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Subcontracting in Hokkaido's Resource Processing Sectors

Ian MacLachlan*

INTRODUCTION

The Japanese economic miracle has inspired considerable interest in the organization of the Japanese industrial system. One of the unique aspects of industrial capitalism in Japan is the vast array of contractual linkages articulating part-time and family businesses with multinational corporations.

This paper begins with a brief definition of terms related to industrial subcontracting in Japan and then considers subcontracting in Hokkaido. While less pervasive than on the mainland, industrial subcontracting is a vital component in Hokkaido's space economy and it is found in every industrial sector. To explain the relations between small and large firms two conceptual models are introduced: dualism and flexible production. Data from primary and secondary sources are used to show that the dualism model is most germane to the resource processing industries of the Hokkaido region.

SUBCONTRACTING IN HOKKAIDO'S RESOURCE PROCESSING INDUSTRIES

Most large industrial enterprises in Japan have developed a complex web of subcontracting relationships with an extended family of large and small firms. Large dominant firms (*oya gaisha* - parent firms) are supplied by an array of smaller dependent firms. Associated firms (*kankei gaisha*) are wholly owned subsidiaries of the *oya gaisha*. *Kankei gaisha* are typically multilocal firms which perform a specific service or production function as subcontractors at or near each of the *oya gaisha's* establish-

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ments. *Kyoryoku gaisha* tend to be small independent firms with annual contracts to supply specific services or goods to one or more establishments within an *oya gaisha*. In this paper both *kankei gaisha* and *kyoryoku gaisha* are referred to as *shitauke* or subcontractors.

Hokkaido's space economy is quite distinct from the remainder of Japan. It relies more on resource extraction and services and less on the manufacturing sector. The structure of Hokkaido's small manufacturing sector is also quite different (Figure 1). Resource processing industries such as food and beverage, wood products, pulp and paper, and ceramic and stone industries are relatively large in terms of employment while industries with higher technology products and greater value added such as transportation equipment, machinery, and precision instruments are underdeveloped.

Thus there is reason to question the applicability of subcontracting models based on the industrial organization of mainland Japan. Economies of scale and capital intensive technologies in large volume materials processing appear to obviate the need for subcontracting in Hokkaido's resource based industrial economy. There are no small

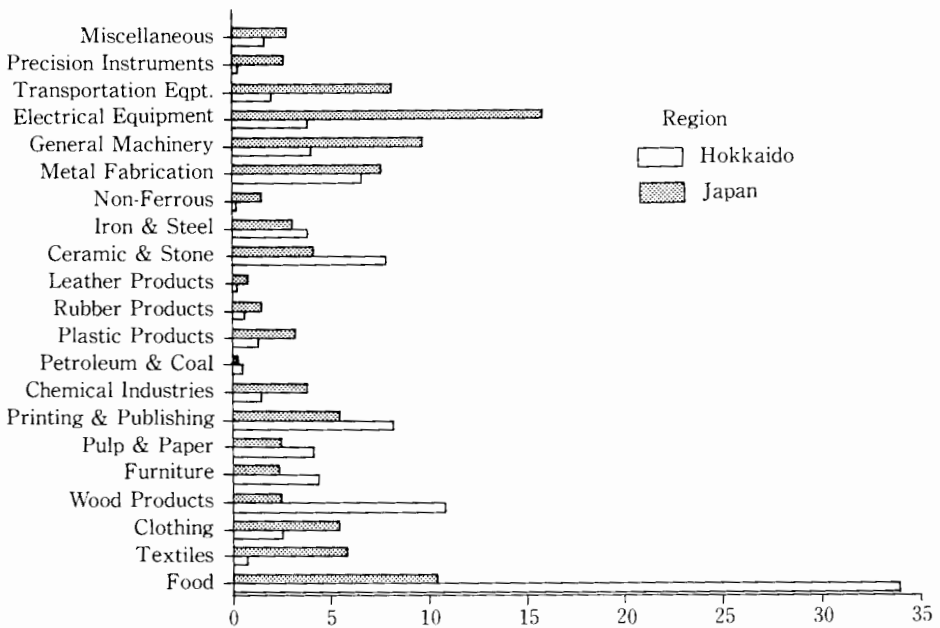


Figure 1: Manufacturing employment structure of Hokkaido and Japan

Source: 1986 Establishment Census of Japan, Volume 1, Part 1, Division Table 11.

