Transnational Production Sharing: A Comparative Study of The United States and Taiwan

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Abstract

Transnational production sharing (TPS) involves the sharing of a company's production between two or more countries. A behavioral framework of TPS is presented to gain an understanding of TPS experiences of individual firms. Ten surveyed firms from Minnesota and nine from Taiwan provide the empirical foundation for transforming the behavioral framework of TPS into a contextual framework for TPS.

Introduction

Transnational production sharing (TPS) was the term coined by Drucker (1980) for the sharing of a product's production processes between two or more countries to gain competitive advantages. TPS is different from an international joint venture (IJV). IJV is a separate legal organizational entity representing the partial holdings of two or more parent firms, in which the headquarters of at least one firm are located outside the country of operation of the joint venture (Shenkar & Zeira, 1987). Thus IJV is only one of the many organizational arrangements where TPS may be practiced. TPS may also be practiced under other organizational arrangements, such as wholly owned foreign subsidiaries.

Kim (1985) seems to use a very broad definition of TPS which is supposed to have occurred when semifinished goods or items were imported and finished in the importing country. In the present research, TPS is said to have occurred when two firms actually coordinate production processes located in two or more countries. Hence, sourcing or importing components from the open foreign market through distributors, etc. would not be considered TPS.

Kim and Kim (1984) showed that TPS played a major role in the phenomenal growth of exports by four Asian developing countries, namely Hong Kong, Singapore, South Korea, and Taiwan. They are often called Newly Industrialized Countries or NIC's (Krarr, 1981). In their follow up study, Kim, Kim, and Lesage (1986) extended their work from aggregate analysis of TPS to a product sectoral analysis. They found that TPS between Japan and three NIC countries (Hong Kong, Singapore, and South Korea) was most robust in the unskilled-labor intensive and

human-capital intensive product groups. These studies were conducted at the macro level using aggregate or product specific trade data. However, there is little research on the behavior of individual firms involved in transnational production sharing. The present study focuses on these micro level of TPS. Its primary purposes are to: (1) develop a framework for describing and understanding the reasons, structure, and the process of TPS and; (2) provide empirical evidence for this framework by studying production sharing experiences of firms in a highly economically and technologically developed country (U.S.A.) and in a newly industrialized country (Taiwan, Republic of China).

A Behavioral Framework for TPS

Assuming that organizations are goal directed, a rational behavioral framework of TPS is proposed (Figure 1). It begins with the motivation to participate in TPS, the actual TPS arrangements, measuring of gains achieved through implementing TPS, and the revision of the whole commitment to TPS by assessing concerns and difficulties of past experiences. This framework is developed to gain an understanding of TPS experiences of individual firms rather than those of a nation.

Although it is generally agreed that the central drive for participating in TPS might be to gain a competitive advantage (Drucker 1980), a combination of specific reasons would help us understand firm level motives. These motives in the first block of the proposed framework (Figure 1) may include taking advantage of government incentives offered in different countries and availability of specific skills.

Figure 1
Behavioral Framework of
Transnational Production Sharing (TPS)
for a Firm

The TPS arrangements will depend upon sharing ownership control and quality products. There are a wide variety of TPS arrangements.

The behavioral framework for TPS suggests that the participating firms will assess the results or achievements of their experience. These gains may include improved financial and operational performance. The effectiveness of TPS is important for its future viability.

Finally, the firms will assess their experiences and identify concerns about TPS to understand difficulties, complexities, and intricacies of their arrangements. They would lead to the development of future motives, arrangements and expectations.

Empirical Research

Empirical research for the TPS framework was conducted in the United States and in Taiwan. A questionnaire was developed by Vasant Nadkarni at Quinnipiac College, Connecticut under a funded national project on production sharing in the U.S.A. Two professors of business conducted in depth personal interviews with executives involved in production sharing at various firms in Minnesota. The open ended questions allowed the respondents to elaborate on each area as much as they wished. Specific question topics included initial reasons for sharing production, techniques of TPS, and concerns and trends in production sharing.

