Morris F. Low

Redirecting Australia towards Asia: The multifunction polis and the development of the Asia-Pacific region

Introduction

Attempts to establish a science city the Multifunction Polis (MFP) in Australia, and recent moves by the Australian government to direct the country more towards Asia stem from the desire to capture technological knowledge and markets. The outlook for the Multifunction Polis is not good, and the Asia-Pacific Economic Co-operation (APEC) is on shaky ground, but at least both are steps towards forging a closer relationship with Japan and the Asia-Pacific region. Scientific and technological links form only part of the web of relations which are necessary for a more integrated and effective Asia-Pacific region. In this paper, I suggest that the concept of an autonomous science city is an outmoded one. We might more usefully think of technology transfer in terms of science and technology regions and the phenomena of "glocalization". This paper argues that such an approach is well-suited to describing the dynamics of the Asia-Pacific region: its global extent, the trend towards regional interdependence, and strong local flavour.

The Multifunction Polis

Australian scientists are able to participate in an exchange program through the Australian Academy of Science, with countries such as China and Japan. The Japan Society for the Promotion of Science, the Science and Technology Agency of Japan, the Ministry of Education, Science and Culture, all these bodies offer Australians opportunities for access to Japanese science and technology in universities and government research institutes. The concept of the Multifunction Polis has been viewed as one way of bringing Japanese science and technology to Australia.

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Why has the MFP been considered so potentially important? If we look at the state of R&D in Australia, it will become clear. In 1992, R&D expenditure per head of population was $AUS 200, compared with $ 400 in Finland.(Cribb 1994) The level of government support (1.2 % GDP in 1987–88) is not unsimilar to many other countries. It was estimated in 1990 that such funding accounted for around 61 % of research spending in Australia.(Maslen 1990) Private sector funding, however, is amongst the lowest of OECD countries (0.57 % GDP) (Maslen 1994). This is in contrast to most developed nations, where private-funded R&D is dominant.

The tendency for Australian subsidiaries of multinational companies to import technology, and the dominance of high-tech industries by overseas firms contribute to this situation. Furthermore, manufacturing in Australia is not always cost-effective and R&D is often conducted elsewhere. The Australian government is attempting to change the role of Australian subsidiaries to one more concerned with R&D. (Australian Science and Technology Council 1989: 55)

The MFP was initially proposed by Japan's Ministry of International Trade and Industry (MITI) in 1987. Since then, the Gillman-Dry Creek precinct, near Adelaide has been chosen as the core site. Critics claim that decontamination costs are understated, that there will be continuing risks posed to MFP residents who will live adjacent to existing industry, and that development of the site will result in major disparities between the MFP site and the surroundingeconomically disadvantaged area. (Sproull 1992b: 4)

The image of the MFP alternates between that of a utopian technocity to a more pragmatic regional centre which draws on local strengths in education and environmental management.(Sproull 1992a: 37) Even if the MFP is not realized, there have been constructive discussions of how the polluted Gillman site might be rehabilitated.(Sproull 1993: 8) While major Japanese investment is not likely at this stage, the whole MFP debate has been highly useful. Perhaps the notion of locating all the infrastructure in one place is an outmoded idea.

The Asia-Pacific Region

The Australian government has hitherto focussed on Japan, China and the Republic of Korea in terms of scientific collaboration, but bilateral science and technology agreements also exist with Indonesia, Malaysia, Thailand and the Philippines. ASEAN countries receive aid in the form of technical assistance, and students from Indonesia and Malaysia participate in technical courses under the aid program. (Australian Science and Technology Opportunities 1992: 10–13)

In recent years, a number of government reports have stressed the need for Australia to redirect its energies to understanding and working with Asia. *Australia's Business Challenge: South-East Asia in the 1990s* (Australian Government 1992) suggests that Australian science and technology could fill the need for know-how in S.E. Asia, in areas such as biomedicine, geology, agriculture and food science. Recommendations include the establishment of an Australia-ASEAN science and technology unit in one of the ASEAN countries. This would serve to encourage industry links, as well as facilitate the involvement of universities and the CSIRO. High level research scholarships for S.E. Asian students to study in Australia would also help. It also suggests that revitalization of the Association for Science Cooperation in Asia would also be beneficial. (Australian Government 1992: xlvii, 147) In terms of other developments, it seems likely that Australia and Indonesia will strengthen science and technology ties, partly to facilitate Indonesia's plan to build twelve nuclear power reactors in Java by early next century.(Stewart 1992: 3)

A paper was submitted to the Prime Minister's Science and Engineering Council entitled *Australian Science and Technology Opportunities and Strategies in the Asia Pacific Region* which reinforces the importance of such measures.(Australian Science

and Technology Opportunities 1992) Its recommendations include expansion of education and training links and exchanges of scientists; establishment of workshops to increase understanding of legal,financial and property rights issues related to technology transfer; use of the Asia-Pacific Economic Co-operation (APEC) group and other forums to encourage science and technology cooperation; and the need to market Australia as a country with know-how worth having. These, I suggest, are ways of building a network which, with enough synergies, could make for a transnational science and technology region in which strategic concerns also play a part.

