

Location and Role of Foreign Firms in Regional Innovation Systems in Japan

SCHLUNZE, Rolf D.*

Abstract

The problems of regional innovation systems in a phase of globalization and the challenges of multinational corporations were critically reviewed. Obstacles and the potential contribution of foreign firms in Japanese learning regions and industrial clusters were identified. This investigation examined the hypothesis that the location of R&D activities impacts organizational and managerial characteristics. A questionnaire survey was conducted on a sample of 185 foreign manufacturing companies with R&D activities in Japan. Forty eight percent replied resulting in thirty eight questionnaires that could be analyzed. The results clearly showed that most of the R&D organizations adapted to the local business environment. To conclude, foreign firms embedded their R&D activities foremost in the two regional innovation systems that exist in the Tokyo-Kanto and the Osaka-Kansai area. Foreign firms needed to embed their research activities in industrial spaces where a dynamic innovation milieu and the sphere of international business overlap. In summary, it was argued that the role of the foreign firms is to add the "spice" to the Japanese innovation systems needed in the process of globalization. Finally, implications regarding how to embed foreign firms and how to open up regional innovation systems were given.

Keywords:

FDI, R&D, Japan, inward investment, locational decision making, embeddedness, adjustments

RITSUMEIKAN INTERNATIONAL AFFAIRS Vol.6, pp.1-25 (2008).

* Professor, Faculty of Management, Department of International Management
e-mail: drrds309@ba.ritsumeikan.ac.jp

INTRODUCTION

In contrast to the policy advice of other researchers to build innovation systems to strengthen the domestic industry, the author argued that without the involvement of global players, a regional innovation system (RIS) can hardly be competitive in a globalizing world. Domestic firms and institutions need to link to global markets and the involvement of global players in the innovation creation process is also essential.

The process of internationalization of individual corporations and entire regions linked to the world economy has brought a development that is often not correctly perceived: the emergence of global players seeking geographic proximity to local, indigenous firms within regional innovation systems to promote their innovative activities globally. Innovative activities are of course associated with regional clusters of high-tech industry but it is a misperception that the role of multinational corporations in regional innovation systems is not important to the development of the domestic industry. The problem is not that they are “footloose” multinational corporations “cracking” the geographies or characteristics of the national or regional innovation system but how these multinational corporations plant their “feet on the ground”. The concern of regional promoters should be how innovation activities of foreign firms can be favorably embedded into the regional innovation and learning systems. Especially the local government needs to draw into consideration the fulfillment of mutual interests when setting up inward investment promotion programs. This mutual interest is achieved when regions are linked up to the global innovation system abroad and the MNE manages to embed its R&D activities in the local community of innovation creators.

Geography matters also in a globalizing economy, thus multinational firms need to consider location as an important determinant of their business strategy since it is a long term element of the marketing mix¹⁾, and cannot easily be changed even by a multinational investor.

Cooke (2003, p.33) underestimates the potential role of multinational firms when he states that “FDI ... contributes little to regional innovation capability though it may assist learning by local suppliers if they can access the supply chain”. Multinationals do not only conduct manufactur-

1) Other variables of the marketing mix are price, product and promotion which can adjusted to short-term strategies of the corporation.

ing activities. Even in the case of manufacturing investment, it is unlikely that interactions occur only with suppliers. However, the key problem was mentioned: access! It is a difficult task, also for multinationals, to establish the access necessary for success in a foreign business or learning environment.

“Regional innovation systems were .. defined as interacting knowledge generation and exploitation sub-systems linked to global, national and other regional systems for commercializing new knowledge” (Heidenreich 2004, p. 363). An important question to be discussed is if Japanese innovation systems are competitive and to what degree foreign research contributes to the competitiveness of those innovation systems. To learn about the answer we need to study the elements of innovation, interactive and intercultural learning, trust, proximity, embeddedness of foreign companies in the Japanese business environment, their cognition, tacit and codified knowledge exchange with other institutions, such as universities, local companies, other research establishments and customers. These elements and their ways of co-operation and collaboration underlay the successes of foreign multinationals in the Japanese economy. Socio-spatial interactions in foreign economic affairs demand special skills that are not easily achieved neither by the host economy nor by the foreign investor. So, foreign companies doing research in Japan are also confronted with human resource problems not only to conduct research with good researchers but also to initiate and control the research process.

Foreign multinationals’ global sourcing is often seen as having little concern for the “soft infrastructure” of the host location (Cooke 2004, p.7), but actually multinationals are aware of the fact that the location strategy needs to be decided with a long-term perspective. Therefore, socially responsible multinational corporations tend to seek mutual interest connecting them with the host location. The co-operation of the local community becomes crucial for their business success when interdependency is available for embedding their research activities in the regional innovation systems. It should be in the interest of the foreign company to contribute to the maintenance and enlargement of the international business community. Those community relations are very important, not only for business exchange but also for the amenity of the expatriated managers and their families.

