two questions. What is the level and type of international alliance activity by Australian firms? What is the significance of this activity for the internationalization of firms?

2. INTERNATIONALIZATION OF THE AUSTRALIAN ECONOMY

In many respects Australia is an international advanced industrial economy. Particularly with regard to *consumption*, the patterns of demand and the sourcing of goods and services reflect processes of economic convergence among OECD countries. Some

activities (e.g. science) and industries (e.g. financial services, tourism, film) are relatively highly internationalized. Social, technological and economic activities closely associated with consumption increasingly reflect international values and trends.

But industrial *production* and export activities are far less internationalized. Import substitution policies have served to Australianize overseas capital and technology rather than internationalize Australian industry. The social, technological economic activities and structures most directly linked with production and export are consequently less influenced by international values and competitive pressures. These issues are now widely recognized with regard to e.g. industrial human resources, industrial relations and transport infrastructure. The 'national innovation system'¹ has remained fragmented and uncoordinated as the major part of the industrial demand for new technology has been met by overseas suppliers. Production of knowledge and industrial production within Australia have been weakly linked.

Australia's situation in the 1980s is unique among OECD countries. The combination of industrial structure, level of international competitiveness, industrial history, distance from markets and the characteristics of the 'national innovation system' present *unique challenges*.

Australia is a late entrant to industrial markets. Most comparable OECD countries began the process of structural change much earlier when the 'window of opportunity' was wider: levels of international competition and rates of technological change were lower. Australia's share of GDP due to exports of goods and services case this share has remained fixed at 15 to 16 per cent over the 1965-86 period. In the case of other countries from 1965 to 1986 this share has changed dramatically, for example: Sweden 22 to 33 per cent; Canada 19 to 27 per cent; Austria 25 to 37 per cent. Australia's export orientation has been and remains particularly low while in most other comparable countries it has increased.² This poor performance is illustrated clearly by comparing Australia's performance with aggregate world trends (Fig. 1).

What is particularly significant is that in comparable small OECD countries these improvements in export performance have been associated with a process of structural change. This process has involved an increase in the share of manufactures in exports, an increase in the proportion of manufactures in high market growth of industries, increased specialization at the industry and product level and the growth of their own multinational enterprises based on strengthened areas of national industrial specialization.³

One aspect of this structural transformation in comparable OECD countries is the increase in manufactured goods share of exports. For example, over 1965 to 1986 Canada increased the manufactures share of their goods exports from 37 per cent to 64 per cent; Spain from 40 per cent to 72 per cent; Finland from 57 per cent to 81 per cent. In Australia's case this proportion increased from 15 per cent to 22 per cent.

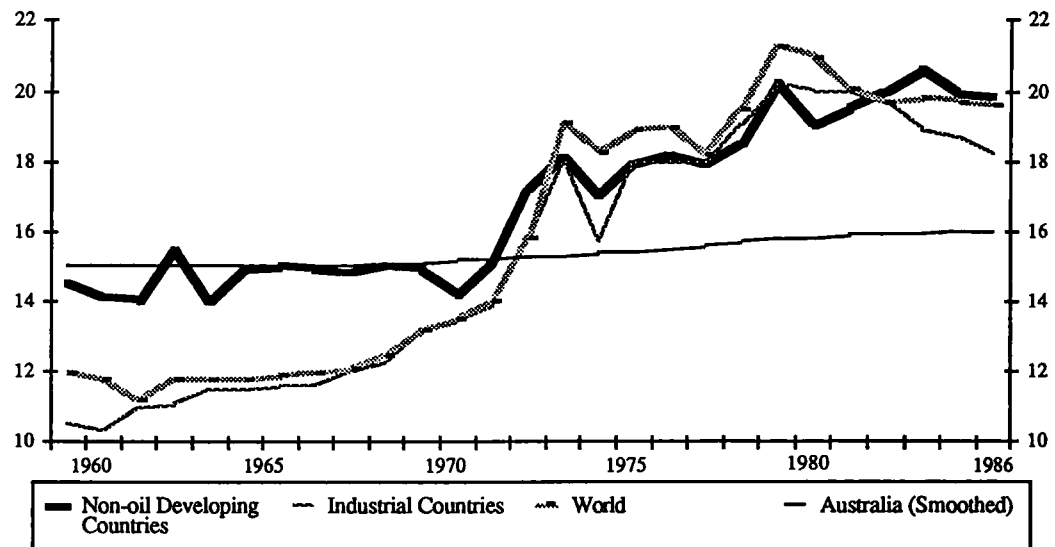
A second aspect concerns country shares of 'high-tech', 'medium-tech' and low-tech' OECD exports in 1970 and 1987. Australia's 'high-tech' market share (i.e. share of what were also high growth markets) was very low (0.2 per cent) in 1970 and was unchanged in 1987. Other comparable countries either maintained reasonably high market shares or

