CORPORATE ORGANISATIONAL CHANGE IN THE AUSTRALIAN TELECOMMUNICATIONS INDUSTRY

Ann Hodgkinson

The Australian telecommunications equipment sector appears to have shown a marked improvement in international competitiveness since the mid-1980s. This paper analyses the causes of this growth in terms of responses to changes in the global — particularly the Asia-Pacific — market and market developments in Australia. This improved competitive position has resulted in organisational change within multinational firms based in Australia, with evidence of corporate specialisation, growing intra-industry trade and emerging strategic alliances which will link the local industry more closely with global developments.

Keywords: Asia-Pacific, globalisation, government policies, organisational change, telecommunication equipment, trade.

INTRODUCTION

Recent reports from the Department of Foreign Affairs and Trade have emphasised the rapid growth in exports of elaborately transformed manufactured products from Australia to East Asia. These reports have identified the telecommunications equipment industry as one of the sources of this growth. Telecommunications supply now represents the type of industry towards which much of Australian industry policy has been directed over the past decade — efficient, export-oriented and internationally competitive[1]. Australia also has one of the most sophisticated telecommunications infrastructures in the Asia-Pacific region, which provides it with the opportunity for regional leadership in this industry[2].

Yet until the mid 1980s, the Australian telecommunications equipment manufacturing industry was inward focused, being composed of multinational subsidiaries and local firms whose main market was the supply of equipment to Telecom. While Telecom demanded high standards and leading edge equipment, most of this involved imported components with local firms mainly responsible for adapting these to meet local technical standards and product assembly. Little exporting occurred and local R & D expenditure was well below international standards[3].

Recent improvements in international competitiveness can be explained with reference to the substantial changes in corporate structure and market strategy undertaken since the 1980s by the firms which comprise the Australian industry. These changes in organisational structure are occurring in response to changes in the world telecommunications market which have encouraged global firms to position themselves in order to capture new growth opportunities. Australian firms, as subsidiaries of global corporations, have been affected by this restructuring process and are taking on new roles within their parents' production and distribution networks.

> The modern corporation appears to be undergoing a significant transformation. The early twentieth century was a period of integration and advance, the middle decades were marked by diversification and the latter decades are characterised by both integration (via merger) and disintegration (via divestiture), coupled with a marked acceleration in the frequency and complexity of collaborative arrangements.[4]

There has been an increasing interest in recent economic and business literature in the processes by which this transformation is occurring and its implications for national economic development and industry policy. The previous view of the corporation as a giant, centrally controlled, vertically integrated hierarchical organisation is becoming outdated. The vertically integrated, diversified 'megacorp' typified in the works of Alfred Chandler, Jr[5] and Alfred Eichner, Jr[6] controlled a tightly integrated global production and distribution system which sourced raw materials and located plants throughout the world to maximise the benefits to the corporation as a whole[7]. In this form of industrial organisation, Vernon's product cycle model[8] was usually adequate to explain location decisions. New, high risk innovation occurred near head office, while in its more mature stages, production was allocated to plants in least-cost, often cheap-labour, locations.

Industry policies until the mid-1970s tended to be protectionist. As a consequence, multinational corporations developed a network of national subsidiaries. Often these had only simple assembly, sales and distribution functions. In some countries, local procurement requirements led to the establishment of small scale manufacturing plants in which products were adapted to meet national technical specifications. This 'multi-domestic' pattern[9] characterised the telecommunications equipment sector in Australia until relatively recently.

Contemporary literature increasingly analyses corporations within a decentralised, co-operative organisational structure which focuses on the strategic nature of business behaviour in a changing and uncertain environment[10]. This approach owed its initial popularity to management discipline texts such as those of Michael Porter and Kenichi Ohmae[11]. However, it is also increasingly evident in the economic, industrial relations and political literature. To a large degree, this reflects attempts to explain the international success of Japanese corporations in recent times[12].

Japanese multinationals appear to represent a very different model of industrial organisation to the large hierarchical, US multinational. They also appear to represent a form of industrial organisation which is more successful in competing in uncertain and rapidly changing international markets than the previous form.

In this paper, I want to briefly formulate the characteristics of this new form of corporate organisation by synthesising the ideas of a number of economic and management analysts who have addressed this topic. I then wish to address the issue of whether the Australian telecommunications equipment manufacturing sector is in the process of restructuring from the earlier multinational form towards a new form of industrial organisation. Under the earlier structure, Australian facilities played a relatively insignificant corporate role predominantly related to meeting Telecom's domestic procurement requirements. In this paper, however, it is argued that the new structure offers opportunities for Australian operations to develop a more autonomous role within the overall global corporate structure and to

develop functions which are consistent with Australian government industrial policy priorities regarding our position in the Asia-Pacific region.

NEW CORPORATE ORGANISATIONAL STRUCTURE

In discussing the new form of business organisation, it is useful to conceptualise the corporate structure as operating at two levels. First, global corporate strategy development is still firmly controlled by head office. The global strategy function has evolved from the general office functions of the earlier large scale, vertically integrated organisational form. This structure involved the centralisation of strategic planning, resource allocation between divisions, monitoring and control of production decisions[13].

