

ABSTRACT. This paper examines the economic role of small business in Japan in the classic model of subcontracting *vis-à-vis* the novel model of networking. The Japanese economy can be characterized by an extensive system of subcontracting. There is an intensively elaborated point of focus on this Japanese approach to the technological and managerial aspects of subcontracting outside of Japan. Small and medium sized enterprises and big enterprises, in their endeavour to be effective and efficient, determine the characteristics of this system of industrial production. The characteristics of the subcontracting system in Japan are undergoing structural changes. The requirements concerning an accelerating technological expertise and marketing know-how of subcontracting firms will be adduced as a motive for the rapid industrial restructuring.

I. Introduction

The Japanese economy can be characterised by an extensive system of subcontractions. Recently, policymakers have started to focus their attention on this system of subcontracting (Acs and FitzRoy, 1989). Their policy emphasis is based on the perceived trend towards subcontracting, the support and protection of SME subcontractors and the development of more strategic subcontracting relationships. For example, the Dutch ministry of Economic Affairs has assigned f 35.4 million to provide information and guidance services on subcontracting between 1988 and 1992. In the summer of 1988, DG XXIII of the Commission of the European Communities, launched a special policy program which focuses on European subcontractors. The single European market in

1992 "resulting in the removal of obstacles created by incompatible technical standards and other hindrances, will increase the tendency of subcontractors to delocate and ease the diversification policies of main-contractors" (SME Task Force, 1988, p. 9). The Commission has therefore decided to play an active role in coordinating and pursuing initiatives which can improve the organization of the subcontracting market.

An important strategic decision for all industries in the world lies in the concept of 'make or buy'. Manufacturing firms are faced with the question of which parts they should manufacture themselves and which parts they can obtain more easily or cheaply from other firms. Modern process industries cannot effectively survive without an industrial framework characterised by a wide network of subcontracting relationships between big enterprises (BEs) and small and medium sized enterprises (SMEs).

In the Japanese industrial production process the ratio between buy and make is probably the highest in the world. The recognition of the proliferating system of subcontracting in Japan has already stimulated numerous scholars to elaborate on a wide range of characteristics of this system of industrial production. As a result, public policy makers have started to concentrate on the system of subcontracting. Moreover, numerous Western main-contractors are attempting to orchestrate a system of subcontracting *à la* Japonaise and incorporating just in time (JIT).

The establishment of JIT at Toyota Automobile Industries, in its drive to achieve comprehensive cost reductions and produce the highest possible quality car, has advanced the automobile industry as a classic example for the success of this unique production management system (Hitomi, 1989). In JIT, final assemblers are supported by subcontractors delivering components, processed parts and subassemblies to precise time schedules and according to specifications on rapid quality

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objectives, set prices and standard levels of delivery. Some examples concerning the automobile industry are characteristic. The General Motor's assembly plant in Orion, Michigan, established in 1983, has incorporated the JIT system since the beginning of its operation, involving some 1,600 suppliers working for this plant near Detroit where Buicks and Cadillacs are being assembled. In France, as of 1986, the Renault Corporation dealt with some 1,400 subcontracting firms. And in Germany, BMW has moved towards JIT production.

The reason for the attention and acclaim of the subcontracting system in Europe and the United States is the expected efficiency and effectivity the modern process industry can gain from the kind of cooperative agreements prevailing in the Japanese system of division of labor production.

These recognitions are all the more interesting as the characteristics of the subcontracting system in Japan are undergoing structural changes (Nakatani, 1988; Sato, 1988; Small and Medium Enterprise Agency, 1988). Transaction relationships, quasi-vertical integration and hierarchy between BEs and SMEs characterized the classic model of Japanese subcontracting. The present-day transition is towards an industrial production system which shows more characteristics of information transfer, quasi-horizontal integration and loosely-knit relationships.

This transition, as argued by Docter and Van Kooij (1989), has been stimulated by some changes in the economic constellation: a sharp appreciation of the yen, increasing competition from the 'New Industrializing Economies' (NIEs), the globalization of Japanese industry, an acceleration of the technical progress, a highly diversified consumer demand, and in reaction to this, an important shortening of production life cycles.

