UNIVERSITY-INDUSTRY PARTNERSHIPS IN AUSTRALIA:
A STRATEGIC PERSPECTIVE

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Abstract: This paper aims to explore university-industry partnerships from a strategic viewpoint. The paper identifies both specific and general issues and problems that are raised in the partnerships, and concludes with a proposal of a comprehensive strategic mode of management for the partnerships. The paper draws upon recent studies of Australian mechanisms for university-industry partnerships and the results of a survey of the latest annual reports of all Cooperative Research Centres (CRCs) in Australia.

Keywords: University-Industry Partnerships, Strategic Planning & Management, Cooperative Research Centres, Science & Technology Parks

1.0 Introduction

Rigid barriers between university and industry are gone as a result of global competition, rapid technological change and tightening university budgets. There are issues and problems regarding planning and management of collaborative research and education between university and industry, while significant progress and benefits have accrued to the collaborations. This writer considers that lack of strategic perspective* by policy makers may lead to loss of competitive advantage of research (education) products and services and less efficiency and effectiveness of the current mechanisms for the partnerships. Many books and articles describe features and benefits of the wide range of university-industry partnerships from government, academic and corporate perspectives (DEET, 1993; Turpin et al, 1996; Carboni, 1992). This paper, however, aims to explore university-industry interactions from a strategic viewpoint. The paper identifies both specific and general issues related to the interactions and concludes with a proposal of a comprehensive strategic mode of management for the interactions. The paper draws upon recent studies of Australian mechanisms for promotion of university-industry partnerships and the results of a survey of annual reports of all Australian Cooperative Research Centres (CRCs) in recent years.

2.0 Mechanisms for University-Industry Interactions: Issues and Problems

*The term “strategy” (or “strategic”) used in this paper draws upon current strategic management theories. It means matching external environment changes (economic, technological, political/legal and social) with capabilities (resources, technology and organization). Strategic managers shape the direction and nature of the enterprise in response to a turbulent and competitive market environment of organizations. The focus of strategy has changed from forecasting and allocating resources to building new capabilities that can be used to shape the competitive environment or respond rapidly and effectively to changes (Lewis et al., 1993; Karger, 1991).
In Australia, there are three generally recognized mechanisms to promote university-industry interactions, that is, science and technology parks, CRCs and university companies. This section explores the development of the mechanisms and identifies issues and problems related to the mechanisms from a strategic point of view.

2.1 Science and Technology Parks

A generally accepted definition of a Science/Technology Park would be:
A property-based initiative which:
• has operational links with universities, research centres and/or other institutions of higher Education;
• is designed to encourage the formation and growth of knowledge-based industries or high value-added tertiary firms, normally resident on site; and
• has a steady management team actively engaged in fostering the transfer of technology and business skills to tenant organizations (IASP, 1999).

The major feature of science and technology parks lies in their capacities to accommodate a large business/industry community with a close link with universities and government agencies.

The first science and technology park of Australia was established in Adelaide in 1984. Science and technology parks as one of the most prominent high scientific and technological schemes of university-industry interaction are able to consolidate resources to promote the local economy due to their geographical proximity. They give high technology firms relatively easy access to research and development (R & D) infrastructure and become movable R & D labs or projects of their industrial partners (tenants). The main role the parks are playing is believed to be that of an incubator of science, technology and innovation. The qualitative significance of science parks exceeds their quantitative amount. In Australia, for example, there are overall around 30 science and technology parks only (Miltra et al. 1999).

Issues and Problems

In the current knowledge-based economy, collaboration or co-operation is as important as competition. While specific criteria for evaluation of the collaboration in the science and technology parks are difficult to define, there currently exist two widely acceptable and generally used indicators for the evaluation, that is, efficiency and effectiveness. The fundamental question is how efficient and effective the science parks are in promoting an industry-university partnership? It is difficult to make a comparative evaluation of the benefits of a company setting up in a science and technology park than in other locations. Recent studies on Australian science and technology parks indicate that the success of some science parks results more from a city’s existing industrial and research base or integrated efforts made by all parties concerned than from the establishment of science parks alone (Industry Commission, 1995). Also in Australia, government incentives, particularly those from state governments, for companies to join in a science or technology park have significantly attributed to the park’s growth.
2.2 Co-operative Research Centres (CRCs)

The Australian Commonwealth Government initiated the Co-operative Research Centre (CRC) Program in 1990 and the first CRC was seen in Australia in 1991. With the inclusion of the new Centres announced in April 1999, there are 67 CRCs across Australia today. All Centres fit within the six targeted industry sectors - manufacturing technology, information and communications technology, mining and energy, agricultural and rural-based manufacturing, environment, and medical science and technology (DIST, 1998).