Cooke indicated that the structure of innovative activity is two-dimen-

sional, in which governance infrastructure and the business structures are constitutive. Japan was characterized as a local, *dirigiste* like regional innovation system (Abe, 2004). Here, technology transfer activities are initiated from outside the region, from the central government in Tokyo. Initiation of actions is a product of the central government. Funding is largely centrally determined. Local RIS tend to be dominated by large indigenous firms and relatively few branches of externally-controlled firms. However, most Japanese prefectures' industrial structures are characterized by small and medium-sized enterprises (SMEs). Since the Technopolis policy was abandoned as a failure and the electronics industry has been hollowed out by translocation to China, the Japanese government established a regional cluster policy. These policies do not focus on the promotion of domestic industry only but also welcome the contributions to innovative activities of foreign firms in the cluster of health industry in and around Sendai City, and in the biotech industry cluster emerging in Osaka and Hyogo-Kobe. Therefore, we may expect that the local, *dirigiste* RIS of Japan will shift towards a more networked and interactive RIS as found in Baden-Württemberg, Germany (Heidenreich and Krauss, 2004).

Abe (2004) indicated regional problems for Northern Japan that can be also found in other prefectures. One problem leading to a dilemma in provincial areas is the brain drain of university graduates. Young researchers and managerial talents capable of working for an international firm are moving into the Tokyo metropolitan area. Compared to the main three metropolitan areas, Tokyo, Osaka and Nagoya, the concentration of private R&D, the level of patent applications shows a poor performance for most provincial regions. Most headquarters and R&D activities of domestic and foreign companies are located in Tokyo. Even if those companies have research facilities in the provincial locations they keep close links with the corporate headquarters and other research institutions located in the Tokyo metropolitan region. The location of R&D establishments shows an unbalanced distribution: Two-thirds of the national R&D establishments are concentrated in the Tokyo metropolitan region and half of the private R&D in the Tokyo and Osaka metropolitan regions. However, justified fears exist that the "hollowing out" will not only affect manufacturing but also R&D in the provincial areas.

What was original in the design of Technopolis is still warranted: up-

grading the entire industrial structure to the level of knowledge-intensive industries and thereby enhancing Japan's international competitiveness. One popular consideration is, if Japan could attract knowledge-intensive inward investment, it would also ease international trade frictions. This research work will show that the role of foreign firms in regional innovation systems reach further and is not limited to such a mercantilist view.

In 1999, the Prime Minister argued that Japan must change from an "equity and equality" to an "efficiency and fairness" society. These changes should enable institutions to realize true cooperation among industry, academia and government and led in the year 2000 to the Industrial Technology Enhancement Law. This law can also be seen as an important step providing foreign companies with a fair business environment where they can use their competitive advantages stemming from superior efficiency as indicated in the Fukao Report²⁾.

Recently, technology policies have come to focus more on the need to facilitate and promote the region's endogenous potential and regional networks. In 2001, not only international competitiveness but also sustainable development was emphasized in the S&T Basic Plan. The regionalization of governmental innovation policy is characterized by a) geographic specialization and cluster formation, b) favoring growth sectors and c) locations that help to maximize the national competitiveness. Abe (2004, p.281) pointed out that the cluster program is again technocratic in nature and does not encourage investors to push their horizon toward a vision of a hopeful future. Another problem for the regional cluster strategy is that in the governmental system, each prefecture tends to be independent and rather competitively seeking for subsidies, instead of co-operating with each other. For a successful implementation a regional innovation system, a regional government would be more effective than a regional bureau of the central government. The central government is not believed to achieve that level of co-operation and collaboration among local and global players necessary for a successful working regional innovation system. Abe concludes that local-regional innovation systems are still fragile in Japan. He advocates self-monitoring practices to fit the new situations, and building social capital for collective innovation activities.

Since innovations are not seen anymore as occasional breakthroughs

2) Fukao Report (2003) URL: http://www.accj.or.jp/document_library/FDI/1067586167.pdf
(22 June 2004)

but as systematic and distinctively regional, multinational corporations locate their R&D activities where pools of talent in science and technology and entrepreneurship are concentrated. Certain cities in Japan became carriers of this new globally linked economy rooted in the biotechnology, information and communication technology and overlapping with financial and cultural services. These industries account for what has come to be called the knowledge economy (Cooke, 2004).

Forslid and Midelfart (2002) stated that “In a globalized world a government has to take into account by whom the rents generated in an industrial cluster are received: locals or foreigners?”³⁾ Such an attitude towards foreign business is not helpful in promoting the industrial development on an international level but creates fear of control by foreign capital. Lately, the Japanese government has realized that the globalization process cannot be completed without foreign investment. In a phase of globalization, FDI helps to stabilize regional development. There is far too little foreign investment in the research sector in Japan relative to the capacity Japan holds in innovation creation.

