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(Revised)

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1. Introduction

This paper tries to describe and analyze patterns of direct investment in Europe by the Japanese automobile and auto parts industries. Our perspective is somewhat broad for three reasons. First, we are interested not only in the decision-making process of direct investments (e.g., whether or not to invest, how to deal with local governments, and where to locate) but also in operational consequences themselves. In other words, the paper discusses how the direct investments by Japanese firms have been implemented, as well as who made such investment decisions when, where, and why. Now that many European investments by the Japanese auto and auto parts makers are near completion, we believe that the issue of post-investment operations is as important as the investment decisions to both European economies and the investing firms.

Second, given the global nature of this industry, we are concerned not only with the bilateral relationships between the Japanese and the European facilities but also trilateral interactions among the Japanese, European and the North American facilities. As almost all the Japanese automobile and auto parts makers that have established European operations had prior investment experience in North America, it would be reasonable to assume that they transferred certain knowledge and experience from America to Europe.

Third, although the paper mainly analyzes manufacturing investments, it also examines other important functional areas such as research and development (R&D) and sales, as well as the interrelationships among these functions. Thus, we consider the issues of direct investment by Japanese automakers in Europe in broad contexts encompassing post-investment operations in multiple regions and functions.

In what follows, we will first review the historical and ongoing developments of direct investments in the auto industry (Section 2). After presenting some data on direct investment decisions, our focus will turn to the issues of implementation and operations. We will first present conceptual models that help us understand certain aspects of these operational issues (Section 3). Using the conceptual models as a framework, we will then examine some empirical evidence on patterns of operations and technology transfers to show that implementation of direct investments is a multifaceted phenomenon to be best explained by multiple models (Section 4). Next, based on this observation, preliminary results of our questionnaire survey will be presented and analyzed (Section 5). The results will reconfirm that different kinds of activities are best interpreted by different conceptual models. Although our study is still exploratory at this point, we will suggest that studies of implementation stages of direct investments need further detailed analyses of individual firms' multidimensional activities.

2. Overview of Japanese Direct Investments in Europe

2.1 A Brief History of Japanese Auto Companies in Europe

The Pattern of Investments in All Industries

As a starting point, let us look at the historical patterns of Japanese direct investments in Europe. A survey conducted by Mitsubishi Research Institute in 1991 (sponsored by the Ministry of International Trade and Industry [MITI], 572 samples, all industries) shows a clear pattern that direct investments by the Japanese firms in Europe started in sales, followed gradually by the manufacturing area. That is, the number of newly established sales facilities peaked in the early 1960s but gradually decreased after the late 1970s, whereas direct investments in manufacturing started in the early 1960s and then accelerated in the 1980s. Investments on R&D facilities started in the late 1970s, but the number has remained negligible so far.

This sequence (sales - manufacturing - R&D) is essentially the same as the one observed in direct investments in the U.S., although the timing is somewhat different: sales investment in the U.S. apparently preceded Europe by about five years and the pace of new sales investments remained more stable (see Figure 1). The timing of manufacturing investments has been similar between the U.S. and Europe: the investments accelerated in the late 1980s in both regions. The pace in the U.S. was about twice as high as that in Europe, however.

Incidentally, the sequence and timing of Japanese direct investments were quite different in Asia, where manufacturing investments tended to precede sales investments slightly.

The Pattern in the Auto Industry

This pattern holds true also in the automobile industry. To examine this, we now review a brief history of Europe-Japan direct investments after World War II.

(1) 1950s: There was a transfer of European technologies to Japanese automakers and auto parts suppliers. In 1952, MITI issued the following policy on importing technologies for developing and manufacturing cars: the import of technologies through licensing agreements was promoted, while capital participation by foreign automakers was prohibited as before; the import of complete vehicles was restricted through quota on foreign currency (until 1965; $610,000 in 1955) and tariffs (35 to 40% until 1968).

Based on these conditions, six technical tie-ups were applied to MITI between 1952 and 1953. Fearing the disadvantage of small scale production, MITI screened them into four groups: Nissan-Austin, Isuzu-Roots (Hillman), Hino-Renault, and Mitsubishi-Willies (Jeep). Interestingly enough, three of the four projects involved European producers. By contrast, none of the American Big Three, apparently insisting on capital acquisition, participated in the arrangements. Also, it should be noted that there were some companies, including Toyota and Prince, which chose not to rely on formal technical tie-ups for passenger car technologies.

The period of Euro-Japan technical tie-ups did not last long. Due partly to production/development experiences of trucks since the prewar era, as well as the substantial development of basic material sectors, most parts were localized within five years (1957). Technical tie-up contracts were also terminated as the European models were replaced by local models, although they were derived from their European predecessors in basic design and concepts.

Although technical relations between Japanese and some European automakers were at most temporary, the impact of European concepts on the basic design of Japanese passenger cars was decisive and long-standing.

(2) 1960s: Exports of Japanese automobiles to the European market started in the 1960s (e.g., the Toyota Corona, the Nissan Bluebird). These exports started from the bottom end of the price range. As shown in Table 1, the number of Japanese passenger cars exported to Europe was negligible in the early 1960s: 14008 units in 1965. The majority of the exports were directed outside Europe. In 1970, car exports to Europe totaled 100,000 units, about half of which were to the European Community (EC). The volume of Japanese truck exports to Europe has consistently been around one-forth to one-fifth of that of car exports since that time.

(3) 1970s: This was an era of expansion for Japanese automakers. Exports of Japanese automobiles grew rapidly, and so did investments on sales outlets. Exports increased tenfold during the 1970s and reached one million in 1980, of which about one-forth were directed to EC countries. The market share of Japanese passenger cars in the EC market also grew dramatically: from less than 1% in 1970 to over 9% in 1980. By the early 1980s, eight of the nine Japanese passenger car manufacturers (except Isuzu, a General Motors [GM] group company) had entered the European market and established dealer networks there.

(4) 1980s: Japanese automakers started direct investments on manufacturing facilities, as the sales growth ratio decreased and trade friction with EC countries escalated. Unit sales of Japanese passenger cars in the European market remained around one million throughout the first half of the 1980s. Japanese exports then grew to 1.4 million units by the end of the decade, reflecting market expansion in the latter half of the 1980s, but the market share of Japanese cars remained between 9 and 10% during the

1980s. Within EC countries, however, market shares of Japanese cars ranged widely from country to country. In 1989, for example, the market share in Spain and Portugal, where Japanese imports were formally restricted by quotas, was about 1%; in France and Italy, the share was informally restricted to about 3 and 1% respectively. By contrast, Japanese market shares in such countries as Holland, Belgium, Denmark, Ireland and Greece, where large European auto companies did not exist, were 20 to 40%. Germany and the United Kingdom, with a Japanese share of 10 to 15%, were in the middle range. At the level of the European Community, Japanese imports were voluntarily restricted since 1986, due to guidelines set by MITI.

Trade friction and export restrictions in the EC markets triggered direct investments by Japanese companies in both automobile assembly and parts manufacturing in the late 1980s. The production facilities tended to be located in the U.K. for the following reasons: government incentives; language familiarity (English), lower wages, Anglo-American business atmosphere (experiences in the U.S. can be directly transferred), and access to the entire EC market. Bandwagon effects among Japanese parts suppliers in European direct investments were also observed.

2.2 Summary of Japanese Automobile Direct Investments in Manufacturing

Let us now take a brief look at the current data on direct investments by the Japanese auto and auto parts companies in Europe.

(1) Assemblers: The major direct manufacturing investments by Japanese automobile assemblers are summarized in Table 2. In the U.K., Nissan and Honda have assembly plants in operation since 1986 and 1989 respectively. Toyota also has an assembly plant and an engine plant under construction, to be opened in 1992. All of these plants are so-called greenfield plants, each of which is 100% owned by a single company. They are, however, the only solo entry operations by Japanese assemblers.

The other Japanese manufacturing investments are mostly joint ventures with European or American auto companies: Isuzu-GM truck assembly in the U.K. (1989); Toyota-Volkeswagen (VW) joint production of trucks in Germany (1989); capital participation in Nissan Motor Iberica in Spain (1987); Mazda's joint production with Ford in Germany (the early 1990s); and Suzuki's capital participation in Land Rover Santana in Spain for assembly of Jeep-type vehicles (1984). In Portugal, Toyota and Mitsubishi, respectively, have established joint ventures with local capital for truck/wagon production. In addition, Mitsubishi has announced a joint venture with Volvo for passenger car assembly in Holland (1995), and Daihatsu plans to assemble micromini trucks/vans jointly with Piaggio, a Fiat group motorcycle maker (1992). Another type of inter-firm cooperation is contract assembly: Honda consigned production of small passenger cars to the Rover group (1984), and Suzuki asked the GM-Isuzu joint venture mentioned above to assemble its micromini vans (1987).

Thus, compared with direct investments in North America, Japanese automakers tend to rely more on joint ventures and other forms of inter-firm cooperation in their European assembly operations.

(2) Parts Suppliers: Table 3 shows a list of direct investments in manufacturing by the Japanese parts suppliers (source: The Japan Auto Parts Industries Association [JAPIA] data, and FOURIN report). Although it is rather difficult to develop a complete list, about 50 cases of direct manufacturing investments by the Japanese automobile parts suppliers were identified as of early 1992 (in North America there are about 200 cases). Besides, about 20 technical tie-up agreements, which did not involve capital participation, were also listed.

Although these investments and agreements included a variety of parts, there were certain patterns. A majority of them, for example, were found to be joint ventures with European or American partners: 27 were join ventures, six were 100%-owned acquisitions, and only 13 were 100%-owned green field operations. With 18 technical tie-up agreements included, 70% of the projects involved inter-firm cooperation with European companies. This contrasts with direct investments by Japanese suppliers in North America, who relied more on sole entry.

Geographically, nearly half the manufacturing facilities (22) are found in the U.K., followed by those in Spain (9). Thus, the U.K. and Spain together accounted for about 60% of the manufacturing investments in Europe by auto parts suppliers. There were also four cases in Germany and five in France. A majority of them started production after the 1980s.

The size of the factories ranged widely. Of 36 cases of direct investments in which the numbers of employees were known, nine were plants with less than 100 employees; ten had 100 to 200; five had between 200 and 300, and eleven had 500 employees or more. Thus, most Japanese parts suppliers' facilities in Europe were small or medium-sized with less than 300 employees, but there were also fairly large factories with over 500 people.

Having explored basic patterns of investments by the Japanese auto and parts manufacturers, let us now turn to the issue of implementation and operations of manufacturing facilities in Japan, Europe and North America.

3. Conceptual Models of Trilateral Overseas Operations

As a groundwork of the implementation analysis, this section presents some conceptual models which may be consistent with observed patterns of operations and technology/knowledge transfers associated with direct investments[1] .

For simplicity let us focus on trilateral relations including facilities in Japan (home country), North America (mostly the U.S.) and Europe (mostly Western Europe), the three main regions of automobile production, ignoring the rest of the world. Also, since

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[1] Note that by model we simply mean a conceptual framework for summarizing and classifying data, rather than a hypothetical system of causal relations.

Japanese investments in manufacturing were the most significant in Europe during the 1980s, let us focus on manufacturing operations for now.

There are a series of criteria by which we can classify actual patterns of the trilateral operations into certain types: difference or similarity between patterns of operations; configuration; direction of flow, single versus multilayer patterns of networks (Figure 2).

(1) Difference or Similarity between the Japanese and Overseas Operations: Are manufacturing practices in the operational systems in Europe (or North America) similar to those in the Japanese factories? Based on the assumption that in many operational aspects "traditional" manufacturing practices at least were quite different between Western and Japanese producers,[2] Abo et al. (1991) argue that application of the Japanese manufacturing practices to overseas direct investments suggests, by definition, similarity or few practical differences between the two operations. On the other hand, they argue that adaptation indicates substantial modification of Japanese practices in response to foreign environments in which direct investments are located. The notions of application and adaptation may be usefully adopted and measured in our research in terms of cognitive distance between Japanese and overseas operations -- i.e., the extent to which various activities of the two operations are perceived by the managers concerned as different or similar.

(2) Difference or Similarity between the European and American Operations: In this case, similarity means either direct application of the Japanese manufacturing systems (repeated application), or similarity of local practices in Europe and America to which the Japanese firms adapted themselves (repeated adaptation). The difference, on

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[2] This assumption may in itself have to be carefully examined with systematic empirical evidence. For example, the conceptual contrast between mass production and lean production (Womack, Jones, and Roo, 1990) should provide a useful guide to such an examination. Focus on Western-Japanese differences and similarities in "labor process" alone would lead to informative research results (e.g., Dohse, Juergens, and Malsch, 1985). However, such tasks go beyond the scope of this paper.

the other hand, means either that the environments and local practices to which they adapted themselves were very different (differentiated adaptation), or that the Japanese system was applied in one region but was not in the other region (asymmetrical transfers).

(3) Configuration: Are there any direct exchange of managerial resources between North American and European operations? If there is no significant flow of managerial resources across the Atlantic Ocean, we may call the configuration "spoke" or V-shaped. If there is, the configuration is regarded as triangular.

(4) Direction of Flow: Is the direction of technology transfers associated with the direct investments unidirectional or reciprocal? Traditional theories of multinational corporations tended to assume unidirectional transfer of technologies and know-how (e.g., Vernon). There may be exchanges of such knowledge through the international networks of headquarters and foreign subsidiaries, as "transnational" model by Bartlett and Ghoshal (1989) predict.