The questionnaire was translated into Mandarin Chinese by a Chinese faculty in Taiwan and was translated back into English by another Chinese faculty. This process was used to clarify the meaning of the technical terms used in the questionnaire, to assure consistency of meaning of the questions, and to improve validity of the data. Four Taiwanese business students were trained to conduct the interviews. After two weeks of training, they contacted several firms in the Kaohsiung area to learn about their production sharing experiences. The interviews were conducted in Mandarin Chinese and the responses were then translated into English.

Nineteen firms, ten from Minnesota, and nine from Taiwan, participated in this exploratory study. Most of the firms were involved in manufacturing electronic products, industrial equipment, and medical products as shown in Table I. The size of the firms varied from forty to over one thousand employees. The sales volume for Taiwan firms varied from Taiwan (NT) \$167 million to one billion (U.S. \$6 million to U.S. \$33 million). The sales of the American firms ranged from U.S. \$4 million to over U.S. \$6 billion.

The experience in production sharing by the participating Taiwanese firms ranged from five to thirty years with a median of fifteen years. The experience of the U.S.A. companies in production sharing ranged from little (one company was just starting production sharing) to over 30 years. Half these companies had five years or less of experience while the other half had ten years or more experience.

The firms participating in this study represented TPS experiences in a fairly diverse geographic area. Many firms shared production with multiple countries. However most of the Taiwanese firms had production sharing with firms in the United States, Japan, and European countries, while most of the American firms shared production with those in Europe, Brazil, and Japan.

TPS Motives

The participating managers from the U.S.A. and Taiwan firms were asked to give reasons for undertaking TPS. Most often mentioned motivators were reduction in labor cost, followed by availability of government incentives and assistance, availability of labor skills, and flexibility of operations. Hence most of the participating firms expected to achieve most from their competitive advantage gains in the above four areas.

In the three major industries represented in this study, electronic products, industrial equipment, and medical instruments, the firms needed to get involved in TPS so that they could benefit from the low cost of labor, the availability of skills, and the incentives offered by the governments of the countries where the product was being processed. Most of the firms took advantage of the General System of Preference (GSP) program offered by the United States, or similar preferences offered by other developed countries and free enterprise zones in Taiwan. These government incentives reduced the cost of the firms' products.

TPS Arrangements

In the TPS arrangements, the firm that designs, develops and retains the trademark of the product will be called the TPS parent firm. The other firms will be called TPS affiliates. Our findings indicated that the parent firms

produced components and subassemblies usually requiring high capital intensive process and sent them to their affiliate abroad. The affiliates finished the product and shipped it for distribution to the customers in various countries including the parent firm nation.

Most of the affiliate firms involved in production sharing were wholly owned by the parent firms (Table 2). The remainder had international joint venture (IJV) or contractual arrangements with each other. The level of investments by parent firms depended on the specific organizational arrangement.

In several TPS arrangements, the parent firm trained the affiliate firm personnel. Most of this training was directed toward meeting product specifications required by the parent firm rather than developing special skills. Some of the Japanese parent firms did include some coverage of process conditions, design explanations, leadership and technology when training TPS affiliate firm employees in Taiwan.

TPS Gains

The American firms participating in TPS reported to have gained access to foreign markets and lowered tariffs and duties through their TPS arrangements. The Taiwanese firms also gained access to large international markets with little product development costs and entry delays.

Competitive advantages were gained through reducing cost of duplicating efforts in product development and processing in the production. In addition, TPS reduced risks of going into international business with limited resources, and alleviated barriers to entering international markets. Taiwanese firms also reported to have benefitted from access to modern technology from their TPS partners abroad.

TPS Concerns

Several major concerns were expressed, the most critical of which was fluctuating exchange rate (see Table 3). Since the currencies of both the United States and Taiwan were strong or rapidly appreciating at the time of our study, the benefits of TPS in terms of cost advantages were uncertain. The high valuation of their currencies would increase relative costs of domestic operations, hence, increasing product price and reducing international competitiveness. Hence long term agreements and arrangements were difficult to negotiate.

