

**The University of London**

**CAPABILITY ENHANCEMENT  
THROUGH CROSS-BORDER CONTRACT  
MANUFACTURING ALLIANCES  
- A Study of Taiwanese Information Technology Firms**

**A Thesis  
In Strategic and International Management**

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## **Abstract**

Capability acquisition from multinational corporations is one of the most important means by which indigenous firms in developing countries can enhance operational capabilities. This research explores the determinants of capability enhancement in a cross-border alliance from the resource-limited partner's perspective. Focusing on contract manufacturing alliances between Taiwanese information technology suppliers and their foreign clients, the particular questions addressed in this study are: 1) Can capability transfer happen in a quasi-market, short-term, and asymmetric partnership such as a contract manufacturing alliance? 2) What factors affect the capability transfer process and alliance performance? 3) How can the existing theoretical framework be enriched and extended?

The theoretical foundation of this study is based on the intersection of the literatures of the resource-based paradigm, cross-border strategic alliance, and international technology transfer. Because of this study's dual purpose of theory extension and theory testing, a modified framework of inter-partner learning is first proposed, and then a questionnaire survey is conducted, which is further complemented by six case studies, to answer the research questions.

The results, mainly based on a survey of 187 cross-border contract manufacturing projects, demonstrate significant capability enhancement among Taiwanese suppliers, and such learning effects are not limited to manufacturing but also spill over into a full array of other firm-specific capabilities. Empirical evidence strongly suggests that knowledge or capability are difficult for the owners to retain once interactive cooperation such as contract manufacturing exists.

From the supplier's perspective, the variables called partner's transparency and inter-partner interaction appear to be two key determinants of a supplier's capability enhancement. The former signifies the importance of initial partner-selection, while the latter underlines the value of emerging relationship-management. In this research, constructs such as transparency and intent, proposed by previous research, are confirmed to be determinants of inter-partner learning. However, other project characteristics and relationship characteristics such as inter-firm diversity, trust, and mutual dependency are equally, if not more, important in the determination of a firm's capability enhancement. Although the existing inter-partner learning framework proposed by Hamel (1991) is validated in this study, a modified holistic framework significantly enhances its explanatory power. Such a holistic framework not only extends existing knowledge of inter-partner learning, it may also be used as a theoretical foundation for further research on important issues of capability enhancement through strategic alliances.

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## **LIST OF ABBREVIATIONS**

<b>C&amp;C</b>	<b>Computer and Communication</b>
<b>DFI</b>	<b>Direct Foreign Investment</b>
<b>EMS</b>	<b>Electronic Manufacturing Services</b>
<b>IT</b>	<b>Information Technology</b>
<b>ITT</b>	<b>International Technology Transfer</b>
<b>LDC</b>	<b>Less Developed Country</b>
<b>MNC</b>	<b>Multinational Corporation</b>
<b>MRO</b>	<b>Maintenance, Repair, and Operations</b>
<b>NIC</b>	<b>Newly Industrialized Country</b>
<b>OBM</b>	<b>Original Brand Manufacturer</b>
<b>ODM</b>	<b>Original Design Manufacturer</b>
<b>OEM</b>	<b>Original Equipment Manufacturer</b>
<b>QC</b>	<b>Quality Control</b>
<b>R&amp;D</b>	<b>Research and Design</b>

## **Chapter I: INTRODUCTION**

*In the academic world, there is a discipline devoted to the study of interpersonal relationships. To my knowledge, however, there is not even one scholar who specializes in the study of intercompany relationships. This is a serious omission, given the importance of joint ventures and alliances in today's competitive environment. We need to know much more than we do about what makes effective corporate relationships work.*

- Kenichi Ohmae (1989: 154)

### **1.1 Background**

One of the most enduring business trends of the last decade has been outsourcing, in which some operational tasks are farmed out to subcontractors (Quinn and Hilmer, 1994; Matthyssens and Van den Bulte, 1994). Outsourcing originates from the idea of "focus", and it is also a result of competition. To remain competitive, numerous firms have contracted out to outside specialists different operations which they regard as peripheral - back-office services, information systems management, and even manufacturing activities.

The use of offshore suppliers or contractors by multinational corporations (MNCs), mainly to reduce production costs, has a long history (Olesen, 1985). However, because of the technology and communication gaps between MNCs and offshore suppliers, it was not until recent decades that cross-border contract manufacturing started to flourish, especially in the electronics and information industries. As price competition intensifies, MNCs usually lose their price competitiveness vis-à-vis

manufacturers in less developed countries (LDCs) or newly industrialized countries (NICs). To make the best of their R&D and marketing advantages, MNCs tend to outsource their manufacturing tasks to offshore suppliers. The traditional justification for such a cross-border endeavor can be derived from the rationale of international division of labor (Findlay, 1980) or what is called "global rationalization" (Wilson, 1985), which can be traced back to Ricardo's principle of comparative advantage.

To pursue comparative advantage in manufacturing, many MNCs have moved their manufacturing activities to low-cost countries, particularly since the 1960s. Because of the huge assets/skills gaps between MNCs and indigenous firms, many MNCs prefer internal modes (e.g., direct foreign investment: DFI, mergers and acquisitions, or joint ventures) over contractual ones (e.g., contract manufacturing or licensing). In this way, MNCs can protect their ownership-specific advantages and pursue the internalization incentive advantages (Dunning, 1993). This trend has caused a surge of DFI from the advanced countries to the LDCs since the 1960s.

However, many MNCs have gradually given up in-house assembly operations overseas in recent decades, and have increasingly contracted indigenous firms in host countries to manufacture their products (Bensaou, 1994), to appropriate the location-specific advantages of indigenous suppliers. Many of them acquire components, subassemblies, and even finished products rather than individual parts (Lyons et al., 1990). In this way, the MNCs can streamline operations and improve efficiencies by concentrating on their core competencies, while their contractors

provide design, manufacturing, assembly, or testing services. For example, many U.S. MNCs have maintained or even strengthened their global competitiveness by skillfully exploiting their technological prowess through technology transfer and offshore sourcing (Kotabe and Swan, 1994).

From the perspective of LDCs/NICs, cooperation with MNCs has contributed to their economic development (Kim, 1991). Indigenous firms in LDCs/NICs may be able to imitate the technology, acquire management skills, and even establish contact and enhance their reputation with international customers, following the example of foreign partners (Wells, 1993). Consider the electronics industry for example: many contract manufacturers have evolved from low-tech "board stuffers" to sophisticated designers and marketers, providing more value-added services including product design, component sourcing, final assembly and even distribution to their MNC clients. The broadening and improving capabilities of these suppliers have made them critical members at every level of the electronics industry (*Electronic Business Buyer*, 1994).

In view of the above trend, the question of how resource-limited indigenous firms in LDCs/NICs (in this research, they are also regarded as niche-capability partners, compared with generic-capability MNCs who usually have more abundant resources and higher level of overall competence) can upgrade their overall competence<sup>1</sup> through cross-border cooperation with MNCs is of particular interest because its

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<sup>1</sup>A firm's overall competence is operationally defined as its integrated capacity encompassing and utilizing all the assets and skills in its control.

answers may be the keys to the development of numerous small and mid-sized firms, and even many developing economies.

## **1.2 Research Questions**

Given that the trend in cross-border alliances between asymmetric partners is towards convergence, this research aims to explore the determinants of capability enhancement in the context of cross-border manufacturing alliances between resource-abundant MNCs and resource-limited indigenous firms in Asian LDCs/NICs. This raises a sequence of important questions:

1. Do Asian suppliers generally see cross-border manufacturing alliances as important vehicles for capability enhancement?
2. Can capability transfer (as an indicator of organizational learning<sup>2</sup>) happen in a quasi-market, short-term, and asymmetric partnership such as a contract manufacturing alliance?
3. From the indigenous firms' perspective, what are the differences in cooperating with partners of the various triad powers, both in terms of the cooperation process and the results? Is there an ideal partner for capability enhancement?

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<sup>2</sup> Senge (in an interview by Meen and Keough, 1992: 59) defines a "learning organization" as *an organization that is continually expanding its capacity to create its future*, and he believes that learning concerns the enhancement of the capacity to create.

4. What factors affect the capability transfer process and alliance performance?

5. How can the existing theoretical framework of inter-partner learning be enriched and extended?

The focus of this study is on question 4 and 5, because these are the most relevant and important issues within this set of questions, both practically and theoretically. Questions 1 to 3 which are mainly exploratory and descriptive, play complementary roles in this thesis, although they can also be at least partially answered through this study.

### **1.3 Research Scope and Its Justifications**

#### *Research scope*

In order to investigate these relatively broad issues, a tight research design is necessary to control the impacts of the situational factors such as the geographic coverage, the industry selection, and the choice of a specific cooperation mode. A designated research setting focusing on one geographic area, one industry, and one alliance mode, can minimize the impacts of these extraneous factors on the results of this research.