component parts to be delivered on time and no labour intensive assembly operations in pulp and paper mill operations. Indeed officials working in the Hokkaido Bureau of the Ministry of International Trade and Industry (MITI) opine that subcontracting is only found in industries which assemble diverse parts and subassemblies such as the automotive sector. Thus it appears that subcontracting should not be as common in Hokkaido as it is elsewhere in Japan.

Figure 2 illustrates the prevalence of the use of at least some subcontractors (hereafter 'contracting out') by every major industry group in Japan in both large and small firms. Contracting out is universal in large firms producing transportation equipment, precision instruments, and leather products and it is at least as common in the resource processing industries. But with only one exception, petroleum and coal, a majority of large firms report that some work is contracted out to *shitauke*. Between one third and one half of the smallest firms contract out but once again the prevalence is lowest in the resource processing sector. The food and beverage industry is notable



Figure 2: Percent of firms in industry contracting-out for goods or services

Source: Ministry of International Trade and Industry. 1990.
The Basic Survey of Manufacturing Conditions, 7th Edition, Summary
 Volume, Table 7.

because it dominates industrial employment in Hokkaido and it has the lowest use of subcontracting of any manufacturing industry in Japan.

Based purely on its industrial mix and the paucity of subcontracting in resource industries, it appears that Hokkaido should have less subcontracting than other regions of Japan. Figure 3 compares the percentage of firms doing at least some subcontracting in Hokkaido with equivalent measures for all of Japan. Taken as whole, only 28 percent of Hokkaido manufacturers report doing subcontracting while 55 percent of all Japanese manufacturers are also subcontractors. Hokkaido has rather more subcontracting in the food, leather, metal fabrication, and electrical products industries and much less in wood products, pulp and paper, printing and publishing and most other industries. With the exception of food and beverage processing, Hokkaido tends to have less subcontracting in its dominant industries.

One of the hallmarks of underdeveloped regional economies is a lack of linkages between small indigenous firms and large scale employers. Industrial activity is

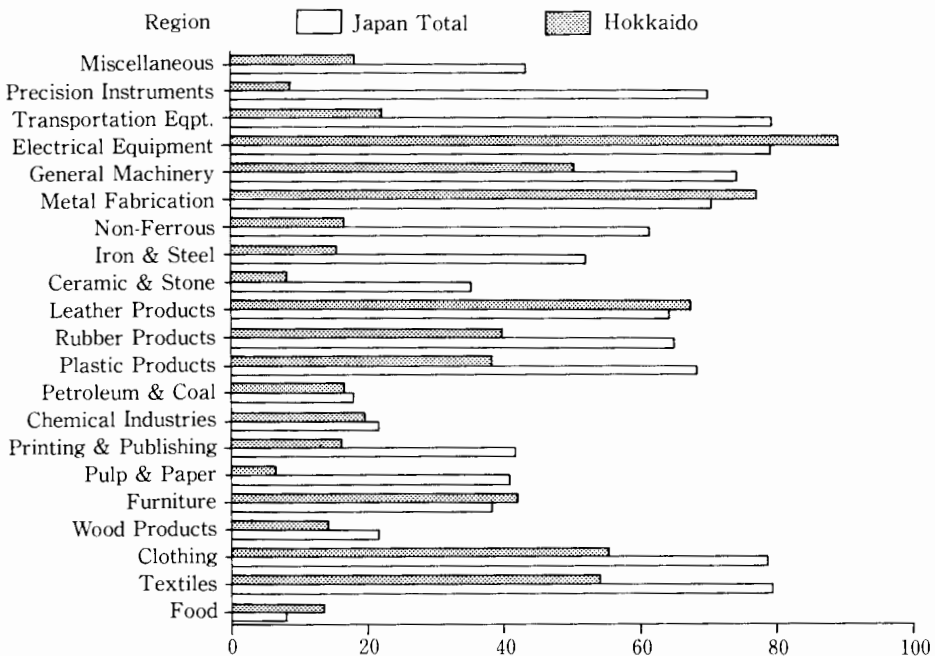


Figure 3: Percent of Firms in industry doing subcontracting

Source: Ministry of International Trade and Industry. 1990. *The Basic Survey of Manufacturing Conditions*, 7th Edition, Prefecture Volume, Table 8.

