This article examines the advancement of Japanese telecommunications carriers and equipment producers into Asia. Nippon Telegraph and Telephone Corporation (NTT), the leading carrier in Japan, was restricted from entering international markets until recently, and this paper argues that the delay discouraged telecommunications equipment producers from promoting operations in Asia. While telecommunications-related firms gained some benefit in expanding business in Asia through official development assistance (ODA) programs, this advantage lessened as the programs became more open. It is often argued that the Japanese government and businesses collaboratively moved to Asia, but for the telecommunications sector the support from the Ministry of Posts and Telecommunications (MPT) was not influential.

**Introduction**

The movement of Japanese firms into East and Southeast Asia has a long history. The relocation of manufacturing operations began in the late 1960s and early 1970s in the textile and consumer electronics industries. The sharp appreciation of the yen after 1985 triggered a massive outflow of Japanese capital, and East and Southeast Asia became major production bases for Japanese manufacturing firms.

The activities of Japanese corporations in Asia have stimulated research into their reasons for and method of entry, their management style and the impact they have on local economies. Much research focuses on the advancement and development of manufacturing firms in the automobile and electronics industries. In the 1990s these firms formed integrated production networks throughout East and Southeast Asia. There has been a growing body of literature that has explored the development of these production networks and the effect of Japanese investment on the recipient countries and regional economies (Aoki 1992; Ernst 1994; Hatch and Yamamura 1996, 1997).¹

Japanese production networks have come under criticism. Some scholars argue that the keiretsu-based networks that favour steady relationships with suppliers and subcontractors impede non-Japanese firms from entering business relationships and exclude local firms in
recipient countries (Guyton 1995; Hatch and Yamamura 1996). Others focus on the role of the Japanese government in promoting the location of firms in Asia, arguing that Japanese aid, trade and investment are mutually reinforcing, and that the government has given firms an advantage in Asia by providing financial support and creating favourable environments for investment (Lincoln 1993; Arase 1995). Some researchers assert that government support has helped create these vertical production networks (Hatch and Yamamura 1996: 60–1).

This article examines the entry of telecommunications-related industries in Asia. The telecommunications services industry is increasingly regarded as imperative for sustaining economic development and improving society. Asian countries have been promoting the development of telecommunications infrastructure, and have nurtured the industry with mixed policies of protection and liberalisation (Ure ed. 1995; Ure and Vivorakij 1998; Harwit 1998). Foreign carriers from Europe, the United States and Australia have been involved in this development through equity participation in local carriers, and strategic alliances. However, the presence of Japanese telecommunications companies in Asia has not been as prominent, despite Japan’s geographic advantage and success of its manufacturing firms. The article explores why investment from Japanese telecom carriers in Asia has fallen behind that of Western firms and whether investment in telecommunications has differed from investment in other sectors.

This study also highlights the strategies and activities of Japanese telecommunications equipment producers in Asia. Telecommunications equipment is manufactured by the electronics industry. Japanese electronics producers retain competitive edges in semiconductors and consumer electronics production, and consumer electronics producers have established integrated production bases in Asia. Yet, Japanese firms do not have a prominent presence in telecommunications equipment manufacturing. What factors explain this difference? This paper looks at the close commercial relationships Japan’s major telecommunications equipment producers have forged with the leading domestic carrier, Nippon Telegraph and Telephone Corporation (NTT). These firms are highly dependent on NTT for sales of telecommunications equipment and for collaborative research and development (R&D), and therefore NTT’s overseas activities are likely to influence the offshore operations of the equipment producers.

The Japanese government’s aid policy is examined and the article asks how the government’s commitments to its firms’ overseas activities have influenced telecommunications investment. The argument that close collaboration between the government and
business is behind the success of firms in Asia will be examined to judge its validity for the telecommunications sector.

**NTT and Asian markets**

NTT, Japan’s main telecommunications carrier, was established as a public corporation in 1952 and until recently provided only domestic services. Kokusai Denshin Denwa (KDD) had the monopoly on international telecommunications services since 1953. In April 1985, the government abolished all legally approved monopolies in the telecommunications industry. After this deregulation, a number of new common carriers (NCCs) entered the local, long-distance, and international telecommunications markets. Because of market segmentation, however, the corporate revenue of the NCCs has been small compared with that of NTT. The Telecommunications Business Law, which stipulates basic regulation of the telecommunications market, does not include clauses to regulate markets where the NCCs can enter. The market was divided by the Ministry of Posts and Telecommunications (MPT) into local, long-distance, and international, with administrative guidance used to decide the number of firms that would be allowed to enter each market. Although it had been a monopoly, KDD’s corporate revenue was small compared with that of NTT. NTT, as the largest domestic provider, was the only carrier with the size and strength to advance into overseas markets and to compete with other global carriers.

NTT, the world’s biggest telecom carrier in terms of operating revenue, had been prohibited from engaging in international telecommunications services largely because of domestic politics. NTT and MPT had once been one ministry, the Ministry of Communications (Teishinsho). In 1949 the ministry was split into the Ministry of Posts (Yuseisho) and the Ministry of Telecommunications (Denki tsushinsho). The Ministry of Telecommunications changed into a public corporation, Nippon Telegraph and Telephone Public Corporation (Denden kōsha), three years later. Although telecommunication policy was officially under the jurisdiction of the Ministry of Posts (later MPT), NTT virtually formulated it. The position of one of the two lead supervisors in the Telecommunications Administrative Office at MPT was reserved for an NTT official, and major positions for technical officials at MPT were also reserved for NTT staff (Suzumura 1996: 22; Vogel 1996: 139–42). The Diet approved NTT’s budget, investment plans and price changes, and MPT had minimal supervisory responsibilities over NTT. MPT officials therefore had little power over NTT.
By contrast, MPT has been able to exert supervisory influence over KDD, and has had a close relationship with the corporation. MPT's Mutual Aid Association has been the company's leading stockholder, possessing 11 per cent of KDD's stock as of September 1995. The chairman and director of the association are the Minister and Vice-minister of Posts and Telecommunications (Nikkei Bijinesu, 13 May 1996: 10). Furthermore, KDD has accepted quite a few amakudari from MPT and KDD's presidency has often been assumed by retired bureaucrats from MPT. By maintaining the demarcation between domestic and international services, MPT secured the status of KDD as the leading international telecommunications carrier.