The overall objective of the CRC is said to strengthen long-term collaboration between research organizations, and between these organizations and the users of the research, in order to obtain better value from the country's investment in R & D. The program provides business with an opportunity to work in partnership with research institutions and to focus research relevant to industry's needs. The Government financial support of around AU$2.2 million a year is granted to each CRC Program for seven years. Annual Commonwealth funding for both the new Centres and existing CRCs is $140 million in 1999-2000 and $141 million in 2000-2001 (DIST, 1999).

The CRCs are established through a Centre Agreement, a contract among core participants, and a Commonwealth Agreement, a contract between the participants and the Commonwealth. Most CRCs are unincorporated joint ventures. The management structure of the CRC is mostly like that of companies, governed by a Board with an independent chair and lead by a Director reporting to the Board. Most CRCs have advisory committees with oversight of different aspects of the CRC activities – research, education and training, interaction with users, commercialization or administration. CRCs’ core participants are universities, public sector organizations and the users of new knowledge, from the private and public sector. Most Australian CRCs have several university partners and a number of industrial and/or business sponsors within one Centre (DIST, 1999).

Issues and Problems

After a comprehensive evaluation of the CRC Program in 1995 by a Steering Committee chaired by Sir Rupert Myers, the Myers Report confirmed the positive roles of the CRCs in developing Australian science and technology and endorsed their continuation. However, the Myers Report also suggested that more attention should be given to management of the Centres and the overall Program, and more attention to strategic planning, performance indicators and ongoing evaluation and reporting by the CRC Committee (Myers, 1995). In a later review of the CRC Program by a Steering Commission of Department of Industry, Science and Tourism (DIST), a conclusion was made that all CRCs should have a comprehensive strategic business plan that is updated annually and includes performance indicators, objectives with regard to research,
commercialization, education, staff training, budget allocations and financial projections (Mercer and Stocker, 1998).

There has been to date no systematic economic evaluation of the CRC Program having been conducted as it is generally believed that it remains too early to carry out such an evaluation (Mercer and Stocker, 1998). The question remains how effective and efficient the CRC mechanism could be in linking universities with their industrial and/or business partners? The controversial Mortimer report criticized the CRC Program as it benefited participants from the private sector with public subsidy (Mortimer, 1997).

2.3 University Companies

University companies are seen as another important mechanism of university-industry collaboration. The university companies have played a role in commercializing university research and accommodating technical needs of industry (Carboni, 1992). Australian university companies saw their growth in the 1980s. They are more than consultancy companies, integrating research, teaching and consultancy in their agenda. It is estimated that in 1990 these commercial arms of universities had a total turnover of AU$150 million, of them 45 percent coming from consulting, 30 percent from intellectual property and 25 percent from teaching courses (Johnson, 1996). There are about 110 commercial enterprises owned and controlled by Australian universities (Turpin et al. 1996).

Issues and Problems

Like issues and problems raised in science and technology parks and CRCs, there is still a question of efficiency and effectiveness of these commercial arms as no formal mechanism has so far been established to report their activities. Recent studies also found that these commercial arms often get in the way of short-term research or consulting projects that have tight time frames. The short-term consultancy services increase frictions between universities and industry. Industry wants a problem to be solved within a time limit whereas universities are reluctant to commit to timelines and want to probe into the fundamental understanding of the problem. Moreover, informal networking and personal connections with industry are one of the main approaches of the commercial arms to initiation of cooperative projects (Turpin et al. 1996). The effectiveness of the approach is questioned while the approach has been crucial to industry-university linkages.

3.0 Broad Issues: A Strategic Perspective

Following a discussion of specific issues and problems related to the three main mechanisms for university and industry cooperation, this section examines broad issues affecting the partnerships and discusses them from a strategic perspective.

3.1 Cultural Differences
There exists a real difference between the culture of universities and that of industry, which generates problems and obstructs the development of university-industry cooperation in many cases. Industry is seen to be profit-driven and profit-oriented whereas universities are a knowledge-based industry, seeking fundamental understanding of things. The different cultures lead to lack of mutual understanding between universities and industry in their cooperation. Intellectual property (IP) is a good case in point. From an industry perspective, universities usually have unrealistic expectation for commercial returns from IP because they do not fully appreciate the cost of commercialization of a research result among other issues. On the other hand, from a university perspective, industry is generally lacking in appreciation of the long-term value of investment in technology and research (BHERT, 1992). In this writer’s view, the deeply embedded differences in perceptions and attitude are likely to change if universities, as research service and product providers, are able to think strategically and offer total value to their customers (research users). More discussion of the issue is given in the next section.