(5) Cross-functional Integration of the Networks: So far we assumed a single layer (i.e., single function) network of the trilateral operations in manufacturing. However, a company may also have such networks in marketing, R&D and other functions. These networks may be managed separately as single layer networks, or they may be integrated into a multilayer international network.

By combining the above classifications, we can construct certain conceptual models or ideal types which may be consistent with the actual patterns of the trilateral direct investments by the Japanese auto and parts manufacturers (Figure 2.1). For example, a single layer V-shaped model with unidirectional and repeated application of the Japanese manufacturing practices may explain certain behavior of some Japanese auto and parts makers effectively. A question may arise, however: Can one single model explain their post-investment operations in Europe? The next section will examine some historical and anecdotal evidence which may support different models.

4. Operations of the European Transplants: Some Anecdotal Evidences

In this section, we apply the conceptual models proposed in Section 3 to some anecdotal and historical evidence to indicate that alternative models may reasonably explain certain different aspects of direct investments in Europe. This makes us suspect that the Japanese direct investment in Europe is generally a multifaceted phenomenon, in which the model that can best explain the real situations may depend on the companies, countries, functional areas, and timing. To clarify our arguments, we will focus on the four questions:

(1) Are patterns of investments in the U.S. and those in Europe different, or do they share common characteristics? (4.1 and 4.2)

(2) Are the patterns of management transfers V-shaped (without any U.S.-European linkage) or triangular (with transfers between the U.S. and Europe)? (4.2)

(3) Are the managerial transfers unidirectional (from Japan to the U.S. and Europe only), or is there reciprocal flow of managerial resources? (4.3)

(4) Are the patterns of the flow multilayer with sales, manufacturing and R&D forming international-interfunctional networks? (4.4)

4.1 Arguments Supporting the Repeated Application Model

We start with two basic facts generally observed during the 1980s:

(1) Recent studies are in general agreement about higher competitiveness of the Japanese automakers in production and product development compared with their U.S. and European counterparts (e.g., lean production, which MIT's International Motor Vehicle Program advocated).

(2) Based on the above competitive advantages back in their home country, and partly because of trade friction in the U.S. and Europe, the Japanese automakers established their assembly plants mainly in North America during the 1980s. They were relatively successful in transferring management skills and production technologies from their home plants to their U.S. plants. As mentioned, approximately 200 parts suppliers also set up their U.S. plants in response to local content requirements imposed on assembly "transplants." In Europe, a similar, though smaller, boom of direct investments in manufacturing by the Japanese auto and parts makers was observed during the latter half of the 1980s.

A simple conceptual model that seems to be consistent with the above two facts is the unidirectional, V-shaped, repeated application model (Figure 2.1), in which Japanese producers merely repeat their home-grown successful patterns of management and technology in the U.S. and Europe. In this model, therefore, the difference between U.S. and European direct investments is a matter of timing.

A story behind this repeated application model may go as follows -- One thing that has been common in Japanese direct manufacturing investments in North America and Europe is the transfer of the "best practice". Japanese producers apply the same principle of paying management attention to the details of volume production and supplying high-quality, market-oriented products to the consumer at a low price. Thus, the Japanese automakers have developed a new manufacturing paradigm which synthesized many features of the existing management methods during the postwar and high-growth periods, which they are now "transplanting" to various localities outside Japan.

Across the Pacific, the U.S. manufacturing industry including motor vehicles had for long been at its height armed with mass production since the beginning of the century.

Since the 1960s, however, "hollowing out" has taken place because of long-term shortage of capital investment, the collapse of skilled labor development, resulting from recession and manufacturing cutbacks, and the weakening of related areas of industry, such as processed materials, auto parts, and electronic parts.

European manufacturing systems (sustained by skilled labor, advanced mechanical systems, and luxury car models) can be perceived as the foundations of the European auto industry's competitiveness. The European market, however, has traditionally been segmented and compounded by political complications and import restrictions. In the mass market segment, moreover, its average competitiveness in terms of cost, productivity and manufacturing quality has been significantly lower than that of the Japanese, and even lower on average than the U.S. producers in productivity, according to MIT's International Vehicle Program (1990). Against this background, certain elements of lean production have recently been studied and adopted by an increasing number of European auto companies through their own learning efforts, joint ventures with the Japanese firms, and cooperation from American-owned firms with Just-in-Time experiences (e.g., Saab getting technical assistance on manufacturing and sourcing systems from GM Europe). Given this situation, it would be reasonable to assume that the Japanese manufacturing activities in Europe can be well explained by the "repeated-unidirectional" model.

Incidentally, the pattern of repeated applications may occur with or without direct flow of managerial resources from North America to Europe. In the former case, a relevant model is the <u>triangular unidirectional model</u> (see Figure 2.1) with repeated and successive application of the Japanese practices from Japan to America and then to Europe. Although we will not discuss this version in detail, typical examples of the triangular configuration include transferring know-how from Nissan's Smyrna, Tennessee, to Sunderland, New Castle, or from Nippondenso America to Europe.

4.2 Arguments Supporting the Differentiated Adaptation Model

An assumption behind the foregoing model of repeating was that the Japanese firms tended toward application of their manufacturing systems in Japan, rather than adaptation of their systems to the local environments of the hosting countries. Thus, the same system in the home country was applied to different soils in a repeated manner. However, this simple model may not always apply. For example, the patterns of operations in the Americana and European transplants may differ significantly when transfer of certain technologies or managerial resources from the Japanese "mother plant" is difficult for some reasons, and when business environments are very different between North America and Europe.

(1) The Limits of Technology Transfers: Although management and technology transfer to U.S. production facilities has been generally successful during the 1980s, recent overseas experience indicates that international cooperation and management transfer in the R&D and white-color sectors are more difficult than it had been. Even in manufacturing operations, there are certain activities (e.g., labor relations, wage systems, recruitment, Just-in-Time delivery) in which unilateral application of Japanese practices tended to create friction against local practices and stakeholders, which may result in erosion of competitiveness. In this case, firms may choose adaptation of the transplants' operations to local environments and practices in disregard of application of the Japanese practices.

(2) Asymmetrical Transfers between America and Europe: The adaptation model alone does not necessarily create the Euro-American differences in operational patterns if the environments in the two regions are similar to each other. In such a case, the repeated adaptation model in Section 3 would fit the reality well.

However, there are other cases which may create significant differences between the American and European operations. One possibility is that the Japanese system is applied to the North American operations, whereas the operating system is adapted more to local environments in Europe: the case of asymmetrical transfers (see Figure 2).

This seems to be particularly the case in the auto parts industry. As we have seen in Section 2, joint ventures between Japanese and local auto parts makers tend to be found more in Europe than in North America, where sole investments by the Japanese is the dominant mode of investments. It would be reasonable to predict more adaptation and less application in Europe due to this capital structure. Besides, after heavy investments on North American plant constructions, and with severe labor shortage and declining profit performance in the early 1990s, many Japanese parts suppliers have found it difficult to make additional direct investments in Europe.

(3) Difference between America and Europe: When adaptation mode is chosen in both North American and European operations, the patterns of adaptation may still differ significantly when product markets, labor markets, supplier systems, government policies and other business environments are very different between America and Europe (i.e., differentiated adaptation model in Figure 2). This situation may happen more often in Continental Europe than in the U.K., and in market environments in particular.

Traditionally, market characteristics in the U.S. and Europe have been different, and certain patterns of Japanese direct investments apparently corresponded to this difference. The U.S. situation, for example, may be summarized as follows:

(a) The U.S. market has historically been large-car-oriented within a single nation. In the 1960s, Japanese automakers began to export small motor vehicles which did not directly compete against large American automobiles. After the oil crises of the 1970s, however, the American makers started to downsize their products, which resulted in direct and intensifying competition between the U.S. and the Japanese makers in the same small car segment of the North American market. The Japanese generally increased market shares, which triggered trade friction since the late 1970s.

As the U.S. makers had to invest huge amounts of money throughout the 1980s on conversion of its entire product line to smaller vehicles (mostly with front-wheel-drive configuration and unit body structure, which they were not accustomed to), the Japanese makers, with small car technologies and know-how on hand, could enjoy natural advantages in the product choice in addition to productivity and quality. Such advantages for the Japanese did not exist vis-a-vis the European competitors.

(b) In the 1980s, the Japanese makers moved toward local production in North America to avoid intensifying trade friction (e.g., the voluptuary export restraint agreement in 1981). Either on their own or through joint venture, Japanese automakers started mostly green-site operations. Taking into account American consumers' tastes, Japanese automakers switched some of their popular cars from export to local production (e.g., the Nissan Sentra, Honda Accord, and Toyota Camry).

(c) Japanese automakers' R&D in the U.S. focused on increasing local content and testing local materials and parts. New, upscale models targeted at the U.S. market were developed based on these studies. Simultaneously, the average size and product content of the Japanese automobiles sold in America increased significantly as the Japanese makers tried to maximize added value and profits from export models, thus getting around the constraints of export volume.

(d) In the U.S., the Big Three's components divisions have occupied a large fraction of the auto parts market. In recent years, the Big Three have been restructuring these divisions to improve the quality and competitiveness of their own products. Japanese automakers needed to increase the local content of their products under political and regulatory pressures, which made way for many of Japanese components makers to localize their own production. As a result, many Japanese suppliers started North American manufacturing operations, mostly on green-sites in response to the local demands of OEM parts by both the Japanese and U.S. automakers.

In the European market, by contrast, small cars have long been the mainstream products. A wide variety of models from the economy-class to the luxury have been offered. The European market has been divided into many countries, each of which has been relatively small and fragmented. Consequently, the models offered by Japanese manufacturers in Europe found themselves to be competing directly with the incumbent European offerings. Unlike in the U.S., where the Japanese direct investments were generally straightforward, their investments in Europe were thus compelled to take complicated "detours."

(a) The existence of many competitive small car makers, coupled with politically imposed volume restrictions, made it more difficult for Japanese automakers to choose the right models and ascertain adequate sales volume. With the exception of Spain and the U.K., Japanese car producers had to get started by way of project-oriented, "licensed production" approaches, which produced mixed results. For example, Nissan/Alfa Romeo failed in model selection; Nissan/Motor Iberica in Spain, by introducing the basic model Micra, divided the work with Nissan's U.K. operation; Mazda and Ford spent years in speculating on model selection; VW/Toyota produced small vans through licensing, but their sales were slow; and Mitsubishi/Daimler-Benz abandoned a plan to develop a new 4WD model.

(b) Direct investments have been mainly limited to the U.K. and Spain (see Section 2), where national champions are absent and there are fewer barriers to Japanese participation. In the United Kingdom, the Rover Group's market share is small, and Ford, GM and the imports from other countries divide the remaining market into small shares--market access has not been so difficult for Japanese auto producers (e.g., Nissan, Toyota, and Honda). The Spanish market has also become an "easy cropping" place for Japanese automakers (e.g., Nissan).

(c) The European automobile industry has had a long tradition of carmaking and has entertained certain peculiarities of each local market. In order to accommodate diversity as well as reasonable economies of scale, product development activities for choosing the right products play a particularly important role there. In this context, Japanese automakers have built their R&D centers on the Continent, prioritizing market and styling research over other issues (e.g., Honda, Toyota and Mazda).

(d) Two parallel patterns of Japanese participation are likely to continue. On the one hand, 100% Japanese-owned investments in green-site European transplants are taking place (e.g., Nissan, Honda, and Toyota in the U.K.) On the other hand, there will continue to be heterogeneous forms of enterprise: project-based collaboration, licensed manufacturing, joint ventures, or acquisition of existing ones.

(e) The auto parts market in Europe has historically been different from that of the U.S. in that a small number of giant component suppliers coexisted with numerous small parts makers (see Tables 4 and 5). In order to avoid friction with the local supplier group, the dominant investment style of Japanese parts manufacturers has been either licensed manufacturing or acquisition of existing operations.

In summary, the pattern of Japanese direct investments in Europe differed from that in North America in many aspects, reflecting the differences in history, geography, market conditions, incumbent products, industrial practices, and government policies. Thus, a simple repeated model of direct investments does not seem to fully explain the actual behavior of the firms. A differentiated adaptation model would be more appropriate here.

4.3 The Reciprocal Model: Learning from the West

At the earlier stages of direct investments, the flow of technologies tended to be dominantly unidirectional from the Japanese mother plants to the overseas facilities. Recently, however, there are signs that reciprocal transfer of know-how and technology has been taking place between Europe, America and Japan. That is, situations which may be better explained by the triangular-reciprocal model (see Figure 2), seem to be beginning to take shape. For example, under the same specifications across Europe, Japan and the U.S., Mazda's regional R&D centers develop car models for each market, and Mazda's headquarters in Hiroshima integrates the best ideas to establish the concept of a new world car. This type of reciprocal model may be regarded as a version of what Bartlett and Ghoshal call "transnational" operations. Another example is Honda. Certain experiences of Honda's Anna Engine plant in the U.S., including in-house production of pistons and other engine components, and clean foundry which eliminates "3-D" (dirty, dangerous, demanding) work conditions, are unique at the U.S. plant and have been effectively fed back to Honda's engine plant in Japan. Also, there are some indications that in the future the experiences of U.S.-European operations (e.g., lean, flexible and multi-skilled operations using a heterogeneous, homogeneous, work force) will be transferred back to Japan. Thus, on a limited scale at the level of assemblers at least, the transfer of know-how from offshore manufacturing sites back to Japan has already begun, and this aspect of the Japanese operations is likely to be better explained by the triangular-reciprocal model, rather than the unidirectional ones.

Behind the new developments described above seem to be the following trends at large.