The Western attention and acclaim of the classic model of subcontracting forwards the need to elaborate on the altering structure of this system in Japan in reaction to the changes in the economic constellation. First, in this paper a brief elaboration on the characteristics and the perceived effectivity and efficiency of the classic model of the Japanese system of subcontracting will be made. Second, the formative causes of the classic model *vis-à-vis* the new mode of industrial organization — the novel model of Japanese

networking — will be viewed. Third, the focus will be on the perceived effectivity and efficiency and the different modes of cooperation within this novel model of networking. The rapid industrial regrouping is forwarded by the requirements concerning an accelerating technological expertise and marketing know-how of SMEs.

II. The classic model of Japanese subcontracting

Characteristics

The classic model of the subcontracting system in Japan can be compared to the French concept of 'filières', which is defined as: vertically organized production modes, which comprise a chain of operations, linked in a technical and economic way, and which runs from raw materials to final products (Roobeek, 1987, p. 131). The Japanese system is characteristic for its decomposition into a final assembler and a large number of suppliers. These suppliers involve primary, secondary, tertiary and lower layers of subcontractors. The dependence of final assemblers on outside supplies is extremely high but the number of subcontractors with whom business is done directly is rather low. Therefore, this classic form of industrial organization forms a pyramid-shaped multi-layer production system. It is referred to as a system with hierarchical relationships. This classic model of the Japanese subcontracting system is a result of the high economic growth period, although it existed before WWII. Some reasons for large and small firms to start utilizing the subcontracting system have been recognized:

In order to adjust to the rapidly expanding production in the period of high-rate economic growth, large firms tried to place under their control as their affiliates those able and strong small and medium factories. Consequently they helped those smaller factories to improve machines, equipment, technologies and management and at the same time required them to rationalize their production facilities; and in this way the relationship between large parent companies and smaller affiliates was transformed from that linked by quantity to that tied by quality ability. Small factories were operated with lower wages as supplementary suppliers in quantity and at the same time as a buffer to a fluctuation of business (Sato, 1989, p. 30).

Corporate groups and parts associations were

formed as a means of supplementing the relationship between parent-firm and their supplying part manufacturers and subassemblers. These corporate groups, called "Kyoryokukai", were organized to promote communication and to help build close cooperative relationships by facilitating the mutual exchange of technology and management information between "Kogaisha", the child companies, and final assemblers. The exchange of technology and information was directed at optimizing the effectivity and production efficiency of the group, and ultimately at the competitiveness of the parent company (Van Kooij, 1990, p. 52).

Effectivity and efficiency

Abstractly speaking, it has been accepted that firms strive to meet those two characteristics to ensure their existence: they have to be effective and efficient (Barnard, 1940). The effectivity principle implies a firm's endeavour to achieve its desired end. In the pursuit of effectivity, a firm can be efficient if it offers more inducements to the members of the firm than they have to put into it. The same principles Barnard suggested, that firms have to meet to ensure their existence, can justify the '*raison d'être*' of cooperative agreements between firms. Cooperative agreements will be established if the parties involved perceive advantages of inter-firm cooperation above hierarchical integration. These cooperative agreements are coined by Jarillo (1988, p. 32) as strategic networks which he defines as, "long-term purposeful arrangements among distinct but related for-profit organizations that allow those firms in them to gain or sustain competitive advantage *vis-à-vis* their competitors outside the network."

To gain or sustain competitive advantages is indirectly the desired end Japanese firms pursue. Cutthroat competition is prevalent. The competitive power and pre-eminence of Japanese industry has often been attributed to the high production efficiency through use of the subcontracting system. The subcontracting system, as mentioned earlier, has the important element of JIT. The principle of effectivity firms strive to achieve has been recognized as largely being effectuated through the utilisation of JIT (Schonberger, 1983). This production organization approach has certain advantages due to the fact that work-in-

process inventories including parts, components and products are expected to decrease.

Since competition will henceforth be measured not only in terms of price but also in quality, delivery times and the choice afforded by a range of products, considerable efforts must be made to accelerate materials flow, and thus reduce stock levels and capital investment. The Just-In-Time production system perfected by the Japanese, maximises materials flow (SME Task Force, 1988, p. 4).