3.2 Lack of Strategic Planning

A fundamental issue with university-industry partnerships is building long-term strategic alliances between the two parties to gain competitive advantage in today’s increasingly competitive and turbulent environment. Lack of strategic vision and thinking in planning for the cooperation prevents both universities and industry from developing and sustaining longer-term, efficient and effective partnerships.

The CRCs in Australia are the most formalized and structured arrangements between research providers and users. The CRC Program sponsored by the Commonwealth Government funds individual CRCs, normally limited to seven years only. As competition for funds from the CRC Program is strong, the fate of the exiting CRCs is uncertain after the seven years’ funding. The uncertainty is likely to hinder the development of a longer-term strategic plan and strategic management process for the Centre. The following citation indicated this concern and the consequence.

“Since the DIST funding will begin its reduction towards zero in 1990/2000, the Board is concerned to ensure that long-term arrangements be put in place well before mid-1999. The current situation is already impinging greatly on the planning of research programs beyond the year 2000” (CRC for Antarctica and the Southern Ocean, 1998 p.3).

A CRC annual report survey over CRC management conducted by this writer found that only less than 30 percent of CRCs’ annual reports talked about their business strategic plans* which deal with environmental changes and achieve or sustain a competitive advantage for the near future. Although most of the reports highlight on the cover page the vision, mission and/or objectives of the Centres (but not on strategies), the statements

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* A business strategic plan is said to be a set of well-coordinated action programs aimed at securing a long-term sustainable competitive advantage. It covers both broad and specific action programs (Hax and Majluf, 1984)
of the mission and objectives show that most Centres have an operational focus rather than a strategic one (CRCs, 1998).

3.3 Lack of Strategic Management Process

As it is a well-known principle that structure follows strategy, management structure should be designed to facilitate the implementation of an organizational strategy (Hax and Majluf, 1984). The CRC annual report survey for this research found that those CRCs, about 30 percent of CRCs in Australia, that are reportedly committed to strategic planning, adopt the Board as their governing body, under which is a management committee and several advisory and/or executive committees. The Board is said to be primarily responsible for providing strategic direction, and monitoring the performance of the Centre in line with the strategic needs of the industry that the Centre serves. On the other hand, most CRCs, without mentioning their strategic plans in their Annual Report, have their Board to be mainly responsible for the updating of milestones and approval of annual and/or three-year rolling budget. Some CRCs have no Board at the top but a management committee only that is responsible for daily operation of the Centre (CRCs, 1998). The survey found it hard to identify the existence of a strategic management process within the CRCs, as most CRCs have followed an operation-oriented organizational design.

4.0 Proposal of Comprehensive Strategy: A Future Perspective

Issues and problems raised in the mechanisms for university-industry interaction are identified and discussed in the previous sections. They are summarized as follows:

- Problems with efficiency and effectiveness in the three main mechanisms to promote university-industry cooperation;
- Cultural differences between universities and industry that are impinging on the dimensions of the partnerships;
- Lack of strategic planning for long-term strategic alliances; and
- Lack of strategic mode in organizational structure and management control.

This section attempts to propose a comprehensive strategy to address these issues and problems as a whole. From a future perspective, the strategy aims to foster stronger and long-term strategic alliances between universities and industry and to help the alliances to achieve and sustain a competitive advantage in the rapidly changing environment of their industry.

**Strategic Thinking**

It is imperative for both universities and industry to make fundamental changes in their attitude towards, and perception of, their cooperative arrangements. Managers involved in university-industry partnerships should reinforce both strategic and operational focuses and accept that strategic thinking is an on-going and integrated process rather than an extra burden. It is effective strategic thinking that enables an organization to keep one
step ahead of the competition and to plan its moves well in advance to gain a competitive advantage. Strategic decisions require strategic thinking to formulate strategies through a systematic analysis of competitive environment and identifying opportunities. As far as universities and industry are concerned, building long-term strategic alliances between the two parties is an efficient and effective way to achieve competitive advantage.