Recently, the chief of the Australian Defence Force has called for the expansion of defence links with Japan and China. (Stewart 1994: 1) What is clear is that there is an important role for bilateral agreements between governments and a growing realisation that Australia complements both North-East Asia and South-East Asia in different ways.

The APEC leaders will meet in Indonesia in November 1994 and are likely to make an ambitious free-trade declaration. Australia has pinned many of its hopes for the Asia-Pacific region on the success of APEC. It's future is by no means certain. (for example see, Colebatch 1994: 5) But what this illustrates is the phenomena of "glocalization" – a trend towards regionalism in trade agreements which sometimes runs counter to the rhetoric of commitment to a global system. (Sheridan 1994: 26) The following sections will explore the "glocalization" of Japanese technology, attempt to conceptualize what has been described as a paradigm shift in industrial operations, and examine its ramifications for Australia and the Asia-Pacific region.

The Globalization of Japanese Technology?

Are we witnessing the emergence of a new, global, Japanese–led industrial space in the late twentieth century – the creation of a multi-polar, trans-national science and technology region centred on Japan? If so, are there information flows to the Asia-Pacific region as well as yen which reflect this? And to what extent does R&D feed back to the centre from overseas affiliates? In the remainder of this paper, some of the key issues relating to the globalization of Japanese technology will be outlined, and reference will be made to some of therelevant literature.

Offshore Manufacturing

With the strong yen and the shift of hi-tech manufacturing offshore, the transfer of actual know-how for the production of computer parts, telecommunications equipment and VCRs may become a reality. Electronic parts are no longer sourced only from Japan but come from throughout the world. Sony, Matsushita and Toshiba procure parts from Southeast Asia. Firms such as Sharp produce 85 % of their overall production overseas.(Tokyo Business Today 1993: 44–46) Hitachi, JVC and other firms now re-import "Japanese" VCRs made abroad. Japan was set to become a net importer of colour television sets in 1993, the overseas assembled sets coming mainly from Malaysia, South Korea and China in descending order. (The Japan Times 1993: 7) What this suggests is that national borders are becoming less relevant and that techno-nationalism will be more difficult to enforce. Nevertheless, the Japanese are still reluctant to part with their know-how.

If we look at the activities of multinational firms in Asia, American and European firms appear to be more willing than those from Japan to give locals strategic positions within their operations. The "Japanese-type" of technology transfer apparently places a great deal of emphasis on training local engineers and operators, thus requiring a large number of Japanese technical experts. It is claimed that the continuing presence of these experts is to provide on-the-job training and ensure that local employees have an understand-

ing of the processes beyond basic operations, especially important in the event of sudden changes to model design and production methods.(Thee 1992) Globalization in the Asian context can mean the transfer of know-how with control at the other end still firmly in the hands of the Japanese.

Paradigm Shift

Fumio Kodama has described how the corporation has begun to move from being a place of production to a place for thinking. If so, perhaps with the help of theinformation highway, we can stretch the concept of place to encapsulate a region. In this fuzzy, postmodern world, the old linear model of technological innovation in which know-how flowed from the U.S. to Japan is no longer valid. International co-operation in science and technology renders national borders less meaningful. (Kodama 1991: 385–92) Perhaps future technological change will be the result of complex processes which include technology transfer through a region. What form will it take?

Flows of Knowledge or Rubbish?

Hitoshi Yoshioka has spoken of the political economy of nuclear power. He would probably agree that the breaking-down of national barriers has enabled the transfer of reject technology and nuclear waste. This is useful for industrially-advanced nations such as Japan where, as a result of strong community opposition, it has become increasingly difficult to begin the construction of new nuclear power plants. Mitsubishi Heavy Industries, one of the leaders in the atomic energy industry, has therefore chosen to expand business overseas, especially in the developing countries of Asia. (Sato 1990: 50–52) While environmental groups have successfully opposed further development of atomic energy in "industrialized" countries, nuclear plants are somehow perceived or presented in Asia as the "wave of the future". China, Indonesia, South Korea, Taiwan, Malaysia, Thailand and other countries have expressed interest in establishing nuclear power plants. (Oishi 1990: 17)

But, to be fair, the "internationalization" of Japan's R&D effort has seen the establishment of major R&D centres in Western countries: e.g. Canon in France, Hitachi in California, Kobe Steel in Surrey, Kyôcera in Washington, Matsushita Electric in Frankfurt and San Jose, Mitsubishi Electric in Boston, NEC in Princeton, Nissan in Detroit and Bedford, and Sharp in Oxford. (Kahaner 1993) American firms, too, have accessed the Japanese research system and markets by entering into alliances with Japanese partners, but they tend to use Japanese R&D facilities to modify American products for Japanese consumers rather than to carry out path–breaking innovations. While Japanese firms have adopted a similar strategy in the U.S., it is apparent that access to R&D facilities there provide the Japanese with a valuable means by which to monitor American scientific and technological know–how. (Mowery and Teece 1993) This suggests that the role of overseas "think-tanks" is much more than mere brainstorming.