The passage of raw materials to the market as a chain of production forwards to view the classic model of the subcontracting system as a collection of interdependent firms. This interdependency causes the high efficiency perceived in these cooperative agreements. The classic model is based on the fact that it encourages complete specialization through the social division of labour (Sato, 1984). This efficiency principle, offering advantages to the members in the cooperative agreement, is supported by the fact that:

The utilization by the parent firm of continuing, long term subcontracting permits it on the one hand to avoid the demerits from having to fix in place the management resources required for inhouse manufacturing, and bring with it the merits of being able to obtain a stable supply of purchased goods of the necessary quality timing, and quantity. Subcontractors also see the merit in the long run of being able to have a stable business and to obtain guidance and assistance from the parent firm (Yokokura, 1988, p. 526).

Relentless competition among Japanese BEs compelled the purchasing management of these parent firms to actively and passively orchestrate severe competition between subcontracting firms. If subcontractors were unable to respond to the demands of the parent company they were not discarded directly, but would be shifted in position from first-tier to second-tier supplier or given guidance to improve their operations. The effectiveness of the competitive mechanism within the subcontracting system was important in establishing it as an efficient system for the social division of labour production. At the same time the guidance and assistance given by parent firms to their subcontractors cannot be ignored. The stable character of transaction relationships between final assemblers and subcontractors is subject to this support. Continuous inter-firm relationships stimulated BEs to supply their subcontractors with

specialized technology, know-how, and facilities. In this way, subcontractors were able to respond to their demands for quality, price, delivery times and service. The classic model of the subcontracting system in Japan thus was an important mode of vertical technology transfer to SMEs. The formative causes of the subcontracting system contributed to the support of the technological development of SMEs.

III. Formative causes

Classic establishment

In order to understand the structural change in the classic model of subcontracting we will first view its formative causes. The mecurial complexity of the subcontracting system and the extensive literature on its establishment compels us to focus briefly on the most relevant facets.

After WWII movements of labour supply resulted in the initial polarization of the Japanese industrial structure. Increasing numbers of workers were drawn in the post-war transition period to salaried labour. The dissolution of the pre-war "Zaibatsu" and the war-production industry combined with an influx of rural surplus workers to the cities had the effect of increasing unemployment and forced independence, and continuous vicious circles of low income and low wages. This resulted in the reconstruction of the structure of production through a multiplication of SMEs and the establishment of a dual economy. BEs had the opportunity to easily place outside orders with these SMEs.

Due to the loss of the former colonies and the termination of the Korean war (the allied occupation of Japan had helped to restructure the Japanese manufacturing industry by using it as a supply base for them) Japan had to find new markets for its products and its sources. Government policies were aimed at a rapid catch-up modernization with Western industrialized countries. This was only to be effectuated by rationalized export-oriented manufacturing. Therefore, initially the government did not strictly enforce the Anti-Monopoly Law in Japan. This gave an enormous leverage to BEs to establish the classic model of the subcontracting system with its hierachical relationships. Government policies to

protect SMEs which were held to be weak, in accordance with the low income, low wage problem, were passive. In the 1960s policies changed from passive to active ones, encouraging the supportive role of SMEs. Available funds were directed at strategic sectors in the national economy, as, "the modernization of engineering industries including large numbers of subcontractors, the creation of new advanced industries such as the electronics industry, and so on" (Watanabe, 1988, p. 11–12).

The former 'deprivation' of international influence had led Japan to be labelled a 'late developer'. Industrialization in Japan came rather late, compared to other modern nations. In that process, BEs had taken the lead in introducing new production technologies. But these large companies had been financially unable to engage in inhouse production of numerous parts. They were compelled to utilize outside ordering. At the same time, the parts manufacturers could not supply low-cost, high-quality components on short delivery schedules. Technologies introduced by the BEs thus filtered down to the smaller firms. An intra-company production system of participation, the classic model of the subcontracting system, was established.

A regular mass-production system was proliferating. The tendency towards an oligopolistic market forced top-parent companies to assume a market-function, creating hierarchical tightly knit relationships with their subcontractors. Purchasing management rationalization and subcontracting reform were carried out through the support of suppliers with technology and management resources. SMEs, which initially operated as supplementary-in-quantity suppliers as a buffer to fluctuating business were rationalized and modernized to operate as complementary in-quality suppliers.

Novel establishment

Apart from advantages of the parent firms' guidance and assistance, the subcontracting system also proved to have demerits (Nagayama and Yamanaka, 1988). The proliferation of these demerits ushered in a period in which the advent of Japanese subcontracting arrived at a crossroads.