controlled from outside and the multiplier effects from new investment tend to leak away to the metropolitan origin of the capital. It appears that Hokkaido labours under a double disadvantage. First, it specializes in industries with a low level of subcontracting. Second, those industries tend to have less subcontracting than is the case in Japan taken as a whole. For these reasons, the forward and backward linkages stemming from manufacturing may be quite weak in the Hokkaido region and much stronger in the mainland.

MODELS OF INDUSTRIAL ORGANIZATION : DUALISM AND FLEXIBLE PRODUCTION

There are two opposing models which attempt to explain the relationship between *shitauke* and *oya gaisha*. The dualism model emphasizes the enormous differences in the labour force and technological sophistication found in large dominant firms and small dependent ones. The flexible production model argues that large firms rely on subcontractors because they are capable of autonomous innovation and have the specialized skills and equipment required to support state of the art production in firms which are global competitors. After reviewing these two models the paper presents some preliminary empirical data from primary and secondary sources which focus on the subcontracting relations of Hokkaido's resource processors.

Automotive Subcontracting : The Dualism Model

The use of subcontracting has reached the highest level of development in the automobile assembly industry which builds cars from a wide variety of different subassemblies and component parts. The large automobile manufacturers (*oya gaisha*) are at the top of a hierarchical network of suppliers with as many as three layers. A typical large automaker buys subassemblies from 170 primary suppliers who purchase components from 4,700 subcontractors which depend on assistance from 31,600 tertiary *shitauke* (*Focus Japan*, 1978). Firms in the lower tiers of the supplier hierarchy are characterized by lower wages and benefits, more labour intensive technologies, poorer working conditions and reliance on a pool of "not-fully-employed lower-class workers" (Ota, Naito, and Yada 1976, 160). The production processes which are subcontracted may be performed in the contracting firm's factory, in the subcontractor's establish-

ment, or in the homes of workers. Remuneration is sometimes based on an hourly wage and sometimes on a piecework rate.

Oya gaisha often divide orders between suppliers to intensify competition and lower prices. When markets are strong the use of subcontractors serves as an employment buffer, allowing upper tier enterprises to stabilize their output at a consistent base level and maintain their lifetime employment policies.

A common strategy of a large Japanese firm has been, therefore, to limit the number of permanent employees to a cyclically justifiable minimum and to rely on subcontractors and temporary workers to handle the addition volume of work. (Yoshino, 1968, 155-156)

When there is a downturn in demand, the amount of work given to subcontractors can be easily cutback, leaving the *shitauxe* to decide when workers must be laid off.

Thus there are two distinct populations of firms in Japan and two different markets for labour. Large firms pay exceptionally high wages to a fiercely loyal and proud workforce. In the neatly pressed uniforms, attendance at morning exercises and motivational meetings, one sees and feels a sincere and powerful sense of pride in the corporate history, devotion to the firm and identity with a community of co-workers. These workers are the cream of the crop of high school graduates and they are selected very carefully. On the other hand, there are thousands of small firms which pay lower wages to a 'lower quality' workforce - those who were not able to secure employment with a big company. They do less skilled tasks with less sophisticated industrial technology, they have less opportunity for training and skills development, and they are vulnerable to lay off in adverse economic conditions. The coexistence of these two types of firms and the division of the labour force between them, are two of the many aspects of dualism in the Japanese economy.