As a consequence of the concern for the research design mentioned above, the unit of analysis in this research are cross-border contract manufacturing projects

between Taiwanese IT (Information Technology) firms<sup>3</sup> and their foreign buyers. In other words, the research focuses on one area (Taiwan), one industry (information technology), and one specific cooperation mode (contract manufacturing). However, it should be made clear here that the purpose of this research is not to develop a specific model for Taiwanese companies, but to induce and formulate a more generic theoretical framework to explain, and even to predict, capability enhancement through cross-border alliances.

#### *Justifications for the research scope*

In general, such a narrow research scope is intended to exclude the external “noises” that would originate from a study ranging across different countries, industries, or cooperation modes, so that attention can be focused on the intrinsic factors which affect the results of cross-border strategic alliances. In addition, the specific reasons for choosing this designated research scope are presented below.

#### The reasons for choosing Taiwan

Many studies of the LDCs/NICs are focused on the region of East Asia, which has been generally recognized as the most successful economic development model among all developing regions (Ramstetter, 1991). Among Asia's developing countries, the so-called "four tigers" (i.e., Singapore, Hong Kong, Taiwan and South Korea) have been envied for their economic "miracles". Their success in

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<sup>3</sup> The IT firms in this research are defined broadly, to include electronics and IC manufacturers.

absorbing foreign technology through cooperation with MNCs is believed to be one of the major reasons for their admirable economic development (World Bank, 1993). With ample studies on the economic development of these countries, the question of how they achieved it is only partially answered at the macro level, with the question of how individual firms in these countries enhance their capabilities through foreign cooperation being unanswered so far.

Among the four tigers, Taiwan arguably provides the most interesting and useful example for other developing economies for the following reasons: 1) In socio-culture, history, and even geographic location, Taiwan has been equally influenced by both Japan and the U.S.; 2) Taiwan emerged from, and still remains, a manufacturing-based economy; 3) Taiwanese firms are predominantly small and mid-sized companies, the backbone of most LDCs/NICs economies; 4) Most Taiwanese firms are "fast followers" in international markets. Their capability in absorbing new technology and know-how can shed some light on skill-based competition (*Fortune*, 1994); and 5) Taiwanese firms have a track record in cooperating with MNCs, especially in the electronics and information technology (IT) industries (*Business Week*, 1993a; *Time*, 1995).

Another reason for choosing Taiwan is the researcher's own "comparative advantage". The researcher has been investigating the issue of cross-border cooperation between Taiwanese firms and their foreign partners for many years. This long history of involvement offers both connections and insights that have proved useful throughout the research process.

### The reasons for choosing the IT industry

In practice, this narrow industry choice is justified by the track record of Taiwanese IT firms in cross-border alliances and their competence improvement during the past decade. In theory, "although single industry studies often lack generalizability, they do afford greater control over sources of extraneous variation because of industry characteristics, environmental noise, and the like" (Mohr and Spekman, 1994:140). Taiwanese IT firms arguably provide a most challenging laboratory in which to develop and test the model of capability enhancement through cross-border alliances because Taiwanese IT firms started from resource-poor and insignificant indigenous firms in the early 1980s, and now they are emerging as competitive global partners of many first-tier players (*Business Week*, 1993a; *Time*, 1995). Many of them have evolved into equal partners of MNCs in engineering and manufacturing, and some have even started to compete directly with their foreign partners (*Business Week*, 1994). In addition, the nature of this industry also makes it mandatory to cooperate and compete on a global basis - 97% of Taiwan's IT output is exported (*Time*, 1995).

The computer industry on Taiwan is recognized as the world's nimblest - and with 1994 revenues of US\$11.6 billion, the fourth largest after the U.S., Japan, and Germany<sup>4</sup> (*Time*, 1995). In 1995, Taiwan produced 27 million notebook

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<sup>4</sup>According to the Industry Development Bureau of the Ministry of Economic Affairs, Taiwan's 1995 revenues from computer-related products (hardware only) had reached US\$15.4 billion, surpassing Germany and becoming the third largest IT hardware supplying country in the world.

computers, and 4.6 million desktops, establishing itself as the largest PC manufacturer in the world. In addition, Taiwan also controlled 80% of the world's commerce in motherboards, as well as 61% of scanners, 80% of mice, 56% of monitors, and 52% of keyboards (*Time*, 1995; Statistics Department of Taiwan MOE, 1995). With this ever-growing prowess, Taiwan's IT industry even made inroads into the realm of upstream key components such as DRAMs and LCDs, which were dominated by big U.S. and Japanese firms. For example, Taiwan ranks sixth in world IC output, having increased its IC production value from under US\$400 million in 1989 to US\$2.2 billion in 1994; and more than US\$10 billion has been committed for investment in IC production in 1995 alone (EIU Country Report, 1995).

The Taiwanese IT industry started almost from scratch, less than two decades ago. Its achievement, though exceptional, has set an example for other resource-limited industries in the LDCs/NICs. Exploration of the fundamental reasons for the Taiwanese IT industry's overall competence enhancement will shed light on the complicated issue of inter-partner learning.

#### The reasons for choosing contract manufacturing alliance

Among a variety of cooperative modes, contract manufacturing alliance is a purely transactional relationship with the least degree of integration between organizations. In this market-oriented mode, opportunism and contract risk are high, and thus theoretically it is a mode with very little internalization incentive for the source to

transfer competence, and therefore the least potential for organizational learning. If learning is possible through this market-oriented, short-term, and asymmetric partnership, it should be more likely to exist in other modes of alliances. Thus a positive learning effect in this research will demonstrate that learning opportunities exist in a wide range of cooperative relationships, no matter whether they take the form of market transactions, hierarchical integration (joint ventures or DFI), or other governance structures (networks) in between (Powell, 1990).

A close examination of the history of Taiwan's IT industry development reveals the importance of contract manufacturing alliances with foreign partners. Among all the modes of cooperation between MNCs and their indigenous partners, contract manufacturing is one of the fastest growing (*Business Week*, 1993a), and probably the most frequent and arguably the most important form of cooperation, particularly from the indigenous firms' perspective. This is especially true in the IT and electronics industries. Although many Taiwanese IT suppliers have shifted their business from OEM (Original Equipment Manufacturer) to ODM (Original Design Manufacturer) as they have progressed technologically, most lucrative value-added activities - marketing, software, services, critical R&D and components - are still controlled by their U.S., European, and Japanese partners (*Business Week*, 1994). This is hardly surprising since only a very limited number of Taiwanese suppliers have the resources to integrate these activities on a global scale. As a consequence, Taiwanese IT firms rely heavily on contract manufacturing business, a situation also common in Korea and other NICs (Cho and Chu, 1994).

In sum, the choice of Taiwanese IT firms' contract manufacturing alliances as the unit of analysis is mainly because of the value and appropriateness of these alliances to the empirical study of cross-border capability enhancement; and partially to exploit fully the researcher's comparative advantage. However, it is also important to note that Taiwanese IT firms are analyzed as representative cases rather than as "success models" in this research.

#### **1.4 Significance of Research Issues**

Although historically some host governments have regarded MNCs as cheap labor exploiters, natural-resource predators, or environmental polluters, thus adopting a skeptical or even antagonistic attitude against MNCs, it is increasingly recognized that MNCs are the reservoir of management, technology, and capital. Their roles as conduits or conveyers of critical resources and capabilities are particularly important to LDCs/NICs and their indigenous firms. In fact, the question of how to absorb capabilities from MNCs is one of the most critical issues in international technology transfer research (Baranson, 1978; Kim, 1991). Therefore, a study on the capability transfer from MNCs to indigenous firms is important not only to the growth of indigenous firms, but also to the development of their national economies. In addition to this macro-level importance, research focusing on inter-partner learning through cross-border contract manufacturing alliances is important for the following reasons:

*1. Contract manufacturing is one of the fastest growing areas in the electronics and information technology industries.*

According to Technology Forecasters, contract manufacturing in the computer industry was a US\$19.5 billion business worldwide in 1992, and the demand for electronic manufacturing services (EMS) will grow at an average annual rate of 15% from 1992 through 1997, to nearly US\$40 billion (*Canadian Electronics*, 1993; *Purchasing*, 1993). Another study, from Frost & Sullivan/Market Intelligence, shows that contract manufacturing services in the U.S. electronics industry alone will quadruple by the year 2000, to become a US\$27 billion market (*Canadian Electronics*, 1993).

In a 1993 survey of OEM purchasing managers in the U.S. electronics industry, 81% of the sample firms used contract manufacturers, distributors, or component manufacturers that offer assembly work (*Electronic Business Buyer*, 1993). These EMS suppliers cater to a variety of general and specific requirements for mechanical, electronic, and electrical manufacturing skills. They offer a flexible approach, differing degrees of labor and technological intensity, and versatile manufacturing ability to achieve product integrity in a reliable, timely fashion and to customer's quality standards. Nowadays, many EMS suppliers, particularly Asian electronics and IT firms, have grown out of their peripheral roles and moved towards the core of the computer industry's infrastructure (*Business Week*, 1993a; *Fortune*, 1994). However, the drivers and consequences of such an important phenomenon have not yet been systematically studied and understood.