Although Japan is obviously not a developing country, FDI in Japan has been often seen as risky and impractical by European and American investors. This is due to the fact that trade and investment have been restricted for a long time and in some phases and cases also prohibited. Iwata (1994) showed that the Japanese business environment is different and therefore has been an obstacle to foreign companies doing R&D in Japan. This led to the conclusion that foreign direct investment outside of Europe and North America was considered to be particularly risky and of limited value (Audretsch, 2003).

Exposure to foreign competition increased in every single OECD country, but until recently not so much in Japan. Initially unwanted, but now very much demanded by the Japanese government is the contribution of foreign direct investment to increase efficiency and international competitiveness of corporations within Japan.

A high cost level country, Japan faced pressure to create comparative advantages by knowledge based economic activities when these advantages shifted out of traditional industries, such as steel industry, ship building, automotive manufacturing and electronic consumer goods, where high wages and high levels of employment could not be expected anymore.

3) Cited by Bröcker et al. 2004, p.2

The Japanese government realized that the emerging comparative advantages are compatible with high wage levels and employment based on innovative activity. Therefore, FDI in information technology (IT) and R&D are very much welcomed and needed.

Foreign multinationals have increasingly invested in research and development (R&D) in Japan. Together, 197 foreign firms with R&D activities created a total employment of 228,943 and employed on average 121 technicians and researchers per firm, among them usually up to six foreign R&D staff members. It is estimated that they created a labor market for at least 12,000 researchers within Japan.⁴⁾ Where are the locations with foreign R&D activity in Japan? How do they relate to upstream and downstream activities within the corporate organization? Are their R&D activities integrated in the regional innovation system?

To the knowledge of the author there is no geographical research about the location of foreign R&D in Japan, although there has been significant work on technological innovation and R&D activities of Japanese firms in Japan and abroad (Mizuno 2001; Schlunze 1991, 2000; Taira 2005, Yamamoto and Matsubara 2000). From the management and marketing perspective several researchers investigate reasons and changes of foreign R&D in Japan (Kamago 1992; Nemoto 1992; Imano 1993; Iwata 1994). Iwata described the actual situation of globalizing R&D or classified R&D institutes in the context of a framework of global synergy of R&D activities.

However, his results basically state that the Japanese management environment is very different and can therefore become an obstacle to foreign companies. Therefore, the collaboration with Japanese companies, universities and national research organizations needs to be improved; meanwhile foreign companies need to embed their research activities in a learning infrastructure for innovation creation (Nakahara 1991; Tomozawa 2002).

Camagni (1991) defined the “innovation milieu” as a local environment creating innovations. “Learning region” emerges where product innovation is concentrated and where an advanced technical infrastructure supported by knowledge-intensive industries exist (Feldman and Florida 1994). “Collective learning” can be promoted by the mobility of skilled workers in the local labor market; spin-offs from companies, uni-

4) Own calculation based on Toyo Keizai data and the results of this questionnaire survey.

versities and public research institutes, and by formal and informal networking among SMEs (Keeble and Wilkinson 1999). These three concepts try to describe the same phenomenon, the process of knowledge creation from a spatial perspective. Here, local actors, framed by an informal network and a common cultural, mental and political background, are required to build up a relationship of trust in order to create an innovative milieu. Nevertheless, for a globalizing economy, such as Japan, only a permanent extension of the network and a successful interconnection to external actors is needed to make continuous growth possible.

Collective learning means to have local tacit knowledge in common. According to Cooke (1998), companies can create innovation by cooperation rather than by competition within a region. Therefore, participation of foreign multinational's R&D in Japanese innovation systems remains in high demand. Interacting with outsiders or foreign corporations creates a chance to widen the learning network. Where a cultural environment and a complex relationship of mutual trust exist among economic actors, it is easier to learn mutually for innovation creation. In a period of globalization it is important to establish an international environment that provides mutual learning on a cross-cultural level through the cooperation of foreign R&D organizations.

Yamamoto emphasized that tacit knowledge does not necessarily need to be fixed in a certain place. It can be transferred not only by spatial proximity, but sectoral proximity can give actors the possibility of easier transfer of tacit knowledge (Yamamoto, 2003). Strong mutual trust and understanding as well as common values or a shared culture are needed to transfer tacit knowledge. Foreign companies need to be located in Japan and be embedded in Japanese society therefore to receive and transfer knowledge. If foreign companies want to embed their R&D activities in a learning region, they need to bore through the "institutional thickness." They need to learn the rules of the local environment to an extent that the regional advantage becomes their own advantage. For this purpose foreign companies need to facilitate their organizational learning from the level of the local production site to the headquarters controlling the entire overseas organization. Upstream and downstream activities are important sources and inspire the innovation creation process of a company.