The 'just-in-time' inventory systems of Japanese automotive assembly enterprises require that dependent subcontractors be located in close proximity to the dominant firm (Sheard, 1983 and Holmes, 1986). Dominant global firms tend to be surrounded by a dependent constellation of smaller *shitauxe* creating a specialized urban-industrial complex. Thus a 'company town' such as Toyota City includes one very large enterprise and a vast ensemble of second and third tier firms that depend entirely on con-

tracts let by Toyota (Hill, 1987, 1989; Miyakawa, 1977). Takeuchi (1980, 157) reports that Nissan, Isuzu, Mitsubishi and Hino have over 50 percent of their subcontractors in the Keihin region where their main assembly plants are located. Daihatsu, Suzuki and Fuji (Subaru) have over 5 percent of their *shitauxe* in Hanshin, Shizuoka, and Kanto respectively. Toyo Kogyo (Mazda) has 90 percent of its subcontractor factories in the Hiroshima district. The formation of industrial complexes which rely on closely linked and spatially concentrated subcontractors for auto parts production may be termed, the 'automotive subcontracting model'.

While the importance of spatially concentrated industrial complexes in the automotive industry is well established, agglomeration economies are less significant in other manufacturing and producer service sectors. In some sectors subcontractors are located hundreds of kilometres from their upper tier plants to benefit from lower labour costs in peripheral regions:

For instance, a large assembly factory of Canon cameras is located in Fukushima city, 300 km north-east of Tokyo. All the parts are brought to the depot in southern Tokyo from subcontract factories located in its surroundings. These completed parts are carried to Fukushima by truck, and completed cameras are carried as return cargo. This flow of goods is continuous: there is not a single subcontractor in the vicinity of the Fukushima factory. (Itakura and Takeuchi, 1980, 54-55)

Takeuchi (1983) describes the restructuring of the textile industry in Hyogo Prefecture in the south of Honshu. Large scale textile factories have all but disappeared while large numbers of small subcontractors have established themselves in rural areas to specialize in particular phases of production. The vertically integrated factory has given way to a rural putting out system reminiscent of the pre-industrial period. Local merchants (*sanmotshosha*) organize the dis-integrated production system and consign work to a chain of small *shitauxe*: weavers, preparators, dyers, and arrangers.

Subcontracting has been adapted to the diverse material and technical requirements of a wide variety of industries. There are marked differences in subcontracting for cars, cameras and cloth. But the fundamental dualism between large and small enterprises appears as an immutable feature of industrial organization. There are sharp differences in the skills and wages of labour, the level of technology, and capital inten-

sity between small *shitauke* and large scale enterprise.

The Machinery Subcontracting Model : Flexible Production

Friedman's *The Misunderstood Miracle* (1988) argues that Japanese manufacturing succeeded by decentralizing production, by innovating and differentiating their products to appeal to specific market niches, and by developing flexible production systems which depended on innovative small subcontracting firms. In the immediate post war period Japanese firms tended to imitate American manufacturing technology, however they soon began to make incremental improvements. Production systems were in a constant state of flux as they were continually fine-tuned to be ever more efficient and competitive on world markets. As price competition in the domestic Japanese market was intense, firms had to develop improved designs to compete through differentiation.

To cope with the constant high level of change in manufacturing infrastructure, Japanese production had to become more flexible than was the case in the United States. The system needed general purpose machines and highly skilled workers who could adapt to improved designs and new specifications. Production runs were seldom long enough for dedicated equipment and 'deskilled workers' (Braverman, 1974) to be substituted for flexible machinery and skilled craftspeople. *Shitauke* were the vital link in these flexible systems and close supervision by contracting firms was costly and difficult. Thus it was in the interest of the large firm sector to encourage subcontractors to be autonomous, flexible, and capable of developing new components for products of ever increasing complexity.