The new strategic functions primarily address geographic market expansion and research and development policy. They thus incorporate the key areas of firm interdependence, strategic manoeuvring and business rivalry, identified as essential for successful international competitiveness. Firms have increasingly utilised strategic alliances and other forms of co-operative venture to overcome the high fixed costs of product development and adaptation, and to achieve their strategic objectives relating to market expansion, including compliance with government regulations and maintaining a presence in all major product and regional markets[14].

At a second level, however, local branches which had developed as semi-autonomous operating divisions in the previous multi-divisional firm are provided with 'mandates' which allow them to develop a more autonomous decision-making role than previously in order to exploit opportunities within the local market and government incentive regime. This feature is referred to as 'insiderism' in the management literature[15]. It provides nationally based firms with access to local market opportunities associated with procurement contracts, entry after deregulation or access to new product markets on more beneficial terms than imports or foreign based firms.

The older form of industrial organisation encouraged a multi-domestic location pattern for subsidiaries. A strategically oriented organisational structure would require the reorganisation of these subsidiaries into regional groupings and the development of a regional office to undertake regional production and sourcing, specific R & D and product innovation and brand promotion policies. National activities would thus be rationalised to provide for increasing specialisation in the production of specific goods and value added services in each subsidiary in order to meet corporate strategic objectives[16].The impact of this restructuring would be an increase in intra-industry trade both within the region and on a global scale.

THE GLOBALISATION PROCESS

Changes in the telecommunications equipment sector are illustrative of more general trends in the international economic system. International market growth and the global integration of previously disparate national economies have resulted in substantial corporate organisational changes and restructuring. This has affected the global corporations which dominate the industry world-wide and are now moulding the nature of their Australian operations.

The major factors explaining the growth in the market for telecommunications equipment include regulatory changes in the carrier sector and the geographical expansion of multinational corporate activity (both of which have expanded the size of the equipment market), together with technological innovation and convergence (which have expanded the product range). These factors have opened up major new market segments to both carriers and equipment manufacturers which have become the focus of inter-firm competition. It has also been associated with the rapid integration of national markets into one global telecommunications market. These market changes have forced firms to adopt new organisational forms which facilitate more effective competition.

Regulatory changes in the telecommunications services sector have led to significant restructuring in the equipment manufacturing sector. The telecommunications carrier sector consists of the public and private providers of communications services to the public, public authorities and private corporations involving telephony, or basic voice communications, and value added services. The telecommunications carrier sector operated as domestic State monopolies, until relatively recently, except in the USA where AT&T had a private monopoly until 1984.

By the 1980s, several countries, including Australia, introduced new carriers into their domestic basic services markets. This forced their national carriers to globalise their activities in order to maintain their competitive position. As a consequence, a number of major international carriers have entered the Australian basic voice, reseller, network and value added services market segments[18]. The eventual effect of the new carriers and reseller operations on Telstra's[19] financial performance has yet to be determined and will be affected by its capacity to expand into the regional market.

Equipment supply evolved in a close relationship between national firms and the public carrier in North America, Europe and Japan. The major equipment manufacturers established subsidiaries in foreign markets primarily to meet the domestic demand of national carriers. In most national markets, procurement was opened to outside firms by the mid 1980s, although substantial policy changes occurred in the USA as early as 1968. The consequence of these moves was an increase in the number of equipment suppliers competing in each major market. These regulatory changes facilitated an expansion in market size, range of value added services available and trade, with manufacturers moving towards a more global production and distribution system[20].

The most significant of the factors causing organisational restructuring in the telecommunications industry has been the geographical expansion of the market as a response to the internationalisation of other industrial sectors — particularly manufacturing, transport and finance — which require telecommunications services as a major input into their productive processes to link the various operating centres of the corporation throughout the globe. The demand by multinationals for faster, more secure and more versatile communications systems has resulted in the growth of global transmission networks, private and virtually private networks, innovations in value added voice, image and data transmission, and digitised switching services. Thus the global market has expanded both geographically and in the

range of services provided as a consequence of corporate demand[21].

The combination of satellite and submarine optical fibre cables is upgrading the international communications system and ensuring the connection of all major economic centres to the global network. Optical fibre cable is facilitating the digitalisation of the telecommunications network. Digitalisation greatly reduces unit costs and allows greater capacity in terms of speed, volume, reliability and overall quality of service. It is consistent with the computerisation of telecommunications equipment and the transmission of data and image as well as voice. These factors have resulted in a demand for new services and greatly increased the demand for telecommunications equipment[22]. While optical fibre connections are initially being targeted to the locations of major corporations — that is, CBD districts of major cities — the eventual extension of fibre to home networks will greatly expand the range of communication services available to all units in industrialised societies[23].

The growing corporate demand for more sophisticated communication services facilitated by the digitalisation of transmission lines has provided an incentive for the telecommunications industry to undertake the rapid technological development and new product innovation now characteristic of it. This has been assisted by the development of alternative transmission mechanisms, such as satellites, cellular telephones and microwave, which have proven very effective in overcoming deficiencies in the basic infrastructure services in many developing countries. As a consequence there has been a rapid increase in the demand for such services and equipment in these regions[24]. Australia has been able to develop a technological capacity in this type of product which now forms a substantial proportion of its exports to the Asia Pacific region[25].