Glocalization

Diana Hicks and her colleagues have recently attempted to measure how international Japanese R&D is. (Hicks et al. 1994) Japanese companies publish scientific papers in international journals, but these are often produced by laboratories in their home country which are staffed by Japanese, rather than by foreign affiliates where some non-Japanese might be employed. Collaborations tend to occur with Japan-based institutions, and citations reflect this emphasis. The conclusion is that the Japanese remain dependent on the national science system, despite contributing to the international literature. And the internationalization of Japanese corporate scientific research is still very small.

This concurs with the work of Keith Pavitt, who argues that Japanese firms rely much

more on Japanese R&D than on any other country's, and that the economic benefits of government investment in basic research and training is actually captured by local firms. The research networks are highly localized, partly as the result of language barriers and geographical distance. (Pavitt 1992: 119–23)

Nation, Region or the World?

Given all of the above, we should be wary of labelling technology as an artefact "made in Japan" or "born in the U.S.A." Scientific and technological know-how is highly mobile, and the advantages do not necessarily accrue to the creators. Even when we can link a particular product to a nation, labels can be misleading. For example, as much "Japanese" hi-tech activity occurs in the region around Tokyo, it might be more accurate to describe Japanese goods as "designed in Tokyo" and made in S.E. Asia! (Castells and Hall 1994: 112, 160) This illustrates the dual nature of Japanese industrial development: internationalization in conjunction with local development. MITI's technopolis program, for example, was partly born out of the desire to revitalize regional areas of Japan. It may be therefore be more appropriate to describe the current technological paradigm shift as "glocalization" rather than "globalization", for less than 20 % of total technological activities of most highly-industrialized nations occur outside the home country. This suggests that most national technological systems are still relatively confined to their own borders. (foray and Freeman 1993)

These findings are not surprising. Scientists and engineers in Japan, and probably other countries, are socialized to a high degree within national boundaries. They are unlikely to leave their company let alone their country. Overseas think-tanks have been established, but international contacts are still slow to occur. This is not to say that the Japanese ignore overseas literature – far from it. But in terms of interaction, it was suggested two decades ago that the larger and less marginal the scientific community, the lower the degree of internationality. (von Alemann 1974)

From Technostate to Technoregion?

Many developing countries have lamented their inability to capture technological knowledge from advanced nations such as Japan. But perhaps the notion of a technostate of research cities spread throughout a country needs to be replaced by a concept of transnational space throughout a region, such as the Asia-Pacific. Regional networks could be meaningful not only in terms of the production of manufactured goods, but also as providing linkages in information. In light of the glocalization of R&D, and the recent slight decline in corporate funding of it, the future growth of science cities like the MFP within national borders is by no means assured. Rather than a research triangle in one prefecture, international flows of knowledge among countries in South East Asia, and between the U.S. and Japan may constitute nodes of a much larger configuration. By viewing the Asia-Pacific region in this manner, the nurturing of locally-based research capabilities overseas is not incompatible with theambitions of those in the centre to remain ahead. Stephen Hill suggests that multinational companies operating in developing countries need to risk "giving away" a certain amount of technological know-how to their overseas affiliates in order for the latter to be able to respond quickly to local needs and remain competitive. If we view the world in this way, the "brain drain" which Shigeru Nakayama will speak of is but part of a larger and longer process in which expatriates are actors facilitating the transfer of technology. (Hill 1994)

Future Prospects for Australia

Given the highly localized nature of Japanese R&D, it is implausible to think that na-

tions will be rewarded by a windfall of Japanese know-how. Rather, perhaps the concept of a science and technology region can be stretched to include the Asia-Pacific with Tokyo at its centre. Such linkages do not appear overnight. The lack of Australian direct investment in South-East Asia, for example, is considered a handicap. In 1991, most of our foreign investment (77 %) was concentrated in the U.S., U.K. and New Zealand. (Sheridan 1992: 31; Stewart 1992: 4)

The lack of cultural differences, and the similarity of the legal and business systems are often cited as reasons for this. Asia is considered as involving greater risks due to such differences. These attitudes cannot be changed overnight, but it has become increasingly clear that Australian firms are becoming more Asia-literate and ready to engage with the Asia-Pacific region. (Australian Science and Technology Opportunities, p. 14)

It has been suggested that Australia could develop "leading-edge" technologies which Asian countries could commercialise. (Cribb 1992: 18) Australia is strong in basic science and in applying advanced technology in agriculture, mining and minerals processing, but weak in R&D in manufacturing. But in order for that to eventuate, investment, trade, defence ties, and science and technology links are all ways by which we can further enmesh ourselves into the region, its dynamism, and the new paradigm. There is already a strong trend in Asia towards regional interdependence. Super–high technology tends to remain in Japan, while other countries within Asia vie for technologies which are less leading-edge. (Mann and Chiba 1994: 4–7) Perhaps Australia could be part of it.[1]

NOTES

1. Paper presented at the International Science City Symposium "The Science City in a Global Context", Kansai Science City, Japan, 16–23 October, 1994.

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Morris F. Low
Dept of Japanese Studies
Monash University
Clayton, Melbourne
Victoria 3168
Australia