NTT was privatised at the telecommunications reforms of 1985 and the principal aim of MPT's policies thereafter was to limit NTT's market power and create a level playing field for the NCCs. There was a long struggle between MPT and NTT over NTT's breakup. MPT wanted to split up NTT and decided that the approval of NTT's international business should be linked to the solution of this issue.

MPT had several times turned down NTT's request to enter the international market. MPT refused to give NTT permission to participate in the privatisation of a Mexico's national telephone company and the privatisation of a mobile telephone service in Brazil (Fransman 1995: 398). MPT also impeded NTT from participating in Synchordia, a British Telecom-initiated alliance to provide telecommunications services to large multinational corporations (Fransman 1995: 400–1).

In May 1992, NTT was allowed equity participation in domestic telecommunications projects in foreign countries if projects were to provide domestic services. After the settlement of NTT's breakup issue in December 1996, NTT was allowed to provide international telecommunications services through establishing subsidiaries. After the partial lifting of the ban on international business in 1992, NTT made inroads into Asian markets. Major Western carriers had already established joint ventures with local carriers, bilateral alliances, and worldwide consortiums. As NTT was a domestic monopoly, it was uncompetitive and had to formulate careful strategies in order to be able to enter fierce international competition. Unlike manufacturing investments, investments in services need a certain level of domestic consumption, and the fast-growing Asian economies were the primary target of NTT's operations. NTT joined a project installing fixed lines in Thailand and Indonesia by becoming a 20 per cent equity holder of Thai Telephone & Telecommunication Company (TT&T) and acquiring a 15 per cent stake of PT Mitra Global Telekomunikasi Indonesia. NTT also obtained equity in the newly created second carriers in the Philippines and Singapore (Table 1).
Although NTT has been actively involved in the telecommunications business in Asia, so have Western carriers. Telecom giants from the United States, Europe and Australia have entered Asia (Table 2) often to support their multinational corporations, which have expanded into the region. Asian countries, which need foreign capital and technologies to develop telecommunications infrastructure, have encouraged this investment.

NTT has been involved in two major projects. The first has been Malaysia’s Multimedia Super Corridor (MSC) project that the Prime Minister Mahathir announced in August 1995.\(^6\) NTT has been involved in this project from the start. After observing NTT’s open computer network system and other multimedia developments, Mahathir asked NTT to collaborate in providing network services in Malaysia and to develop the MSC project (Business Times, 1 November 1996).

NTT formed a joint organisation with Telecom Malaysia, Mimos Bhd. (formerly the Malaysian Institute of Microelectronic Systems) to design the MSC network system. In August 1996 Mahathir announced the seven applications that would be achieved in the MSC. The announcement was based on an interim report drafted by NTT’s project team and its Malaysian counterparts. In May 1997 NTT acquired a 15 per cent share of Cyberview Sdn Bhd., a joint venture developing infrastructure for Cyberjaya. NTT was the only non-Malaysian participant. In addition to Minos, Telecom Malaysia and Sun Microsystems, NTT, as a pioneer company, was given MSC status.\(^7\)

---

**Table 1  NTT’s business operations in Asia**

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Business operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/1992</td>
<td>Thailand</td>
<td>Fixed-line installation in a rural area</td>
</tr>
<tr>
<td>3/1995</td>
<td>Philippines</td>
<td>Equity participation in Smart Communications Inc. (15%)</td>
</tr>
<tr>
<td>10/1995</td>
<td>Indonesia</td>
<td>Fixed-line installation in central Java</td>
</tr>
<tr>
<td>2/1997</td>
<td>China</td>
<td>Joint venture with Shanghai Posts and Telecommunications Administration</td>
</tr>
<tr>
<td>8/1997</td>
<td>Sri Lanka</td>
<td>Equity participation in privatised Sri Lanka Telecom (35%)</td>
</tr>
<tr>
<td>11/1997</td>
<td>Vietnam</td>
<td>Fixed-line installation in Hanoi</td>
</tr>
<tr>
<td>5/1998</td>
<td>Singapore</td>
<td>Equity participation in StarHub (20%)</td>
</tr>
<tr>
<td>8/1998</td>
<td>China</td>
<td>Joint venture with Beijing Telecommunications Administration</td>
</tr>
</tbody>
</table>

**Note**  Figures in parentheses represent equity share.

**Source**  Compiled from *NTT gijyutsu janaru*, November 1998: 8.
A second big project in which NTT is involved is the Asian Multimedia Forum (AMF). The forum was established in June 1997 by seventeen carriers from eight countries and areas: Japan, South Korea, Hong Kong, Thailand, Indonesia, Singapore, Malaysia and the Philippines. This loose corporate group aims to promote the acceptance and implementation of multimedia services application and technologies in Asia. NTT's President, Junichiro Miyazu, was selected as the first president of the forum, and the secretariat was located at NTT's International Division. Miyazu had plans in September 1996 to establish an Asian-wide multimedia forum, but this was before NTT was allowed to embark on international business.\(^8\) In November and December NTT proposed this idea to the major carriers in East and Southeast Asia.

At the time, major Western carriers were split into three mega-groups: Global One – a consortium of Deutsche Telekom, France Telecom and Sprint Corp. of the United States; World Partners of AT&T and others; and Concert (British Telecom and MCI). NTT was reluctant to join any of these consortiums and saw the opportunity to form its own group in Asia, where the Western carriers had not penetrated as deeply.