2. *The evolution of Japanese and Western inter-firm relationships shows the emergence of changing buyer-supplier relationships.*

The "slim manufacturing", "just-in-time", and "ship-to-stock delivery" concepts in Japanese manufacturing industries have a lot to do with their *keiretsu*-like manufacturing network, which connects central firms with different levels of satellite suppliers (Blenkhorn and Noori, 1990; Cutts, 1992) - a relationship that has been labeled "obligational contractual relation" (Sako, 1992), or simply "Japanese-style partnership" (Dyer and Ouchi, 1993). Japanese auto makers especially, have achieved high supplier performance through long-term relationships, transaction-specific investments, and even sole sourcing (Richardson, 1993).

As global competition intensifies, the negative sides of such a captive buyer-supplier relationship have been exposed. The potential problem of such a relationship is that the large Japanese manufacturing firms are believed to prosper at the expense of their multilayer subcontractors (Hasegawa, 1991). Therefore, it is not surprising to see that the clan-like Japanese vertical *keiretsu* system is beginning to open up under current competitive pressures, particularly at the level of component supply (Turner, 1994; Uchihashi, 1994). Such a trend reveals that the autonomy of Japanese contract manufacturing suppliers is increasing (Sako, 1995), and the relation between industrial buyers and suppliers in Japan is becoming increasingly market-oriented.

At the same time, however, European and American MNCs are establishing similar vertical *keiretsu* relationships with their suppliers, in search of manufacturing excellence (Turnbull et al., 1992; Simerly, 1992; Hyun, 1994). As Morris and Imrie (1993: 53) have observed: "*An emerging model of Japanese-style partnerships between large firms and small firms is being introduced through Japanese direct investment and emulation by Western firms.*" In fact, a converging trend of the U.S. "exit" relationship and the Japanese "voice" relationship has been observed in the automobile industry (Helper, 1991; Helper and Sako, 1995).

The traditional supply-management doctrine (especially in the West) suggests that buyers should search for multiple sources and change suppliers occasionally in order to maintain their bargaining power over suppliers (Stuart, 1993), and avoid the risks of being controlled by the suppliers (Frey and Schlosser, 1993). This is based on the assumption that the buyer-supplier relationship is a zero-sum game, and the buyers will be better off if they exploit their suppliers (Kenney and Florida, 1993: 130) - an arm's-length contractual relation whose prevalence in the West has been empirically confirmed (e.g., Helper, 1991; Sako, 1992). However, although conflicts between buyers and suppliers do exist, both sides may find it mutually beneficial to develop a stable and long-term relationship with each other (Lohtia and Krapfel, 1994). In fact, several recent empirical studies have witnessed this trend, that buyers are reducing their supplier base and developing closer relationships with remaining suppliers (Han et al., 1993; Frey and Schlosser, 1993; Bensaou, 1994). The implicit philosophy behind this movement is that buyers and suppliers are partners, working closely to create a win-win solution.

It is because of this shift in mentality that a new form of relational transaction, referred to as the "just-in-time exchange relationship", has been adopted and implemented by many OEM buyers and suppliers of components and parts (Frazier et al., 1988). Furthermore, the term "partnership sourcing" is also advocated, which represents a long-term buyer-supplier relationship based on clear, mutually agreed objectives to strive for world-class capability and competitiveness (Towill and Naim, 1993). Finally, synthesizing the merits of Japanese hierarchical relationships and Western market-oriented relationships, a hybrid form of buyer-supplier structure known as "parallel sourcing" is emerging (Richardson, 1993), and a new type of "permeable network" (Richter and Wakuta, 1993) is claimed to be superior to either the Western open network or the Japanese closed network, because it has the strength of an integrated group while retaining the flexibility to respond to environmental changes.

These labels may be confusing, but the message behind them is quite clear: these phenomena herald the emergence of a changing buyer-supplier relationship - a "quasi-long-term" relationship between partners that is neither captively long-term nor transactionally short-term, consisting of both the elements of collaboration and competition (Prahalad and Hamel, 1994). This trend is also in line with other business phenomena such as the emergence of the modular system (Langlois and Robertson, 1992), the "modular corporation" (*Fortune*, 1993) or the "virtual corporation" (*Business Week*, 1993b; Davidow and Malone, 1993) - a torrent of

spontaneous partnerships which are over-publicized but under-studied both in business and academe.

*3. Cross-border buyer-supplier relationships have become increasingly important to both MNCs and indigenous firms in LDCs/NICs.*

Compared with domestic buyer-supplier cooperation, cross-border buyer-supplier cooperation is more complicated but may be more profitable if properly utilized. On the one hand, firms are forced to use an array of cross-border cooperative activities because of the unstoppable trend of internationalization and global competition. On the other hand, they are also attracted by foreign firms' complementary capabilities which the domestic partners simply cannot adequately provide.

Previous research on cross-border alliances has predominantly focused on alliances among MNCs, and between the triad countries. However, cross-border alliances are not limited exclusively to MNCs, because the competitiveness of these global players is greatly influenced by their use of offshore suppliers. In fact, many MNCs have formed a variety of alliances with their suppliers in LDCs/NICs ever since they started to internationalize decades ago. The vertical link between MNCs and indigenous suppliers in LDCs/NICs is particularly strong in the electronics industry. According to a survey of 1,000 electronics purchasers (*Purchasing*, 1995), OEM buyers which outsource save, on average, about 18% of their manufacturing costs by using contract manufacturers - a vital cost saving for any

firm in this competitive industry. It is mainly because of this fact that Rappaport and Halevi (1991) even proposed that the U.S. computer firms should totally outsource their manufacturing offshore and focus on software technology and services, in order to remain competitive.

In view of the prevalence of cross-border contract manufacturing alliances in the electronics industry, it is evident that such alliances have become increasingly “strategic” not only for indigenous suppliers, but also for MNC buyers. However, research on this emerging relationship is still lacking.

*4. Existing knowledge on cross-border buyer-supplier relationships is limited and fragmented in the management literature.*

Traditionally, buyer-supplier relationships have been studied mainly in the marketing field (e.g., Dwyer et al., 1987; Frazier et al., 1988; Anderson and Narus, 1984, 1990; and Han et al., 1993). However, most of these marketing studies overlook the strategic impacts of these relationships on the competitiveness of the firms involved. Another bias is that most of these channel research is studied from the perspectives of the distributors (e.g., Anderson and Narus, 1984; Mohr and Spekman, 1994). Manufacturers (suppliers), on the other hand, play a relatively peripheral role.

The trend of American MNCs contracting out their manufacturing operations to offshore suppliers has certainly caught the attention of strategy and international

management scholars. One of the major questions investigated has been the costs and benefits of an offshore outsourcing decision, and the conclusions at this stage are still controversial. Many scholars believe that the improper use of outsourcing is partly responsible for the continuing competitive decline of many Western firms (Markides and Berg, 1988; Bettis et al., 1992). By the same token, there are also concerns from practitioners over the declining competitiveness of the "hollow corporation", which is a corporation lacking in-house manufacturing capabilities (*Business Week*, 1986).

While researchers in the strategy and international management field continue to focus on the costs/risks and benefits of offshore outsourcing (Cavinato, 1989; Johnson, 1994; Kotabe and Swan, 1994), more firms seem to be outsourcing offshore, and the question of how to manage the changing relationships remains unanswered (Simon, 1991). The fact that firms need to get access to some critical assets/skills is a reality, no matter what the results of this "make or buy" debate will be. The key question is not whether MNCs should use offshore contractors or not, but how they should manage this cooperative process to protect and even enhance their own benefit<sup>5</sup>. The answers to this "how" question are not only of practical importance, but also of theoretical significance if we want to incorporate the existing knowledge of strategic sourcing into the realm of strategic management or international management.

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<sup>5</sup>Both parties involved in an inter-firm cooperation have an inalienable *de facto* right to pursue their own interest, even at the expense of the other partner. This is one of the major thrusts of institutional economics, especially transaction cost theory (Williamson, 1975, 1985).

*5. The critical issue of international knowledge or capability exchange deserves further study.*

The IMP Group (1982) has identified four elements which can be exchanged by buyers and sellers: a product or service; money; information; and sociality. This is in line with Badaracco's (1991b) conclusion that the flows of inter-organizational cross-border exchange can be classified into three categories: *product* flow, *capital* flow, and *knowledge* flow. Rapid resource mobility is one of the major driving forces for increased cross-border activities (Moss-Kanter, 1995).

Theories for international exchange of product and capital are much better established<sup>6</sup> than the theory of international knowledge or capability exchange, although the latter may play a more important role in the shift of the balance of competitiveness between exchanging parties. This is probably because of the relative subtlety, complexity, and intangibility of knowledge or capability.