Friedman (1988) uses MITI data to show that the dualism hypothesis seriously understates and misrepresents the role of small firm subcontractors in the organization of industrial production in the general machinery industrial group. Friedman's rebuttal has three components :

1. Small firms do not act as employment buffers for large firms. Friedman examines four recessionary periods: the great depression of 1929-1932, the 1957-59 'mini-recession' and two oil price shocks of 1975-77 and 1978-80. During the great depression large firms lost employment while small firms actually grew. The largest firms lost the most employment while smaller firms gained the most. In subsequent recessions the trends are much more ambiguous. The analysis is impressionistic and the timing of

MITI's surveys does not correspond precisely with the onset and end of recessionary periods. Taken at face value, there is no support for the notion that large firms force small firms to bear the burden of production cutbacks during periods of declining demand (Friedman, 1988, 129-134).

2. The low wages observed in small firms are not symptomatic of subjugation of small firms by large ones (through downward pressure on prices) or of the exploitation of labour in the small firms sector. Friedman (1988) argues that the relatively high wages in large firms arose from labour militancy. The low wages observed in small firms are mainly for older workers who have failed to be promoted out of the blue collar ranks. The youngest workers in small businesses actually out-earn their peers in large enterprise. As many as 60 percent of the workers in small business who do not go on to become business owners themselves are promoted to supervisory positions in small firms with wages equivalent to blue collar workers in large firms (Kiyonari, 1970, quoted in Friedman, 1988, 146). There is a dualistic pattern of labour careers:

Workers in large firms fought for high wages because the opportunities for independence were reduced in the giant factories, whereas in small firms workers accepted lower wages as the price for training that might lead them to become independent factory operators (Friedman, 1988, 135).

Workers in small firms are compensated for the immediate prospect of low wages by an apprenticeship system, paternalistic care, and the long term prospect of promotion to supervisory rank or the opening of their own small business (Yasuba, 1976, 286).

3. Far from being enclaves for low skilled workers doing simple labour intensive jobs, Friedman argues that the small firm sector is innovative and possesses skills and capabilities that frequently exceed those in large companies. The smallest manufacturing subcontractors (1-3 employees) have an average of three clients while subcontractors in the 200-299 group have an average of 11. Since subcontractors tend not to rely on a single contracting client, it is difficult to make the case that *shitauke* are completely dependent on a single *oya gaisha*. Small manufacturing businesses in Japan are actually more profitable than large firms in the corporate sector. Thus it is wrong to portray all or even a majority of subcontractors as being dependent on contracting firms (Fried-

man 1988, 146-151).

Subcontracting Relations in Hokkaido : Data Analysis

If the dualism hypothesis is correct then subcontractors in Hokkaido should be expected to act as an employment buffer, have relatively low wages, and have a high level of dependence on the large firm sector. If the flexible production model is more apt then employment should be more stable, wages should be higher, and subcontractors should be less dependent and more capable of independent and innovative activity. To test these opposing hypotheses primary data and secondary data were collected. The primary data were collected using structured interviews with senior managers in two large pulp and paper mills (disguised as 'Himawari Seishi' and 'Kiku Seishi') to gain a direct perspective on the use of subcontracting in the production process. Secondary data were obtained from two MITI surveys: the 7th edition of *The Basic Survey of Manufacturing Conditions* (MITI, 1990) and the "Field Survey of the Structure of the Division of Labour in the Manufacturing Industries" (MITI, 1989).

Both responding firms were asked if *shitauke* were used as employment buffers when demand is high and whether *shitauke* receive less work when markets are weak. Himawari Seishi responded, "If demand is declining then we just cut *shitauke* off, we don't care about them." Kiku Seishi responded, "Kiku Seishi has not laid off one of its own workers in over 100 years. Because so much work is done by subcontractors Kiku Seishi does not need to dismiss people, that is the subcontractor's problem, his responsibility. If demand is low, the subcontract is finished."

Subcontracting is used as an employment buffer, however, both respondents emphasized that lay offs were an extraordinary occurrence. One reason for this may be the relative stability of paper production during expansionary and recessionary conditions. Both companies appeared to be proud of their lifetime employment policies and the use of subcontractors provides the assurance that their record will remain unblemished.