NTT has cemented its relationships with the AMF’s partners. In August 1997, NTT acquired a 15 per cent share of Asia Internet Holding. This company manages links that

---

Table 2 Major new carriers in southeast Asia and foreign participants

<table>
<thead>
<tr>
<th>Country</th>
<th>Carrier</th>
<th>Business area</th>
<th>Major foreign participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>Telecom Asia</td>
<td>Local, cellular</td>
<td>Nynex (US 14)</td>
</tr>
<tr>
<td></td>
<td>TT&amp;T</td>
<td>Local</td>
<td>NTT (Japan 18)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Satelindo</td>
<td>International, cellular</td>
<td>DeTe Mobil (Germany 25)</td>
</tr>
<tr>
<td></td>
<td>Telkomsel</td>
<td>Cellular</td>
<td>PTT Telecom (Neth. 17.3)</td>
</tr>
<tr>
<td></td>
<td>Excelcomindo</td>
<td>Cellular</td>
<td>Nynex (US 23.2)</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Celcom</td>
<td>Local, international, cellular</td>
<td>Deutsche Telecom (Germ. 21)</td>
</tr>
<tr>
<td></td>
<td>Binariang</td>
<td>Local, international, cellular</td>
<td>US West (US 20)</td>
</tr>
<tr>
<td></td>
<td>Mutiara</td>
<td>Cellular</td>
<td>Swiss Telecom (Switzerl. 30)</td>
</tr>
<tr>
<td>Philippines</td>
<td>Smart</td>
<td>Local, international, cellular</td>
<td>NTT (Japan 15)</td>
</tr>
<tr>
<td></td>
<td>Philicom</td>
<td>Local, cellular</td>
<td>COMSAT (US 16)</td>
</tr>
<tr>
<td>Singapore</td>
<td>StarHub</td>
<td>Local, international, cellular</td>
<td>NTT (20), BT (UK 20)</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses represent equity share of foreign participants.

Source: Compiled from data in Nohara, Kitora and Suzuki (1998).
connect Japan and Asia, and provides international call services as well as offering network information to firms in the region. Telecom Malaysia and the Communication Authority of Thailand (CAT) also acquired equity of the company (Nihon Keizai Shimbun 19 August 1997). This was the first time that NTT has undertaken a joint project with other foreign carriers.

Apart from its decision to rush into Asia, NTT's strategies for international operations have not been clearly formulated. NTT's president Miyazu stated in February 1999 that ‘we have not formulated decisive policies for international telecommunications business because we are still in the warming-up time for the business which would be undertaken for the coming 10 or 20 years’ (Sentaku, March 1999: 96). However, several distinctive characteristics can be seen in NTT's commitments to Asia.

First, NTT's involvement in Asia was sustained by its long record of technical cooperation with Asian countries. NTT has cultivated close relations with Asian governments and carriers through the acceptance of trainees and the dispatch of engineers. NTT dispatched 671 engineers to 51 countries between 1960 and 1996, and invited some 6,400 trainees to Japan between 1955 and 1996 (NTT gijyutsu janaru, August 1997: 24). Asian countries were major partners in these activities. NTT has also implemented technical exchange programs with Asian telecommunications carriers. The carriers NTT selected to form the AMF were from countries it had forged close relationships with through providing technical assistance. This long history of technical cooperation has helped NTT to enter projects in Asia. Fransman argues that a major reason why NTT defeated France Telecom in joining TT&T in Thailand was that NTT had operated an office for technical assistance for 30 years (Fransman 1995: 398).

Second, NTT's strength is its technology advantages. For instance, the AMF is a technology-oriented corporate group aiming to share R&D costs and diffuse common technological standards. Although NTT's standards were domestic, its technological lead is broadly recognised. For instance, NTT developed six out of the nine connectors for optical fibre cables in the world (CIAJ 1996: 45). NTT seeks to utilise its technological capability to penetrate the Asian markets, particularly its multimedia technology. As Miyazu argues, ‘NTT is an amateur in international business, but it is breaking from a mere “telephone operator”. On the other hand, the Western carriers still remain large-scale telephone operators. Accordingly, NTT has a chance to compete with them’ (Sentaku, March 1999: 97). In sharing its high-level multimedia technology with other Asian carriers and creating networks in the region, NTT can compete with its Western rivals.
A third strategy is to create loose tie-ups with Asian carriers, as shown by its commitments to the AMF. Unlike Western consortia, whose objectives are the direct expansion of business, the AMF, an open and loose forum, does not aim to lead to business immediately.\textsuperscript{10} This enables NTT to avoid direct competition with its Western competitors and follows its aim of promoting cooperation through joint commitments.

In summary, NTT could not advance into Asian markets until recently because of government regulation. MPT prohibited NTT from entering international markets because it wanted to limit NTT's power and because of a struggle over its breakup. After the lifting of the ban on international business, it has been actively involved in fixed-line installations and has obtained stock in primary and secondary carriers in Asia. At the same time, NTT has forged technology-oriented, loose relationships with Asian carriers by using its long history of technical cooperation and accumulated expertise in multimedia.

\textbf{Japanese telecommunications equipment producers in Asia}

Japanese electronics firms, which manufacture a wide variety of products, can be classified into three groups: comprehensive electronics producers that manufacture various products ranging from heavy electrical apparatus to semiconductors and telecommunications equipment (Hitachi, Toshiba, and Mitsubishi Electric); computer and communications equipment producers (NEC, Fujitsu, and Oki Electric); and consumer electronics producers (Matsushita Electric Industrial, Sony, and Sanyo Electric). NEC, Fujitsu, and Hitachi are the major telecommunications equipment producers.

Although NTT's advancement into Asia was delayed because of government regulation, the activities of telecommunications equipment producers have not been restricted. Consumer electronics firms have been active in establishing offshore production in Asia. According to a survey by the Electronic Industries Association of Japan (EIAJ), between 1987 and 1991 Japanese firms established 65 bases in Asia for manufacturing consumer electronics, and between 1992 and 1995 set up a further 69 (EIAJ 1996: iv). However, there was little production of telecommunications equipment.

NEC and Fujitsu have bases throughout Asia (Table 3). Fujitsu has eight telecommunications equipment plants in Asia, seven of which were established after 1992. NEC moved to Asia earlier, establishing telecommunications equipment plants in Taiwan in 1958 and in Malaysia in 1973. NEC rushed into the Chinese market in the 1990s, setting up seven plants
Table 3  The establishment of production bases of NEC and Fujitsu in Asia in the telecommunications equipment field

<table>
<thead>
<tr>
<th>Year</th>
<th>NEC</th>
<th>Fujitsu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>2 (China)</td>
<td>1 (India), 1 (China), 1 (Taiwan)</td>
</tr>
<tr>
<td>1993</td>
<td>2 (China), 1 (Indonesia)</td>
<td>1 (Malaysia)</td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td>1 (India)</td>
</tr>
<tr>
<td>1995</td>
<td>2 (China)</td>
<td>1 (China)</td>
</tr>
<tr>
<td>1996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td>1 (Vietnam)</td>
</tr>
<tr>
<td>1998</td>
<td>1 (China)</td>
<td></td>
</tr>
</tbody>
</table>

Source  Compiled from internal documents of NEC and Fujitsu.

to manufacture various products, including switching systems, optical-fibre cables, pagers and microwaves. However, telecommunications equipment production is much smaller in scale than consumer electronics production. For example, in 1996 Matsushita had eight production plants for consumer electronics goods and six for electric parts in Malaysia alone (EIAJ 1996: 181–6).