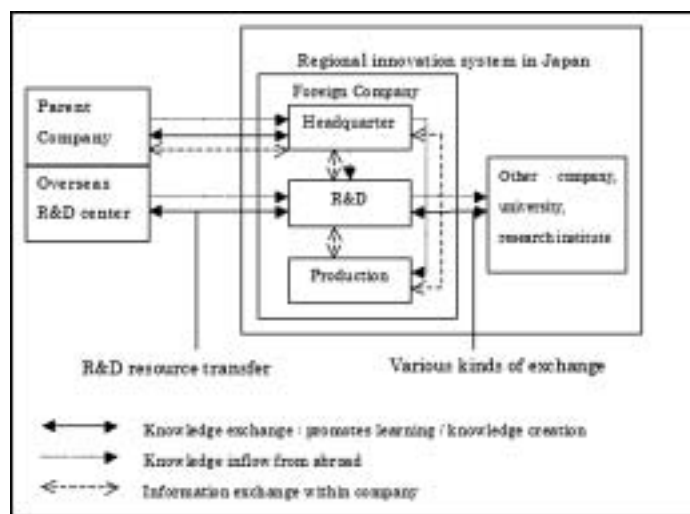


Figure 1: Foreign R&D investment and regional innovation systems

“When actors [of a region] are open to the outside world, knowledge creation will be more active” (Yamamoto 2003, p. 44). We expect that from the perspective of a Japanese firm, a foreign company is seen as an “outsider.” However, since foreign companies have got “linkage to the outside” a relationship with a foreign-affiliated company can provide knowledge of a foreign country or countries. As shown in Figure 1, exchange between the inside and outside of an industrial cluster could be promoted by foreign-affiliated companies operating within a regional innovation system in Japan.

Recently within management science, and also geography, the embeddedness of MNEs has been discussed by several researchers (Phelps et al. 2003; Hemmert, 2003; Schlunze, 2004). Phelps examined key indicators of MNE embeddedness, such as the corporate status and functions, R&D activities, the supply chain and local purchases, skill and training demands and repeat investment, and access to the influence of regional agencies on the embeddedness process. Their results showed that embedded MNE’s operations are partially or fully integrated through the co-existence of upstream (R&D) and downstream (sales and marketing) functions.

Granovetter’s embeddedness approach (1985) is based on the central fact that all economic behavior is fundamentally socially embedded. The embeddedness school is fully discussed by Onias (1996) and divided into

two groups: one centers on the network paradigm (Forsgren and Johanson, 1992), the other strongly follows the implications of the “new flexibility” for organizational strategies and structures. Foreign firms adjust to elements of the local business environment within their modes of operation. This adjustment is done according to their organizational forms and distinctive managerial attitudes and their firm specific attributes (Dunning 1979). Schlunze (2004) noticed that the degree of embeddedness of European manufacturers in Japan differs depending on the locational adjustments of managerial elements. The style of management does have locational implications and embodies, therefore, the potential for local embeddedness. We can expect that the longer a subsidiary has been operating in Japan and the more integrated their organizational activities are, the more its behavior would be embedded locally. Other theoretical propositions are that the process and degree of embeddedness are determined by the process of location decision making of the foreign firm, the formation of foreign R&D organizations and their involvement in local innovation systems, and the local adjustment of R&D management.

The aim of this survey was thus to analyze the process of the locational decision making, the formation of R&D organizations, and their integration in the regional innovation system.

METHOD

In order to prepare two standardized questionnaire sheets, interviews with companies and with investment promotion centers and other related organizations were carried out until December 2003. From January 2004 to April 2004, a questionnaire survey of research and development dynamics was conducted at 185 foreign affiliate manufacturing corporations holding research and development centers or departments in Japan. The questionnaire was structured in five sections asking for detailed information about a) the R&D organization, b) the R&D management, c) the process of determining the site location, d) received public investment support and e) such company data that helped to evaluate the R&D activities of foreign firms in Japan.

A list of foreign-affiliated companies in Japan published as a CD-Rom in 2003 by Toyo Keizai was used as the distribution database, since the one provided by Jetro showed fewer firms and included IT companies.

Forty five percent, or 84 R&D organizations, replied to the questionnaire. Among them, 34 stated that they do not conduct R&D activities or were not longer affiliated with a foreign company. Twelve R&D organizations refused to participate in the questionnaire survey. Finally, 38 questionnaires could be used for the analysis. Additionally, interview surveys were carried out during the second half of the year 2004 in purpose to investigate distinguish types of R&D locations and organizations in detail.

<Figure 2 about here>



Figure 2: Spatial distribution of foreign R&D establishments responding to the questionnaire survey (n= 38)

RESULTS

Foreign firms that established an independent R&D center usually used the parent company or the Japanese subsidiary to establish the R&D site. A team, consisting of foreign and Japanese members, or a trusted Japanese manager, was usually in charge of negotiating the site. Rarely foreign managers could do this job on their own. Among the factors important for deciding on the site for the R&D division, the accessibility and the land/lease/rent price were the most important criteria. The presence of customers and clients, the market size, and the nearness to the firm's factory were also seen as important location factors. A few companies indicated the importance of technological, managerial, and living environment for deciding the site of the R&D division. The availability of a test field

was important in one case. Furthermore, the presence of a technology park was indicated to be important by a pharmacy company with 3000 employees in Ibaraki Prefecture and the existence of an international school by a manufacturer of precision instruments with 30 foreign staff members in Kanagawa Prefecture.