Interview evidence suggests that the wages paid by subcontractors are considerably below the wages paid to employees of the *oya gaisha*. The labour costs of Himawari Seishi average 617,000 yen per month for wage earning employees (excluding management, Table 1). Kiku Seishi pays an annual average of 8 million yen (667,000 yen per

month) to its workforce (including managerial positions). Subcontractors' wages are considerably lower but there is a great deal of variance. Some unskilled jobs may pay as little as 100,000 yen per month (e.g. the sorting of waste paper by middle-aged women). The average labour cost ranges from 400,000-500,000 yen per month for unskilled work but subcontracting positions with a high level of skill and difficulty may pay (with overtime) as much as regular employees receive. Contrary to the assertions of Friedman and Kiyonari (Friedman, 1988, 143-146), respondents stated that it was most unusual for the workers of small subcontracting firms to establish their own businesses. In sum there is a sharp distinction between the quality of labour force and wages paid by *oya gaisha* and *kyoryoku gaisha* which is fully consistent with the dualism model.

Finally there is the assertion that subcontractors are not all dependent, labour intensive processors. Interview respondents in the pulp and paper industry stated that the main reason for subcontracting is the reduced wages paid by subcontractors. In most cases, the work performed by subcontractors is simple, low skill, repetitive work which cannot be automated. In some cases subcontractors undertake periodic maintenance jobs that require a large number of semi-skilled workers for a short time period to complete work quickly and reduce shutdown time for large paper machines. In other cases, the subcontractors have specialized equipment (e.g. lift trucks designed for moving rolls of newsprint) and some workers have developed specialized manual techniques for tasks requiring strength, stamina, and a sense of balance (e.g. moving heavy logs). However, the innovative subcontractors using and developing high technology with state of the art machine tools that Friedman (1988) describes are not at all representative of subcontracting in pulp and paper mills.

Shitauke tend to depend entirely on subcontracting. Figure 3 shows the percent-

Table 1 Average Monthly Wage at Himawari Seishi

Basic monthly wage plus overtime	390,000
One sixth of semi-annual bonus	126,000
Insurance	51,000
Other company welfare	19,000
Pension	<u>31,000</u>
Total	617,000

Source: Data provided by Himawari Seishi Management.

age of subcontractors who work exclusively as subcontractors for other firms. It is clear that in most industries small subcontractors tend to rely on subcontracting for 100 percent of their revenues. In the large firm sector (where subcontracting is much less common), about one half of the subcontracting companies do no other work. Comparing Hokkaido with the rest of Japan (Figure 4), it is clear that the level of dependency among subcontractors is even higher, especially in resource processing sectors such as pulp and paper and ceramic and stone. In most industries subcontractors are totally dependent on contractual links for all of their cash inflows.

Exclusive reliance on subcontracting need not lead to dependency if subcontractors have a large number of client firms and could then negotiate for higher prices. Figure 5 shows the mean number of clients for large and small subcontractors. On average, the larger subcontractors have more customer firms but in the small firm sector the average number of customers is only 4. This suggests that there are many small sub