Figure 1 shows market shares in the production of digital public switching systems (a major telecommunications equipment item) in Asia and Oceania. In 1988 NEC and Fujitsu each had a quarter of the market, but by 1994 their combined share was only 34 per cent. Japanese producers are also weak in the Chinese market. Alcatel, a French telecommunications equipment manufacturer, produced 49 per cent of China’s public switching systems in 1992. Fujitsu and NEC were ranked fifth and sixth largest producers, accounting for 8.5 per cent and 5 per cent of the market, respectively (Ingelbrecht 1995: 203). In cable equipment production, AT&T, Alcatel and Siemens were the big three in Asia and Oceania in 1993, sharing 17 per cent, 15 per cent, and 9 per cent of the market, respectively. The shares of NEC and Fujitsu were 7 per cent and 6 per cent, respectively (CIAJ 1996: 39).

The weak status of Japanese electronics firms in the telecommunications equipment field in Asia is because of several factors. Asian countries adopted Western standards in
telecommunications equipment. For switching systems, the Conference of European Administrations of Parts and Telecommunications (CEPT) and Bellcore of the United States are de facto standards (CIAJ 1996: 44). Japan’s standards have been NTT standards. These were not designed for outside Japan and were not adaptable to overseas markets. Japanese telecommunications equipment producers had to develop equipment specific to overseas markets. For instance, NTT and its equipment suppliers had developed two digital public switching systems, D 60 and D 70, but owing to their extremely high specification, these switches could not compete in price in overseas markets. Accordingly, NEC and Fujitsu developed two entirely separate products, NEAX 61 and FETEX 150, for overseas markets (CIAJ 1996: 24–5; Vietor and Yoffie 1993: 139). In addition, Japanese equipment producers did most of their overseas businesses with Japan’s general trading houses and had therefore had little understanding of local markets and could not respond to market trends (Hayama and Fukui 1996: 11).

A more crucial factor relates to domestic intercorporate linkages. Telecommunications carriers and equipment suppliers have forged close relations because interoperability is crucial in developing communications networks. In Japan, NTT has fostered a family of companies that produced switching equipment, telephones, electric cables, and so on. In
switching equipment, NEC, Fujitsu, Oki Electric and Hitachi have had a considerable and stable share of NTT's business, producing 26.5 per cent, 24.7 per cent, 24.1 per cent and 18.8 per cent of this equipment, respectively, in 1994 (CIAJ 1996: 25).

NTT's business has guaranteed the profitability and growth of these firms. Sales to NTT accounted for almost half of NEC's total sales in 1967 and still constituted one-third of its business in the mid-1970s (Fransman 1995: 332). NEC expanded sales at the same rate as NTT's budget increased, and the guaranteed business allowed NEC to expand into semiconductors and computers (Kobayashi 1991: 41–4) NTT's overall importance declined but in the 1990s NEC still obtained one-fourth of its sales in telecommunications equipment (some 900 billion yen annually) from NTT (Nikkan Kogyo Shimbunsha 1996: 132). Equipment suppliers have worked with NTT at its Electrical Communications Laboratories to develop new equipment and technology. They have also accepted retired NTT officials as high-ranking executives.

The security of being part of NTT's family discouraged Japanese telecommunications equipment producers from expanding business. As Koji Kobayashi, former president of NEC, recalls, 'because NTT had traditionally been NEC's chief customer, the company had had little need for public relations, and our dealings with the market for ordinary industrial or consumer use were weak' (Kobayashi 1991: 33). Since NTT was prohibited from engaging in international business, these firms were reluctant to enter overseas markets without their parent carrier.

In the 1990s, rising competition with Western rivals further reduced the market share of Japanese producers in Asia. The combined share of NEC and Fujitsu in the market for digital public switching systems in Asia and Oceania was over 50 per cent in 1988 but fell to 34 per cent in 1994. The combined share of European and North American producers steadily climbed from 20 per cent in 1988 to 42 per cent in 1990 and to 60 per cent in 1994. In Thailand, until the 1980s NEC held approximately 80 per cent of the public switching systems market, with the rest provided by Ericsson. However, Siemens, Alcatel and Lucent Technologies entered the market, and NEC's share declined to around 40 per cent by the mid-1990s. In Singapore, Fujitsu had been the only supplier of public switching systems, but after the entry of Alcatel, its share dropped to 80 per cent in 1997.

The recent decline in the market share of Japanese telecommunications equipment producers stems largely from the liberalisation of Asian service sectors. In the past, Asian governments limited the number of telecommunications equipment suppliers able to enter
the market. These regulations were gradually relaxed, largely as a way to reduce the cost of developing telecommunication infrastructure. The number of suppliers of public switching systems in Asia countries increased greatly after 1990 (Table 4). Siemens was dislodged as the sole supplier in the Philippines and Indonesia after NEC, Alcatel, and Lucent Technologies entered these markets. Lucent Technologies and Northern Telecom, two North American producers, were particularly active in the region after 1990.