Most organizations stated that they never took advantage of public investment support institutes. The few companies that did demand support usually received information and the land or office for the R&D center was suggested by the local authorities. Such cases were reported by R&D centers located in Aichi, Hyogo and Osaka Prefecture. They helped also with recruitment and with procedures such as office registration or taxes. Two companies stated that they received public subsidies. Among them one chemical processing company located in Fukushima Prefecture, setting up their R&D unit in 1987, fifteen years after the company was established. Asked to comment on other potentially useful support from bureaucratic or public organizations, some companies wished to receive tax reduction, assistance in identifying new subcontractors or reductions in the cost in case of relocation. One company interviewed in Kanagawa Prefecture considered re-locating their business to Chiba Prefecture in order to have closer contact with their customers in the oil industry.

Most companies entered Japan in the form of new direct investment and were wholly-owned by the parent company but one third were joint ventures. More than half of the R&D companies had only Japanese staff. As seen in Table 1, mainly the metropolitan city regions, Tokyo-Kanto and Osaka-Kansai⁵⁾, did profit from the in-flow of foreign R&D investment. The relative concentration of R&D activities in the sector of chemical processing is stronger in Kansai area. However, the absolute concentration of R&D activities area is much higher in the Tokyo-Kanto for all industrial sectors. Only 13 foreign companies located their R&D activities outside these both regional innovation systems. Among them most companies were conducting manufacturing as well.

Foreign companies belonging to the sector of chemical engineering or pharmaceutical research were dominant. Most foreign firms started their R&D activity during the 80s and 90s. Most conducted R&D at the headquarters or the factory site, but one third did establish an independent R&D center. Development research, such as the introduction or improve-

5) Here, Kanto includes Shizuoka Prefecture and Kansai Okayama and Mie Prefecture.

ment of new materials, devices, products, processes, and systems, is most popular in foreign R&D in Japan. Whereas technology transfer from the parent company was strong in the initial phase, more companies conducted applied research later. Most companies stated that they believe they can quickly and adequately respond to the needs of the local market and do have contacts with customers at the forefront of technology in Japan, but secondly it was indicated that they transfer technologies from the parent company to Japan. Various reasons exist that drive foreign investors to conduct R&D in Japan, but establishing an R&D center to ease technological friction counts only as a minor reason.

| | | Region | | Total |
|-------------------|---------------------|----------------------|----------------------|-----------------------|
| | | Kanto | Kansai | |
| Industrial sector | Chemical processing | 31 35.2% | 10 45.5% | 41 37.3% |
| | Pharmaceutical | 20 22.7% | 5 22.7% | 25 22.7% |
| | Electronical | 13 14.8% | 2 9.1% | 15 13.6% |
| | Precision | 7 8.0% | 2 9.1% | 9 8.2% |
| | Metal working | 12 13.6% | 1 4.5% | 13 11.8% |
| | Other | 5 5.7% | 2 9.1% | 7 6.4% |
| | Total | 86 100.0% | 22 100.0% | 110 100.0% |

Table 1: Spatial and sectoral distribution of foreign R&D activities

Source: Toyo Keizai 2003; own calculations.

Three locational types of R&D activity could be observed: first, R&D departments attached to headquarters and factory, second, R&D departments attached to a factory and third, independent R&D centers.

As seen in Figure 3, R&D activities co-located with the headquarters concentrate in and around Tokyo. Locating in Tokyo, Kanagawa and Chiba Prefecture ensures access to the number one regional innovation system, Tokyo, which is characterized by the highest concentration of the information and communication technology (ICT) industry and sectoral diversity of research activities in Japan. A sub-type is characterized by R&D activities that co-locate with the headquarters but have the factory on another site. Such a case exists, headquartered in Tokyo, with the factory located

in Saitama, a prefecture close by. The other case is a well known US multinational and consumer goods company that co-located a technical center with the headquarters employing 550 researchers in Kobe. This company has one factory within the same prefecture and also two production sites in more distant prefectures.

Figure 4 shows the second type with R&D activities conducted at a factory site. Obviously, R&D and manufacturing activities tend to head-quarter in Tokyo. These companies seem to combine downstream and upstream activities because the application of research results is most important.