The need for consistent corporate global communication systems between subsidiaries, the provision of large scale infrastructure which requires shared use by a large number of services to justify the expense and the need to recover massive R & D costs by large production runs are all creating pressures towards technical consistency for major equipment items. Modern large scale telecommunications systems increase interdependence between component suppliers, technical innovators and the network service users. This increases pressure towards the development of technically compatible components and standardisation within the system[26]. It creates opportunities for large scale production and with it the introduction of cost based competition into the components segment of the industry.

Multinational corporate demand and regulatory changes have caused the rapid geographical expansion of the major carriers and telecommunications service providers throughout the globe, particularly into the newly industrialising regions. This has had major repercussions on the market strategies of equipment manufacturers. Corporate demand for more secure and sophisticated services has lead to technological innovation and a highly competitive environment for equipment suppliers, which in turn has resulted in rapid market growth in the equipment manufacturing sector. As a consequence, those firms are also extending their presence throughout the globe in search of new market opportunities. This forced the major equipment suppliers to abandon their national market focus and move to global

production and marketing strategies over a relatively short period. New market opportunities exist in the newly industrialising regions and in new product development. However, firms need to speed both the innovation and market penetration process in order to capture these opportunities.

The co-existence of rapid product development and growing market demand creates its own problems. "(C)ompetitive advantage in such industries is a function of the rate of increase in knowledge ... . R & D costs and risks are much larger ... . Product life cycles are much shorter ..."[27]. This diminishes the firm's capacity to recoup these expenses and technological rents before that product has been superseded. All these features, it is argued, have caused firms in riskier environments, and in industries experiencing rapid technological change, to utilise alliances as a means of controlling these problems[28]. It has required them to move to a more strategically oriented corporate form as outlined above, including a growing use of collaborative business arrangements[29].

REGIONAL ASPECTS OF GLOBALISATION

Within this process of overall globalisation in the telecommunications industry there have been significant regional variations in growth rates and in the nature of the corporate response. Telecommunications spending only increased by 1.7 per cent in Western Europe and 3.0 per cent in North America between 1991 and 1992. By contrast, it increased by 13.7 per cent in the Far East and Pacific, 20.9 per cent in South and Central America and 33.2 per cent in Africa, although the actual magnitude of expenditure in the last two regions was quite small[30].

Rapid growth in the Asian market is forecast, with an emphasis on the provision of both basic carrier infrastructure and value added services to international businesses. This regional market is expected to grow from $US 60 billion in 1990 to $US 200 billion by the year 2000, making it the fastest growing region after Eastern Europe[31].

Regional expenditure on equipment was $US 18.4 billion in 1990[32] and $US 23.8 billion in 1992[33]. Sub-regional growth rates vary from 9.2 per cent p.a. in ASEAN-Indochina, 7.9 per cent p.a. in Middle East, 6 per cent p.a. in China, 5.3 per cent p.a. in Western Asia, 5 per cent p.a. in Oceania and 4.6 per cent p.a. in the NICs[34]. It is now a major growth market due to the lucrative contracts available in developing countries such as Malaysia, Indonesia, Thailand, Vietnam and China as they upgrade their infrastructure in anticipation of further industrial growth[35].

The competition for contracts to supply public switching and transmission facilities has caused increased activity from international carriers already established in the region, particularly from the USA and the UK. Japanese firms such as NKK have also taken an active interest in this market but with relatively less success in securing contracts[36]. This, in turn has expanded the market for equipment supply contracts which are now being actively competed for by the major European and Japanese firms, many of whom have operations in Australia. North American firms, including AT&T, Motorola and Northern Telecom (NorTel), have a major presence in the Asia-Pacific market, although they are only beginning to establish facilities in Australia.

RESPONSES BY AUSTRALIA-BASED FIRMS

If telecommunications firms are adopting more strategically oriented organisational structures, this should be evident in the rapidly growing Asia-Pacific region. The process should include increasing specialisation in production, growing intra-regional trade and potentially the emergence of regional offices in strategic locations. As Australia had one of the more advanced telecommunication structures in the region, the actions of firms located in Australia should provide a useful case study of the corporate restructuring process. A number of corporate responses, as outlined below, have been identified as evidence of industrial organisational change in Australia.

Outward Expansion

First, firms have tendered for foreign contracts. Most of this activity has occurred in the carrier sector, with Telstra (originally as OTC and Telecom Australia International) successfully securing contracts in Sri Lanka, Pakistan, Cambodia, Philippines, Hong Kong, Thailand, Indonesia, Vietnam, the Cook Islands and Saudi Arabia. Many of these were structured as joint ventures with local partners[37]. Contracts obtained by Telstra have played an essential role in the internationalisation of the local telecommunications equipment industry by providing opportunities for Australian manufacturers to also enter these markets. For example, Telstra's (OTC) ten year contract to supply telecommunications infrastructure to Vietnam has involved more than 60 Australian companies including sales by telecommunications companies such as AWA, MM Cables, Connell Wagner, Ericsson Australia and Philips Australia[38].