¹ The 'national innovation system' includes, in particular, the scientific, technological and education infrastructure, the industrial structure, the institutions concerned with policy and management, and the links and processes through which these parts of the system interact. See Freeman (1987).

² Australia's relative performance in service exports parallels that of industrial export performance. See Bureau of Industry Economics (1988a)

³ See, in particular, Walsh (1988), Soete (1988) and Freeman (1988). With regard to the issue of own multinational enterprises, 70 per cent of R&D expenditure in the Netherlands is by five Dutch multinationals. Hence, the combination of small firms and small country poses particular problems.

Strategic ally in the int'l of Australian industry



Source: IMF International Financial Statistics; IMF Supplement on Trade Statistics

Fig. 1. Share of external trade in economy: Exports as percentage of GDP.

substantially improved their performance over this period. The story for 'medium-tech' exports is much the same. There is almost an inverse relationship between the value-added level of an industry and its share in Australia's manufactured exports. (BIE, 1989).

The profound lack of internationalization and structural change in manufacturing industries has four major consequences:

- **Inappropriate industrial structure and orientation**

As a result of the regime of inward-looking import substitution Australia's manufacturing industry structure remains broad and shallow. However, in most high-growth, high-technology industries the structure is best described as truncated and fragmented. Local production in these industries is often by small national firms while domestic markets are dominated by large multinational enterprises who generally engage in little integrated local production and even less export or local product development.

Manufacturing industry has developed little international specialization or orientation — in sharp contrast to comparable small OECD countries. By international standards the development of managerial, manufacturing and marketing experience and knowledge has been limited.

- **Lack of dynamic inter-sectoral and interfirm links**

Fragmentation is particularly evident in the generally low interaction between sectors and firms. In many other small OECD countries 'leading-edge' users in primary, secondary and tertiary industries have stimulated the development of similarly progressive local suppliers. These dynamic relationships have been the origin of new firms and industries able to compete in world markets.

- **The independent evolution of the science and technology infrastructure**

Without internationally active manufacturing firms generating a strong *demand* for new technical knowledge, the science and technology infrastructure and manufacturing industry have evolved separately with limited interaction. This infrastructure has not been shaped through links with an industry that developed technology-based competitiveness in specialized industry areas.

- **Declining trade balance**

Australia has a poor balance of trade performance largely because it missed out on the surge in world trade in the 1970s, neglected structural change in the 1960-80

period, failed to build any significant share in the most rapidly growing world product markets, has rapidly internationalizing demand patterns, and has experienced steadily declining terms of trade since 1950.

The combination of these factors results in formidable structural, cultural, institutional and technological barriers to the internationalization of Australian manufacturing. Relative to many comparable OECD countries, Australia has had a very limited historical accumulation of the skill, knowledge, organizations and relationships that constitute the basis for international competitiveness.

3. INTERNATIONAL PERSPECTIVES ON INTER-FIRM ALLIANCE ACTIVITY

National economies and the industries and firms within them are becoming increasingly interdependent and interrelated. This is evident in trade flows of goods and services, investment and financial capital flows, technology flows and information flows. An unavoidable priority for national governments and for a widening range of industries and firms is developing strategies to internationalize and ensure international competitiveness.

At the firm level internationalism involves: increasing international sourcing of production and investment goods and services, capital, technology and personnel; increasing orientation toward production for global markets; and the location and coordination of firms' activities (technology development through production to marketing and product support) to achieve overall global competitiveness.⁴

Three powerful trends underlie these processes of change and compel a continuous strategic adjustment:

- **Technology and industry convergence** driven by the development and diffusion of generic technologies such as information technology and biotechnology;
- **Capability convergence** leading to constant rivalry for leadership in core technology and product areas and a constellation of innovative new entrants in specialized technology areas;
- **Market convergence** as demand characteristics and market infrastructure, at least in OECD countries, becomes increasingly similar.