As one can see from Figure 5 the third type, the independent R&D centers, is part of a more extended spatial network. Independent R&D facilities are basically located in two areas north of and southwest from Tokyo. Here, manufacturing activities are quite dispersed and tend to be more at a distance to the headquarters than the R&D facilities. This implies that development research is not so important when comparing the second type. One exception is a chemical processing company with a headquarters and R&D activities located in the Osaka-Kansai area. However, both areas belong to two main regional innovation systems that show a relative high participation of foreign R&D activities and an industrial structure that favors foreign investment.

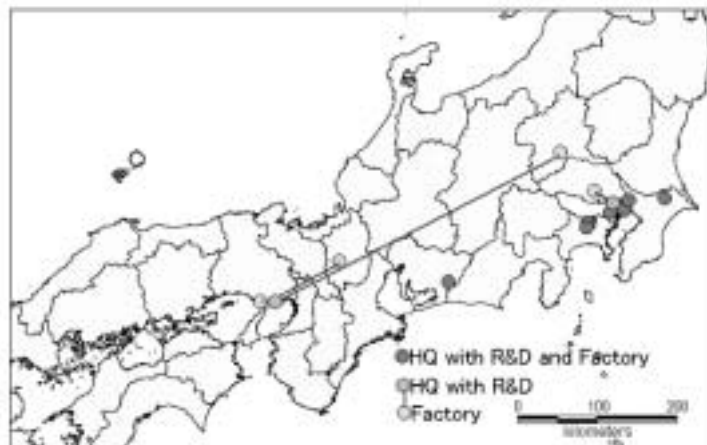


Figure 3: R&D departments attached to headquarters

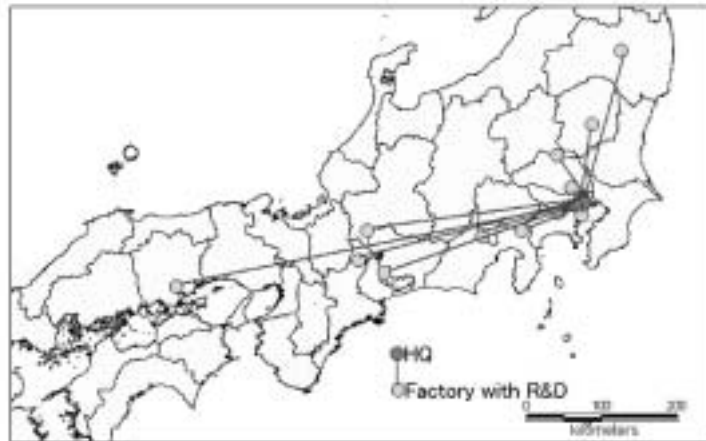


Figure 4: R&D departments attached to factories

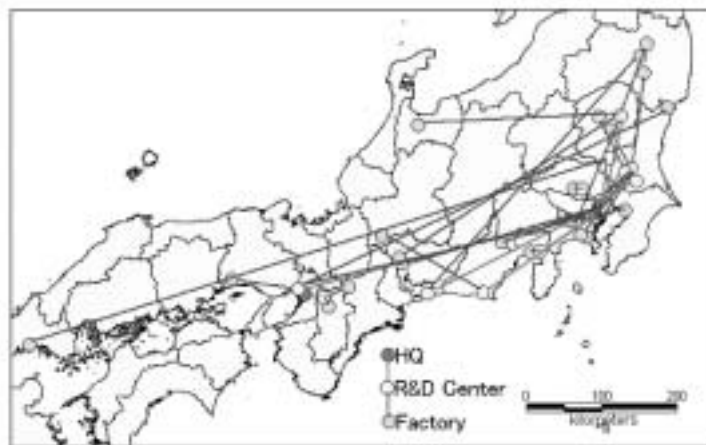


Figure 5: Independent R&D centers

Among the R&D resources that were transferred from the parent company, R&D results and R&D funds were mentioned. In return, the R&D results of the Japanese branch most utilized by the parent company or other overseas subsidiaries. The biggest difficulty was the high cost of conducting R&D. Second, difficulties in recruiting qualified local personal such as researchers and technicians were mentioned. Importantly, some companies view the Japanese business environment itself still as an

obstacle for doing business. Nevertheless, most assessed their company's R&D performance as successful. Only five manufacturers, all operating for a longer time in Japan, stated that they are neither successful nor unsuccessful.

Most R&D organizations are seen as totally independent from the foreign parent company and managed according to the Japanese style, but one third replied that independence is not always ensured. Companies managed in the home country style often depend on the parent company regarding research, research planning and managerial methods. Strong influence of the parent company on the management style was found at the R&D centers located in Tokyo and Kobe city. However, we observe that R&D organizations that are managed in the style of the home country or a mixture are found foremost in the Tokyo-Kanto area. At attached research facilities, Japanese style is dominant. Meanwhile, at independent R&D centers, we find slightly more foreign style management. Obviously, there is a significant relationship in which style the R&D organization and the R&D activities are managed (Kendall's $\tau_b = 0.707$). Thus, the source of the management practice is important for deciding on the style of conducting R&D activities (0.6). If the source of a managerial method is a foreign manager, methods of the home country tend to be applied. When the head of the R&D department is a foreigner this mechanism is even stronger, but in case of Japanese heads or managers it is not true that they will always decide for local methods. However, companies that have recently changed their management of R&D activities would prefer to apply practices from their home country than adapt to local practices. Foreign managers succeeded in implementing their home country/Western style research and development practices at R&D centers located in the Ibaraki, Kanagawa and Saitama Prefecture as in the Hyogo Prefecture.