Equipment suppliers have also submitted overseas tenders. Ericsson Australia submitted a tender for a large Indonesian contract to supply 350,000 lines of public switching capacity, which it lost to USA and Japanese firms despite being price competitive[39]. In order to improve the capacity of Australian based firms to compete for overseas contracts, the industry recently established the Telecommunications Export Task Force. This forum will be used to help co-ordinate the currently fragmented attempts to pursue contracts in Asia by supporting the formation of consortia of local firms to bid for major tenders against international rivals. Members include Alcatel Australia, AWA and Ericsson Australia. Government support for Australian companies will be given a high profile, including Ministerial leadership of trade delegations and the provision of concessional export finance to local tenders[40].

Secondly, Australian carriers are active partners in major global infrastructure projects. Telstra (initially through OTC) is a 50 per cent partner in the PacRim consortium which links Australia to the USA and Japan via high capacity, high security optical fibre cable[41]. Optus is a partner in the TPC Cable 5 consortium. As a result of these initiatives Australian firms have become major suppliers of optical fibre cable throughout the Asia-Pacific region. The Australian joint venture company Alcatel-TCC, which was formed by Alcatel Australia and other Alcatel subsidiaries, is manufacturing fibre optic cable at Botany Bay for the Tasman 2, PacRim and the recently announced Thailand-Vietnam-Hong Kong cable contracts. MM

Cables, Olex Cabling and Pirelli Cables have used their supply relationship with Telstra (Telecom) to secure overseas contracts to supply optical fibre cable to Thailand, India, Pakistan, Indonesia and China[42].

These factors illustrate the processes by which an outward expansion of the Australian industry into the Asia-Pacific region is occurring. They clearly parallel the internationalisation process in the global economy whereby the Australian carrier sector has actively entered the global market, thus creating opportunities for international activity for its suppliers. A continued regional presence by Telstra and Optus would appear to be essential in order to ensure future expansion in the local equipment supply sector.

Regulatory Change and Market Growth

A third significant area where Australian firms are responding to global change is in the domestic market. The regulatory changes and increased sophistication of the Australian telecommunications market has resulted in an increased investment in Australian facilities. The Australian market has changed rapidly in recent years with significant restructuring of the functions and finances of the national public telecommunications corporation, the entry of Optus in June 1992 and later the granting of the third mobile licence to Arena GSM in December 1992. Other factors which have expanded the Australian market have included the establishment of State Government networks[43], the upgrading of the Defence Forces network[44] and the provision of the "most liberal re-sale regime in the world", which has resulted in at least 16 local providers of discounted services[45].

These regulatory changes have resulted in the entry of a number of new multinational firms into the Australian market. The major carrier entrants include the US firms AT&T, MCI International and Sprint International who have entered via re-seller joint ventures, usually including an Australian partner. BT (Australasia) has also been involved in re-seller projects and successfully bid to establish the New South Wales government network. The new carrier licences resulted in the entry of Bellsouth (USA) and Cable and Wireless (UK) initially with 49 per cent of Optus[46], and Vodafone (UK) as the foreign partner in Arena GSM[47].

Public network contracts and new licences have usually been tied to requirements that the successful firm undertake a significant proportion of local supply for its equipment requirements, and provide substantial local R & D expenditures and training commitments. These arrangements have been paralleled by the entry of most major telecommunication equipment suppliers into the Partners for Development Program. This program is aimed at larger multinational companies which have at least $A40 million in contracts with the Government. Its objective is to increase the presence of multinational companies in Australia by providing them with exceptions to local sourcing requirements in return for a seven year commitment to increase exports to at least 50 per cent of imports and to achieve R & D expenditure of at least 5 per cent of turnover[48]. This scheme has the advantage to firms of allowing them to fully import some products and concentrate their local production in a few activities where they believe they can achieve international competitiveness. It is thus consistent with a global production and distribution sys-

tem but aims to ensure a manufacturing presence for Australian subsidiaries within that system.

Thus there has been an associated expansion of Australian based manufacturing and R & D facilities by multinational firms tendering for these new supply contracts. NorTel and Nokia established local manufacturing activity in co-production agreements with Australian companies. Both have funded local R & D activity at the University of Wollongong[49] and joined the Partnership for Development Program with, for example, Nokia agreeing to achieve $120 million in exports and expenditure of $25 million on local R & D over the next seven years[50]. In addition, both NEC and Fujitsu are expanding Australian production of their private branch exchange equipment, including sophisticated ISDN related systems, purportedly in response to new market opportunities arising as a consequence of these regulatory changes[51]. All these firms are achieving export sales of their Australian manufactured products.