As transaction relations grew unique, BEs were

able to obtain monopsonistic market power *vis-à-vis* their suppliers:

In the subcontracting system, there are a great number of subcontractors who have no way to market a product other than to a particular buyer, and whose production and technology have been meshed in with the production system of a particular purchaser, so that there is the possibility that they will be in a disadvantageous position in transactions (Yokokura, 1988, p. 527).

This disadvantageous position in transactions is even strengthened by the advent of JIT:

with the advent of Just-In-Time production . . . subcontractors are being drawn even further into the final producer's overall organization of planning and production, with ever greater demands being placed on reliability of supply, consistency of product quality, and logistical adaptability. With the transformation of the subcontracting relationship, many firms have been inclined to shift costs and risks very one-sidedly to subcontractors (Rothwell *op. cit.*, 1989, p. 284).

These demerits are not, as sometimes suggested, counterbalanced through the advantages of the parent firms' support in the technological development of their subcontractors. Although the manufacturing process of the classic model can be subdivided into self-contained and independent processes, certain prerequisites like a homogeneous quality and a well-balanced engineering of the various separately manufactured parts and components have to be met. Modification or innovation of a part or component or production process by one subcontractor inevitably affects the manufacturing process as a whole. Innovation among subcontractors is subject to the constraint of compatibility with the parent company's technology. Therefore, the high degree of technology transfer was specifically matched to mass-production and the specifications and requirements of the parent firms. Subcontractors only needed to be informed about the necessary adaptation of their production process. The rigid integration in a division-of-labour system therefore constituted a brake on innovation.

This recognition supports the argument that the efficiency of production, not the creation of innovations, defined the driving force behind the complementary advantages gained in the classic model. BEs and SMEs could concentrate on their distinctive competences — the activities of the value chain of production in which firms excess —

because the pursuit of effectivity and efficiency of the production system was all encompassing; it allowed firms to gain competitive advantages. The proliferation of cooperative agreements towards make and buy between BEs and SMEs in the subcontracting system bear the differences in technological and marketing ability between both parties.

The fact that Japanese subcontracting is at a crossroads indicates a rise in friction towards the mutual advantages perceived. This is due to the fact that the pursuit of effectivity and efficiency of the production system is no longer prevalent. What happened?

From the mid-1970s significant new industrial phenomena, which had no doubt slumbered for years, found a careful start in the rise of the information society and a subsequent decline of the industrial society, and accordingly in greater opportunities for more independent SMEs. The information society is largely characterized by:

the informatization (the real-time collection and processing of data and information, the development of new information media and so on) based on the rapid development of ME (micro-electronics) and the high-technologies, such as numerically controlled equipments, biotechnology, new materials and the advanced software systems which are basis of the advanced technologies; all these would make up "a society with information networks" and this new society has been given a great impact not only on various industries but also on small business (Sato, 1989, p. 14).

The information society boomed in the 1980s by giving rise to a structural change in the demand for products. The shift from industrial society to information society is shown in Figure 1. The 'economies of scale' characterized by the production for mass-markets have transformed into 'economies of variety' characterized by the production for niche markets and the demand for consumer-specific goods and services. A proliferation of "Kei Haku Tan Sho" products (light-thin-short-small) with short product-life-cycles is now being produced through intra-sector and inter-sector cooperation.

The growing number of opportunities for highly mobile SMEs, due to the rise in the information society, were dramatically grasped in the period after the 'Plaza Agreement' in September 1985. In the period between the agreement and February

Item	Industrialized society	Information society
Needs	Uniformation	Diversification
Objects of R&D	Production technology Hardware	Creative technology Software
Fast growing industry	Smokestack industry	Non-smokestack industry
Feature of products of fast growing industry	Heavy, thick, long and large	Light, thin, short and small
Production process of fast growing industry	Production of a small number of items in large quantities	Production of a large number of items in small quantities



Many opportunities
are given to large
companies with
large capital



A growing number of
opportunities are
given to highly
mobile SMEs.

Fig. 1. The industrial society *vis-à-vis* the information society.