The second concern was reliable and competitive delivery time of components and finished goods. The relatively long distances between firms in different countries, the variety of transportation systems used, and, entry and exit regulations in transferring goods between countries seem to complicate TPS's effectiveness and efficiency.

Table 1
Industries Represented by the Participating Firms

<u>Industry</u>	<u>U.S.A.</u>	<u>Taiwan</u>	<u>Total</u>
Electronics	3	5	8
Equipment	4	2	6
Medical	2	-	2
Others	1	2	3
Total	10	9	19

Table 2
Organizational Arrangements in TPS

	<u>USA</u>	<u>Taiwan</u>	<u>Totals</u>
Foreign Affiliate			
Wholly-owned	8	5	13
Joint venture	5	1	6
Contractual	2	3	5
Total	15	9	24

Note: The totals may exceed the number of participating firms since multiple responses may apply.

Table 3
Major Concerns About Transnational Product Sharing

<u>Concerns Expressed</u>	<u>Percentage of Firms</u>		
	<u>USA</u> (n=10) %	<u>Taiwan</u> (n=9) %	<u>Total</u> (n=19) %
Exchange rate fluctuations	40	100	68
Delivery time/delivery reliability	40	44	42
Lost domestic jobs	40	22	32
Communication (product specs)	30	11	21
Quality	10	33	21
Local New Product development	-	33	16

Note: The totals may exceed 100% since multiple responses may apply.

Some U.S. firms were also concerned about difficulties in communicating product specifications to their affiliates in TPS. It may have been caused by the differences in technical systems (British versus Metric measurements, etc.) languages and cultures.

A national concern in the U.S.A. at the time of this study was the loss of domestic jobs caused by TPS. Some concerns expressed by the Taiwanese firms were related to improving their product quality and developing new products locally, which were becoming national concerns toward becoming a "developed" nation. Improved quality would change the image of Taiwanese firms and their products, and hence, would make them competitive with those from the advanced nations such as Japan. Furthermore, developing their own products, brand names and trade marks would make these Taiwanese firms independent of their TPS partners in the world markets.

The concerns expressed by both the U.S. and Taiwan firms suggested that the behavioral framework lacked inclusion of country specific external factors such as national, economic, social and political issues and priorities. These factors seemed to have moderated and imposed constraints on long term relationships in TPS arrangements.

A Contextual Framework for TPS

The empirical research findings of this study were used to enhance and modify the initial behavioral framework for TPS toward developing a contextual framework for TPS model at the firm level (Figure 2). This framework explicitly delineates some of the specifics that the participating firms included in their TPS - motives, arrangements, gains and concerns.

The contextual framework allows one to describe firm specific TPS behavior in relation to national priorities and environmental factors of the countries where TPS firms are located. The national priority of reducing unemployment in the U.S.A. and becoming a technological advanced in Taiwan affected some of the long term TPS strategies.

Dynamic environmental changes require flexible approaches to TPS. The contextual framework allows for describing and understanding various TPS arrangements that a firm may adopt in different countries toward achieving competitive advantages.

Concluding Comments

This exploratory study of TPS has led us to the following propositions: 1. TPS increases competitiveness of firms involved in the cooperative effort; 2. Competitiveness gains seem to be through cost reductions and market access in the short term while through flexibility and technology sharing in the long term; 3. TPS may involve sharing of ownership, risks, technologies, research and development; 4. A TPS arrangement is contingent upon the specific needs of the partners and their socio-technical, political and economic environment.

Although the contextual framework for TPS was developed on the basis of empirical data from nineteen firms in two countries, it may generate additional research in this vital area of international business. TPS is an excellent and flexible way of gaining strategic competitive advantage in manufacturing operations for large as well as medium and small size firms.

Autobiographical Notes

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Figure 2
Contextual Framework of
Transnational Production Sharing