Cost Competitiveness and Local Mandates

The fourth area of interest has been the capacity of Australian firms to be cost competitive with developing Asian countries in the production of mature technology telecommunications products and with Japan and Europe in the more innovative product range. In Australia, production of items such as telephone assembly and printed circuit boards is undertaken utilising advanced automated technologies. Developing countries such as China produce these products using labour intensive assembly line techniques[52]. Firms such as Alcatel and Exicom believe it is possible to produce standardised mature products such as telephone handsets and small business systems competitively in Australia and have successfully exported telephones to the Middle East, North America, Asia and the Pacific[53]. Most multinational firms have found that Australian production costs are competitive with Europe, while NEC has found them competitive with Japan. Australian producers can locally source components at prices which are competitive with their parents[54].

Consequently, local innovations are now being developed in Australia for global distribution. Siemens and Alcatel produced the QPSX under licence; this is a digitalised switching system for metropolitan area networking originally developed by the University of Western Australia in conjunction with Telecom, which became the basic technology in that market niche[55]. Siemens gave its Australian subsidiary a mandate to expand exports in Asia, particularly to Thailand, Taiwan and China[56]. NEC's Australian subsidiary is expanding the range of products produced locally and also has a mandate to establish Australia as a key export platform to the South East Asian market in the telecommunications equipment sector[57]. NEC has incorporated Australian developed software into paging systems and mobile telephones which it is now producing in Australia and exporting to South Korea and Taiwan as well as through other NEC subsidiaries[58]. Ericsson Australia has contracts to supply mobile cellular telephones and radio base equipment to its global network[59].

Thus, while government procurement policies and 'insider' incentives have encouraged firms to establish facilities in Australia, cost competitiveness has been a major factor allowing the evolution of these subsidiaries into production centres

which now supply locally developed and manufactured products through their corporate global distribution networks.

The capacity of Australian facilities to become significant contributors to corporate production and distribution networks critically depends on their ability to develop unique products of world-wide acceptance. Requirements for increased local R & D have been built into all the Partners for Development and new licensing agreements with telecommunications companies. As a consequence, expenditure on R & D by multinationals such as Alcatel, Ericsson and Siemens has increased considerably. Most of their Australian corporate design activity has related to computer linked communication services and software design and development for telephony, paging systems and, to some extent, higher value added services such as video telephones, optical fibre transmission and corporate network services[60]. Nevertheless, a considerable proportion of local research and innovation activity continues to occur within local indigenous firms and research institutions, and this will probably remain the basis of any competitive edge in the local industry.

Successful innovation, especially when flexible manufacturing techniques are being utilised, requires close interaction between the research, production and marketing areas of the organisation[61]. Given the policy requirement for an increased local R & D effort and increasingly more competitive market conditions, Australian research has been oriented towards niche, end user specific products to meet local and regional specific requirements utilising local engineering and software skills. Given the significance of R & D to the strategic position of the firm in the global economy, research into the major 'leading edge' products tends to be centralised in the major industrial locations of the corporation.

Further evidence of the corporate reorganisation process can be found in the response of some companies to establish Asia-Pacific regional headquarters in Australia. Ericsson was the first manufacturer to move in this direction, giving the local subsidiary a mandate to rapidly expand the corporation's Asian presence and prove that the Melbourne facilities can become their Asia-Pacific headquarters. While Ericsson also has factories in Malaysia and South Korea, they are not as well developed as their Australian facilities[62]. Australian governments have promoted the concept of a regional headquarters. When the third mobile carrier licence was granted to Arena GSM, Vodafone (UK) agreed to relocate its Asian-Pacific headquarters in Australia and transfer Australian expertise to its business relationships in India, S. Korea, and Hong Kong[63]. As a consequence of gaining the NSW State network contract, BT agreed to establish its regional centre in Sydney[64].

Thus the Australian subsidiaries of many international companies show indications of moving towards a more autonomous role within the corporate production and distribution system. The development of this role has been facilitated by the capacity of local firms to be internationally cost competitive within specific product areas and to access locally designed software and innovations. Nevertheless, acceptance of a regional role for Australian subsidiaries must be seen as predominantly a response to Government pressure associated with public procurement and licensing arrangements, the full economic implications of which will only become evident in the long term.

Evolution of Strategic Alliances

There is only limited evidence of the local use of strategic alliances, the second major feature of the new organisational structure, and then primarily by indigenous Australian companies in order to strengthen their market position.

Alliances have been used by multinational firms to enter the Australian market. In June 1991, Exicom and Northern Telecom of Canada (NorTel) signed a strategic agreement for Exicom to manufacture under licence and service NorTel products for the Australian market and to export locally manufactured products through NorTel's global distribution network[65]. Exicom recently announced a five year export arrangement worth $30 million in its first year, to supply business telephones to Canada and the USA through Northern Telecom[66]. Nokia, the Finnish multinational, originally entered the Australian market via a joint marketing venture with Datacraft , and now has a collaborative agreement with ERG to locally manufacture Nokia products for the Australian market. Nokia has also established R & D facilities in Australia[67].

Telstra (AOTC) has a policy of seeking long-term supplier relationships for its planned $10 billion of local equipment purchases. These agreements establish a framework for networking which involves ongoing discussion and consultation with suppliers to assist product development. It has also identified areas where Australia has world technical leadership, such as synchronous digital transmission, fast packet (ATM) switching and intelligent networks and systems, as opportunities for Australian firms to jointly develop new products[68]. These agreements have been extended into strategic alliances between carriers and suppliers to build on complementary strengths in research, design and the operation of telecommunications systems as the basis of expansion into the Asia-Pacific region[69].