Most companies encourage their researchers to participate in Japanese academic conferences. Foreign R&D companies conduct information, technology or research exchange mostly with research institutions outside the region. As shown in Figure 6 for the institutional exchange within the region the information exchange was mentioned as most important. It appears that most firms in the Kanto area found information and technological research not only outside but also often within the region. Here, foreign firms succeeded in receiving the cooperation of local research institutes in terms of human resource (HR) exchange though this was not

reported in the Kansai area. All foreign R&D firms located in the Kansai area established technological or research exchanges with Japanese institutes outside the area, but only one reported having such a relation within the Kansai area. Since the scale of the participation of foreign firms in the two regional innovation systems differs so much, it is hard to comment on characteristics with certainty.

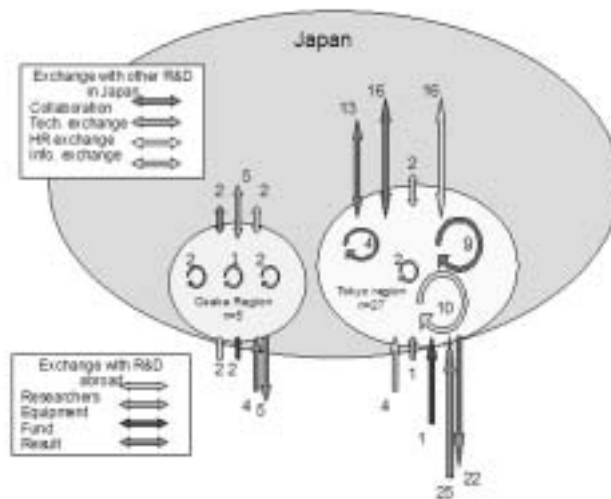


Figure 6: Inter and intraregional interaction of foreign R&D establishments in Japan

Nevertheless, one important result is that the intra-regional exchange seems to be less developed than interregional exchange with local research institutions. Correspondingly, the relationship with Japanese universities increased more on an inter-regional level. Although some firms were not able to find a corresponding group for participation, there is a potential, and a demand, for intra-regional exchange as documented by the fact that the R&D staff of foreign firms was encouraged to participate in local research seminars.

Company interviews showed how diverse the roles of foreign firms are.

- ✓ A well known chemical company from Switzerland located their research center in Osaka City and developed a substance necessary to produce the flat screen displays of Sharp Corporation

located in neighboring Nara Prefecture. Flat screens are a recent hope for growth and employment in Kansai and other regions dependant on the consumer electronics industry. Thus, one could conclude that foreign companies deliver the substances of economic development to the Japanese industry.

- ✓ A pharmacy company from Belgium, headquartered in Tokyo, replied that they brought health to the Japanese people by inventing a drug against depression when in Japan this mental disorder was not even recognized as an illness. The local pharmaceutical industry was encouraged by the foreign competitor to conduct research and invent new products for those patients.
- ✓ A French company, located in Kanagawa, is conducting research on and producing oil field detectors with semiconductor technology from the USA. This foreign firm serves big oil companies located in Chiba Prefecture, and therefore contributes directly to more sophisticated oil field exploration of these companies and indirectly to the supply and success of the Japanese petrochemical industry.
- ✓ A German company headquartered in Yokohama with testing facilities located in Osaka, Nagoya, Hiroshima and Fukuoka is testing products of Japanese multinationals and small medium-sized firms for their use in overseas markets. The role of this foreign firm can be seen as developing the export activities and overseas success of Japanese manufactures as well as ensuring the safety of overseas customers.

DISCUSSION

The results led us to believe that for wholly-owned new investment and also for foreign involvement in the research process, development is in favor of the regional innovation system in the Tokyo-Kanto area, and to some lesser extent the Osaka-Kansai area as well. Obviously, accessibility is more important than centrality for foreign corporations conducting research in Japan. This implies that especially for independent R&D centers the location is not necessarily determined by the density but by the quality of contacts. For research exchange, distant institutions can be contacted using information technology or – for face to face contacts – by

using Japan's exemplary transport infrastructure such as Shinkansen high speed trains. Many foreign companies indeed rely on Japanese staff able to communicate their research results in English. To conclude, foreign firms needed to embed their research activities in industrial spaces where a dynamic innovation milieu and the sphere of international business overlap.