(1) Lean Production Facing Internal Problems: Emerging problems of domestic labor shortage and excessive work hours, as well as slow down of production in the 1990s may jointly trigger in Japan a chain reaction which jeopardizes the effectiveness of the Japanese lean production as it is now. To avoid gradual destruction of the current manufacturing organizations from inside, the Japanese companies may have to overhaul the existing production systems so that they can respond even more flexibly to the changes in both product and labor markets.

In transforming the Japanese system to some kind of a "post-lean" mode, it is quite likely that the Japanese manufacturers have to learn more from the experiences of European and American manufacturers, particularly in regard to how to maintain competitiveness and attractiveness of the work place in the middle of labor shortage and work hour reduction. This kind of direct mutual learning between the Japanese and the Western auto and parts companies may somewhat go beyond our primary concern of Japanese direct investments per se. But it is worth considering this issue here as such interaction will be observed more often in the 1990s.

(2) Partial Catch-up of the Western Auto Industries: Although production and development systems of the Japanese auto industry have shown significant international competitiveness during the 1980s, the performance gaps between the Japanese and the Western auto companies have narrowed in many, if not all, aspects, including manufacturing costs, assembly productivity, manufacturing quality, and development lead time. Main reasons for this catch-up are: appreciation of yen after 1985, learning efforts by the Western makers, transfer of the Japanese practices through inter-firm cooperation and Japanese direct investments, and slow down of productivity improvements by the

Japanese makers during the 1980s. Under the circumstances, there seems to be less reasons to believe in unilateral transfer of the "superior" manufacturing practices from Japan.

A sign of direct mutual learning has already been observed between Japan and Germany. In Europe, especially in Germany, fundamental manufacturing technology and workers' skills are generally perceived to be richer than in the U.S. But Germany also has high wages and specific industrial relations. In the beginning, Japanese firms investing in Europe avoided this situation; their transplant operations tended to be located in the non-industrial areas of Wales, England, France, Spain, and Portugal.

Recently, however, Japanese investments in Europe have expanded to the heartland of Europe, including Germany. Increasingly, Japanese manufacturers are required to clarify their know-how and logically explain Japanese manufacturing methods to workers and suppliers of various nationalities, modifying traditional Japanese methods to fit various Western customs and labor relations.

To cope with the recent labor shortage in Japan, moreover, Japanese producers are developing new concepts of labor-saving production lines and management expertise. They are conducting experiments in an effort to determine know-how of short working hours, high skill levels and automation based on information from Europe, especially Germany. For example, in preparation for building Toyota's newest production lines at its Tahara No. 4 assembly plant, over 1,000 staff -- including union members -- visited the assembly lines of Volkswagen, Toyota's collaboration partner, to study the labor-mechanical system in Germany. The new concept, "More Human, Easy-to-Work Production Lines," was born under the influence of such activities. There are reasons to believe that this type of interaction and learning will be increasingly observed as the traditional demarcation between domestic and multinational operations becomes blurred in the age of transnational corporations.

4.4 Toward the Multilayer Reciprocal Network

As discussed, the pattern of Japanese investment in Europe was developed in line with the characteristics of each market, supported by the transference of the best practice. In this situation, the unidirectional transfer from Japan's know-how (whether or not it was repeated, triangular or differentiated) was recognized. Given the increasing reciprocal influences among the Japanese, European and North American operations, however, Japanese producers are now reviewing the existing systems of overseas businesses and trying to link more strategically the three locations at multilayer levels, i.e., R&D, production, and marketing. Evidence suggests that networks are emerging in the direction which is consistent with the multilayer model (see Figure 2), although whether there will be a full-scale development remains to be seen.

Examples of such networks are vehicle exports from U.S. plants to European markets based on local R&D activities. In 1991, Honda started selling its Accord Wagon, which was developed by Honda Research of America (HRA) and manufactured by Honda of America Manufacturing (HAM), in six European countries, including the U.K., France and Germany, through Honda Motor Europe (HME). Mitsubishi also started exporting its Eclipse, made in the U.S. by Diamond-Star Motors Corporation, to Austria, Switzerland, and Sweden in 1991. Toyota will be exporting its Camry Wagon, assembled at Toyota Motor Manufacturing USA (TMM), to Europe some time in 1992. The above three models have also been exported to Japan.

Although the exports of complete vehicles originating from European plants to U.S. and Japanese markets have not yet begun, it is likely that some European plants owned by Japanese automakers will start exporting to those regions sooner or later, as they expand manufacturing operations in Europe. Thus, we may see a mutual and triangular pattern of vehicle exports through "transnational" manufacturing-sales networks of Japanese automakers in the foreseeable future.

R&D operations of Japanese automakers in Europe are also emerging, although their pace is rather slow. Honda, for example, established Honda R&D Europe in Germany in 1988. Its main activities include emission control testing and industrial design, as well as market research and product planning. Honda also established Honda Engineering Europe in the U.K. (on the Swindon plant site) to support manufacturing engineering of its European operations. Nissan set up three facilities, two in the U.K. in 1988 and one in Belgium in 1989, under the Nissan European Technology Center (NETC). With a staff of 350 as of 1991, the two U.K. facilities are taking charge of product planning, testing, prototype assembly, and support activities for localization of parts procurements. The Brussels facility, with a staff of 50, was established mainly for emission control testing and will be expanded by 1994. Toyota, on the other hand, established a design center (Europe Office of Creation, EPOC) in Belgium in 1989, and plans to set up another such center in Italy. Toyota also has a technical center in Belgium called Toyota Motor Europe Marketing and Engineering. Mazda has had an R&D office in Germany since 1990 for design (with a clay model room), product planning, and emission testing with a staff of 50. Mitsubishi plans to create a design center in Germany as part of Mitsubishi Motors Europe (MME).

Thus, we have seen a start-up boom of European R&D facilities by Japanese automakers since the end of the 1980s. The size of the operations is generally small, however, and the tasks assigned to them so far tend to be limited to emission testing and product planning/design of the European version, and thus exclude large-scale operations for full-fledged component/vehicle engineering, which usually requires at least a few hundred engineers and technicians per project.

Although we should not be too optimistic about quick development of the triangular, reciprocal and multilayer networks by major Japanese automakers, it is obvious that the building blocks of such networks are gradually emerging. Whether current trends evolve into full-scale multilayer networks depends partly upon product line-up policies of the companies; that is, allowing European operations to develop and manufacture a few models mainly for European markets (e.g., a five-door hatchback model) may justify investments in full-scale R&D operations in Europe, and will facilitate a significant amount of vehicle exports to the U.S. and/or Japan from Europe. This, in turn, will help these companies establish triangular, multilayer and reciprocal networks involving European operations in sales, engineering, R&D and manufacturing.

In summary, the foregoing discussion has generally demonstrated that implementation of the Japanese direct investments in Europe and America is a multifaceted phenomenon in that no single organizational model can explain the entire picture of the trilateral operations. In the next section, we will present some preliminary results of our survey, which systematically support our arguments at a more detailed level of analysis.

5 Survey Results on Japanese Automobile Parts Suppliers

As discussed, it is not an easy task to describe and analyze implementation of trilateral direct investments. Which model in Section 3 would best fit the reality, for example, may depend upon company strategies, timing, and types of activities. Although it is beyond the scope of this paper to examine all aspects of this issue, it is at least possible to explore the relationship between types of activities and the proposed organizational models.

Outline of the Survey:

In order to analyze the relationship between types of manufacturing activities and the conceptual models which is consistent with observable patterns of operations, we conducted a mail survey in 1992 in the Japanese auto parts industry. The questionnaire asked those Japanese parts suppliers, which have made direct investments in manufacturing (including technical tie-ups) both in North America and Europe, about patterns of operations and technology transfers by types of activities. Thus, our unit of analysis was chosen to be activities rather than companies. Specifically, 29 main activities in manufacturing operations (covering human resource management, production technology, facility management, supplier management, production and inventory control, quality control, and improvement programs) were selected for the survey.

Sixty auto suppliers that had manufacturing experiences in both North America and Europe were identified through our research, to which we mailed a questionnaire. Most of them were relatively large first-tier suppliers. Nineteen companies (31.7 percent response rate) returned usable responses, from which we calculated simple averages for our analytical purposes. Although we could analyze how patterns of direct investments differed across different types of companies based on the same survey data, this paper focuses on types of activities as a unit of analysis. That is, only aggregated data by activities are used for the analyses.

For example, a "distance index" was calculated for each of the activity and each pair of regions (Japan-America, Japan-Europe, and Europe-America) by taking the ratio of those respondents who said that the operational pattern was somewhat or very different between the pair of regions in the activity in question. The indices were then used for subsequent analyses.

Also, the questionnaire results were supplemented by our clinical evidence from interviews and direct observations of the sample companies. Since we have visited a majority of the facilities in Europe and North America at first hand, field notes from our extensive visits were used for interpreting the quantitative data.

Summary of the Preliminary Results:

Let us summarize the tentative results of the survey along the line with the models proposed in Section 3 (Figure 2).

(1) Similarity or Difference between Japan and Europe/America: Figures 3 and 4 summarize the results on the "distance" index defined above between Japan and Europe and between Japan and America respectively. The larger the number, the larger the fraction of the respondents who think that the patterns of operations are different between the two regions in question. Assuming that the traditional practices have been significantly different between Japan and the West in all activities, a high score of the index is associated with a high degree of adaptation, while the low score would indicate a high degree of application.

As is clear in the figures, the profiles of the distances in 29 activities are very similar between the two pairs of regions. The activities with relatively high scores (i.e., cross-regional difference) included recruit process (#1), training (#2), union relations (#4), wage systems (#7), age of employees (#9), and work-in-process inventory policies (#24). The results were generally consistent with previous academic studies (e.g., Abo et al., 1991) and consensus among practitioners. The activities which showed low scores (i.e., cross-regional similarity) included automation policy (#11), automation ratio (#12), requirements imposed on suppliers (#19), levels of inspection criteria (#26), and revisions process of standard operating procedures (#27). Thus, the data indicated tendency toward application in certain production technologies and quality control standards, while adaptation to local environments was observed in activities associated with the external labor market.

Figure 5, a scatter diagram between the Euro-Japan distance index and the U.S.-Japan index by activities, basically shows a high correlation between the two (correlation coefficient = 0.84). Since the points off the diagonal in Figure 5 indicate the asymmetrical transfers discussed in Sections 3 and 4, the high positive correlation means the lack of significant cases for the asymmetrical transfers, despite our prediction in Section 4. Also, the average score of the Euro-Japan distance index was 0.58, which was almost the same as that of the America-Japan distance index, 0.57. Thus, on average, the European operations and the North American operations were almost equally different from the Japanese operations.

(2) Similarity or Difference between Europe and America: The second basic question is whether the operational patterns of the European and North American facilities are similar (i.e., consistent with the repeated model) or different (i.e., consistent with the differentiated model). To answer this question, we made distance indices that measure the perceived differences between Europe and America at the plant construction stage and the production stage. First we asked the perceived difference in policies and technology transfers at the plant construction stage. As shown in Figure 6, the respondents saying that their experiences in American plants and European plants were different turned out to be a minority group. Although equipment procurement policy was significantly different between America and Europe, the data did not indicate a large difference between the two regions at the construction stage.

Second, as a measures for the post-investment (i.e., production) stage, the distance index was measured for the 29 activities between Europe and America. The result, shown in Figure 7, is somewhat different from the result in Figure 6. Particularly high scores of the Euro-American difference were observed in such activities as union relations (#4), job design (#5), age of employees (#9), criteria for supplier selection (#18), transportation methods (#20), and quality control system (#25). Although detailed analysis of this pattern is beyond the scope of this paper, the data indicated that the absolute level of the Euro-American difference was significantly high (average distance = 0.43), although relatively low compared with the average Euro-Japan and America-Japan differences.

Figures 8 and 9 show scatter diagrams between the Euro-American distance index and the Euro-Japan index, and between the Euro-American index and the America-Japan index respectively. Our models proposed in Section 3 predict a triangular distribution of data points in each diagram, with the repeated application type in the lower left area, the repeated adaptation in the lower right area of the diagonal, and the differentiated adaptation in the upper right area. The distribution of the data points in the figures is generally consistent with this prediction. For example, a typical activity that fits the repeated application model is automation policy; Promotion and recruitment policies are among the ones that would fit the repeated adaptation model; Relations with unions is a typical activity consistent with the differentiated adaptation model. Thus, the result generally confirms our idea that implementation of direct investments is a multifaceted phenomenon and that different models would fit different types of activities.

Finally, we examined a statistical model by which the Euro-Japan distance index for the 29 activities was regressed by the Japan-America and America-Europe indices, assuming that the decisions on direct investments in America preceded those in Europe. The result was as follows (JE, JA, AE are Japan-Europe, Japan-America, and America-Europe distance index respectively) :

$$JE = 0.05 + \underset{(0.09)}{0.61\,JA} + \underset{(0.15)}{0.43\,AE}$$

(R^2 = 0.78. Standard errors in parenthesis. Degree of freedom = 26)

Thus, the regression results was consistent with our idea that the perceived difference or similarity in operational patterns between Japan and Europe can be explained partly by the preceding experiences of application/adaptation in the American operations, and partly by the perceived difference between the American and European patterns of operations.

(3) Spoke versus Triangle: As for transferring managerial resources and technologies between the American and the European facilities, about one third said that they transferred at least part of the managerial resources between them (Figure 10). Relatively high scores were observed in hardware and formal system (e.g., organization design, cost control, and production technology), which are generally regarded as

transferable. The score was somewhat lower in more "soft" management practices such as personnel and supplier.