Intra-industry trade

Changes in organisational structure should be reflected in changes in the pattern of trade. Australian imports and exports of telecommunications equipment have grown substantially throughout the past 12 years. Exports have grown at three times the rate of imports but from a much smaller base. In 1980-81, the Import/Export Ratio was 7.68. In 1992-93, it was 2.31, suggesting a marked improvement in the trade balance over this time. However, the sector remained in substantial overall deficit during this period although this has stabilised and slightly declined since the mid-1980s, in real terms[70].

Australian exports of telecommunications equipment have a strong regional focus, particularly in relation to developing countries within the Asia-Pacific region. The type of product being exported includes optical fibre cable, mobile radio and telephone systems, satellite related equipment and network management. However, mature mass produced items such as telephone handsets are also being successfully exported as an adjunct to obtaining large volumes of domestic output[71]. This pattern illustrates that Australia has specialised in software-enhanced products for regional export, often associated with mobile telephony. Significant development of these products is occurring and Australia has proven a successful innovation centre in this area.

Simultaneous growth in imports and exports is indicative of the increasing internationalisation of this market and, in particular, increasing intra-industry trade. This pattern is consistent with the new corporate structure, as local firms specialise in particular products for local supply and export while importing others through their corporate distribution networks. Specialisation in production within corporate networks will result in increasing imports as the Australian market grows and becomes more sophisticated, thus increasing the demand for high value added services. However, a more decentralised structure provides an opportunity to offset this import growth with increasing exports. A successful production centre strategy should see the trade deficit in this sector reduce over time, correlated with rising overall trade as a proportion of total activity.

IMPLICATIONS FOR ORGANISATIONAL CHANGE

The above analysis of responses to changes in the global market by Australian based multinational subsidiaries can be summarised into three broad indicators as to the nature of organisational change in the local telecommunications industry.

First, there is a clear indication that global equipment manufacturing corporations are beginning to view their Australian subsidiaries as possessing sufficient strategic assets to justify their development as autonomous innovation and manufacturing centres within their global production and distribution networks. However, a number of qualifications must be made to this general observation.

This devolution of activities to Australian subsidiaries is, in effect, a trial process in that the local branches will need to prove their capacity to contribute to the overall system before they become accepted as production centres. The Australian operations will need to establish that they are capable of research and innovation, of producing quality items in a cost effective manner, and that these products are able to secure significant overseas sales through the corporate network. Early indications appear favourable in this regard.

Moreover, while a production centre structure is consistent with multinational firms' global strategies, the decision to establish R & D and manufacturing centres in Australia as distinct from other parts of the Asia-Pacific region has been largely induced by government purchasing and licensing requirements and industry policies, as outlined in the previous section. Nevertheless, if Australian subsidiaries and research units prove their value within the corporate global networks, this role should become permanent. It must be noted that other Asian countries have similar policies in relation to their telecommunications industries. Most require foreign investors to establish local manufacturing facilities and/or joint ventures with local partners as part of the awarding of national telecommunications contracts.

Consequently, unless such operations are protected or subsidised by national governments, they need to export some of the production in order to obtain efficient scales of operation. Thus, this process is likely to accelerate the trend towards specialisation of production within national facilities, with each subsidiary concentrating on producing a limited range of export quality products. Again, this trend can clearly be seen in their Australian operations.

In addition, it must be recognised that the establishment of effective production centres which operate in a manner consistent with Australian government policies brings benefits to global corporations. It provides them with access to the domestic procurement process and to export contracts obtained as part of Telstra's overseas tendering process. It also places them so as to access innovations developed within smaller indigenous firms and research institutions which can potentially be developed into export quality products. Again many examples of these benefits of "insiderism" can be seen in the operations of the Australian subsidiaries. Thus, provided the national Australian economy continues to offer such benefits, global firms will continue the process of developing local production centres and be willing to develop their operations in a manner consistent with Australian industry policy.

The second type of organisational change observed is that there are indications that Australian subsidiaries may also develop a role as the regional headquarters for their corporation in the Asia-Pacific. Ericsson, Vodafone and BT are already moving in this direction, as discussed above. The movement will be improved if Telstra is able to position itself as a major service provider to national governments in the region. This would encourage suppliers to locate in Australia in order to gain access to the flow-on contracts for equipment and value added services.

For Australia to become the regional headquarters for major corporations, it must become one of the major switching nodes within the global communications networks currently under construction. Australia's technical leadership in optical fibre cable and reputation as one of the most highly technologically advanced nations in the region in telecommunications will attract major network switching capacity. However, geographically it is less well located as a regional node than Singapore, Malaysia and Hong Kong. Success in becoming the regional centre will depend critically on Telstra's capacity to expand its regional presence and upgrade its carrier network to meet the capacity requirements of multinational corporations operating in the region. It will also require substantial government support to encourage global carriers to switch their networks through Australia. In this area, the media requirements associated with the Olympic Games can be utilised to upgrade Australia's position within these global networks.