Although some management scholars have contributed to our understanding of this elusive phenomenon<sup>7</sup>, there is still no theory to describe or prescribe international capability exchange. Such a theoretical gap is surprising but understandable - the

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<sup>6</sup> Research on international product exchange has well-established theories founded on international trade (such as the Hechscher-Ohlin factor-proportions theory) and the topic of international capital flows has drawn broad attention from scholars in finance, economics, and even international business.

<sup>7</sup> A firm's global rationalization endeavor, which is labeled "coordination of activities" (Porter, 1988) or "global integration" (Bartlett and Ghoshal, 1989), can be regarded as MNCs' global deployment and exchange of different operational capabilities. Recently, cross-border alliances are further considered as vehicles for strategic leverage (Hamel and Prahalad, 1993) - the leverage of global knowledge or capabilities.

natures of knowledge and capability resist direct measure. In spite of the difficulties, more research is still required to develop this fertile yet relatively uncultivated field.

*6. A study of capability transfer or learning through cross-border alliances is necessary to complement existing literature of strategic alliances.*

Most of the research on cross-border buyer-supplier relationships relies on either subjective satisfaction or objective sales revenue as indicators of partnership success (Mohr and Spekman, 1994). In other words, researchers tend to explore a phenomenon with strategic implications through a lens which is either too fuzzy or too myopic. Although these indicators are relevant to a firm's short-term performance, they are, at best, only crude indicators of a firm's long-term competitiveness (Hamel, 1991).

According to Itami (1987), business partners can contribute three things: profit, volume, and *learning*. Moss-Kanter (1995) also believes that learning is one of the three major incentives for a firm's international endeavor. In the cross-border alliance literature, Kogut (1988) sees joint ventures as an instrument of organizational learning. Different from the traditional explanations for cross-border alliances, either from the perspectives of reducing transaction costs or increasing market power, this organizational learning perspective views joint ventures as a means by which firms learn or seek to retain their capabilities. Westney (1988) and Lyles (1988) support the argument that learning may be an explicit goal in an

alliance. This learning motivation behind alliances is further confirmed by other subsequent research (Parkhe, 1991; Child and Markoczy, 1993; Adler and Cole, 1993) and many scholars believe that learning resulting from inter-firm alliances will affect firms' long-term competitiveness (Hamel et al., 1989; Hamel, 1991; Lei 1993). In practice, even the strongest MNCs, such as IBM, treat partnering as a way to "*learn things we couldn't have learned without many years of trial and error*" (*Electronic Business*, 1985). In view of this, the results of learning should be an important indicator of partnership success. However, learning result is rarely studied as a performance indicator in the strategic alliance literature.

*7. The existing theoretical framework of cross-border inter-partner learning needs further extension and testing.*

Although the concept of learning through alliances has been recognized by previous researchers, a generally accepted theory either to describe or to prescribe this phenomenon remains to be established. Most scholars in the inter-partner learning research area tend to focus on joint ventures (Lyles, 1988; Kogut, 1988; Child and Markoczy, 1993; Adler and Cole, 1993) with fewer studies covering other forms of alliances (Hamel, 1991; Badaracco, 1991a). On the other hand, although there are many studies on the issue of technology transfer through licensing or DFI, whether they are inter-organizational or intra-organizational (for a review, see section 2.3 International Technology Transfer), studies on capability transfer through the buyer-supplier contract manufacturing alliances - the most market-oriented and the most common mode of cross-border cooperation - are still lacking. This missing element

certainly limits the generalizability of inter-partner learning research. Therefore, the existing paradigm needs further extension, and more rigorous theory testing must be done before this stream of study can gain academic significance on a par with its practical importance.

The most relevant and arguably the most important research to explain the phenomenon of cross-border inter-partner learning and its determinants has been undertaken by Hamel (1991). Using a longitudinal study based on case method and interviews with nine cross-border alliances, Hamel outlines several determinants of inter-partner learning. However, because of its theory development purpose (Hamel, 1991: 84) and the limitations of research samples and methodology, complementary research is required to further extend and test his findings:

Firstly, Hamel's units of observation were all large MNCs in the triad countries (four U.S. firms, four EC firms , and three Japanese firms). Since MNCs' skill endowments and competition arenas (in terms of geographic coverage and product position) are different from those of small and mid-sized indigenous firms, whether the findings with MNCs can be applied to other types of firms is questionable.

Secondly, since Hamel's work is largely based on interviews with executives from different socio-cultural backgrounds, the subjective judgments of these respondents might be biased by their cultural or social backgrounds. In other words, the Japanese executives' perception or expectation towards their partners may be very different from that of their U.S. counterparts because of either different conceptual

frames of reference, or from calibrating the true scores differently (Riordan and Vandenberg, 1994). To avoid this potential bias, a comparative study from a more objective third party's perspective should be necessary.

Thirdly, in his exploratory study, Hamel has included some possible determinants in his theoretical framework and classified them into three major constructs - intent, transparency, and receptivity (Hamel, 1991: 91). However, there are other forms of classification and other potential determinants (e.g., trust, interaction, characteristics of skills, and inter-firm diversity) which are considered to be important to performance in other literatures but not included in Hamel's framework. Therefore, a theory extension and theory testing study which includes other relevant determinants of inter-partner learning will enrich this research area and add more insights into our existing knowledge base.

Fourthly, after Hamel's path-setting work, the research area of cross-border inter-partner learning has gone through the emerging stage (which requires theory development) to a growing stage (which requires theory extension and theory verification through a test of rigor). However, the research for pushing our existing knowledge boundary out further is still lacking.

Finally, the challenges of such a theory extension and theory testing study are two-fold: on the one hand, the study must achieve better control over the variables, especially the extraneous variables such as the variation arising from different modes or industries. On the other hand, the study must devise more objective

indicators and measurements for the dependent variable - the performance of an alliance. It is clear that a different research method, other than case studies, not only provides another tool to tackle the same research issue, it is almost an imperative if the existing knowledge frontier is to be extended.

*8. A study from the learners' (suppliers') perspective is crucial to understanding the organizational learning process and it could also provide valuable insights for the "teachers" (MNCs) as well.*

Although some researchers on cross-border buyer-supplier relationships have correctly warned against the strategic risks of losing competitiveness through alliances, such as declining manufacturing capability or deteriorating product innovation (Venkatesan, 1992) and overlooking strategic or technological issues (Welch and Nayak, 1992), they tend to investigate this "leakage" issue (Harrigan, 1986) mainly from the perspective of the "teachers" (sources). In fact, the learners may play an equally, if not more, important role in this inter-partner learning process.

Suppliers in the contract manufacturing business can be described as "job shops" which provide manufacturing services to their clients according to agreed contractual terms. Lacking end-customer delivery capability in a specific product-market, some manufacturers have to rely on firms with end-customer marketing capability. Apparently, contract manufacturing can be beneficial to the suppliers (Weller, 1981; Cavinato, 1989; Bergstrom, 1993), and the learning benefits for

suppliers have been implicitly indicated in some empirical research (Kim, 1991; Langlois and Robertson, 1992). However, the reality is that not all suppliers enhance their capabilities through these relationships. Conversely, many scholars and practitioners believe that OEM businesses are dangerous for suppliers because of their unstable nature, and relying on OEM orders will have negative impacts on a firm's long-term competitiveness (Chen, 1994; Cho and Chu, 1994). Therefore, more in-depth research is needed to account for the different alliance results among indigenous suppliers.

On the other hand, although U.S. firms have made some efforts in developing closer contract manufacturing partnerships to source on a global scale, especially with Asian suppliers, they do not understand fully the nature of these competitive trading partnerships (Spekman, 1991). Therefore, it will be helpful for MNCs to improve their supply management if they can understand inter-partner dynamics from their partner's perspective. The knowledge of offshore suppliers is particularly important for MNCs regarding suppliers as potential competitors because, as Sun Tzu put it (1963: 84): "*know the enemy and know yourself; in a hundred battles you will never be in peril*". Furthermore, because an alliance is a two-way learning opportunity, if MNCs can switch their teacher's mentality to accommodate some learner's intent, it might occur to them that they can learn from their indigenous suppliers as well.

## **Chapter II: LITERATURE REVIEW**

Because inter-partner learning is still relatively unexplored territory in the realm of strategy and international management, no existing theory can be directly applied as the sole theoretical foundation of this research. Nevertheless, a variety of theories or paradigms from different disciplines can still serve as useful building blocks towards a theoretical framework of inter-partner learning. This review intends to summarize the existing literatures relevant to research on inter-partner learning through cross-border alliances. First the resource-based theory literature is introduced, then cross-border strategic alliance and international technology transfer research are reviewed, as the relevant theoretical foundations of this research.