Overall, the transfer of technologies and managerial resources was not active in a majority of the firms. Thus, in the auto parts industry, spoke or V-shaped configuration rather than the triangular pattern, was a dominant mode.

(4) Direction of Flow: In the case of the auto parts industry, very few cases of flow back to the Japanese plants were reported: Only two companies out of 19 respondents said that they had some experiences in the reversed technology transfers (negative = 11; no answer = 7). Thus, as far as this industry was concerned, the cases which fit the reciprocal model were very limited. Unidirectional mode was still dominant. In a way, this result contrasts with early anecdotal evidence of reversed technology transfer at the level of assemblers' international operations as discussed earlier, although more systematic and comparable evidence is yet to be produced.

The survey did not ask whether their network of operations was single-layered or multilayered. Based on our interviews, direct observations and literature surveys, however, we can assume that the cases of multilayer management are as yet limited except certain larger assembly makers, as indicated in section 4.

In summary, the survey on the implementation of manufacturing direct investments by the Japanese auto parts industry has indicated that one configurational model that is consistent with the currently dominant practice is the unidirectional, spoke, and single layer model, although there are some indications that triangular and reciprocal models may become more relevant in future. Also, the survey has shown that the repeated application, repeated adaptation, or differentiated adaptation models are consistent with parts of the data, depending on the types of activities, apparently reflecting the multifaceted nature of direct investments.

6. Conclusion

This paper described and analyzed certain aspects of foreign direct investments in Europe by the Japanese automobile and auto parts companies, with a particular focus on the implementation stage. After briefly discussing historical and current developments of the firms' investment decisions (Section 2), we turned to the issue of implementation and presented a series of conceptual models that may explain parts of the reality in the trilateral operations between Japan, Europe and America (Section 3). The subsequent discussions based on observable evidence (Section 4) made us assume that post-investment management of foreign operations is a multifaceted phenomenon, in that multiple models are required to explain the behavior of the firms. The results of the survey conducted in the auto parts industry were generally consistent with our view that no single model can fully explain this complex phenomenon (Section 5). Furthermore, it was claimed that the configurational models (V-shaped or triangular) which take into account patterns of transfer (repeated or differentiated), operational modes (application or adaptation), and information flow (unidirectional or reciprocal) provide a more relevant framework to our subject. It was also indicated that a full-fledged system of triangular, reciprocal and multilayer configuration had not yet been developed in this industry although early evidence in that direction was identified in some automakers' transnational operations. Overall, the survey suggested that detailed empirical research at the operational level is essential for a deeper understanding of the complex reality.

Now that most major investment decisions by the Japanese auto and auto parts companies have been made as of 1992, the issue of implementation and post-investment management of global operational network will become increasingly important. In pursuing this area of research, we believe that we need to develop a broad perspective covering multiple regions (not only Europe but also other geographic areas), multiple functions, and detailed analyses at multidimensional operational levels. This paper addressed the issue of transnational investments by Japanese firms with this motivation in mind.

Post-investment management on a global scale is a new challenge to many Japanese manufacturing firms. Although we could not as yet systematically present a strong case of trilateral, reciprocal and multilayer management of global operations, our interviews and other observable evidence indicated the budding of such a system. More detailed case studies as well as statistical surveys to capture the emergent patterns of management practices will be necessary. Whichever methods may be used, further research should integrate clinical and quantitative, as well as macroscopic and microscopic, aspects of this complex phenomenon.

Bibliography:

Abo, Tetsuo, Hiroshi Itagaki, Kunio Kamiyama, Tetsuji Kawamura, and Hiroshi Kumon. America ni Ikiru Nihonteki Seisan System (The Japanese Production Systems in America). Tokyo: Toyo Keizai Shinpo-sha. (1991, Japanese)

Bartlett, Christopher A., and Sumantra Ghoshal. Managing Across Borders. Boston: Harvard Business School Press. (1989)

Dohse, Knuth, Ulrich Juergens, and Thomas Malsch. "From `Fordism' to `Toyotism'? The Social Organization of the Labor Process in the Japanese Automobile Industry." Politics and Society, 14, 2, (1985).

Flaherty, M. Therese. "Coordinating International Manufacturing and Technology." In Porter, Michael E. ed., Competition in Global Industries. Boston: Harvard Business School Press. (1986).

FOURIN. 1991 Oshu Jidosha Buhin Sangyo: Shijo, Shuyo Kigyo Hen (1991 European Auto Parts Industry: Market and Main Parts Companies). Nagoya: FOURIN (1991, Japanese).

Japan Automobile Manufacturers Association, Inc. (JAMA) 1992 The Motor Industry of Japan. Tokyo: JAMA. (1992)

Japan Auto Parts Industries Association (JAPIA). Jidosha Buhin Kogyo Kaigai Jigyo Gaikyo Chosa (A Study on Overseas Operations by the Auto Parts Industry). Tokyo: JAPIA. (1991, Japanese)

Mitsubishi Research Institute (MRI). Globalization no Shinten to Sangyo Gijutsu ni kansuru Chosa Hokokusho (Research Report on the Progress of Globalization and Industrial Technologies) Tokyo: MRI. (1991, Japanese)

Nissan Motor Company. Jidosha Sangyo Hand Book (The Automobile Industry Hand Book). Tokyo: Nissan. (1991)

Shimada, Haruo. Humanware no Keizaigaku (The Economics of Humanware). Tokyo: Iwanami Shoten (1988, Japanese)

Suzuki, Naotsugu. America Shakai no Naka no Nikkei Kigyo (The Japanese Companies in the American Society). Tokyo: Toyo Keizai Shinpo-sha. (1991. Japanese)

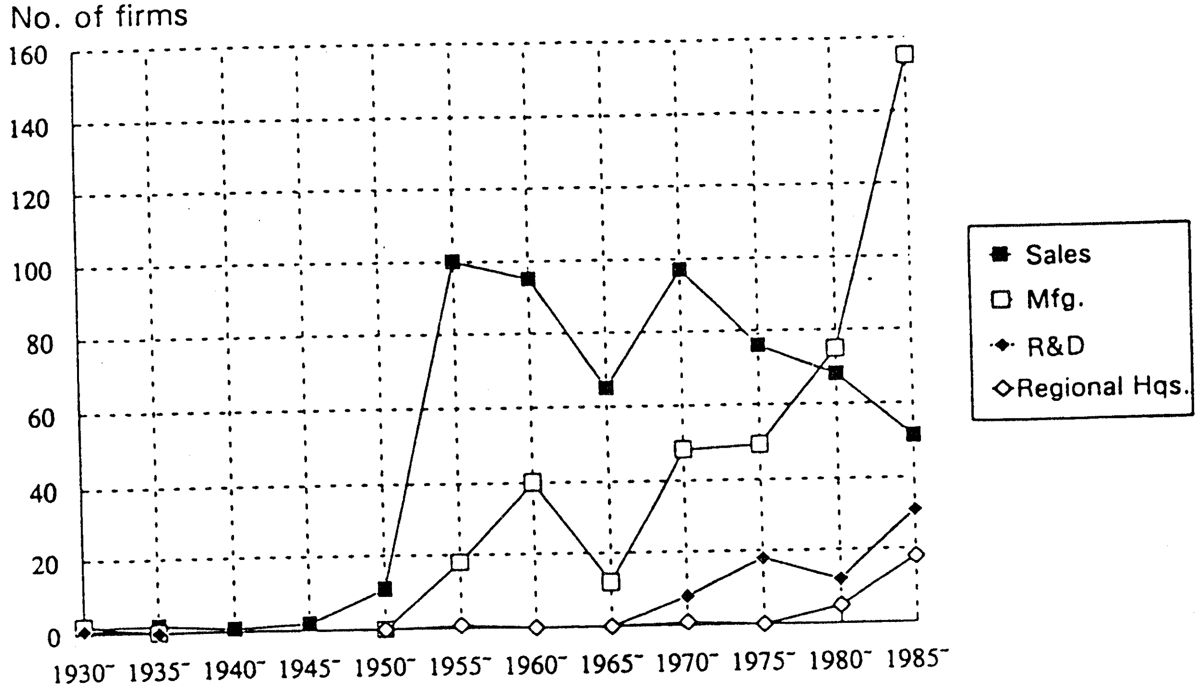
Vernon, Raymond. Sovereignty at Bay. New York: Basic Books. (1971)

Wickens, Peter. The Road to Nissan: Flexibility, Quality, Teamwork. XXXX (1987)

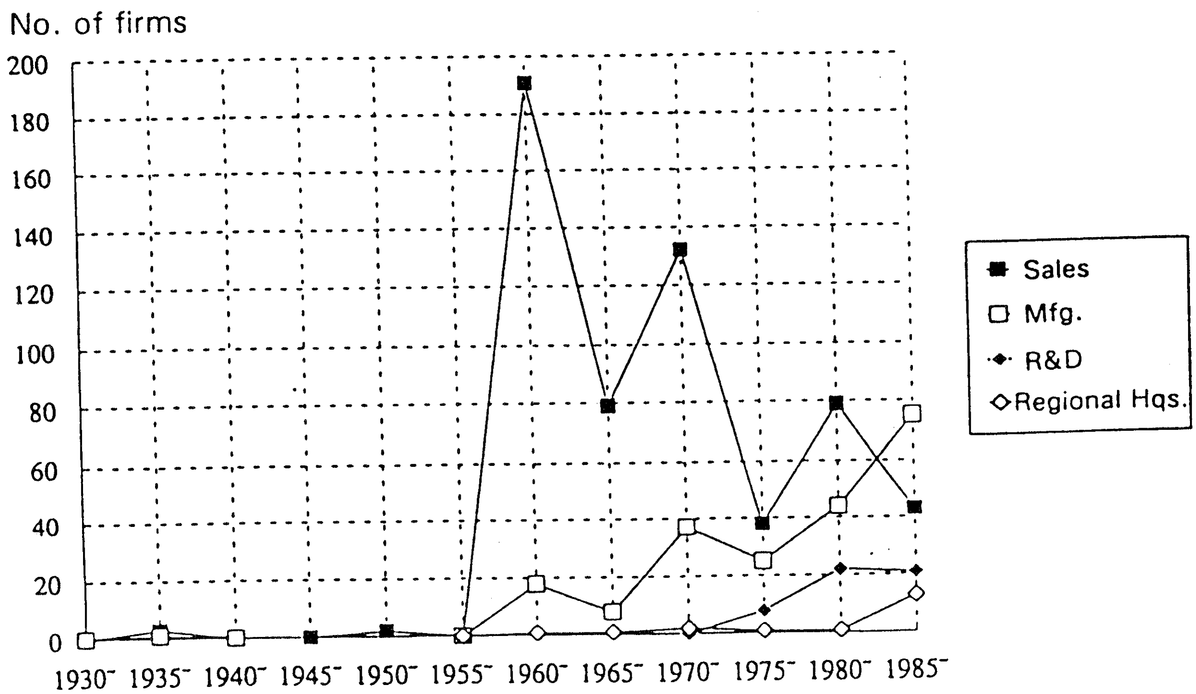
Womack, James P., Daniel T. Jones, and Daniel Roos. The Machine That Changed the World. New York: Rawson Associates. (1990).