Finally, the type of organisational change occurring within the Australian industry indicates that alliances are being used but are not yet a major feature of the local industry except for Telstra and a number of indigenous firms.

Locally based multinational subsidiaries have not yet been involved in any significant externally oriented alliances in order to expand export sales, although the activities of industry's Telecommunications Export Development Group, leading to the establishment of the export task force, are now moving in this direction.

CONCLUSION

The Australian telecommunications equipment manufacturing industry is tending towards a strategic industrial organisation structure and is developing an improved competitive position within the Asia-Pacific region. The improved export

performance of Australian firms can be directly related to the evolution of corporate organisation whereby the export activity in the multinational subsidiaries occurs predominantly through corporate distribution channels.

Such an organisational structure would be more beneficial for local economic development than the more rigid vertically controlled corporation structure. Firms with this latter organisational form would be more likely to by-pass Australia when developing their global production and distribution systems, on both cost and technology intensity criteria, and thus would be expected to import both consumer equipment and new value-added services and equipment into Australia, with little offsetting export activity.

As outlined above, such a corporate strategy would ignore the capacity of Australian firms to innovate and manufacture some of the product range on a global scale. A production centre structure does not guarantee Australian firms 'international competitive' status in this industry. However, unlike more rigid organisational structures, it at least offers them the opportunity to develop such a capacity and demonstrate the value of the Australian subsidiary to the overall corporate system.

NOTES AND REFERENCES

1. Department of Industry, Technology and Commerce, *Annual Report*, AGPS, Canberra, 1989, p. 25.
2. Bureau of Transport and Communications Economics, Information Paper, 34, *Communication Services in Australia*, AGPS, Canberra, 1990, p. 12.
3. The Allen Consulting Group Pty Ltd, *Australia's Telecommunications Industry*, report prepared for Department of Industry, Technology and Commerce, July 15, 1991, pp. 72-73.
4. Gary Pisano, Michael Russo and David Teece, 'Joint ventures and collaborative arrangements in the telecommunications equipment industry', in David C. Mowery, (ed.), *International Collaborative Ventures in U.S. Manufacturing*, Ballinger. Massachusetts, USA, 1988, p. 23.
5. Alfred D. Chandler, Jr, *The Visible Hand: The Managerial Revolution in American Business*, Belknap Press, Massachusetts, 1977.
6. Alfred S. Eichner, Jr, *The Megacorp and Oligopoly*, Cambridge University Press, New York, 1976.
7. Robert B. Cohen, Nadine Felton, Morley Nkosi, and Jaap van Liere (eds), *The Multinational Corporation: A Radical Approach — papers by Stephen Herbert Hymer*, Cambridge University Press, Cambridge, 1979.
8. Raymond Vernon, *Storm over the Multinationals, The Real Issues*, Macmillan, London, 1977.
9. Michael E. Porter, *The Competitive Advantage of Nations*, Macmillan, London, 1990.
10. Michael H. Best, *The New Competition : Institutions of Industrial Restructuring*, Polity Press, UK, 1990.
11. Porter, *op. cit.* and Kenichi Ohmae, *Triad Power: The Coming Shape of Global Competition*, The Free Press, New York, 1985.
12. See Chalmers Johnson, Laura D'Andrea Tyson and John Zysman, *Politics and Productivity: The Real Story of Why Japan Works*, Harper Business, Berkeley, 1989; Best, *op. cit.*; Martin Kenney and Richard Florida, *Beyond Mass Production: The Japanese System and Its Transfer to the US*, Oxford University Press, New York, 1993.
13. Oliver E. Williamson, *The Economic Institutions of Capitalism*, The Free Press, New York, 1985, p. 281.
14. Pisano, Russo and Teece, *op. cit.*, p. 24.
15. See Kenichi Ohmae, *Beyond National Borders*, Dow Jones-Irwin, Illinois, 1987; Michael E. Porter, *op. cit.*
16. Ohmae, 1985, *op. cit.*, pp. 184-188.