### **2.1 Resource-Based Theory**

#### **2.1.1 From product-market focus to skill focus**

The traditional focus of business strategy has been on the analysis of the linkage (fit) between the environment and the organization. The well-known and widely-accepted SWOT analysis (evaluating and matching internal Strengths, Weaknesses, and external Opportunities and Threats) can trace its root to a group of Harvard scholars (Learned et al., 1965; Andrews, 1971). The greatest merit of this model is its theoretical legitimacy and comprehensiveness, encompassing both internal and external factors in strategy formulation. However, the original paradigm fails to answer the question of how to assess either the environment or the firm (Collis and Montgomery, 1995). A number of established management theories, including the

structure-conduct-performance industrial organization model (Bain, 1954), environment-strategy-structure paradigm (Chandler, 1962; Miles and Snow, 1978), contingency theory (Lawrence and Lorsch, 1967; Hofer, 1975) , BCG model (Boston Consulting Group, 1970), and five-forces analysis (Porter, 1980), are almost all predominantly based on the analysis of environmental factors<sup>8</sup>, especially market structure and product competition. In other words, product-market analysis has been the foundation for designing business strategy until the 1980s, and the internal organizational factors have been peripheral concerns at most (Bartlett and Ghoshal, 1991: 8; Collis 1991: 49-50).

Recently, due partly to increasing uncontrollability of the environment, many scholars (Wernerfelt, 1984; Prahalad and Hamel, 1990; Barney, 1991) and even consultants (Klein et al., 1991; Towner, 1994) have shifted their focus from traditional product-market positioning to viewing firm-specific skills or competencies as the foundation of competitive advantage (Collis and Montgomery, 1995). This shift is in line with the industrial trend in which product life cycles are becoming shorter while skill life cycles are becoming longer, a phenomenon especially obvious in high technology industries. Nowadays, many managers are more interested in identifying and acquiring requisite skills than finding out which market to enter or what product to develop.

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<sup>8</sup> Traditionally, strategy process and organizational structure are the focuses of the internal factors. However, they are often considered to be the tools to implement or adjust strategies, instead of the factors serving as the bases of strategy formulation.

The resource-based paradigm (Barney, 1991) emphasizes corporate strengths, firm-specific assets or capabilities. This paradigm has focused the attention of both scholars and practitioners on the more controllable internal factors of a firm. When the internal factors are investigated, a fundamental question will be: what is a firm? Prahalad and Hamel (1990) conceive a firm as a portfolio of core competencies encompassing a variety of value-creating disciplines, rather than as a portfolio of product-market entities. Chandler (1992) also perceives a firm as a pool of learned skills, physical facilities, and liquid capital. In fact, resource-based scholars see companies as different collections of physical and intangible assets and capabilities (Collis and Montgomery, 1995: 119). This new viewpoint is different from the traditional one which usually views a firm as a combination of different input factors, literally a bundle of assets, or a production black box. A firm certainly possesses assets, but assets alone do not constitute a firm, nor do they reflect its true value. Therefore, the skills or capabilities that make a firm function are just as, if not more, important in defining what a firm really is.

### **2.1.2 The anatomy of a firm**

Previous researchers have used different terms with similar connotations in referring to firm-specific assets and skills. Assets are often associated with "resources", which Penrose defines as "... *physical things a firm buys, leases, or produces for its own use, and the people hired on terms that make them effectively part of the firm*" (Penrose, 1959: 67). Grant (1991) takes the same viewpoint by defining resources as the inputs to the production process. Thus he has given a

detailed classification and description of various types of tangible and intangible resources of a firm. Lado et al. (1992) consider resources to be firm-specific assets that are potentially rent yielding. All these views regard assets or resources as the input factors of a firm's value-creating activities.

Focusing on the intangible assets a firm possesses, Itami (1987) calls the information-based resources "invisible assets", and he believes they are just as essential for effective operation as the visible corporate resources. Moreover, he believes they are the most important resources for long-term success. Hall (1991) has tried to include these intangible assets in the realm of accounting by specifically classifying them into people-independent intangible assets and people-dependent intangible assets. The former are intangible assets with their own integrity, while the latter are intangible assets embedded in actors of the business system.

These so-called "invisible assets" or "people-dependent intangible assets" can be best understood as *knowledge*, which can be regarded as another type of input factor of the value creation process. Viewing a company as a knowledge processing and creating system, Nonaka and Takeuchi (1995) further classify knowledge into explicit knowledge and tacit knowledge. While the former can be articulated in formal language, the latter is personal knowledge embedded in individual experience which is hard to articulate. Nevertheless, tacit knowledge can be a more important source of a firm's competitiveness than explicit knowledge.

To sum up, the term “assets” is operationally defined as the input factors in a value-creation system, and it is interchangeable with the term “resources” in this research. Such an operational definition is consistent with Amit and Schoemaker’s (1993: 35) definition: *“The firm’s Resources will be defined as stocks of available factors that are owned or controlled by the firm. Resources are converted into final products or services by using a wide range of other firm assets and bonding mechanisms...”*

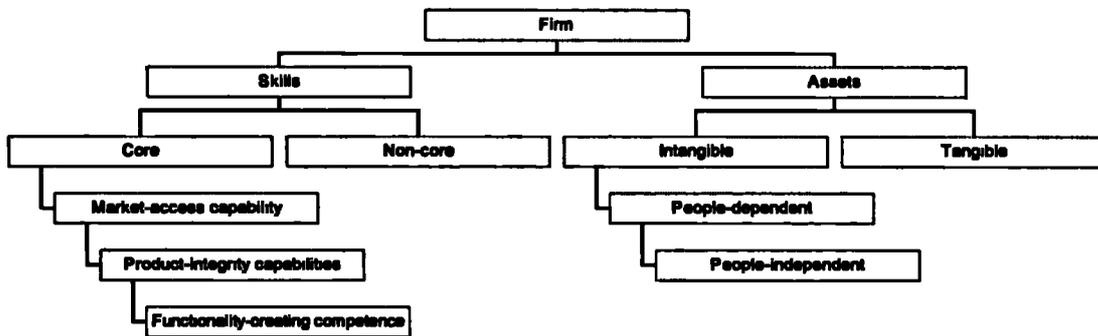
Skills, on the other hand, are the intrinsic capabilities embedded in a firm. The distinction between capabilities and resources is encapsulated by Amit and Schoemaker’s (1993: 35) definition: *“Capabilities, in contrast [to resources], refer to a firm’s capacity to deploy Resources, usually in combination, using organizational processes, to effect a desired end.”*

In management literature, “skill”, “capability”, and “competence” are often interchangeable, if not synonymous, because the definition and usage of skill, capability and competence are somewhat arbitrary (Nonaka and Takeuchi, 1995: 48). Hofer and Schendel (1978: 25) regard competencies as *“patterns of resource and skill deployments that will help it (the firm) achieve its goals and objectives.”* Along similar lines, Reed and DeFillippi (1990: 90) consider competencies as *“the particular skills and resources a firm possesses, and the superior way in which they are used.”* They seem to define competencies as the joint utilization of all the input factors within the firm’s control. In this research, the three terms: skill, capability, and competence are interchangeable, and there are only slight semantic differences

among them. In short, a firm-specific capability is defined as a capacity to secure, deploy, and utilize required input factors for the accomplishment of a designated value-added task.

Adopting Hamel's identification of three important areas of competencies (see Stonham, 1993: 151) that may be "core": 1) market access capabilities, 2) product-integrity capabilities, and 3) functionality-creating competence, and Hall's (1991) classification of intangible assets, the anatomy of a firm can be viewed as follows:

Fig. 1: The Anatomy of a Firm



The main purpose of Figure 1 is to trace the roots of a firm's competitiveness. The conceptual separation between input factors (assets or resources) and factor-utilizing capacity (skill, capability, or competence) has important implications for a firm's sustainable competitive advantage. As already defined, assets are what a firm has, while skills are what a firm can do. The former are static in nature, with an emphasis on the state of ownership; while the latter are dynamic and people-embedded in nature, with an emphasis on continuous functionality. The above distinction can even clarify some subtle notions. For example, a piece of information or knowledge is an asset when it is transformed or embedded into

products or services; but if it is used to deploy and combine assets in order to extract the intrinsic value of these assets, it is better regarded as know-how and classified as a skill. However, it is also noteworthy, at this point, that although it is conceptually sensible to separate assets from skills, they are interdependent and intertwined in practice, and jointly they form the basis of a firm's competitiveness.

### **2.1.3 In search of the strategic resources**

Barney (1986) defines the resources necessary to implement a strategy as “strategic resources”, and he argues that if the strategic factor markets are perfect, the costs of acquiring strategic resources will approach the economic benefits derived from utilizing these acquired resources. Advocating the notion of “asset stock accumulation”, Dierickx and Cool (1989) believe that strategic resources can only be developed internally, and they cannot be acquired externally. However, these resource-based studies fail to elucidate the contents of the “strategic resources” they are arguing about.

Wernerfelt (1984: 172) believes that a firm's strategic resources are the semi-permanent tangible and intangible assets for which resource position barrier can be built up. His examples of these attractive assets are machine capacity, customer loyalty, production experience, and technological leads (p 174). Other input factors, such as cash, brand names, skilled personnel, trade contacts, and in-house knowledge of technology, are also widely accepted as the foundations of sustainable competitive advantages.