Figure 1 Newly Established Facilities by Japanese Firms

(1) North America



(2) Europe



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(3) Asia

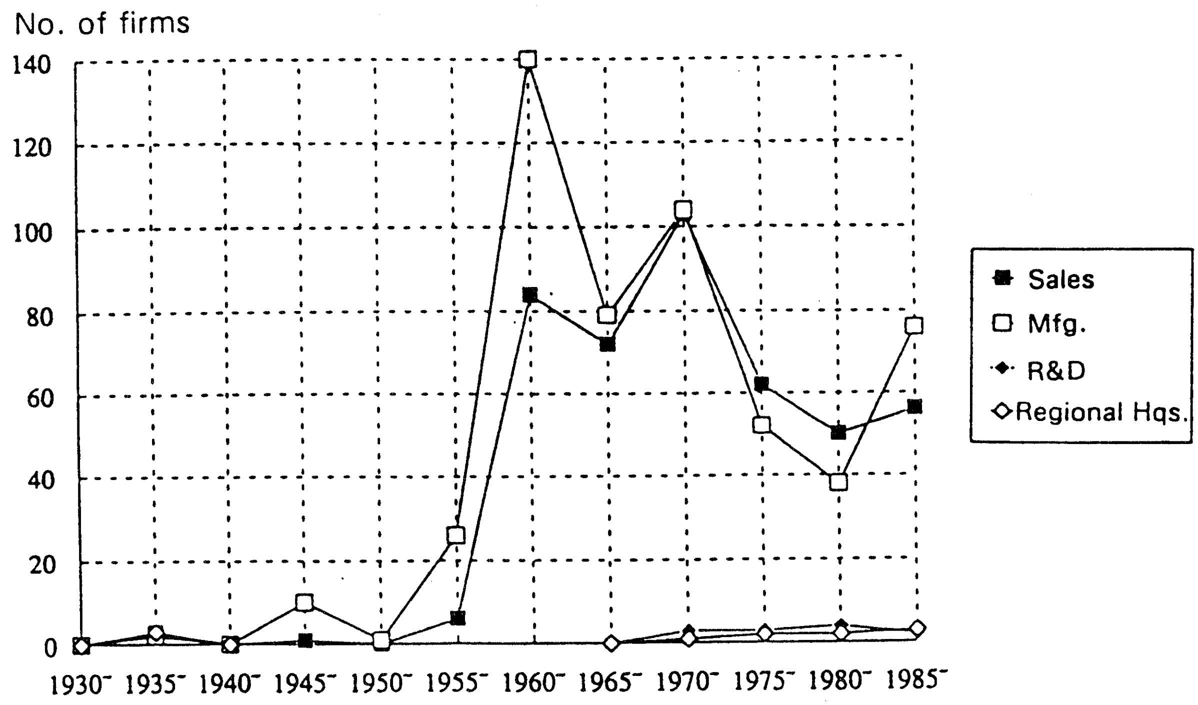
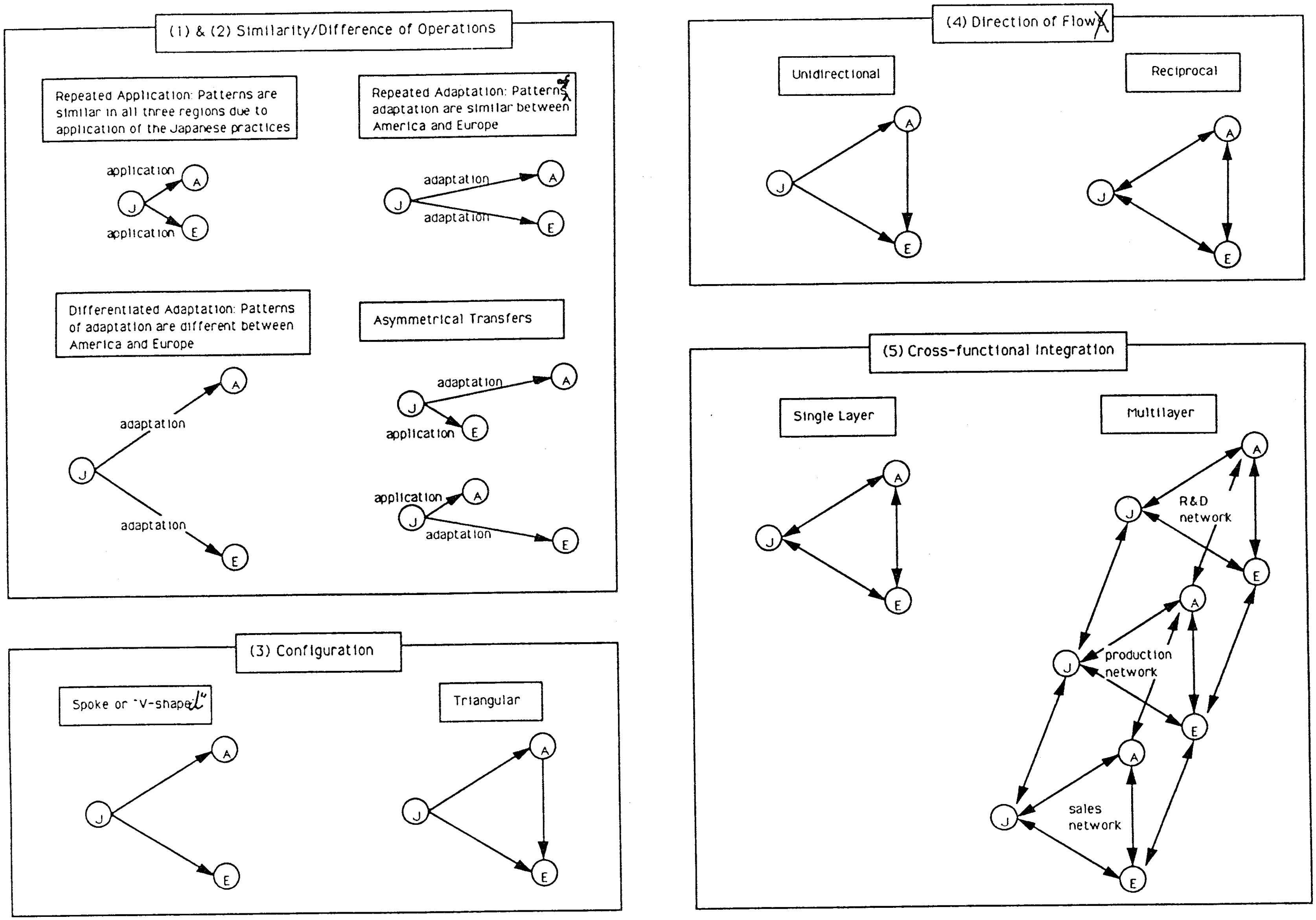

No. of firms
140
120
100
80
60
40
20
0
1930⁻ 1935⁻ 1940⁻ 1945⁻ 1950⁻ 1955⁻ 1960⁻ 1965⁻ 1970⁻ 1975⁻ 1980⁻ 1985⁻
Sales
Mfg.
R&D
Regional Hqs.

Figure 2 Patterns of Overseas Investment among Three Regions



Key: (J): Japanese operation (A): North American operation (E): European operation Distance between the nodes represents differences in operations. Arrows represents flows of technologies.