Table 4 Suppliers of public switching systems in major Asian countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Suppliers in 1990</th>
<th>New suppliers after 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>NEC, Ericsson</td>
<td>Siemens, Alcatel, Lucent Technologies</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Siemens</td>
<td>NEC, Lucent Technologies</td>
</tr>
<tr>
<td>Malaysia</td>
<td>NEC, Ericsson</td>
<td>Fujitsu, Alcatel, Siemens</td>
</tr>
<tr>
<td>Philippines</td>
<td>Siemens</td>
<td>NEC, Fujitsu, Alcatel, Lucent Technologies</td>
</tr>
<tr>
<td>Singapore</td>
<td>Fujitsu</td>
<td>Alcatel</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Alcatel</td>
<td>NEC, Fujitsu, Siemens, Northern Telecom</td>
</tr>
<tr>
<td>China</td>
<td>NEC, Fujitsu, Siemens, Alcatel</td>
<td>Lucent Technologies, Northern Telecom</td>
</tr>
</tbody>
</table>


The privatisation of telecommunications operators and the entry of second carriers put Japanese telecommunications equipment suppliers in a bad position. The new domestic carriers often selected Western carriers as business partners and tended favour their foreign partners’ equipment suppliers because of interoperability. In October 1997, for instance, Siemens, a German producer, got a US$6.9 million contract to provide switching systems for Cellular Communication Network Sdn. Bhd. (Celcom) in Malaysia. This contract had much to do with the fact that Celcom, a new common carrier, accepted a 21 per cent equity participation of Deutsche Telecom. In addition, the Asian governments and carriers often require foreign suppliers to show comprehensive commitments including the provision of finance, preferential loans from their home governments, as well as expertise and know-how in technical and commercial planning. The European equipment suppliers have often advantages in this respect.
Although the presence of Japanese telecommunications equipment suppliers is low in Asia, their competitiveness is likely to improve for two reasons. The first is their strength in computer technology. NEC and Fujitsu are both computer producers, and will be able to use their expertise in telecommunications production. The mode of communication is shifting from voice to data communication, and technological and functional boundaries between telecommunications and computing are becoming blurred. Second, NTT’s entry into international markets gives Japanese equipment suppliers advantages in Asian markets. In April 1998 NEC won a 4.6 billion yen contract from Sri Lanka Telecom for installing public switching systems and optical fibre cables after NTT became its equity holder in August 1997 (Nihon Keizai Shimbun, 20 April 1998). A director of Pernac, an NEC-affiliated equipment producer in Malaysia, expressed the hope that NTT would advance into Malaysia.15

The telecommunications equipment field provides a sharp contrast with the consumer electronics field. The consumer electronics producers repeated fierce competition at home in overseas markets, while telecommunications equipment producers were held back from overseas competition by their reluctance to leave their parent firm.

**Official commitments to the Asian telecommunications market**

The Japanese government has assisted economic development in Asia by providing official development assistance (ODA).16 Can the government’s actions provide an explanation for the slower development of telecommunication-related firms in Asia compared with other manufacturing firms? Japanese ODA places a high priority on funding the development of economic infrastructure in the recipient countries. Approximately 40 per cent of ODA has been devoted to infrastructure, including telecommunications infrastructure. Grants and loans have been provided for the development and expansion of communications networks and funding has been granted for technology transfer and personnel training necessary for operating and managing communication systems. However, telecommunications aid has been only a small portion of total ODA (Table 5). In 1996, for instance, ODA loans in telecommunications totalled 45.57 billion yen, or 3.5 per cent of the overall loans, and grant aid was 8.7 billion yen, or 4.5 per cent. The relatively high profitability of telecommunications business has meant developing countries have been able to attract private capital.
Table 5 Bilateral ODA in the telecommunications field 1991–96

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Grant aid (¥ bn)</th>
<th>ODA loans (¥ bn)</th>
<th>Technical cooperation</th>
<th>JOCV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(¥ bn)</td>
<td>(¥ bn)</td>
<td>Trainees accepted</td>
<td>Experts dispatched</td>
</tr>
<tr>
<td>1991</td>
<td>7.94 (7.7)</td>
<td>43.73 (4.6)</td>
<td>527 (6.5)</td>
<td>72 (2.8)</td>
</tr>
<tr>
<td>1992</td>
<td>7.20 (6.2)</td>
<td>20.44 (2.2)</td>
<td>516 (6.2)</td>
<td>80 (2.9)</td>
</tr>
<tr>
<td>1993</td>
<td>7.80 (6.1)</td>
<td>55.72 (5.6)</td>
<td>586 (6.6)</td>
<td>76 (2.6)</td>
</tr>
<tr>
<td>1994</td>
<td>3.20 (2.6)</td>
<td>17.62 (2.1)</td>
<td>527 (5.5)</td>
<td>98 (3.2)</td>
</tr>
<tr>
<td>1995</td>
<td>4.18 (2.2)</td>
<td>23.23 (2.0)</td>
<td>562 (5.4)</td>
<td>80 (2.6)</td>
</tr>
<tr>
<td>1996</td>
<td>8.70 (4.5)</td>
<td>45.57 (3.5)</td>
<td>462 (4.2)</td>
<td>77 (2.5)</td>
</tr>
<tr>
<td>1997</td>
<td>6.92 (3.5)</td>
<td>31.09 (2.9)</td>
<td>534 (4.7)</td>
<td>84 (2.8)</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses represent the respective shares of telecom aid in grant aid (excluding grant aid for debt relief, nonprofit grant aid and grant assistance for grassroots projects), total ODA loans (excluding rescheduling), and overall technical cooperation; JOCV denotes Japan Overseas Cooperation Volunteers.


Japanese telecommunications ODA has been largely directed toward Asia. Asia and Oceania accounted for 67 per cent of loans and 64 per cent of grant aid in the telecommunications and broadcasting field between 1991 and 1995 (Yusei Kenkyujo 1997: 71). The large amount of funds needed for a communications project means it can only be effective when the domestic market is large. While rapidly growing Asian countries can meet this requirement, less-developed countries cannot. The relative importance of the region is apparent in other aid programs concerning telecommunications. Eight out of fifteen development studies and four out of eleven technical cooperation projects between 1991 and 1995 were in Asia and Oceania. The region also accounted for 38 per cent of the total trainees accepted and 50 per cent of experts dispatched until 1995 (Yusei Kenkyujo 1997: 72).