However, compared with factor-utilizing capacities (skills, capabilities, or competencies), input factors (assets) are more tradable, imitable, and substitutable. Therefore, assets should not be the “strategic resources” upon which a firm can build its sustainable comparative advantages. More precisely, it is the unique capabilities a firm demonstrates through its superior management of the controlled assets that is the “strategic resources” in quest.

Stalk et al. (1992) have used the term "strategic capability", which is a set of business processes that help a firm to distinguish itself from its competitors in the eyes of customers. Along a similar line, Bartmess and Cerny (1993: 81) also have defined capabilities as *"a company's proficiency in the business processes which allow it to constantly distinguish itself along the dimensions that are important to its customers."* Their viewpoints are consistent with Kogut and Kulatilaka's (1994) viewing capabilities as the accumulated skills of what firms become best at doing. The common thread of their definitions is that a capability realizes its value only when it is utilized, and its relative value is decided by external competition and market demand.

Selznick (1957) uses the term "distinctive competence" to describe those activities which a firm does better relative to competitors. This definition almost makes "distinctive competence" a synonym of "excellence" (Peters and Waterman, 1982), which has a strong management emphasis. Studying the issue of diversification, Wrigley (1970) is probably the first scholar proposing the notion of "core skills",

which he defines as the skills required by a firm to compete within a chosen product-market area. This notion of the “core skills” is magnified by the paradigm of the “core competencies”, advocated by Prahalad and Hamel (1990). They maintain that the core competencies are at the root of a firm's competitiveness, not only for its current operation, but also for its future success. From their point of view: *"Competencies are the glue that binds existing businesses. They are also the engine for new business development"* (Prahalad and Hamel, 1990: 82). Although Stalk et al. (1992) have tried to extend the notion of core competencies by including other value-added activities (such as distribution) which are labeled with "core capabilities", their notion does not add much because Prahalad and Hamel never confine core competencies to technological know-how or R&D activities. Leonard-Barton (1992) further augments the range of "core capabilities" to include a firm's underlying values and norms, and she defined a core capability as *"the knowledge set that distinguishes and provides a competitive advantage"* (p. 113).

In sum, a firm's sustainable competitive advantages lie in its capabilities, not its assets. Therefore, firm-specific skills or capabilities, rather than assets or resources, should be the targets of external acquisition or internal accumulation.

#### **2.1.4 The relevance of resource-based theory in this study**

Previous research founded on the resource-based perspective has provided a theoretical rationale for subsequent studies focusing on firm-specific resources. It is

therefore theoretically sound to conceptualize a firm as a reservoir of competencies, which consists of a hierarchy of different assets and skills.

From the preceding analysis, it has been made clear that the resource-based paradigm provides a theoretical justification for focusing on firm-specific capabilities. From this perspective, the acquisition of critical resources, or the capability enhancement (learning) of a firm, should be the most important performance indicator in inter-firm cooperation. Such a viewpoint also justifies the choice of inter-partner learning (capability enhancement) as the major dependent variable in this research.

However, the question of how to measure firm-specific capabilities (or inter-partner learning) is a great challenge for researchers adopting a resource-based view of firms. Similarly, one major challenge for the application of the “core competencies” paradigm is the identification and measurement of these elusive firm-specific competencies. To solve such a practical research problem, a firm’s overall competence is decomposed into measurable capability indicators in this research. In such a way, this research makes possible the assessment of different levels of capabilities in a firm, and the notion of competence is no longer just a metaphor, but refers to firm-specific capabilities with concrete measurable contents.

Another problem with the resource-based paradigm is that although it recognizes the possibility of competence acquisition from external sources, it assumes that there are efficient factor-markets (Barney, 1986), and it therefore fails to address the

question of how to acquire competence, particularly the question of how to acquire new competence. However, such questions are critical to firms founding strategies on their firm-specific competencies or resources. A complementary effort to mend such a theoretical gap is thus necessary to make the resource-based paradigm applicable in practice. This study, focusing on the determinants of capability enhancement through cross-border alliances, is precisely such an effort.

Finally, a potential pitfall of adopting a resource-based perspective is that the research tends to emphasize the importance of internal factors while overlooking the influence of external factors. In fact, the value of firm-specific resources or capabilities must be tested and determined by product-market competition, and a firm's capability enhancement should eventually be reflected in its economic performance. In this research, a firm's sales growth after the project, and its change of cooperative strength with the partner, are two indicators related to the firm's economic performance; and the relationship between a firm's learning (capability enhancement) and these economic indicators, are also studied. Therefore, although this research focuses on firm-specific capabilities, it also takes the influence of product-market competition into consideration. Such an attempt is made in order to bridge the gap between resource-based theory and the established perspectives of market competition and industry structure.

This study adopts a resource-based perspective to evaluate the capability enhancement effect and its determinants in cross-border alliances. The focus of this study is on firm-specific capabilities, and although assets (resources) are not

explicitly studied in this research, they are nevertheless embedded as the bases of different capabilities. Only through combining and utilizing a bundle of complementary assets can a firm gain or upgrade its capabilities, because capabilities multiply and amplify the value of assets.

## **2.2 Cross-Border Strategic Alliance**

### **2.2.1 The definition of cross-border strategic alliance**

In the past decade, “strategic alliance” is one of the overused phrases in the management field, probably because a variety of cooperative activities between MNCs have emerged and drawn increasing attention since the 1980s. There is ample literature studying these phenomena from different angles. International management scholars have intensively studied MNCs' entry mode decisions (for a summary, see Agarwal and Ramaswami, 1992) and many economists and management scholars have focused on the specific cooperative mode of DFI (e.g., McClintock, 1988; Ramstetter, 1991). Certainly other forms of strategic alliance have also been studied, especially the technological collaboration among the triad countries in high-tech industries (e.g., Gugler, 1992; Hagedoorn, 1993).

Although difficult, a clear definition of cross-border strategic alliance is the prerequisite of meaningful analysis. As many scholars have used different terminologies with similar definitions to describe the same phenomenon of inter-firm alliances (e.g., Porter and Fuller, 1986: *Coalition*; Buckely and Casson, 1988: *Cooperation*; Hamel et al., 1989: *Collaboration*; Mohr and Spekman, 1994:

*Partnership*), the research adopts Parkhe's (1991: 581) definition of cross-border strategic alliances:

*"The relatively enduring interfirm cooperative arrangements, involving cross-border flows and linkages that utilize resources and/or governance structures from autonomous organizations headquartered in two or more countries, for the joint accomplishment of individual goals linked to the corporate mission of each sponsoring firm."*

According to the above definition, a cross-border strategic alliance must fulfill the following three requirements:

1. It must involve two (or more) autonomous firms with different country origins (or headquartered in different countries).
2. There must be a bilateral exchange of resources between the firms.
3. The relationship should carry strategic implications for both firms (i.e., affecting the future competitiveness of the firms).

### **2.2.2 OEM buyer-supplier relationship as a form of strategic alliance**

Using the above criteria to evaluate the contract manufacturing activities between MNCs and their indigenous suppliers, all cross-border OEM buyer-supplier relationships qualify under the first two criteria. The question then focuses on whether the contract manufacturing relationships carry strategic implications for both firms.

Many scholars have found that the traditional linkages between MNCs and indigenous firms were often asymmetric and tactical. On the one hand, the MNCs are in a commanding position as the most prolific purveyor of technology transfer (Baranson, 1978). On the other hand, because of their gaps in resources, sizes and capabilities with MNCs, many indigenous firms would lack the capability or ambition to enter into the competitive arena with their more global partners (Doz et al., 1986).

As many indigenous firms in Asian NICs are narrowing their capability gaps with MNCs and their strategic intents are expanding beyond national borders, their relationships with MNCs have become increasingly symmetric and even strategic. The traditional perspective of viewing this relationship only as a one-way and one-off business transaction could be both misleading and dangerous, because this relationship may have profound implications for indigenous suppliers as well as for their MNC partners.

Studying the technological diffusion among and within vertical *keiretsu* groups in the Japanese electrical machinery industry, Suzuki (1993) has found that technology transfer from a core firm to its subcontracting firms is substantial. From the observation of Korean firms and their MNC partners, Kim (1991: 225) has found that in an OEM agreement it is not unusual for the foreign buyers to deliberately provide technical know-how to the indigenous suppliers in order to ensure that the products will meet the stringent specifications set by the buyers. In this way, although technology *per se* is not negotiated and priced in the market, it becomes a

by-product of contract manufacturing cooperation. Similar findings are confirmed by local managers in field interviews both in Korea (Westphal et al., 1985; Cho and Chu, 1994) and in Singapore (Wong, 1992). These findings provide the anecdotal evidence that an OEM buyer-supplier relationship can be strategic in that it can be used as a conduit for technology transfer.