Figure 2.1 Some Typical Patterns of Overseas Investment by Japanese Automakers

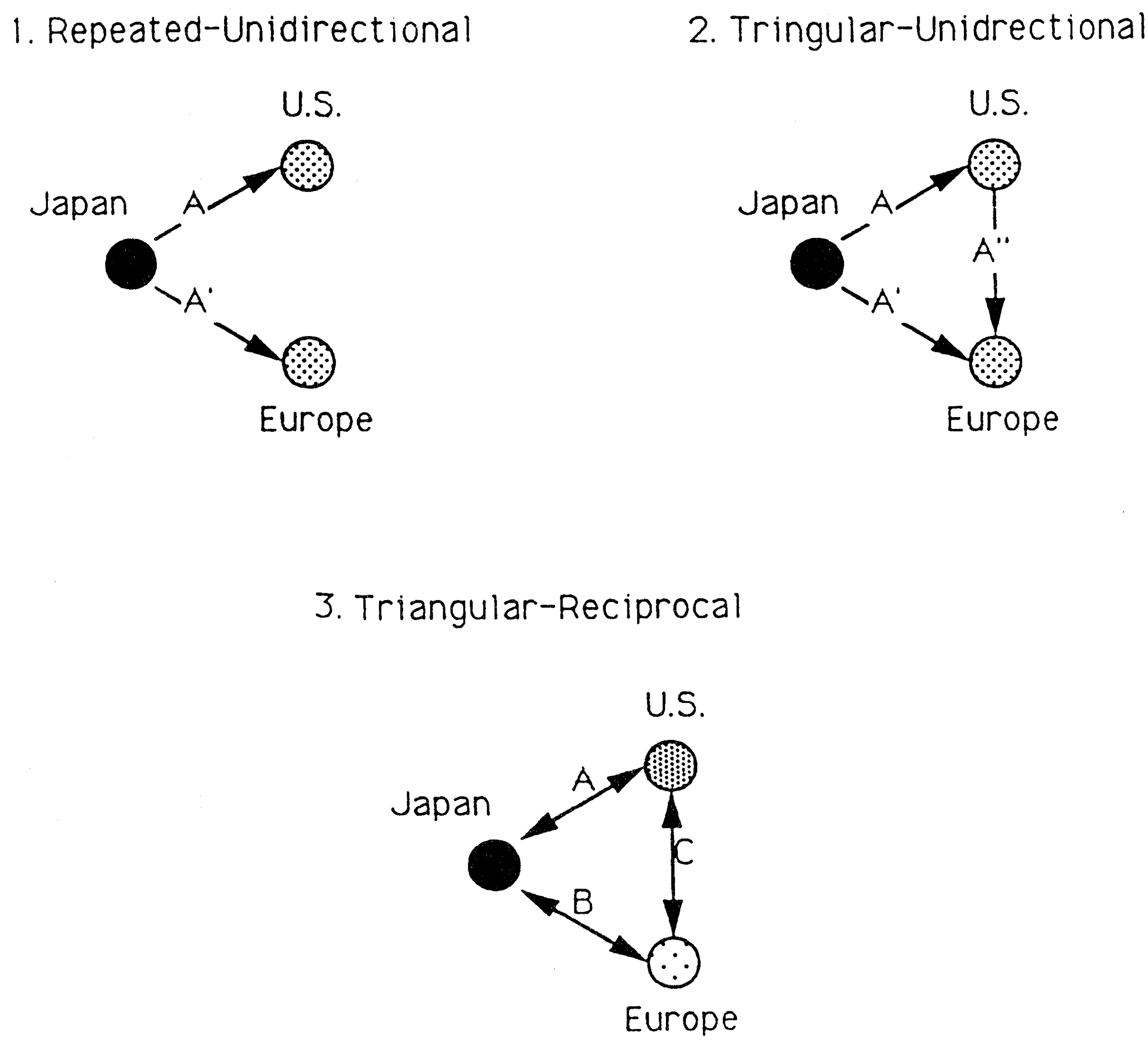


Figure 3 Japan - Europe Distance Index

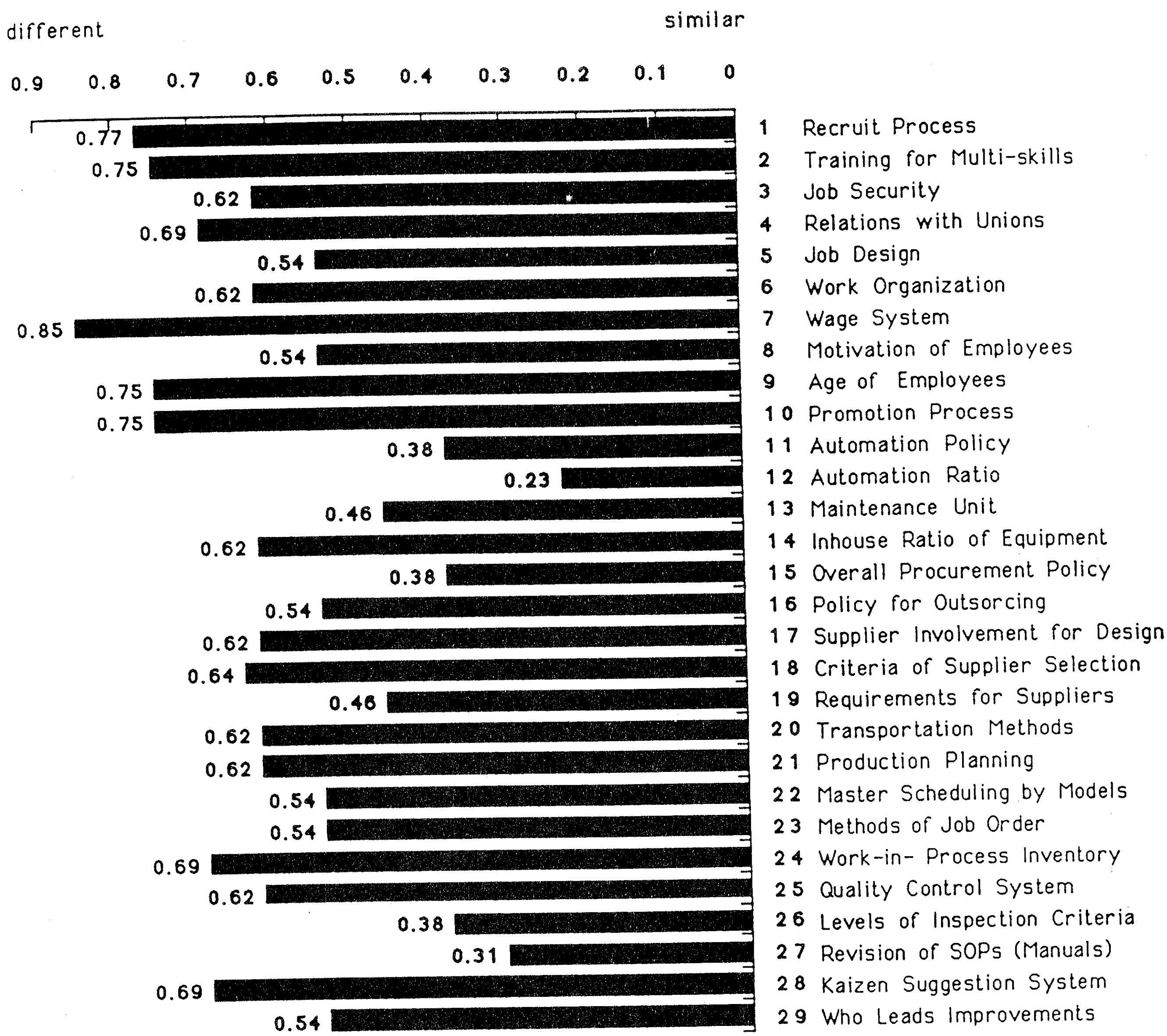


Figure 4 Japan - U.S. Distance Index

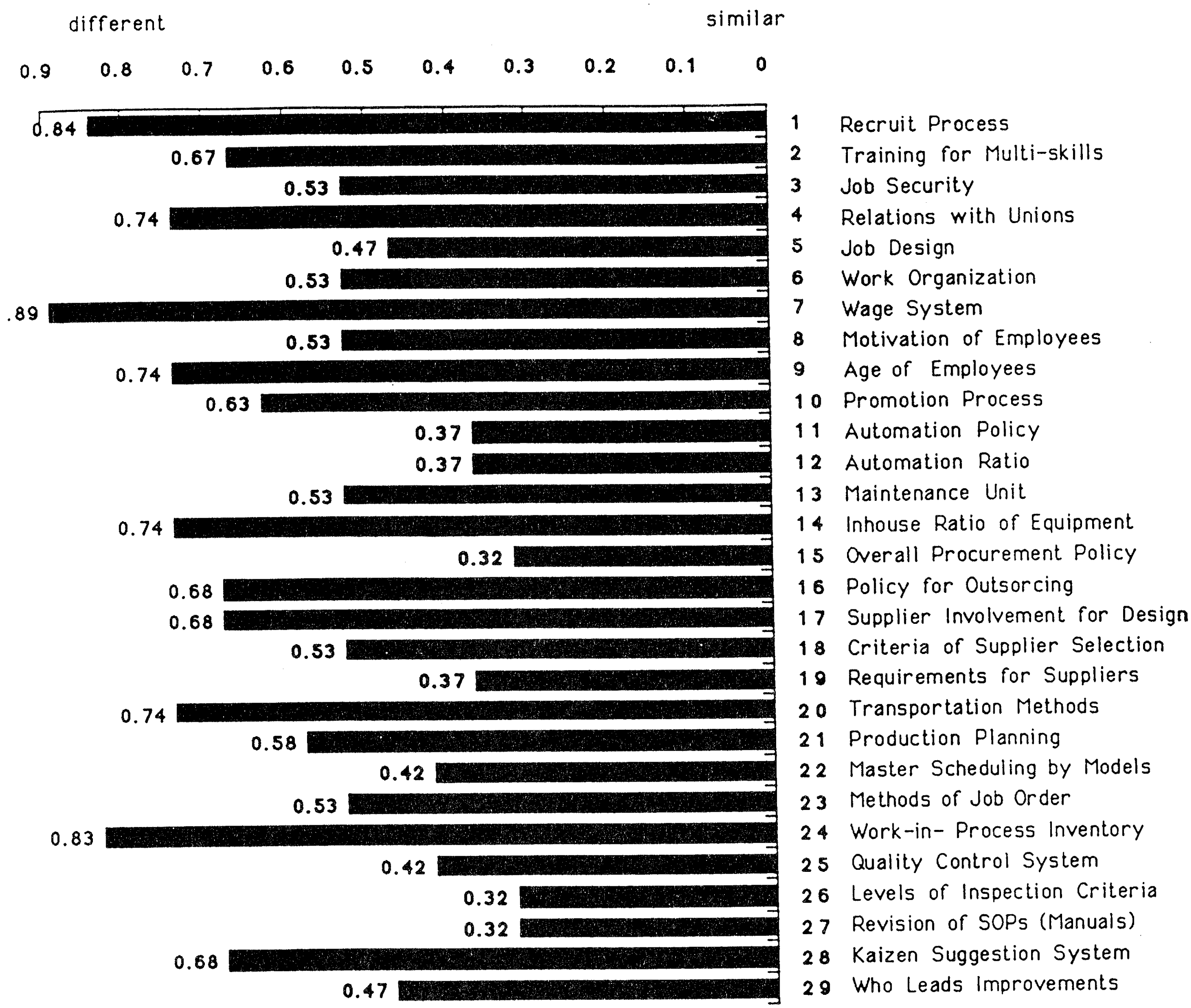


Figure 5 Scattergram for Distance Indices (1)

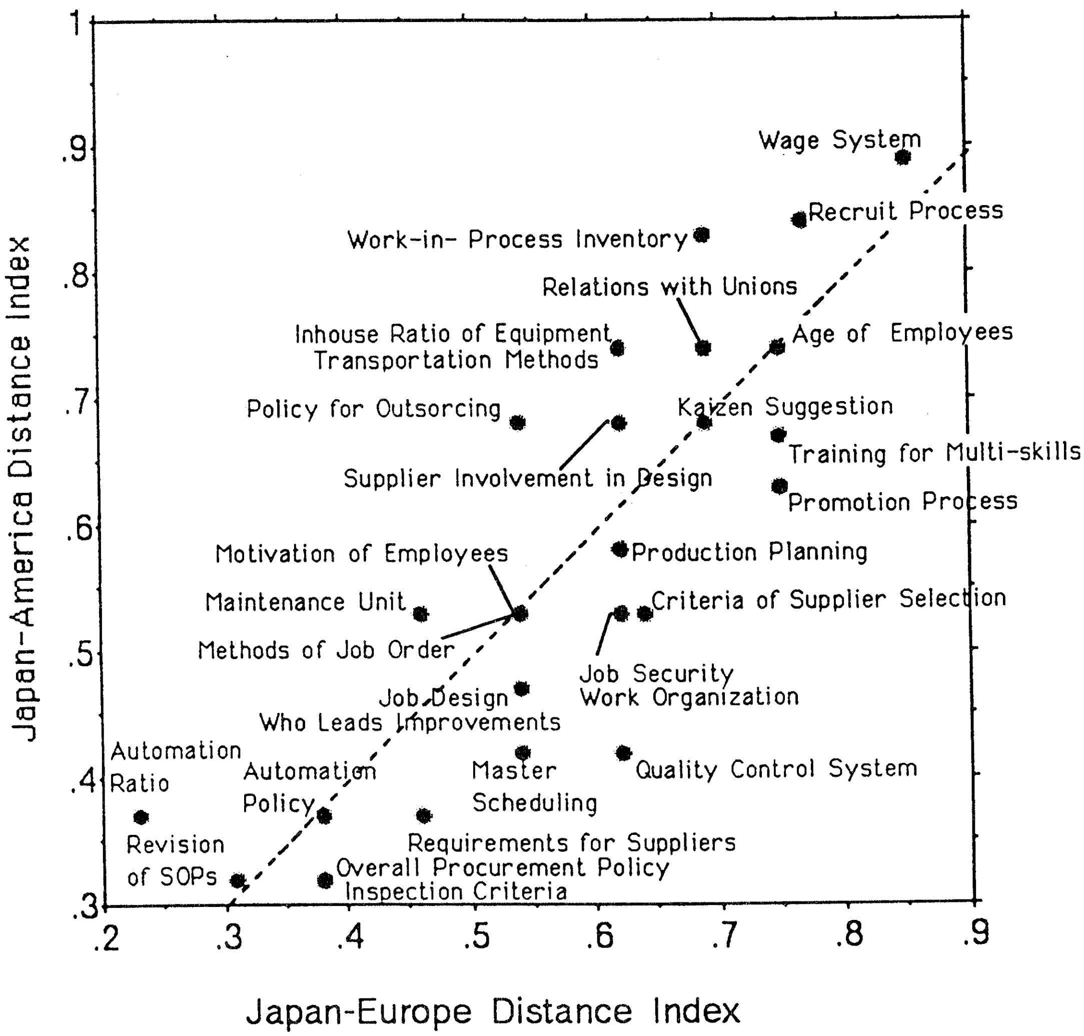


Figure 6 Distance Index in Plant Construction Patterns between U.S. and Europe

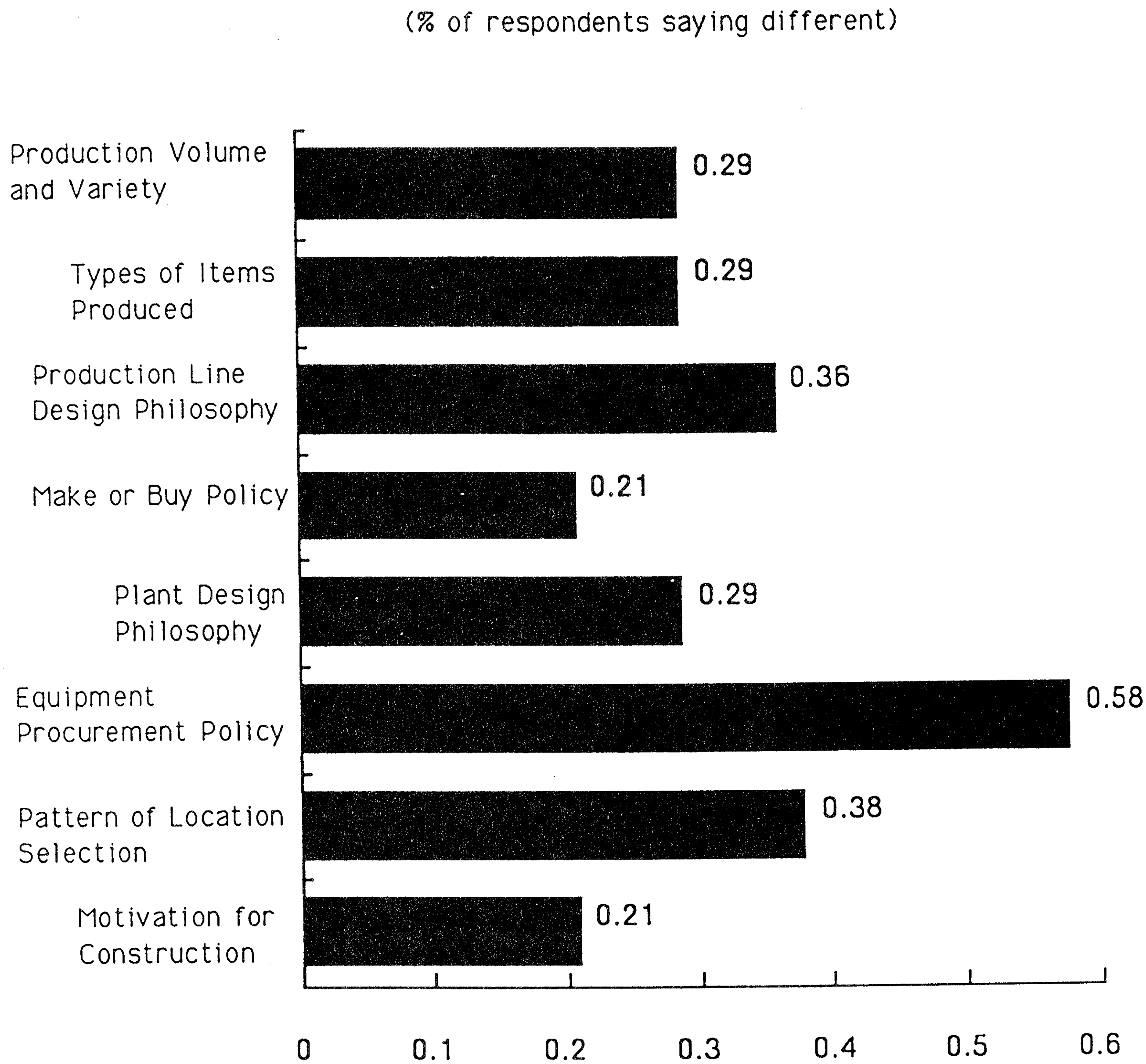
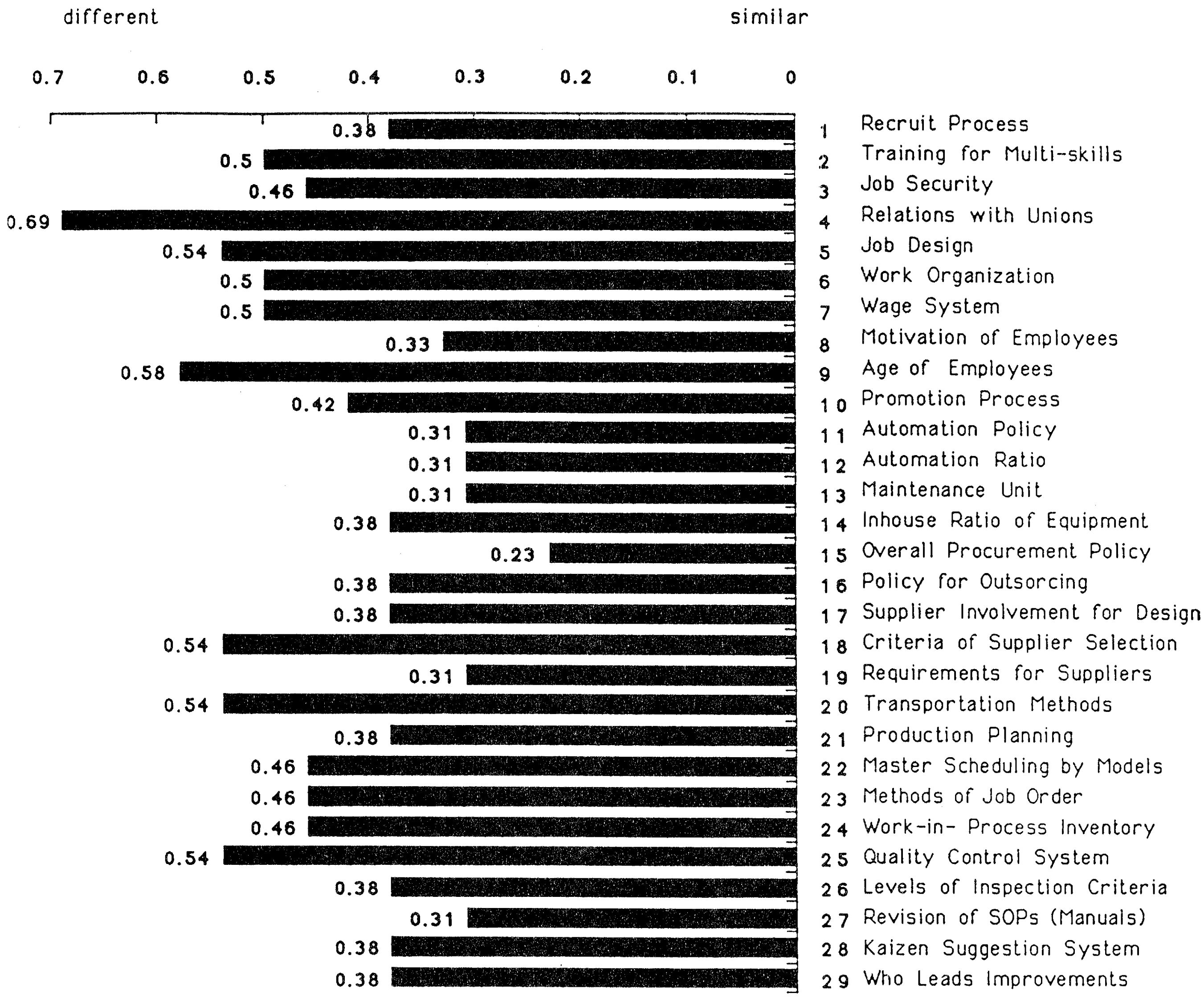