Japanese yen loans have played a substantial role in developing telecommunications infrastructure in Asian countries. Between 1967 and 1995, Thailand, the Philippines, and Indonesia received loans of 67, 46, and 148 billion yen, respectively (Table 6). China also received 96.8 billion yen for telecommunications development between 1984 and 1995. Japan’s loans to the Philippines contributed to the construction of 15 per cent (87,000 lines) of the country’s telephone circuits and Japan funded 5 per cent of China’s long-distance transmission optical-fibre cable. Japanese loans helped construct 73 per cent of the junction networks in Jakarta and 50 per cent of Indonesia’s microwave routes (OECF 1998: 246).
Table 6 Bilateral ODA to major Asian countries in the telecommunications field 1967–95

<table>
<thead>
<tr>
<th>Country</th>
<th>Grant aid (¥ mn)</th>
<th>ODA loans (¥ mn)</th>
<th>Trainees accepted</th>
<th>Experts dispatched</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>9,248</td>
<td>67,304</td>
<td>586</td>
<td>464</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5,451</td>
<td>148,314</td>
<td>398</td>
<td>234</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0</td>
<td>14,841</td>
<td>183</td>
<td>31</td>
</tr>
<tr>
<td>Philippines</td>
<td>785</td>
<td>46,174</td>
<td>312</td>
<td>170</td>
</tr>
<tr>
<td>Singapore</td>
<td>0</td>
<td>1,192</td>
<td>126</td>
<td>77</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0</td>
<td>3,027</td>
<td>86</td>
<td>3</td>
</tr>
<tr>
<td>Cambodia</td>
<td>4,328</td>
<td>0</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>Myanmar</td>
<td>4,635</td>
<td>5,620</td>
<td>102</td>
<td>27</td>
</tr>
<tr>
<td>Laos</td>
<td>4,433</td>
<td>0</td>
<td>63</td>
<td>7</td>
</tr>
<tr>
<td>China</td>
<td>7,302</td>
<td>96,804</td>
<td>284</td>
<td>118</td>
</tr>
</tbody>
</table>

Source: Compiled from MPT’s internal documents.

It is often stated that Japanese ODA advantages Japanese firms as they are able to develop project proposals for the host country (Cronin 1992: 43). Prior to the 1980s, telecommunications services were provided by governments, public entities or highly regulated monopolies. Japanese equipment producers, telecommunications consultants and general trading houses could share a dominant portion of telecommunications-related projects under this system because projects proposed by them were often adopted as ODA projects. After it was allowed to enter the international market NTT also used official funds to advance into Asia. In August 1997 NTT planned to invest 35.4 billion yen in Sri Lanka Telecom to instal fixed lines and received an ODA loan of 10 billion yen (Meakawa and Otani 1997: 38).

However, the role of Japanese firms in ODA programs lessened in the 1990s. Table 7 shows principal holders of yen loans for telecommunications development in China and Indonesia after 1990. Japanese firms are major contractors in both countries. However, in Indonesia local firms won six out of eight contracts, most of which are joint projects with Japanese partners. Tied aid has declined in Japanese ODA.17 In China, AT&T International got a contract for the Hai-nan Dao development project in January 1991. This was because the third yen loan package to China was open to bids from manufacturers outside Japan. This was a notable exception to loans in the telecommunications field, which are normally open only to firms from the donor country (Ingelbrecht 1995: 232).
Table 7  Principal contractors of yen loans in the telecommunications field in China and Indonesia after 1990

<table>
<thead>
<tr>
<th>Project name</th>
<th>Date of approval</th>
<th>Amount of approval (¥ mn)</th>
<th>Principal contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hai-nan Dao development (I)</td>
<td>22/1/91</td>
<td>2,663</td>
<td>AT&amp;T International (US)</td>
</tr>
<tr>
<td>Nine provinces and cities telecommunications network expansion (I)</td>
<td>22/1/91</td>
<td>17,800</td>
<td>Sumitomo Corp./Nissho Iwai/Marubeni Corp. (Japan)</td>
</tr>
<tr>
<td>Qing Dao development</td>
<td>28/3/91</td>
<td>4,034</td>
<td>Sumitomo Corp. (Japan)</td>
</tr>
<tr>
<td>Nine provinces and cities telecommunications network expansion (II)</td>
<td>4/10/91</td>
<td>11,576</td>
<td>Sumitomo Corp./Marubeni Corp. (Japan)</td>
</tr>
<tr>
<td>Nine provinces and cities telecommunications network expansion (III)</td>
<td>15/10/92</td>
<td>14,358</td>
<td>Nissho Iwai (Japan)</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance centre for telephone equipment outside plants (I)</td>
<td>14/12/90</td>
<td>6,537</td>
<td>NTT International (Japan)/PT. Budi Agung Wibawa (Indonesia)</td>
</tr>
<tr>
<td>Microwave network for coastal area (III)</td>
<td>25/9/91</td>
<td>4,057</td>
<td>Japan Telecommunications Consulting (Japan)/PT. Konstel Nusantara (Indonesia)</td>
</tr>
<tr>
<td>Junction network for larger Jakarta area exchange</td>
<td>25/9/91</td>
<td>3,556</td>
<td>Tomen Corp. (Japan)</td>
</tr>
<tr>
<td>Regional telecommunications network in Surabaya and (surrounding areas (I)</td>
<td>8/10/92</td>
<td>2,941</td>
<td>Sumitomo Corp. (Japan)/NEC Nusantara Communications/PT. Humpuss (Indonesia)</td>
</tr>
<tr>
<td>Regional telecommunications network in Surabaya and surrounding areas (II)</td>
<td>4/11/93</td>
<td>8,091</td>
<td>Tomen Corp. (Japan)/PT. Silkar National Ltd/PT. Santosa Asihjaya Ltd/PT. Perkonusa (Indonesia)</td>
</tr>
<tr>
<td>Regional telecommunication networks in larger Jakarta</td>
<td>4/11/93</td>
<td>3,587</td>
<td>Sumitomo Corp. (Japan)/NEC Nusantara Communications/Humpusselektronika (I) (Indonesia)</td>
</tr>
<tr>
<td>Regional telecommunications networks in larger Jakarta (II)</td>
<td>29/11/94</td>
<td>13,766</td>
<td>Japan Telecommunications Consulting (Japan)</td>
</tr>
<tr>
<td>Maintenance centre for telephone equipment outside plants (II)</td>
<td>29/11/94</td>
<td>1,627</td>
<td>Graha Kemang Sentosa/Primantara Persada (Indonesia)</td>
</tr>
</tbody>
</table>

Notes: Publication of the contractors’ names is subject to the approval of recipient countries. Names of contractors listed above received contracts amounting to more than 100 billion yen or equivalent value for consulting services, or 1,000 million yen or equivalent value for others. Contractors under the OECF Commodity Loan and the Two-Step Loan are not listed above.