1989, the value of the yen *vis-à-vis* the dollar increased 95%. Accordingly, the growth in competition of the NIEs effected the decrease in exports of the Japanese manufacturing industry. Exports in terms of yen declined 6.5% in 1987, following a decline in 1986 of 19.4% over 1985. Not only SMEs which were directly engaged in the export business, but also those whose parts of products were exported through domestic transactions, including subcontractor relations, were indirectly affected by "Endaka", the high yen. The total decline in both direct and indirect exports in 1987 amounted to about ¥6,214.7 billion, which accounted for 4.6% of the total shipments from SMEs in 1985 (Small and Medium Enterprise Agency, 1988, p. 44). Recently, transaction conditions between subcontractors and their parent companies have become increasingly difficult. As far as high-tech SMEs are concerned, two trends are prevalent. First, these 'well-managed' SMEs are changing the traditional one-sided relationship with their parent companies to that of a bilateral relationship. Second, these enterprises are developing new business areas with other SMEs in the same or other industries. We will elaborate on the variety and the characteristics of these new modes of interfirm interaction later.

IV. The novel model of Japanese networking

Effectivity and efficiency

The effectivity and efficiency principles of the

classic model of subcontracting have declined to give rise to advantages perceived in novel networking. To gain or sustain competitive advantages — the desired end firms pursue — can no longer only be reached through the high production efficiency characteristic of the classic model of subcontracting. The efficiency principle has received a different content.

The establishment of governance structures — the institutional matrix within which transactions are negotiated and executed (Williamson, 1979, p. 239) — in the classic model of subcontracting enabled efficient processing of information about transactions (Roehl, 1983, p. 121). The costs of gathering relevant information concerning transactions was minimized for BEs and SMEs through the establishment of governance structures. By farming out their production activities, BEs could obtain monopsonistic market power *vis-à-vis* their suppliers if they were the only one to purchase the specific goods or services. SMEs as suppliers had the advantage that they could stabilize their expectations concerning the demand. Efficient production was thus facilitated (Richardson, 1972; Van Kooij, 1988).

The rise of the information society has forwarded the fact that the efficient production of a specific product is no longer the most critical problem for a company. Instead, the problem has become that of deciding what to produce. The increasing emphasis on the development of new products and new markets furthers the need to accumulate and integrate technological expertise and marketing know-how. The process of gathering information relevant to the individualized demand (diversified consumer tastes and stratified consumer markets) and the gathering of information concerning technological potentials (the results of R&D of high technology) is facilitated through the flexibility of the novel networks. In terms of transaction cost theory, to some extent, arguments about market failure in technology markets still hold in interenterprise exchange groups. In general, cooperative agreements bearing on technology can lessen the firms' perceptions of uncertainty. Beije (1988, pp. 14–21), in following Imai and Itami (1984) and adding to the transaction cost approach of Williamson (1979), argues that the trade-off between efficient transactions and the creation of new production tech-

nologies, and associated problems of information acquisition and accumulation determines the establishment of governance structures. It can therefore be said that the combination of the drive to minimize transaction costs and to maximize efficient information accumulation and efficient integration of technological expertise and marketing know-how stimulates the establishment of novel networking.

The complexity of scientific and technological inputs, the uncertainty of economic conditions and the risks associated with uncertain technological trajectories, appear to have reduced the advantages of vertical and horizontal integration and made "hierarchies" a less efficient way of responding to market imperfections (Chesnais, 1988, p. 84).

The motives behind the drive to establish governance structures as subcontracting relationships have increased. This is illustrated by a survey of the Small and Medium Enterprise Agency in Japan on the transitory facets of the subcontracting system:

If we examine the reasons (so far and in the future) why parent companies utilize subcontracting enterprises so that we can see the changes in attitude, we can see that the percentage of those parent companies which cited "cost reduction" was overwhelmingly high in the past, however it has now declined to 50.1% (at so far) to 39.5% (in the future). On the other hand, the percentage of parent companies which said that they "utilized the special technologies of subcontracting enterprises" and "considered them as partners in research and development" rose from 41.7% to 44.2%, and from 2.1% to 10.7%, respectively. It is clear from this that these factors are becoming increasingly important as reasons for utilizing subcontracting enterprises. Furthermore, if we examine the scope of selection of subcontracting enterprises, the percentage of parent companies which said that they selected subcontracting enterprises for "those in the same business group with existing close relationships" reached 84.2% before the appreciation of the yen. However, the percentage fell to 54.8% in their "present policy" and to 29.2% in their "future policy" (Small and Medium Enterprise Agency, 1989, p. 89).