Figure 7 Europe - America Distance Index



Fiogure 8 Scattergram for Distance Indices (2)

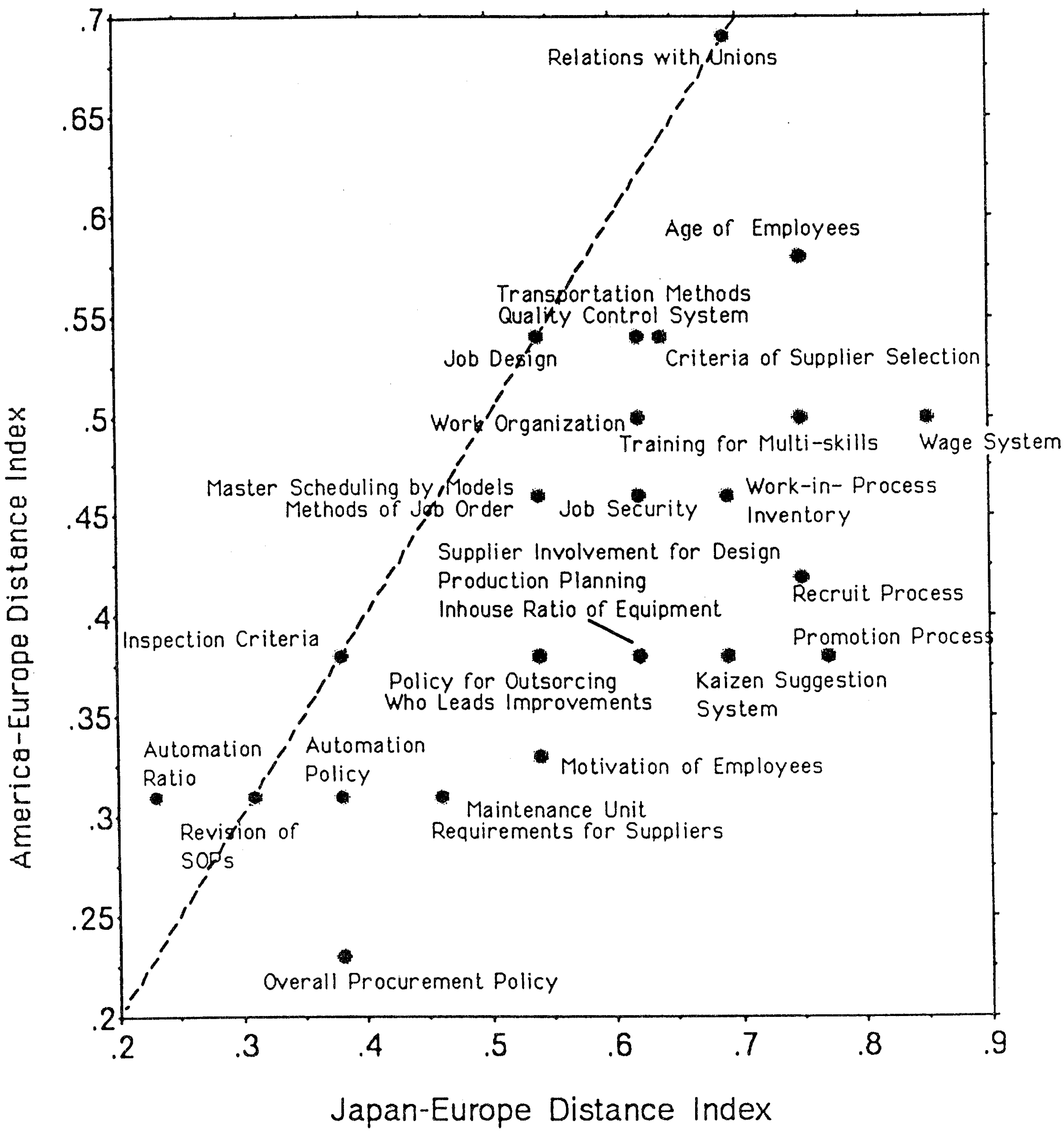


Figure 9 Scattergram for Distance Indices (3)

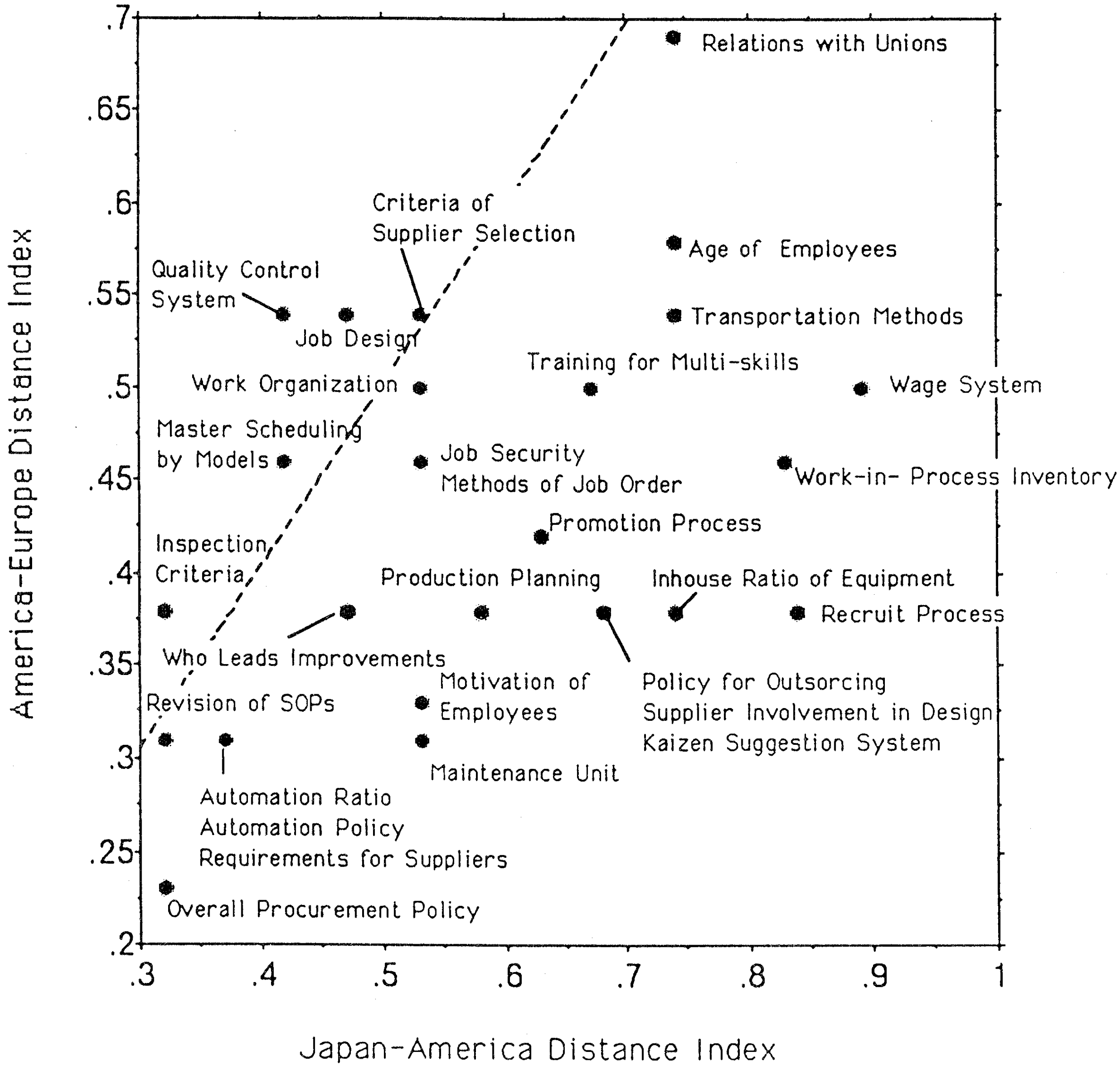


Figure 10 U.S. - Europe Management Transfer Index

% of all respondents

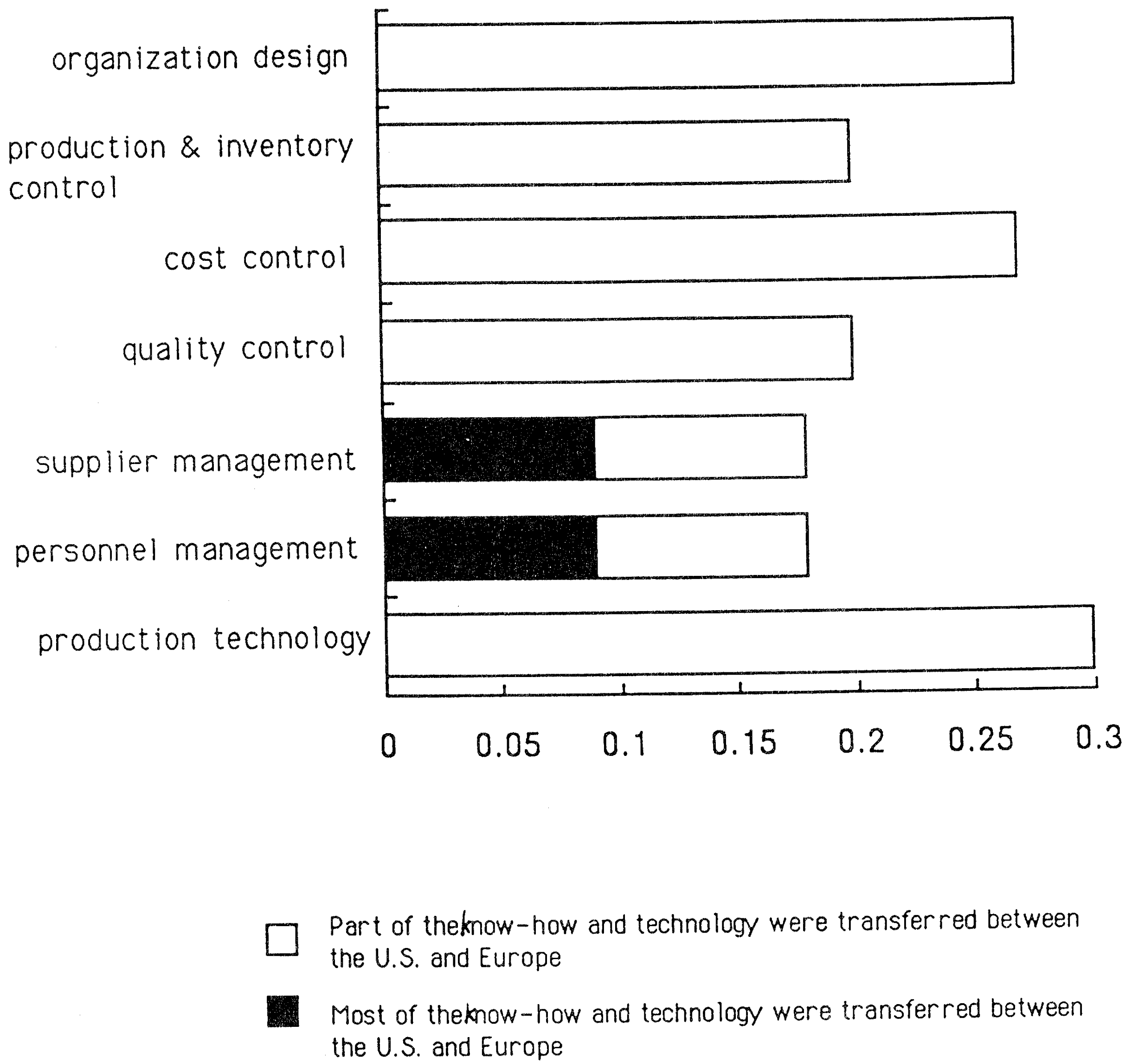


Table 1. Exports of Japanese Automobiles to Europe

	A	B	C	D	E	F
1	year	Export to Europe	Export to EC	European Market	EC Market	# of Dealers
2	1960					
3	1961					
4	1962					
5	1963					
6	1964					
7	1965	14008	1263			
8	1966					
9	1967					
10	1968					
11	1969					
12	1970	101516	44530			
13	1971					3500
14	1972					
15	1973	359469				
16	1974	340842				
17	1975	482002	368264			
18	1976	663889				7300
19	1977	663529				
20	1978	649650				
21	1979	808792		10700457	8962857	
22	1980	1007532	744082	10020834	8424137	
23	1981	950012		9938120	8453465	
24	1982	903952		10253606	8662746	
25	1983	1045255	762156	10459055	8781839	12900
26	1984	1043306	790361	10198876	8629414	
27	1985	1093500	791365	10750857	8922934	13700
28	1986	1319535	932971	11697600	10531072	
29	1987	1408906	1006459	12409789	11269747	14000
30	1988	1456959	1037924	12953056	11780574	
31	1989	1449182	1057438			15500
32	1990					
33	Source:Nissan Motor Company, MIRU.					