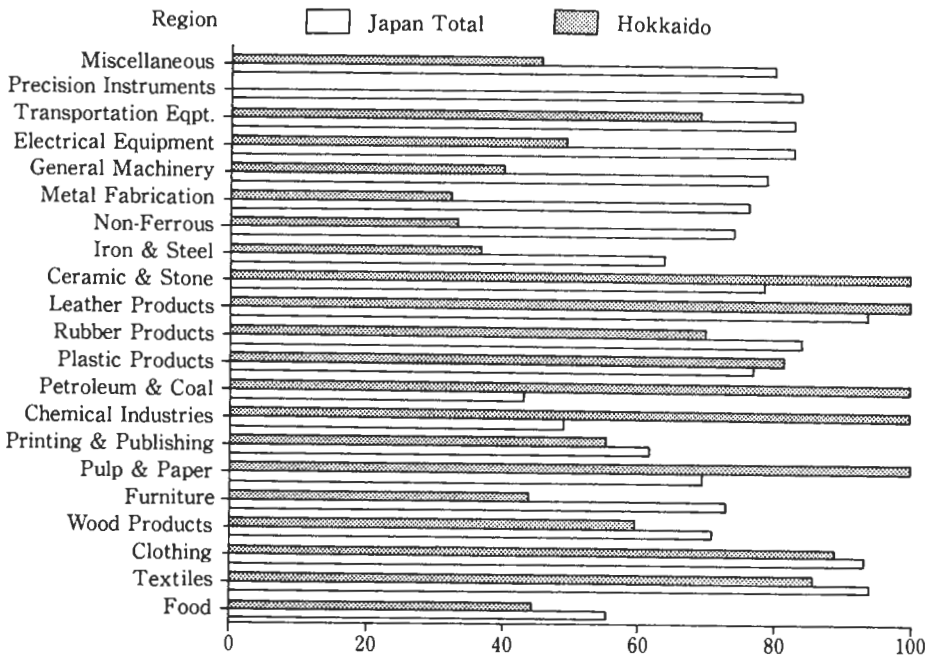


Figure 4: Percent of subcontractors which get 100% of their revenues from subcontracting

Source: Ministry of International Trade and Industry. 1990. *The Basic Survey of Manufacturing Conditions*, 7th Edition, Prefecture Volume, Table 8.

contractors who depend on a single *oya gaisha* for 100 percent of their sales. Many *shitauke* are thus vulnerable to perennial pressure to lower prices. However, subcontractors are a vital component in the production process. *Oya gaisha* recognize that they must give their subcontractors large enough profit margins to assure their survival.

Motives for Subcontracting

Respondents from the pulp and paper industry suggest that cost reduction and economic buffering are the principal reasons for contracting out. To determine whether these responses are representative of other industries, a more broadly based survey of motivations is required. The most recent survey of the reasons for using *shitauke* were gathered by a MITI Field Survey (1989) and they are summarized in Figure 6. Respondents to the survey had used subcontractors to reduce costs, to gain access to specialized technologies, and to provide a flexible response to increased demand. When asked to speculate on future reasons for using subcontractors, respondents downplayed cost reduction and increased the importance of specialized technical skills. While

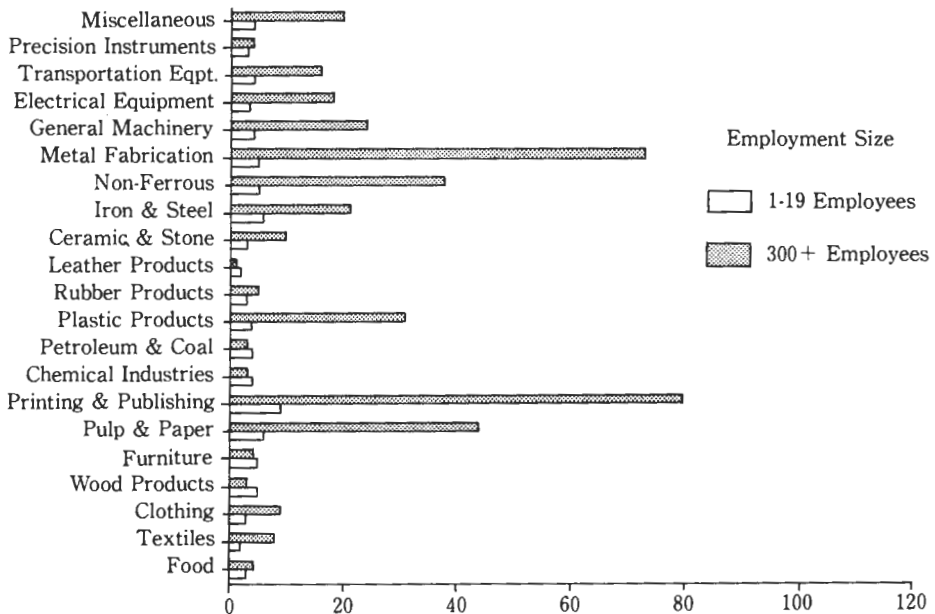


Figure 5: Average number of clients per subcontractor

Source: Ministry of International Trade and Industry. 1990. *The Basic Survey of Manufacturing Conditions*, 7th Edition, Summary Volume, Table 12.

there is some evidence of a change in the role of subcontractors, cost reduction and buffering of demand fluctuations remain very important motives for using subcontractors.