17. Ben Dankbaar, John Groenewegen and Hans Schenk, 'Recent economic developments and the prospects of industrial organisation', in B. Dankbaar, *et. al.* (eds), *Perspectives in Industrial Organisation*, Kluwer Academic Publishers, Netherlands, 1990, p. 3.
18. Evatt Foundation, *Telefuture: Telecommunications Reform in the 1990s*, Final Report, April, 1991 pp. 22-29.
19. The Australian telecommunications services sector has undergone major restructuring following the Ministerial policy statement of May, 1988. This involved the amalgamation of Telecom and OTC International into AOTC in February 1992 and renamed Telstra in April 1993, and the sale of AUSSAT to the second licence holder, Optus. The convention followed in this paper is to refer to Telstra whenever possible but to cite past actions to the actual organisation name relevant at that time. Telstra continues to trade domestically as Telecom.
20. Evatt, *op. cit.*
21. Robin Mansell, Peter Holmes, and Kevin Morgan, 'European integration and telecommunications: restructuring markets and institutions', *Prometheus*, 8, 1, June 1990, pp. 55-56.
22. Christiano Antonelli, 'The dynamics of technical interrelatedness: the case of information and telecommunications technologies', in Dominique Foray and Christopher Freeman (eds), *Technology and the Wealth of Nations*, Pinter Publishers, London, 1993, p. 196.
23. *Australian Business Monthly*, 'The world gets wired', December 1991, pp. 136-137.
24. Mansell, Holmes and Morgan, *op. cit.*, pp. 53-54.
25. *Australian Business Monthly*, *op. cit.*
26. Christiano Antonelli, 'The economic theory of information networks', in C. Antonelli (ed.), *The Economics of Information Networks*, North-Holland, Amsterdam, pp. 13-14.
27. Claudio U. Ciborra, 'Innovation, networks and organisational learning', in Christiano Antonelli (ed.), *The Economics of Information Networks*, North-Holland, Amsterdam, 1992, p. 94.
28. *ibid.*, p. 96.
29. Pisano, Russo and Teece, *op. cit.*, p. 34.
30. *Telephony*, 'Global economy, changing political scene play havoc with spending', 6 January 1992, pp. 21-26.
31. East Asia Analytical Unit, Department of Foreign Affairs and Trade and Austrade, *Australia's Business Challenge: South East Asia in the 1990s*, AGPS, Canberra, 1992, p. 222.
32. The Allen Consulting Group, *op. cit.*, p. 17.
33. *Telephony*, *op. cit.*
34. The Allen Consulting Group, *op. cit.*
35. East Asia Analytical Unit, *op. cit.*
36. *The Economist*, 'Asian telecommunications: no connection', 18 January 1992, p. 68.
37. Australian and Overseas Telecommunications Corporation, *Annual Report*, 1992.
38. *The Australian*, 'Beddall faces hectic schedule in Vietnam', 1 November 1993, p. 15.
39. *The Economist, op. cit.*
40. *Australian Financial Review*, 'New task force on telecommunication', 3 December 1992, p. 5.
41. Overseas Telecommunications Corporation, *Annual Report*, 1990.
42. *The Australian*, 'Export boost from fibre-optic lead', 23 August 1993, p. 13.
43. *Australian Communications*, 'The state network spree', August 1992, pp. 15-18.
44. Stewart Fist, 'Australia's defence communications', *Australian Communications*, December/January, 1992-93, pp. 75 - 81.
45. Mark McDonnell, 'The resale revolution', *Australian Communications*, March 1993, pp. 89 - 96.
46. *Australian Financial Review*, 'Telecommunications survey', 27th April, 1992, p. 34.
47. *Australian Financial Review*, 'Arena GSM slightly favoured', 15th December, 1992, p. 1.
48. Randal G. Stewert, 'Industrial policy', in Christine Jennett and Randal G. Stewert (eds), *Hawke and Australian Public Policy*, Macmillan, Melbourne, 1990, p. 122.
49. *Australian Communications*, 'What's on in Wollongong', October, 1992, pp. 31-34; and 'Arena's third mobile licence', February, 1993, p. 15.

50. *Australian Communications*, 'Alcatel signs PDP agreement', March 1993, p. 10.
51. *Australian Financial Review*, 'Japanese competition spurs local growth', 4th February, 1991, p. 38.
52 Bill Page-Hanify, 'Manufacturing — now dealing from strength', *Australian Communications*, December/January, 1992-93, p. 61.
53. *ibid.*; Exicom Ltd, *Annual Report*, 1992.
54. The Allen Consulting Group, *op. cit.*, p. 45.
55. Stewart Fist, 'Where are metropolitan area networks going?', *Australian Communications*, May 1993, p. 71.
56. Siemens, *Business Report, Australia and New Zealand*, 1992.
57. *Australian Financial Review*, 'Japanese competition spurs local growth', 4 February 1991, p. 30.
58. *ibid.*
59. *Australian Financial Review*, 'Ericsson in $200m export deal', 6th June, 1990, p. 29.
60. *Australian Financial Review*, 'Ericsson shows rivals a clean pair of heels', 21 May 1991, p. 30; *Business Review Weekly*, 'Open networks will give suppliers a boost', 7 December, 1990, p. 17.
61. Michael H. Best, *op. cit.*
62. *Australian Financial Review, op. cit.*
63. *Australian Communications*, 'Arena's third mobile licence', February 1993, p. 15.
64. *Australian Communications*, 'BT claims New South Wales', February 1993, pp. 13-14.
65. Exicom, *op. cit.*
66. *The Australian*, 'Five-year deal gives Exicom line to the US', 16 August 1993, p. 10.
67. *Australian Communications*, 'Nokia-ERG alliance flourishing', April 1994, p. 17.
68. Australian and Overseas Telecommunications Corporation, *AOTC Industry Development Plan*, 1992.
69. *The Australian*, 'Big suppliers win in Telecom strategy', 15 November 1993, p. 16.
70. ABS, Statistics of Merchandise Exports and Imports; Exports and Import Price Indexes (Catalog No. 5. 5434/5, 6405, 6414).
71. The Allen Consulting Group, *op. cit.*