Table 2. Manufacturing Direct Investments in Europe by Japanese Automakers

United Kingdom					Germany	Spain	Portugal
Nissan	Honda	Isuzu	Toyota		Toyota	Nissan	Toyota
Sole Entry	Sole Entry	Joint Venture with GM	Sole Entry		Joint Production	Capital Participation	Joint Venture with Salvador Caetano
Nissan Motor Manufacturing (UK) Limited	Honda of the U.K. Mfg., Ltd.	IBC Vehicles Limited	Toyota Motor Manufacturing (UK) Ltd.		Volkswagen AG	Nissan Motor Ibérica, S.A.	Salvador Caetano I.M.V.T., S.A.
April 1984	February 1985	September 1987	December 1989		—	June 1987	1946
Nissan 100%	Honda 4.1% Honda Motor Europe 75.91 Rover Group 20%	GM 60% Isuzu 40%	Toyota 100%		—	Nissan 67.6% Local 32.4%	Toyota 27% Local 73%
Tyne and Wear, England	Swindon, England	Luton, England	Burnaston, England	Deeside, Wales	Hanover	Barcelona	Ovar
Primera	Mid-size Car, Engines	Fargo, Carry, RV	1.8-liter Passenger Car	Engines	Toyota Hilux, VW Taro	Safari, Vannette, Trade, Trucks, Parts, Engines & Transmissions	Dyna, Hiace, Hilux, Land Cruiser, Coaster
July 1986	Oct. 1989	Sept. 1987	Late 1992	Mid 1992	Jan. 1989	Jan. 1983	Oct. 1968
100,000 units (200,000 in '92)	100,000 cars 70,000 engines	60,000-70,000 units	200,000 units (100,000 units in first phase)	200,000 units (100,000 units in first phase)	15,000 units	67,200 units	12,000 units
2,500	Cars: 1,500 Engines: 300	2,000	3,000 (1,700 in first phase)	300 (200 in first phase)	—	6,870	2,360
£600 million	¥5 billion	£34 million	£700 million	£149 million	N.A.	N.A.	N.A.
Nissan European Technology Centre Ltd. Nissan European Technology Centre (Brussels) N.V.	Honda R&D Europe GmbH	—	Toyota Technical Center of Europe Toyota Europe Office of Creation		—	Nissan Motor Ibérica, S.A.	—
80%	N.A.	80%	'93: 60% '95:80%		N.A.	N.A.	N.A.

Source: JAMA, 1991: The Motor Industry of Japan.

Table 3. European Direct Investments by Japanese Auto Parts Companies

Company	Location	Start of Production	Mode of Operation	Product	Number of Employees	Maket/Customer					Remarks
						OEM (Euro)	repair (Euro)	OEM (JPN.)	repair (JPN.)	others	
Ikeda Hoover	U.K.	1986 (production)	J.V. Ikeda (Japan) 51% Hoover(U.S.)49%	seat, roof liner, door panel, head rest	270	GM		NMUK			Local content ratio = 60-70% #2 plant is complete in 1992
Reydel Ltd	U.K.	1989 (Kasai joined)	Capital Participation; Kasai 30%, Reydel (France) 70%	door trim	255			NMUK			
Calsonic Exhaust Systems	U.K.	1989 (acquisition)	100% Acquisition by Calsonic (Japan)	muffler exhaust sustem	63			NMUK			
Llanelli Radiators	U.K.	1989 (acquisition)	100% Acquisition by Calsonic (Japan)	radiator, heater, seat frame	1052			NMUK			
Marley-Kanto	U.K.	1990 (established)	J.V.; Kansei (Japan) 50% Marley (U.K.) 50%	instrument panel radeater grille	n.a			NMUK			Production starts in 1992
Koyo Bearing Europe	U.K.	1991 (production)	100% by Koyo Seiko (Japan) green field	ball baring taper roller bearng	250(plan)	X					
Lucas SEI Wiring Systems	U.K.	n.a	JV; Sumitomo Denki/Denso 30%; Lucas (U.K.) 70%	wire harness	n.a.						
European Components	U.K.	1988 (established)	Takata (Japan)	seat belt, door latch	975						Northern Ireland
Dunlop-Topy Wheels	U.K.	1987 (Topy joined)	J.V.; Topy (Japan) 15%; Dunlop (U.S.A.) 85%	steel wheel	600						
Elta Plastics	U.K.	1990 (acquisition)	J.V.; Nifco (Japan) 80%; Marubeni (Japan) 15%	plastc parts	n.a.	Ford		NMUK, Honda, Toyota			
Bowden Controls	U.K.	1989 (NCS joined)	Capital Participation; Nihon Cable System (Japan), 35%	control cable	250			X			
UK-NSI	U.K.	1987 (est.); 1988 (produ.)	100% by Nihon Seiki (Japan)	combination meter	114	Rover					Plan for plant expansion I 1992, supplying to Audi, Fiat, Honda
NSK Bearing Europe	U.K.	1974 (est.); 1976 (produ.)	100% by Nihon Seiko (Japan)	bearing	n.a			NMUK, etc.			Vertically integrated with casting and heat treatment
NSK-AKS Precision Ball Europe	U.K.	1990 (production)	J.V.; Nihon Seiko (Japan) 60%, Amatsuji (Japan) 40%	ball for bearing	62						
United Precision Industries	U.K.	1990 (acquisition)	100% by Nihon Seiko (Japan) Acquisition	bearing	n.a.						
ND Marston	U.K.	1989 (acquisition)	100% by Nippon Denso (Japan) Acquisition	radiator, oil cooler, intercooler, etc.	960						
(Nippo Denso)	U.K.	1991 (production)	J.V.; Nippon Denso (Japan) 75% Magneti Marelli (Italy) 25%	air conditioner, heater	n.a						
Hashimoto Ltd	U.K.	1989 (est.); 1990 (produ.)	100% by Hashimoto Foaming (Japan)	exterior parts	120			NMUK			#2 plant is complete in 1992
Nissan Yamato Engineering	U.K.	1987 (est.); 1990 (produ.)	J.V.; Yamato Kogyo (Japan) 20%, Nissan (Japan) 80%	small stamping parts	190			NMUK			
Yuasa Battery Ltd	U.K.	1981 (est.).	100% by Yuasa Battery (Japan)	battery	479						
Lucas Yuasa Batteries	U.K.		J.V.; Yuasa (Japan) 50%; Lucas (U.K.) 50%	battery	654						
Ryobi Aluminum Casting	U.K.	1990 (est.); 1992 (produ.)	100% by Ryobi (Japan)	transmission case clutch case	plan	Ford					Nolhern Ireland Plan to get more customers

Source: JAMA data, FOURIN reports, Toyo Keizai directory, etc.

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Company	Location	Start of Production	Mode of Operation	Product	Number of Employees	Maket/Customer					Remarks
						OEM (Euro)	repair (Euro)	OEM (JPN)	repair (JPN.)	others	
Esteban Ikeda	Spain	1990 (est.), 1990 (produ.)	J.V.; Ikeda (Japan) 49%, Esteban(Spain) 51%	seal	107			Motor Iberica			
AP Amortiguadores, S.A	Spain	1983 (Kayaba joined)	Capital Participation, Kayaba (Japan) 25%; TI (U.K.) 75%	shock absorber	740						
Pacific Notario	Spain	1988 (acquisition)	99% by Taiheiyo Kogyo (Japan) Acquisition	tire valve, core	103	x					
VND S.A.	Spain	1989 (est.); 1991 (produ.)	J.V.; Nippon Denso (Japan) 50%; Valeo 50%	DLI coil	n.a						
Eguzkia-NHK S.A	Spain	1980 (NHK joined)	J.V.; NHK/Nissho (Japan) 50%; MBHA (Spain) 50%	coil spring, stabilizer	63						
Iberica de Suspensiones	Spain	1989 (est.); 1992 (produ.)	J.V.; NHK/Nissho (Japan) 50%; MBHA (Spain) 50%	coil spring	30						
Nachi Industrial	Spain	1976 (established)	100% by Fujikoshi since '89 (originally J.V. with local)	ball bearing, roller bearing	170						
Yazaki Monel	Spain	1988 (Yazaki joined)	J.V.; Yazaki Sogyo (Japan) 51%; local (Spain)49%	wire harness	612						
Durco Espana	Spain	1989 (established)									
Benoac Fertigteil	Germany	1986 (established)									
Simrax	Germany	1976 (est.); 1977 (produ.)	J.V.; NOK (Japan) 40%; Freudenberg (Germany) 60%	mechanical seal	26						
NTN Kugellagerfabrik	Germany	1971 (est.); 1972 (produ.)	100% by NTN (Japan)	ball bearing	144						
Matsushita Communication Deutschland	Germany	1985 (est.); 1985 (produ.)	100% by Matsushita (Japan)	automobile telephone	140						
PU S.A.	France	1990 (est.); 1990 (produ.)	J.V.; Uchiyama Kogyo (Japan) 40%; Procal (France) 60%	cylinder head cover, gasket, washer seal	n.a.						
Clarion France	France	1983 (est.); 1984 (produ.)	J.V.; Clarion (Japan) 95%, Group Bessis (France) 5%	car stereo set	290						
Trio-Kenwood Bretagne	France	1984 (est.); 1985 (produ.)	J.V.; Kenwood (Japan) 50%; SOFREL, etc. (France) 50%	car stereo set, CD player	49						
Stanley-Idess	France	1984 (est.); 1989 (produ.)	J.V.; Stanley (Japan) 83%; Idess, etc. (France) 17%	LED lamp	n.a.						
NGK Spark Plug Industries Europe	France	1990 (est.); 1991 (produ.)									
Calsonic Exhaust Systems B.V.	Holland	1989 (acquisition)	100% by Calsonic (Japan) Acquisition	muffler, exhaust pipe	37						muffler: 300K/year exhaust pipe: 250K/year
Hokushin Europe B.V.	Holland	1987 (established)									
Flamm-GS S.P.A.	Italy	1988 (GS joined)	J.V.; Nihon Denchi (GS, Japan) 49%; FIAMM (Italy) 51%	battery	30						
Yazaki Saltano	Portugal	1987 (established)	J.V.; Yazaki (Japan) 86%; Saltano (Portugal) 14%	wire harness	2071						

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Company	Location	Start of Production	Mode of Operation	Product	Number of Employees	Maket/Customer					Remarks
						OEM (Euro)	repair (Euro)	OEM (JPN.)	repair (JPN.)	others	
Semperit-MBL	Austria	1982 (established)	J.V.; Yazaki (Japan) 50%; Semperit (Austria) 50%	synthetic rubber belt	127						
AW Europe	Belgium	1990 (established)	100% by Aishin AW (Japan)	automatic transmission	500 (plan)	opel					Plan: start of production = 1993 Local content ratio = 60% (1996)
Zexel Gleason Europe	Belgium	1989 (established)	J.V.; Zexel (Japan) 44%; Zexel Gleason U.S.A. 56%	n.a.	125						
Glaverbel	Belgium	1981 (acquisition)	J.V.; Asahi Glass (Japan) 72%; local (Belgium) 28%	front glass, mirror	3600						
Massglass B.V.	Holland	1981 (acquisition)	J.V.; Asahi Glass (Japan) 40%; Glaverbel (Belgium) 60%	automobile glass	620						
Sharp Precision	U.K.	1988 (established)	100% by Sharp Precision (Japan)	engineering plastic parts	59						

Table 4. Outline of the European Auto Component Industry

Country	Production Milion $	Nr.of Employee	Large Company	Sales Milion $
Germany	39,000	329,100	Bosch	7,611
			ZF	1,942
			Continental	1,772
			BASF	1,667
			Teves	1,306
			Mahle	861
			VDO	859
			Uni-Carden	795
			Behr	770
			Freudenberg	607
			Fichel&Sachs	602
			Hella	600
			Siemens	600
			Du-Pont	600
			SWF Electric	483
France	21,500	168,700	Michelin	8,070
			Valeo	2,063
			GM Component	1,997
			Bendix France	779
			Saint Gobain	771
			Epeda Bertrand	655
			ECIA	550
			Motrola	530
			Huchinson	342
Itary	14,100	138,500	Pireli	2,900
			Magneti Mareli	2,038
			Gilardini	394
Spain	11,200	147,100	Bendix Spain	150
U.K.	10,500	132,600	Lucas	1,989
			GKN	1,803
			T&N	1,080
			Pilkington	956
			BBA	928
			BTR	820
			Rockwell	770
			Eaton	241
Others	3,500	20,200	Philips	3,786
			SKF	1,779
			Goodyear	1,673
Total	100,000	950,000		

Market Share of 17 Large Companies (over $1,000 million) = 40.7%

Table 5. The European Auto Component Industry

	Prod.	Export Import	Nr.of Employee	Nr.of Company	Market Share of big2	big5	big10
Germany	39,0	+9.05	329.100	600	24.5%	36.7%	46.6%
France	21,5	+2.17	168,700	400	47.1%	63.6%	
Itary	14,1	+2.42	138,500	1,000	35.0%	40.5%	
Spain	11,2	-0.64	147,100	450	16.8%		
U.K.	10,5	-1.15	132,600	350	36.1%	64.3%	
Others	3,5	-2.17	20,200	over230			
Europe	100,0	+9.68	950,000	3,030			
U.S.A.							
Japan							