Source: Compiled from OECF, Annual Report, various years.
MPT’s support for telecommunications carriers and equipment suppliers has not been conspicuous and relations between MPT and telecommunications equipment producers are limited largely because these producers are under the jurisdiction of the Ministry of International Trade and Industry (MITI), which has had repeated jurisdictional conflicts with MPT over the value-added network (VAN) services and other issues.

MPT maintains a close relationship with the Research Institute of Telecommunications and Economies, which conducts research on the development of telecommunications and postal services, and has sent officials to the overseas offices of the institute. However, the main objective of the overseas offices is to collect information about new government policies and strategies of major carriers. Therefore, most offices are located in Europe and America, and Singapore has the only office in Asia. This makes a sharp contrast to MITI, which collects information about overseas industries and economies through a number of branches of the Japan External Trade Organisation (JETRO). 18

Significantly, Japanese business and government set up a collaborative system to promote the personal handy-phone system (PHS), learning from the European success in developing and diffusing the global system for mobile communications (GSM). 19 In June 1996, the Association of Radio Industries and Business (ARIB), an MPT-affiliated organisation, initiated the establishment of the PHS Memorandum of Understanding group. The group comprises domestic and foreign operators and equipment suppliers, as well as those holding industrial property rights related to PHS or those interested in PHS technology. The major objective of the group is to sustain various activities to promote the international diffusion of the PHS. In April 1998, MPT also organised a study group for promoting foreign operations of private firms in the telecommunications and broadcasting fields. The group aims to discuss problems regarding foreign operations and the existing official assistance systems.

In summary, the Japanese government has helped Asian countries to develop telecommunications infrastructure through the provision of funds and technical cooperation. Japanese telecommunications-related firms have been able to develop their business in Asia by utilising the government’s ODA programs, but this opportunity is declining as the ODA programs have lower tied aid ratios and now adopt an open-bid method. In addition, MPT’s support for the advancement of Japanese carriers and telecommunications equipment producers into Asia has not been substantial.
Conclusion

This article examines the advancement of Japanese telecommunication carriers and equipment producers into Asia, and the Japanese government’s involvement in this move. Previous studies of Japanese firms in Asia have tended to focus on the manufacturing sector. Manufacturing firms have been major investors in Asia and have contributed to the region’s rapid industrialisation. However, the study of other sectors adds much to our knowledge about how Japanese firms operate in Asia, and about their influence on the host countries.

Japan’s main telecommunications carrier, NTT, was late to enter Asian markets and was behind its Western competition because of government regulation. MPT prohibited NTT’s international business because it wanted to limit NTT’s market power and because of the confrontation over NTT’s breakup. NTT has become actively involved in telecommunication business in Asia through installing fixed lines and by obtaining equity in local carriers. It is establishing an influential status in Asia because of its high technology and expertise in multimedia.

Japanese telecommunications equipment producers have not established a solid base in Asia either. The difference in adopted standards between the home and Asian markets and the close linkages with NTT affected the weak performance of the Japanese producers.

The telecommunications equipment sector makes an interesting comparator with the consumer electronics field. This study shows that domestic intercorporate linkages have a critical influence on overseas activities of industries and firms. The difference in domestic linkages has led to diverse strategies and operations even within the same industry or firm.

The study of Japanese telecommunications equipment producers in Asia reveals lessons for international competition. As Vietor and Yoffie (1993) argue, major telecommunications equipment manufacturers from the United States, Japan and Europe each dominate their home market. Asia is growing rapidly and is a major telecommunications market. It boasts five of the world’s ten fastest growing telecommunications markets in terms of fixed line growth: China, India, Indonesia, Thailand and Malaysia (Ingelbrecht 1995: 195). Accordingly, Asian markets are crucial to Western equipment manufacturers (Froot and Yoffie 1993: 151). As this study demonstrates, Japanese telecommunications equipment producers were held back by their domestically oriented strategies. However, they might gain competitiveness by utilising their edge in computer technology as NTT penetrates Asian markets more deeply.
Previously, Japanese telecommunications-related firms penetrated Asian markets through Japan’s ODA programs. However, the liberalisation of the telecommunications industry reduced the scope of the ODA programs, and rising demands on foreign suppliers for packaged finance and preferential official loans put Japanese firms at a disadvantage. This case study demonstrates different aspects of how the relationship between business and government has influenced the move to overseas markets. In the manufacturing industry, the private sector and MITI collaboratively promoted local production in Asia. MPT provided almost no support for the overseas operations of NTT and telecommunications equipment producers, and long opposed NTT’s advancement into overseas markets. The lack of cooperation between the public and private sector put the Japanese telecommunications carriers and equipment producers at a disadvantage in competing with their Western rivals.

Notes

1 Production networks are ‘arrangements that link a multitude of producing units in different countries so as to provide all components, materials, and management for the assembly of a particular product’ (Bernard and Ravenhill 1995: 171).

2 DDI Corp., Japan Telecom Co., and Teleway Japan Corp. entered the long-distance telecommunications business, while International Digital Communications Inc. (IDC) and International Telecom Japan Inc. (ITJ) began to provide international services. Local call services were provided by subsidiaries of regional electricity companies, and cable television operators Titus Communications and Jupiter.

3 In 1997, NTT’s revenue was 9.45 trillion yen. The revenue of DDI Corp., the second largest carrier, was 1.18 trillion yen, followed by KDD-Teleway (0.47 trillion yen) and Japan Telecom (0.41 trillion yen) (Nihon Keizai Shimbun, 9 August 1998).

4 Amakudari (literally ‘descent from heaven’) is a custom whereby bureaucrats descend after retirement into high positions in industrial associations or companies. Bureaucrats, through amakudari, exert influence on industries and companies.