Obviously, most companies did not want to disclose financial information such as received subsidies. However, they are available and used as an important instrument to attract foreign R&D investment to provincial locations. So far successful acquisitions in Kansai other provincial areas are heavily based on the skillful implication of these instruments.

A relation between locational and organizational patterns was found. The results support the assumption that the application of foreign management method for conducting research and development is easier in locations that are more accessible for international managers. There are nevertheless examples that show that elsewhere than in Tokyo, a potential for successful international management indeed exists. The results infer that the sphere of international business embodies itself in such places that have a history of succeeding in nurturing entrepreneurial exchange with foreign corporations. The spatial diffusion of independent R&D centers led us to assume an increasing foreign interest in research resources offered by two regional innovation systems: the Tokyo-Kanto and the Osaka-Kanto cluster.

The results showed that foreign firms, locating their R&D activities in Kanto area, do participate more dynamically in the regional and national innovation system. For companies that located in Kansai area complementary advantages such as collaborative partners were said to be very important, but it appears that foreign R&D firms lack dynamic exchange activities within the region. Therefore, they needed to look outside the area for technological or research exchange with Japanese research institutes. These results infer that the technological, research and human resource exchange with companies, national research centers and universities in the Kansai area needs to be encouraged in order to attract and embed foreign R&D firms within the regional innovation system. From a regional perspective, the technology transfer usually occurring in the initial phase of an investment project is an important reason to invite foreign R&D activities. In order to create spillover effects, the regional authorities should promote

information exchange among foreign and local institutions, such as companies, national research centers, universities, and experts during the start-up phase. This should be done with the purpose of achieving a better embeddedness of the foreign firm into a particular learning region. The fact that foreign firms conduct information and technology exchange foremost with Japanese research institutions outside their regions indicates that most foreign firms embed their R&D activities preferably in the entire national innovation system than in a particular learning region. Clearly, from a corporate perspective, it is not important to be part of a regional innovation system. However, from the perspective of the local government such interactions are very valuable since they promote the formation and international competitiveness of a regional innovation system. A possible explanation for the absence of asking for local support even in the initial phase could be simply the lack of knowledge about institutional support schemes and programs, or the fact that many firms are not eligible because they were already registered as local firms. Further, non-Japanese actors were merely capable of negotiating the R&D site. This limitation implies that language problems in prefectural governments are still severe. If the Japanese government is serious about increasing foreign investment, foreign companies should be aided to the extent that it becomes possible to implement their business without any Japanese language expertise. Further, easing not only the entry but also the embeddedness of international businesses of foreign investors not only for sales and manufacturing but also for research activities would be attractive. Only then can Japan advance in an international marketplace that attracts innovative investments from all over the world. Since most R&D operations in Japan are still “young,” these activities of foreign firms should receive enough support to embed their R&D activities most favorable in order to nurture the image of Japan as a promising research platform in the global economy.

POLICY IMPLICATIONS

One policy recommendation could be that local and foreign firms should be encouraged to put forward visions of creating platforms of innovation. The Japanese government could organize a competition on a company base for certain regions such as Osaka-Kansai, Nagoya-Chubu, Sendai-Tohoku or Fukuoka-Kyushu. Here, domestic and foreign firms

would propose their ventures to the prefecture government, and these projects would be reported as innovative clusters. Government should not only be publicizing success stories of foreign companies but also undertaking efforts to integrate them within the local business community network. This and related activities, such as meetings among local and foreign firms, should help to widen their network and to match them with other businesses within their region.

Inward investment promotion programs should be related to industrial cluster formation. Assigned areas should receive special investment promotion subsidiaries such as to attract foreign biotech and chemical industry to the Kansai area and petrochemical and IT companies that develop new products and services for the automotive industry of the Nagoya-Chubu area. These “producer services” of foreign research and development firms should directly link to the Japanese manufacturing companies, since intermediates might reduce efficient knowledge exchange and therefore the speed of creating innovations. The process of integrating foreign businesses into the learning region should be carried out systematically. Spaces of international circulation and opportunities for networking “new” local and “old” local entrepreneurs need to be created.

The prefectures in the Kanto area should more consciously focus on the potential they have and support of central managerial and innovative functions of foreign businesses that helps to build up an international competitive regional innovation system in the respective region. Therefore, on administrative as entrepreneurial level continues efforts need to be undertaken towards cooperation between local, international and foreign players within a learning region enabling the international competitiveness of a regional innovation system.

Embedding foreign R&D firms is necessary for internationally competitive and globally connected regional innovation systems. In the process of globalization the competitiveness of Japanese firms and region cannot be achieved without the participation and contribution of foreign firms. Foreign firms conducting R&D in Japan are important to build up the role of Japan as an international research platform. Local government and companies need to embed foreign firms and thus treat them not only as “local-ized”, but also “global eyes” business partners and build “international social capital” for collective innovation activities in co-operation with their neighbor prefectures.

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Note: (E/J) : English with Japanese summary; (J) : Japanese only.