In the 1980s one important feature of firms' strategies has been the increased use of inter-firm cooperation particularly for product and process development, coordinated manufacturing or market entry. There has been a marked growth in intra- and international strategic alliances in a widening range of industries.

Traditionally, cooperation has been a second best alternative to what remain the two primary types of relationship between firms: integration (i.e. merger or acquisition) or competition (including arms-length contractual links). But where firms have shared objectives and complementary capabilities their strategic goals can often be more effectively pursued through a blend of internal and external approaches. In the past, government restrictions on market access have been a major reason for establishing international joint ventures. International competition, technological interdependence and the complexity and increasing importance of innovation are now more important reasons.

Today's international strategic alliances are part of a much broader and growing network of cooperative links. There are three related but distinct trends in the growth of these links:

⁴ For further discussion of internationalization, the forces driving these exchanges and the implications for public and corporate policy. See: Porter (1986); TASC (1988); US National Academy of Engineering (1987); Gallagher (1988).

• **Research cooperation**

There is a growing trend among firms to 'source' technology from external suppliers (other firms, universities, etc.) through contracts and various forms of collaboration — this is a key feature of change in technology strategies⁵. These research links are also becoming increasingly international — the US computer manufacturer Digital Equipment Corporation, for instance, has 200 research projects with universities around the world.

• **Industrial networks**

Inter-firm cooperation linking leading manufacturers with suppliers and producers of complementary products has long been a feature and source of strength of the Japanese 'keiretsu'. Driven largely by the interdependence of much technology and the need for coordination, links between large user-firms and their suppliers are increasingly common in other OECD countries. Such networks appear to provide flexibility when change is rapid and allow the 'lead manufacturer' to focus on 'core technology' while drawing on the specialist capabilities of suppliers. They have been referred to as a form of quasi-integration.

• **Accessing complementary assets for production and marketing**

Small and medium size firms have an increasing role in trade and innovation. They are gaining access to overseas markets and accumulating vital market knowledge through a variety of mechanisms — direct investment, arms-length contracts with distributors or agents, or cooperative agreements with other firms.

4. INTERNATIONALIZATION AND INTERNATIONAL ALLIANCE ACTIVITY IN AUSTRALIA

Overview

Surveys by the Centre for Technology and Social Change indicate a marked concentration in the sectoral distribution of cases of alliances between Australian and overseas firms (Table 1). In the technology-intensive sectors such as biotechnology, computer hardware and software and communications more than 20 per cent of the companies surveyed were active in alliances. In the mature sectors surveyed (e.g. packaging, chemicals and engineering) there was little or no collaborative activity.

Table 1. Alliance activity by sector

Sector	Proportion of Firms having an International Alliance (%)
Computer Hardware & Software	24
Instruments	9
Communications	27
Chemicals	14
Biotechnology	75
General Engineering	10
Electronics	6
Materials	25
Packaging	9
Aerospace	60

Source: TASC Survey

⁵ This broader trend is discussed in Centre for Technology and Social Change (1988) and Centre for Technology and Social Change (1989) where recent studies are reviewed.

Although many alliances were motivated by a combination of objectives (e.g. market and technology access) the most common, primary objective on the part of Australian firms was market access. Technology access or technology development ranked second.

International collaborative agreements are a relatively recent phenomenon in Australia. The earliest agreements identified were signed around 1980, although there are possibly earlier alliances in aerospace and some other sectors. However, a pronounced upswing in the pace of alliance formation occurred around 1985. Most of the alliances identified date from the post-1985 period.

Information Technology

A detailed survey of the Australian information technology (IT) sector found that only a minority of firms were active in international alliances. These were generally the larger and most export-intensive firms. However, only about half of the alliances identified through the survey were focussed on export markets (i.e. outward oriented). Just as many were targetted on the local market; the cooperative agreement provided the local firm with access to the foreign firm's market channels in Australia or to the foreign partner's technology (embodied in products). The most actively internationalizing firms used alliances largely for export market entry.

There are five basic features of international alliance activity in the Australian IT industry.