**Strategic Planning**

Today’s dynamic and uncertain environment has increased the importance of strategic planning for management. It is recognized that strategic planning plays a critical role in an organization’s success (Robbins and Mookerjl, 1994). The annual report survey for this research found that some CRCs have developed and revised their strategic plans to take them forward into the new millennium. Take the CRC for Sustainable Sugar Production for example. The Centre has recently revised its strategic plan in light of experience during the establishment phase and the Second Year Review. The *Strategic Plan: 1998 – 2003* highlights the Centre’s strategic intent in terms of research/development and education/training for the Australian sugar industry, and identifies its goals and formulates strategies to achieve the goals for future collaboration in the next five years. The Plan analyses the environment of the Australian sugar industry and acknowledges the challenges as well as strengths of the Centre in enhancing profitability and sustainability of sugar industry (CRC for Sustainable Sugar Production, 1998). While there remains certainly some room for improvement (for instance, no statement given about the Centre’s commitment to financial resources for strategy implementation), the Plan sets a working example for other small organizations or operational units involved in cooperative programs to develop a strategic management procedure starting from strategic planning.

**Strategic Management**

Strategic management is an on-going process that incorporates strategic planning, strategy implementation and evaluation. The process of strategic management involves managers from all parts of an organization in the formulation and implementation of strategic goals and strategies. Strategic management in university-industry partnerships requires that managers from both parties collaborate in developing and evaluating alternative strategies which focus on both long-term externally oriented issues and short-term tactical and operational issues. The current main externally oriented issues confronting industry-university interaction include:

- Priority areas of technology for future collaboration;
- Economic, market, technological and social factors that determine the profitability of cooperative projects; and
- Important trends in the industry concerned and main threats against the development of collaborative research and development in the industry.
Successful strategies are to be implemented in an effective organizational structure. Given the characteristics of managing university-industry interaction, it is advisable that managers adopt a combination of a contingency approach and a team approach to designing the cooperative organizational structure. The contingency approach facilitates an organization to adapt to continuous changes in the external environment and internal shifts and requirements. The team approach removes artificial organizational barriers and encourages a sense of openness (Robbins and Mukenjl, 1994). In terms of the operation of CRCs, science and technology parks and university companies, cooperative projects are initiated largely on a casual basis and undertaken usually by a small research group. The combined approach to management enables leaders of the collaborative research projects (or education programs) to ensure a responsive and effective implementation of organization strategies and to propose new strategies to the Board or the management in terms of strategic needs for cooperation.

The final step in the strategic management process involves evaluation of results of strategies implemented and revision of the strategic plan for the future. A strategic evaluation system has the same conceptual requirements as an operational one. Whilst an operational evaluation tends to focus mostly on short-term and straightforward financial results, a strategic evaluation concerns mostly with long-term impact and result of the chosen strategic plan and effectiveness of the deployment of strategic funds. As far as the university-industry partnership is concerned, the existing evaluation system of Australian CRCs is likely to be modified to accommodate the needs for both operational and strategic evaluation.

Performance indicators, as a key measurement of the CRCs, are specified individually for each CRC in their Commonwealth Agreement, which are required to cover the five areas designated below:

- Cooperative arrangements
- Research and researchers
- Education and training
- Application of research
- Management and budget.

Each CRC is required to report against these indicators in its Annual Report to the Secretariat of the CRC Committee, as an input to the formal evaluation processes. The formal evaluation and review processes comprise three components:

- A comprehensive annual report, including an audited financial statement;
- The appointment of a “Visitor” to each CRC; and
- Formal reviews in the latter half of the first, second and fifth years of a CRC’s operations (DIST, 1999).

The performance evaluation and review procedure of the CRCs is applicable to strategic management of other cooperative arrangements between industry and universities, if it is extended to be compatible with the strategic positioning of the organization.

5.0 In Conclusion
This paper is devoted to the question of enhancing management of university-industry interaction. This writer believes that the paper is important and unique as it attempts to approach issues and problems raised in the interaction from a different point of view, that is, from a strategic perspective. In the writer’s view, closer and more linkages between industry and universities would be developed if managers from both sectors could think strategically about the potential benefits from establishing a strategic and long-term alliance. Moreover, more efficient and effective mechanisms for the interaction could be achieved if strategic planning and management processes were adopted in the entire management system of the interaction. Of course, there is ample scope for further research in this area.

References


**Web sites:**
International Association of Science Parks (IASP) (1999) [www.iaspworld.org](http://www.iaspworld.org)