Even within existing management literature, the OEM buyer-supplier relationship should still be regarded as an important mode of strategic alliance, even though it is usually not treated as being as “strategic” as the other modes, and consequently not being studied as thoroughly. Borys and Jemison (1989) have used the term “hybrid organizational arrangements” to describe the phenomena in which two or more sovereign organizations combine to pursue common interests. Among the four different hybrid types they studied (Mergers and Acquisitions, Joint Ventures, License Agreements, and Supplier Arrangements), they conclude that supplier arrangements may carry the same strategic importance as any other modes. Porter and Fuller (1986: 315) believe that “*Coalitions are formal, long-term alliances between firms that link aspects of their businesses but fall short of merger.*” They also explicitly include supply agreements as formal, long-term alliances.

In other research, buyer-supplier alliances are described as vertical sourcing agreements operating in adjacent stages of a value chain (Harrigan, 1988a: 148), which can be distinguished from the horizontal alliances - collaboration between competitors (Burgers et al., 1993: 420). Similarly, some researchers have classified alliances into competitor alliances and non-competitor alliances (Sheth and

Parvatiyar, 1992). Scholars tend to regard the horizontal alliances as the competitor alliances; while they associate the vertical alliances with the non-competitor alliance. Because of such a conceptual association, many scholars and even practitioners have considered the horizontal alliances as “strategic”, but the vertical alliances as only “operational”<sup>9</sup>.

However, such a simplistic dichotomy is both untrue in practice and misleading in theory. It is practically untrue because in reality it is very difficult to decide whether a partner is a competitor or not, given the fact that most firms are multi-product players with presence in multiple markets. Even if there is no immediate product-market overlap, conflicts may arise as partners develop new products or enter new markets. The dichotomy is theoretically misleading in that a sensitive relationship is not necessarily more strategic than an assured one. Conversely, it is often the unnoticed operational routines - relationships with supportive suppliers and loyal customers - that lay the foundation of a firm’s sustainable competitive advantages. An MNC’s competitiveness may lie more in its vertical global operational network than in its horizontal linkages with other MNC competitors.

Inasmuch as competition and conflicts do exist in the vertical "non-competitor" relationships between OEM buyers and their suppliers, and the results of offshore contract manufacturing do affect the future competitiveness of both indigenous firms

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<sup>9</sup> Traditionally, contract manufacturing or supply chain management are much more frequently studied in the realm of operational management than in the field of strategic management.

and MNCs, it is evident that an OEM buyer-supplier alliance, like other horizontal alliances, should be regarded as a form of strategic alliance.

### **2.2.3 Cross-border strategic alliances as learning platforms**

Viewing organizational learning as a knowledge acquisition and capability enhancement process, an organization can usually take two different but complementary routes to learning - internal development and external acquisition. There has been some research on the issue of intra-organizational learning (Epple et al., 1991; Szulanski, 1993), or capability enhancement through internal efforts or past experiences (Garud and Nayyar, 1994). Although it is important for a firm to learn by itself or to develop competence internally, external sources probably provide more opportunities from which the firm can learn. More often than not, external learning precedes and results in internal learning (Nonaka and Takeuchi, 1995: 6), and it is especially important for firms with limited assets or skills, which constrain their capability for internal learning. External learning is also more important when a firm faces an uncertain environment; a case in point is the increasing importance of benchmarking competitors and the diffusion of best practices in industries.

Scholars adopting a resource-based perspective have argued rigorously that if a strategic resource can be traded or imitated through factor markets, it cannot sustain competitive advantage for its owner, because asset stocks are *strategic* to the extent that they are *nontradeable*, *nonimitable*, and *nonsubstitutable* (Dierickx and Cool, 1989: 1501). Even if strategic capabilities are tradable (through mergers and

acquisitions) and the factor markets are not perfect enough to fully reflect the true value of these capabilities, the market is still not an effective mechanism for capability transfer. Buying a piece of technology or even the whole organization does not guarantee the acquired capabilities will remain intact, let alone their successful assimilation and application by the acquirer.

The limited usefulness of the market mechanism for firms in quest of strategic capability acquisition has forced companies of all levels into all kinds of strategic alliances, because although strategic capabilities cannot be bought and are difficult to imitate, they can be “borrowed” or even be “learned” through partnering with the capability sources. However, as Teece (1986: 294) points out: *"The current euphoria over 'strategic partnering' may be partially misplaced. The advantages are being stressed... without a balanced presentation of costs and risks."* From his point of view, there are two major risks of partnering: 1) the risk that the partner won't perform according to the perceived agreement; and 2) the danger that the partner may imitate the innovator's technology and then compete with the innovator. The first risk is more tangible and closer at hand, while the second risk is more subtle but potentially more critical. Teece believes the second risk is particularly high when the partner has complementary assets (manufacturing or distribution-related) with which to realize the profit of the technology in question.

From his observation of Japanese firms, Kojima (1978) has noticed this issue and introduced the notion of using a joint venture as a vehicle for personnel training - a skill transmission process from the tutors (usually the U.S. MNCs) to pupils

(usually the Japanese firms). The success of Japanese firms (Abegglen and Stalk, 1985; Reich and Mankin, 1986) has highlighted the critical role of learning through alliances in the enhancement of a firm's competitiveness, especially from the perspective of the resource-poor partner.

However, it was not until the study of joint ventures emerged in the 80s that scholars started to apply this notion of organizational learning to strategic alliance research. According to Itami (1987), business partners can contribute three things: profit, volume, and *learning*. After studying the motivation of joint ventures, Kogut (1988) proposes joint ventures as organizational learning vehicles by which knowledge is transferred and by which firms learn from one another. In addition to the traditional transaction costs and strategic behavior (market power) perspectives, the organizational learning perspective views joint ventures as a means by which firms learn or seek to retain their capabilities. Similarly, Westney (1988) and Lyles (1988) also note that learning may be an explicit goal in an alliance.

Mody (1993) believes that alliances may be thought of as experimental organizations that trade off the acquisition of knowledge against potential losses because of cheating and opportunism. With a similar view, Ciborra (1991) regards alliances as institutional arrangements that allow firms to implement strategies for organizational learning and innovation. According to this perspective, alliances (particularly joint ventures) are vehicles for organizational learning, which is the same as Lei's (1993) notion of "alliances as learning platforms".

If alliances are learning platforms, cross-border alliances may be more effective platforms, because both partners are exposed to multiple stimuli, heterogeneous cultures, and complementary skills, which enable them to develop competencies and learning opportunities not open to domestic alliances. In fact, there is preliminary evidence showing that partners from a different cultural background may place different emphasis on the learning aspect of cross-border alliances. After studying 340 small and mid-sized Korean firms conducting outward investment, Tallman and Shenkar (1990) found that the firms' strategic concerns were different from those of large MNCs. Their findings support the organizational learning perspective over the transaction cost perspective in explaining the foreign cooperation of Korean small and mid-sized firms. The conclusions may imply that resource-limited firms in LDCs/NICs place more emphasis on learning than their resource-abundant MNC counterparts.

A variety of cross-border alliance modes for organizational learning have been suggested in the management literature. Among them, joint venture is the most intensively studied mode (Lyles, 1988, Kogut, 1988, Adler and Cole, 1993). However, as Hobday (1990) points out: learning can happen through joint ventures; by installing capital goods, training, hiring key individuals, reverse engineering, imitating partners; and through assembly and mass manufacturing, exporting and investment abroad. This perspective implies that learning occurs in a variety of business functions: research, design, engineering, manufacturing, and marketing (Dodgson, 1993) through different routes. This may at least partially explain why

the competitive balance in alliances is very difficult to control through legal clauses or structural solutions (Pucik, 1991:136).

Pucik (1991) believes that the only sustainable response to this challenge of cross-border alliances is a proactive policy encouraging organizational learning that matches or even surpasses the learning ability of the partner. In other words, the relative bargaining power between partners will change, depending on whether a firm takes simply a "substitution intent" to leverage the partner's capabilities and assumes its partner will do likewise, or it adopts an "internalization intent" where it recognizes the importance of a "learning race" and tries to "out-learn" its partner (Hamel, 1991).

#### **2.2.4 The relevance of strategic alliance research in this study**

Research on cross-border strategic alliances provides us with a comprehensive understanding of the reasons for and results of international cooperation. The above review justifies the choice of contract manufacturing alliances as the units of analysis in this study, because such a buyer-supplier relationship has strategic implications for the supplier as well as the buyer. From a strategic point of view, contract manufacturing alliances are not simply business options to utilize the partner's strengths, but they are also strategic opportunities for capability enhancement. This is particularly true for the resource-limited and niche-capability partner.

Previous research on strategic alliance predominantly focuses on the collaboration between symmetrical partners among the triad countries. As intensifying global competition has forced all levels of firms to cooperate internationally in order to secure access to critical assets/skills, the breadth and strength of cross-border strategic alliances is unavoidably increasing. The propensity to study collaboration within MNCs not only limits the generalizability of strategic alliance research, but also neglects the supporting forces of MNCs: their numerous indigenous partners. More importantly, these emerging indigenous firms in LDCs/NICs are the future challengers in the global arena.