The White Paper on SMEs (Small and Medium Enterprise Agency, 1989, pp. 91–96) explains that the management policy of SME subcontractors has also changed. It argues that in the past SMEs attached importance to "cost reduction" and "quality improvement", in the future their efforts are directed towards the "sophistication of

the ordered products and the manufacturing of high value-added products", "diversification of enterprises with which they have a transaction relationship", and "strengthening the development of their own products". It has become essential for SMEs to think more along the lines of new products and processes, and less on their traditional incremental approach to product development (Griffiths, 1989, p. 27). The reason for this is that BEs increasingly regard "specialized technologies" as an important yardstick in selecting domestic enterprises, the "cost reduction factor" is left to selecting overseas enterprises (especially from the NIEs).

The concept of classic governance structures has changed and given rise to the proliferation of interenterprise exchange, as in novel networks. As can be pointed out, these new Japanese groups with inter- and intra-firm relationships can lessen the sunk costs, relevant to the extended form of information accumulation, of the network organization:

It [the network organization] accumulates know-how or learned knowledge through each member of a network, the degree of sunk costs of the network is relatively small compared to the independent large organization. The network can smoothly disseminate a new idea by reshuffling its constituent members, and it also is possible to change suppliers of each component technology or goods and services according to needs brought about by new ideas. This lessens the sunk costs of network organizations (Imai, 1988, p. 54).

The strength of novel networking lies in the creation of products that incorporate technologies from different industrial sectors, which Schumpeter called the "neue Kombinationen". The role of SMEs in the creation of innovations, in this sense, has become highly important. As Kiuchi argues:

Companies do not need mammoth organizations and mass-production systems to succeed; they need small project teams or ventures that can spot business opportunities early and exploit them quickly. They need in other words, a guerilla-type approach to business. Accumulating know-how and experience will be high-priority organizational goals, and the organizations best able to meet these goals are likely to be quite small (Kiuchi, 1988, p. 23).

The effectivity and efficiency principles perceived through the creation of new techno-market combinations have forwarded different modes of inter-

firm relationships in the novel model of Japanese networking.

Different modes

In the establishment of the model of Japanese networking, as already briefly stated, two modes of interaction can be perceived. The first mode perceived to occur is a new form of BE/SME interaction. Some SMEs are changing the traditional one-sided relationship with their parent companies to that of a bilateral relationship, and diversifying their customers. The second mode comprises SME/SME interaction. SMEs are developing new business areas with other SMEs in the same or other industries.

The variety in type of interaction between BEs and SMEs within the concept of novel networking is twofold. On the one hand the hierarchy and control of the parent firm in the subcontracting system, as prevalent in the pyramid, is maintained. On the other hand a new co-contracting system is being established in which the relational dependency is not hierarchical but reciprocal.

The activities of SMEs in the first type of BE/SME interaction can be characterized by carrying out diversification programs, which are strange or new to the core activities of the parent firm. The reason for this type of interaction can be found in the need of BEs to attribute an antenna function to SMEs:

The BE's lack of technology or knowledge concerning new markets and the risk involved with solo-entry stimulate maintaining relationships with some diversifiers. The SME's insight in market functioning is 'traded' for the BE's technical expertise. SMEs simply operate as fore-runners, they are ordered to investigate the market possibilities for mass-production by BEs (Van Kooij, 1990, p. 36).

In this sense, networking of parent companies cannot be regarded as forwarding an increased independence of subcontracting enterprises which carry out diversification programs. In effect this form of networking is no different from the formation of "Kyoryokukai" in the pyramid. As argued by Kosaka (1989, p. 57), parent companies first demand independence of their subordinates in order to construct networks. In the eyes of the SMEs the response is a positive choice to leap.

From the parent firm's point of view it is nothing more than a means of classifying and discarding subordinates with low technological strength and low or mediocre management abilities. The high-tech SMEs are put under the control of the parent companies by making them a member of their networks. This means that the networking policy of parent companies has the purpose of changing the division-of-labour system into a new control mechanism. BEs can lower the risks involved in solo-entry on new markets.