- There has been a rapid increase in activity in the past few years. The Offsets and Partnerships programs have had a minor but significant role in this growth. More important driving forces have been: the growth and internationalization strategies of Australian firms; structural and technological change in the global and Australian IT industry; the importance of distribution channels in gaining market access; and the systemic nature of much technology.
- Almost as many alliances are 'inward' as 'outward' oriented. The great majority of the former were agreements with major US, UK or Japanese MNCs to access Australian markets through their networks or using their technology. The majority of the 'outward' alliances were also marketing agreements. While most were also with the same TNCs active in 'inward' alliances a major proportion were with smaller (particularly European, UK and US) firms. Less than a fifth of all alliances involved significant joint product development although a higher proportion involved minor or substantial product adaptation for specific markets.
- Most alliances were neither close (in terms of the level of mutual interdependence) nor comprehensive (in terms of the range of objectives addressed). They were often, however, of considerable strategic significance for the Australian firm.
- There was a very wide diversity in the objectives and the formal organization of alliance relationships. Less than a fifth were equity joint ventures.
- The majority of alliances developed and remain in the context of commercial relationships between the partners. Almost two thirds were quasi-market relationships. An increasing proportion of alliances involve more substantial joint, and hence less narrowly commercial, activities.

In assessing the strategic role of alliances for Australian firms it was evident that these firms were spread along a spectrum from those oriented almost entirely to domestic markets to those that were actively internationalizing, and that the significance of alliances usually varied accordingly. Firms that were least active in exploring or exploiting international alliances were generally small, oriented to domestic niche markets, under-resourced in terms of capital and commercial capabilities, and heavily focussed on in-house sources of technology.

Firms that were most active in using international alliances were located at the other end of the spectrum. They were larger, drew on a wider range of external technology sources (as well as in-house efforts) and were active exporters. Most had well developed growth strategies in which internationalization through exports, investment and participation in various overseas ventures had a central role. For most of these firms alliances were a key mechanism for access to overseas markets. However, alliances were usually *one* component of internationalization strategies and were complementary to developing an international presence through subsidiaries, acquisitions, direct exports and distribution agreements. The smaller of these firms, with less resources for overseas expansion, were relatively more dependent on strategic alliances to achieve their internationalization objectives. As well as actively internationalizing in general, the firms at this end of the spectrum were also relatively more active in exploring the potential of Asian markets.

The middle of the spectrum was occupied by a range of firms that were diverse in many respects but shared two characteristics: they were not internationally oriented but there were many indications that they were becoming so; they used international alliances largely for gaining access to Australian markets and also, but to a lesser extent, for gaining access to overseas markets and technology. The use of alliances for local market entry and technology access is often combined. These firms are developing internationalization (largely export) strategies and in particular exploring the use of fairly low-level alliances for export market entry.

Biotechnology

Strategic alliances have been a pervasive feature of commercial biotechnology since its emergence in the United States. Cooperative relationships in the initial phase were largely between small research-based firms and universities or other research organizations. A more complex and evolving set of relationships have since developed as more countries have entered the field, small firms have grown in number and some in size, an increasing number of large established firms have responded to the technological opportunity and research has moved closer to application.

Over the past few years perspectives on the future of commercial biotechnology have changed. Three aspects of this new outlook stand out. Biotechnology is now seen as an *enabling* rather than displacing technology. In the past it was often thought that biotechnology would parallel the evolution of microelectronics and lead to the emergence of new firms and industries and the demise of firms and industries tied to old technologies. While this may turn out to be true in the case of some industry segments and firms, major dislocations have not developed. Second, a division of specialization between small research firms and established firms has persisted. But over time the strategic advantages of the large firms have generally enabled them to use biotechnology to strengthen world oligopolies and raise already high barriers to entry. Some biotechnology start-ups have grown (e.g. Genentech and Cetus) but many others have failed or been acquired by large firms. Third, the commercialization of biotechnology has been slower and more expensive than anticipated. As the technological sprint became a demanding cross-country marathons many smaller firms exhausted their financial reserves.

The growth of commercial biotechnology in Australia is similar to the US experience. Many of the 70 or more firms using advanced biotechnology are small research-based firms linked to public research organizations. Cumulative private and public investment in product development reached about \$250m by 1987. (Biotechnology Consultative Group 1988). This is about the level of expenditure that one US firm (Genentech) required to take its first major product from initial research to the market

place. Over the past two years the flow of new investment funds from the sharemarket, venture capital funds and private investors has not matched the strong interest in the mid-1980s. This has led to serious financial difficulties for many firms and a slower rate of new firm formation.