This summary of the 'reasons for subcontracting' may conceal the existence of two or more fundamentally different motives for subcontracting and different populations of subcontractors. For example, some subcontractors may indeed function as employment shock absorbers, some may specialize in low skill, low wage, labour intensive tasks, and others may be valued for their specialized capabilities and innovative capacity. Thus the survey evidence does not completely resolve the dualism-flexible production debate; both models may be appropriate in different circumstances.

CONCLUSIONS

Subcontracting is a unique feature of Japanese industrial organization. It is found

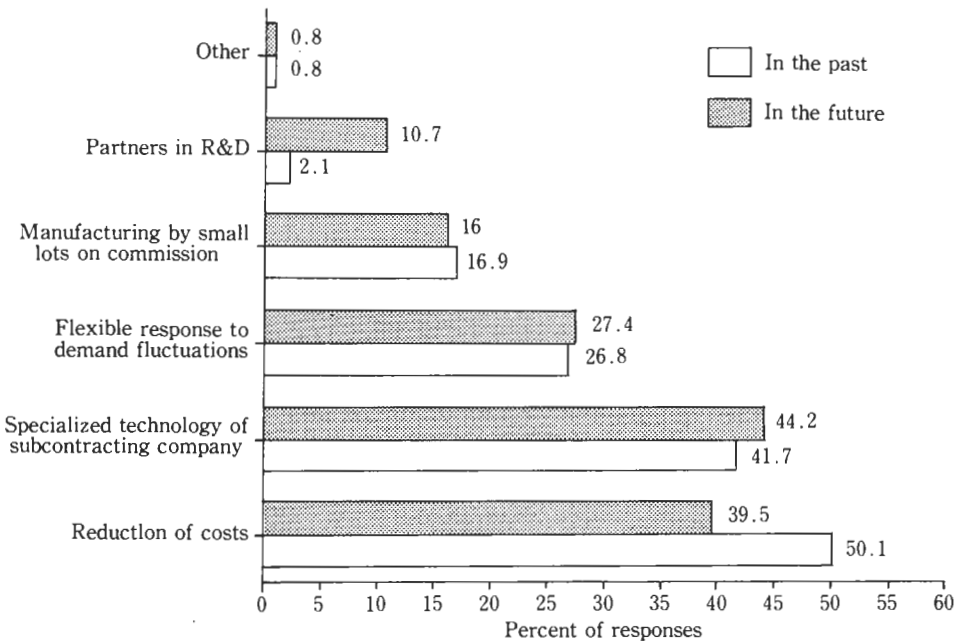


Figure 6: Reasons why parent companies use subcontractors

Source: Ministry of International Trade and Industry. 1990.
Small Business in Japan: White Paper on Small and Medium Businesses in Japan, p. 85.

in virtually every sector and region of the country. While it is not as prominent in the resource processing industries as it is in other sectors, subcontracting is still a vital part of Hokkaido's industrial economy.

Despite trends towards more innovative and specialized subcontractors in industries such as general machinery (Friedman, 1988 and MITI, 1989, 80-96) the dualism model is still a very apt portrayal of the fundamental dichotomy in Japan's pulp and paper industry, and by implication, in all resource processing sectors. Subcontractors specialize in the provision of low skill, low wage occupations and they are used primarily because they specialize in the provision of a low quality but cheap labour force. The flexible production model offered by Friedman (1988) is *not* representative of conditions in the pulp and paper industry. Ironically, however, the dualistic nature of industrial organization is motivated to give flexibility to the large firm sector. Subcontractors provide flexibility by acting as a buffer against the impact of the business cycle.

There is considerable scope for further research in this field. First, the different reasons for subcontracting need to be considered in a conceptual model that suggests why contracting out may have quite different motives. Second, it is important to examine subcontracting relations at the establishment scale in other resource based industries to determine whether the pulp and paper industry is truly representative. Finally, the implications of different subcontracting relations for regional economic development should be examined to provide a more informed basis for regional policy formulation.

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