SMEs' activities in the second type of BE/SME interaction are characterized by manufacturing specialized parts, which obtain a high degree of specialized technological expertise. SMEs which have high technical and production control capabilities have increased the number of parent companies and diversified and developed their own products. An example of the operation of Tectron, a specialized parts maker, can be given as follows:

Tectron operates as a specialized parts maker for such prestigious corporations as: Matsushita, Sony, Toshiba, Hitachi, Ricoh and Texas Instruments. Its marketing strategy is to maintain a policy of aiming at a large number of clients in order to avoid dependence on any BE (no BE accounts for more than 20 percent of the SME's global sales). Tectron works with 13 subcontractors itself. As it is a high-tech company, relationships with BEs increasingly focus on joint technical development. . . . Relationships have expanded to the transfer of technology, managerial information and human capital. Electronic engineers are sometimes recruited from big companies. BE's lack of sufficient very specific technical background concerning high quality ASICs results in the co-development with the specialized parts manufacturer. Next to this, several BEs make active use of marketing information gathered by Tectron (Van Kooij, 1990, pp. 43–44).

In this sense, specialized part manufacturers have gained a certain extent of independence as they have diversified their customers. The drive towards networking is largely undertaken by specialized part makers themselves. In this way they have been able to avoid being swayed by the management conditions of certain parent companies or the sales of specific products, and therefore decentralizing the risk involved (Small and Medium Enterprise Agency, 1989, p. 94). Between these SMEs and the BEs, cooperative agreements bear technological specialization. Competitive advantages are found prevailing in

the fusion of different kind of new technology. Mutual advantages are gained by operating as partners in R&D, and even more by buying each others specialized technologies.

In addition to the ample thrust of this paper concerning types of BE/SME interaction, SME/SME interaction in Japan is increasing and deserves to receive attention. These new inter-enterprise exchange networks are called "Igyoshu Koryu". An "Igyoshu Koryu" is a group of SMEs which produce goods and services that are not competitive, and exchange information, technologies, and so on. The aim of this interenterprise exchange is that the individual SMEs can reinforce their abilities to manage their own companies, and that the nucleus as a whole can establish abilities to develop new business.

In 1983, 155 SME/SME interaction groups already existed, which involved a total of 3,575 firms (Rothwell, 1989, p. 289). In May 1987, some 700 "Igyoshu Koryu" were counted in Japan, with a total of 20,000 companies participating (Small and Medium Enterprise Agency, 1988, p. 147). According to a survey conducted by the Japan Small Business Corporation in December 1988, the number of "different industry exchange groups" has grown to at least 1,527. In total 52,149 enterprises were counted to participate (Small and Medium Enterprise Agency, 1989, p. 65). It may therefore be said that the establishment of these groups is surging ahead, enveloping the entire country.

The strength of "Igyoshu Koryu" is based on Techno-Mixing (TM). TM involves not just technological exchanges, but also managerial and marketing know-how exchanges (Rothwell, 1989).

The formation of "Igyoshu Koryu" results in an increase in sales potentials, in technological information sources and financial sources for each individual firm as well as for the entire nucleus. Old subcontracting relationships are sometimes maintained in an independent form next to the cooperative activities. In this way the former distribution channels can be used by the nucleus. Cooperation between enterprises operating in different industrial sectors has the potential to sell final products to a large group of purchasers and consumers (Van Kooij, 1990, p. 48).

The novel model of Japanese networking is adept in integrating internal and external technological expertise and marketing know-how of different

enterprises. Competitive efficiency is found in the exploitation of these new techno-market regimes.

V. Conclusion

As shown in this paper, industrial structure anticipates the changing requirements brought about by the economic constellation. Small- and medium-sized enterprises and big enterprises, in their endeavour to be effective and efficient, determine the characteristics of the system of industrial production. The economic role of small business in Japan is undergoing a transitory period. The classic model of subcontracting is being replaced by the novel model of networking. The requirements concerning an accelerating technological expertise and marketing know-how of small business have been adduced as a motive for this rapid industrial restructuring.

The classic model of Japanese subcontracting has attracted a great deal of attention in Europe and the United States. As argued in this paper, this acclaim fits an industrial society better than an information society. Of course a shift in industrial structure does not happen overnight. Also, in Japan traits of the fading industrial society and traits of the up-coming information society mingle; likewise, the classic model of subcontracting and the novel model of networking still interact in this transitory period. The degree to which this trend is relevant in Europe and the United States could clarify the economic role attached to small business as an independent unit and in the support of their larger counterparts. In case the orient and occident meet at the crossroads of subcontracting, both classicism and novelty deserve attention and acclaim.

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