While emphasising the importance of international markets and orientation a recent report on the development of Australian biotechnology noted several barriers to internationalization:

- small firm size;
- lack of international presence;
- deficiencies in domestic product development infrastructure;
- absence of international marketing and distribution networks;
- international trade barriers (tariff and nontariff); and
- lack of finance (without threat to equity). (Biotechnology Consultative Group, 1988)

Local and international strategic alliances would appear to be a possible mechanism for addressing many of the financial, managerial and market entry barriers facing many Australian biotechnology firms. In particular strategic alliances offer three main potential benefits:

- financial support through contractual agreements or equity participation;
- access to such vital complementary assets as professional management, regulatory experience and marketing channels;
- economies of scale in various activities.

Our survey found that the majority of Australian biotechnology firms have a strong international orientation — they aim to develop products for global market segments. But almost all have very limited production and international marketing capabilities, capital resources and revenue flows. In view of the substantial barriers to entry in many international markets, few of these firms can contemplate an independent route to market entry. International, *and domestic*, strategic alliances will have a key role in the development of Australian biotechnology.

Australian firms used international strategic alliances for three primary purposes:

- to benefit from economies of scale, complementary knowledge or capital investment for product development;
- to generate revenue through contract research, contract production or provision of services, marketing overseas product in the local and regional market;
- to use an overseas firm's knowledge of regulatory procedures, marketing capabilities and distribution channels to enter export markets.

Although commercial biotechnology activity in Australia is diverse in terms of product area, firm strategies etc., it is useful to characterize two groups of firms.

- **Research-based firms** closely linked to research organizations, focussed on product development, with very limited production and marketing capabilities and generally without comprehensive strategies for commercial development;
- **Commercially oriented technology based firms** that are positioned at the interface of product innovation and downstream application.

The first of these groups tend to use international (and domestic) alliances for product and process development, and anticipate also using alliances for export market entry. The second group tend to use domestic alliances for product acquisition and international alliances for revenue generation and market access. Firms in this group also tend to have more comprehensive strategies for *developing* through organic growth, joint ventures or acquisitions, targetted integration into key downstream assets.

In forming international alliances the assets of Australian firms that have attracted overseas partners have been: specific product or scientific knowledge; links to the

broader public sector science base; and access to the Australian or regional market. These assets have attracted the participation of several significant US and European biotechnology firms and major, particularly European, MNCs.

For both groups of firms international alliances have been a source of significant tangible and intangible benefits through, in particular, extending their marketing contacts, knowledge sources, and profile into the wider international arena.

5. CONCLUSIONS

Three key points emerge from this review and the surveys of Australian involvement in international strategic alliances:

- **Internationalization is an unavoidable challenge for Australian industry**

Australia is a laggard in structural change and internationalization. Due to a long historical under-investment in developing sources of international competitiveness we have a limited accumulation of experience, human resources, production and innovation capacity etc. For these and other reasons we face substantial structural barriers in achieving and sustaining international competitiveness.

- **The organization of innovation, production and trade is changing**

Growing inter-firm cooperation within and between major OECD countries is contributing to their competitiveness and raising the barriers to technology and markets for new entrants. While these changes are overthrowing the traditional concepts of markets and competition they are also creating some opportunities to link into international innovation, production or supply networks — although not always on favourable terms.

- **Strategic alliances are a mechanism for internationalization**

International strategic alliance activity is increasing in Australian industry — particularly by actively internationalizing firms in research-intensive sectors. These alliances focus on market access; pointing to the critical role of marketing for Australian firms. By international standards Australian involvement in alliances is largely peripheral and explorative. There is very little participation in significant international technology development or production ventures. There is little alliance activity between Australian firms, and between Australian firms and small firms, particularly from small OECD countries or Asian countries. There are understandable reasons why firms focus effort on larger firms from major OECD countries. But it is likely that domestic and small firm alliances will be particularly effective in the long-run internationalization process.

The experience of the more alliance-active and internationalized Australian firms indicates that alliances can be valuable mechanisms for achieving strategic objectives. Capabilities for assessing forming and managing international alliances will be increasingly important for Australian firms. But alliances are not a panacea. Two other forms of sustained effort are essential: strengthening internal competitive capabilities and internationalizing through direct investment of arms length market transactions.

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