5 The NTT reform issue was first taken up by the Second Provisional Council on Administrative Reform (Rincho) in 1982. The Rincho report recommended the privatisation and breakup of NTT but only the privatisation was implemented in 1985. The Telecommunications Council issued reports in March 1990 and February 1996 to recommend the breakup of NTT, but the issue was postponed largely due to political considerations.

6 The MSC is a 750 square kilometre commercial corridor being developed at south of Kuala Lumpur. The corridor will include two of the world’s first smart cities. One is Putrajaya, a new administrative centre where the concept of electronic government will be introduced. The other is Cyberjaya, an intelligent city comprising multimedia industries, R&D facilities, a multimedia university, and an operational headquarters.
for multinational corporations wishing to use multimedia technology to direct their worldwide manufacturing and trading activities.

7 MSC status offers access to world-class physical and information infrastructure, unrestricted employment of workers and freedom of ownership.

8 Interview with Norihiko Ohkubo, Senior Manager, NTT Global Business Headquarters, September 1997, Tokyo.

9 NTT vice-president Masanobu Suzuki explained this orientation at the inaugural meeting of the AMF, stating that 'When comparing projects in various countries, we have found a number of similarities in concepts and technologies. Many of these projects can be carried out more efficiently by collaborating, sharing mutual experiences, and jointly developing technologies and applications' (Newsbytes, 11 July 1997).


11 Interview with Akihisa Ariga, General Manager, NEC Corporation, March 1998, Tokyo.

12 Interview with Toshitaka Ezoe, Senior Manager, Fujitsu Limited, December 1998, Tokyo.

13 Interview with Toshiyuki Yasuda, Resident Director, Pernac Corporation, March 1998, Kuala Lumpur.

14 Interview with Akihisa Ariga, General Manager, NEC Corporation, March 1998, Tokyo.

15 Interview with Toshiyuki Yasuda, Resident Director, Pernac Corporation, March 1998, Kuala Lumpur.

16 Japanese ODA is classified into subscriptions and contributions to international organisations, and bilateral aid. Bilateral aid is further divided into grants – comprising grant aid, technical cooperation and subsidies for nongovernmental organisation (NGO) projects, and loans – including project loans, nonproject loans, and debt rescheduling.

17 The ratio of tied aid to total bilateral aid was 11.5 per cent in 1993. This was the fourth lowest among all 21 member states of the Development Assistance Committee (DAC) (OECF 1996: 76–7).

18 As of 1998, JETRO had 80 offices in 58 countries with some 700 staff. Seventeen offices were located in the Asia-Pacific region.

19 The GSM system is a de facto standard for the digital cellular service system. It is widely adopted by 38 countries in Europe and 86 countries in the rest of the world (Asahi Shimbun, 4 January 1996). The success in diffusing the GSM system sprang largely from cooperation among telecom carriers, equipment suppliers, and relevant government organisations to develop a European-wide system, aiming at the future international expansion.

20 For instance, domestic producers had 94 per cent of public switching systems markets in Japan, 90 per cent in the United States, and 83 per cent in Europe in 1994 (CIAJ 1996: v).
References


CIAJ (Communications Industry Association of Japan) (1996) Tsushin kiki sangyo no kokusai kyosoryoku ni kansuru chosa kenkyu hokokusho (Survey report on international competitiveness of the telecommunications equipment industry), Tokyo: Kikai shinko kyokai keizai kenkyujo.


EIAJ (Electronic Industries Association of Japan) (1996) 96 Kaigai hojin risuto (The list of overseas subsidiaries in 1996), Tokyo: EIAJ.


Previous Pacific Economic Papers

295  Free trade champion? Australian views of the US crusade against Japan
     Julia Lowell, September 1999

294  Governance and Australian financial institutions
     Kevin Davis, August 1999

293  The changing climate for foreign direct investment into Japan
     Peter Drysdale, Ray Trewin, Toshi Naito and Dominic Wilson, July 1999

292  The Japanese origins of PAFTAD: The beginning of an Asian Pacific economic
     community
     Takashi Terada, June 1999

291  Not just a question of multilateral free trade: Australia’s bilateral trade
     liberalisation agenda towards Japan
     Jamie Anderson, May 1999

290  Perspectives on Japanese investment, employment and management in Australia
     Roger Farrell and Peter Drysdale, April 1999

289  Predicting banking crises: Japan’s financial crisis in international comparison
     Michael Hutchinson and Kathleen McDill, March 1999

288  Japan’s financial reform Volume I
     Hugh Patrick, Takatoshi Ito, February 1999

287  International trade and environmental policy: how effective is ‘eco-dumping’?
     Xinpeng Xu, January 1999

286  Open regionalism going global: APEC and the new transatlantic economic
     partnership
     Andrew Elek, December 1998

285  Realism and postwar US trade policy
     John Kunkel, November 1998

284  Attracting FDI: Australian government investment promotion in Japan, 1983–96
     Jamie Anderson, October 1998

283  The Multi-function polis 1987–97: an international failure or innovative local
     project?
     Paul Parker, September 1998

282  Organisation, motivations and case studies of Japanese direct investment in real
     estate 1985–94
     Roger Farrell, August 1998
Japan’s approach to Asia Pacific economic cooperation
Peter Drysdale, July 1998

The politics of telecommunications reform in Japan
Hidetaka Yoshimatsu, June 1998

Sustainability of growth in the Korean manufacturing sector
Chang-Soo Lee, May 1998

Export performance of environmentally sensitive goods: a global perspective
Xinpeng Xu, April 1998

Modelling manufactured exports: evidence for Asian newly industrialising economies
Francis In, Pasquale Sgro and J ai-Hyung Yoon, March 1998

Laos in the ASEAN free trade area: trade, revenue and investment implications
Jayant Menon, February 1998

Globalisation
Heinz Arndt, January 1998

Annual subscription rate for twelve issues:
Individuals A$60.00
Institutions A$100.00

Cost for single issues:
A$15.00
A$10.00 (Students)

All prices include postage

Available from: Publications Department
Australia–Japan Research Centre
Asia Pacific School of Economics and Management
The Australian National University
Canberra ACT 0200, Australia
Facsimile: (61 2) 6249 0767
Telephone: (61 2) 6249 3780
Email: ajrc@anu.edu.au
URL: http://ajrcnet.anu.edu.au/