Judging from the fact that the research stream of learning through alliances mainly focuses on joint ventures, and the existing capability transfer studies predominantly choose intra-organizational settings, there seems to be an underlying assumption that capability learning (or transfer) takes place in a quasi-hierarchical environment, and only happens over a long period of time. However, learning from customers has also been suggested as an important source for a firm's capability enhancement (von Hippel, 1988), and technology transfer that leverages capabilities (compared with other alliances that leverage resources) usually takes the form of an OEM supply agreement (Pucik, 1991: 124). Capability learning should also be observable in a quasi-market and short-term cross-border contract manufacturing alliance. Research focusing on OEM buyer-supplier alliances will complement and strengthen the existing strategic alliance literature.

Still another limitation of the existing literature is that academic research on strategic alliance has tended to be more macropolicy-oriented than management-oriented (Simon, 1991: 20). From the manager's perspective, the question of how to manage alliances is still unanswered in the strategic alliance literature. Specifically, although learning has been recognized as a major motive for cross-border alliance, it is rarely treated as an alliance performance indicator and empirically measured and studied. By exploring strategic alliances through the lens of organizational learning, this study is expected to shed new light on issues of alliance management, particularly in terms of capability learning.

## **2.3 International Technology Transfer**

### **2.3.1 Definition of technology transfer**

Technology transfer is a widely used term that needs some degree of clarification. The definitions and boundaries of both "technology" and "transfer" should be specified first in order to understand the content of existing research. From a broader perspective, technology includes all knowledge, tools, and skills which transform inputs into outputs in a value creating system (Kast and Rosenzweig, 1979; Daft and Lengel, 1986). However, most technology management scholars tend to focus their research on technological know-how, which can be roughly classified into product technology and process technology (Hayes and Wheelwright, 1979).

Adopting a broader definition for technology transfer, Gee (1993) proposes that technology should include all useful information and knowledge embedded in the forms of: 1) technical ideas, information or data; 2) people: personal technical skills and expertise; and 3) physical models: prototypes, design, computer codes, etc. Similarly, Sharif (1988) also embodies the intangible technology by decomposing it into four basic components: 1) technoware: production tools and facilities; 2) humanware: production skills and experiences; 3) infoware: production facts and information; and 4) orgaware: production arrangements and linkages. Apparently, these scholars study technology from a broad perspective. In this sense, technology should be considered as a carrier of knowledge and cultural values rather than a material artifact (Levin, 1993: 497). More specifically, technology is information that is put to use in order to accomplish some tasks, the knowledge of how to do something (Gibson and Rogers, 1994: 333), and an extension of human capability (Large and Barclay, 1992: 14). Following this broader definition, technology should be regarded as know-how, skills, and capabilities, instead of discrete pieces of technological knowledge. In other words, technology is valuable to firms only when it utilizes input factors (assets).

The term "transfer" is misleading in two respects: first, transfer has an implicit connotation of free movement. This is why some scholars prefer "technology trading" to "technology transfer" (Vestal, 1989). But even "trading" does not capture the essence of this process because technology transfer is far from a one-off spot transaction. It usually takes a long time, involving much on-going effort from both the transferor and the transferee. The second problem with using the term



"transfer" is that it implies a one-way sequential process (Levin, 1993: 500), which does not reflect the reality that both sides can get something out of this two-way interaction process.

Gee (1993) conceives of transfer as a two-way or multi-lateral learning process between exchanging parties, a perspective also adopted by Levin (1993). This definition captures the essence of the dynamic interaction process better than the traditional one-way models, as Gibson and Rogers (1994: 333) have pointed out: *"Transfer is the movement of technology via some channels from one individual or organization to another... an interactive process with a great deal of back-and-forth exchange among individuals over an extended period of time."*

Compared with domestic technology transfer, international technology transfer (ITT) usually faces greater difficulties because of differences in cultures, norms, communication, and other administrative constraints between the exchange parties. However, its success is crucial to the firm's internationalization. Most previous ITT research deals with national government policies and focuses mostly on DFI (including joint ventures) or licensing as the channels to transfer technological capability (for a review of ITT, see Reddy and Zhao, 1990). However, the traditional research scope of ITT appears to be too narrow in that it fails to address the essence of cross-border competence diffusion through a variety of different channels, both formal and informal. Therefore, more studies on international capability transfer are necessary to enrich and complement the existing ITT literature. In this research, technology transfer is considered to be a socio-

technological learning and development process, as proposed by Levin (1993), and the theoretical framework of this research is largely based on the ITT literature.

### **2.3.2 Summary of literature on determinants of technology transfer**

Technology transfer exists between individuals (such as scientist-scientist, scientist-client, manager-customer, manager-scientist, etc.), within an organization (cross-department or parent-subsiary) or among organizations, in university-industry collaboration and new R&D consortia, and between government and industry. Researchers in the field usually adopt a *source-destination perspective* to analyze the process (Williams and Gibson, 1990: 10). Others adopt a *bridge perspective*, focusing on the transfer agents who act as match-maker, educator, translator, and facilitator (Goldhor and Lund, 1983). In the ITT literature, the primary transfer agents remain the MNCs (Reddy and Zhao, 1990: 300), although they are also the sources most of the time. Still others advocate an *alliance perspective*, claiming that transfer barriers can be reduced by a process of alliance building (Lambright and Teich, 1976).

Previous research on technology transfer is abundant. Much research has been done on technology diffusion from developed countries to LDCs/NICs, which mainly focuses on either DFI or technology licensing as the transfer mode (e.g., Mansfield et al., 1982). Some research focuses on the commercialization process of scientific knowledge from research centers (universities or R&D institutes) to firms (e.g., Stewart and Gibson, 1990; Large and Barclay, 1992). As new forms of cross-border cooperation emerge, research on technology transfer through inter-firm

alliances (in the forms of R&D consortia, joint R&D, or joint ventures) has increased dramatically (e.g., Gibson and Rogers, 1994). However, although production-sharing agreements have been recognized as another ITT mode (Reddy and Zhao, 1990: 297), very little research has been done on the area of technology transfer through contract manufacturing alliances.

In addition, although the measurement of a country's technology capability has been more or less established<sup>10</sup>, disagreement widens among scholars when it comes to the measurement of corporate-level technology capability, and the specific factors affecting a firm's performance in technology transfer are also diverse (for a review, see Godkin, 1988). Many scholars in the ITT field believe that a more holistic model should include micro-level determinants such as source, recipient, technology (Davidson and McFetridge, 1985), and the actors' interaction process (Ounjian and Carne, 1987). Following this argument, a summary table of performance determinants from previous technology transfer research, classified according to the four distinct factor groups, is listed in Table 1.

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<sup>10</sup>The most inclusive formula for a country's technological capability is its weighted average of 1) the input factors: such as human resources, R&D investment, and production technology, 2) the output factors: such as number of registered patents, the sum of technological trading, and the export value of technology-intensive products, and 3) the spatial linkages: such as subcontracting expenses and dependence on raw materials (Felsenstein and Bar-El, 1989).

Table 1: Factors affecting the effectiveness of technology transfer

Source	Recipient Characteristics	Source Characteristics	Technology Characteristics	Relationship Characteristics
Utterback, 1974	Need recognition (demand pull)			
Lingwood, 1975	An interdisciplinary transfer team Turnover among key people in the transfer team	Familiarity with client needs		
Teece, 1977	The amount of experience in the target technology	The number of previous applications of the technology		
Vernon and Davidson, 1979		The amount of commercial experience in foreign countries The degree of technological competition among supplier firms		
Voll, 1980	The capacity to absorb the technology		The suitability of a technology The transmission channels The cost of technology	
Sharif and Haq, 1980	Recipient motivation The assimilation of the recipient	Technology level of the source		
Contractor and Sagafi-Nejad, 1981		Size Extent of international experience	Type of technology Product maturity	
Benvignati, 1983	The amount of commercial experience		Channel of transfer used Degree of innovation complexity Degree of technological competition between source and recipient	Relationships between interacting countries or firms
Davidson, 1983		Supplier firm's organizational structure		

Source	Recipient Characteristics	Source Characteristics	Technology Characteristics	Relationship Characteristics
Brown, 1985			Language barrier limits the amount of information that can be imported from abroad - particularly Japan	
Ounjian and Carne, 1987	Technological expertise Management support Early involvement with researchers Sense of ownership of research Adequate resources to receive Willingness to exchange staff Geographical or cultural closeness	Management support Adequate resources to research Adequate resources to transfer Providing adequate documentation and training Willingness to exchange staff	Receiver's familiarity with technology Market pull Transfer is timely Quick and early success in showing technical feasibility Selecting right application Offering obvious economic benefits	History of positive relationships Common goals established early on Sense of a team exists between giver and receiver
Chanaron and Perrin, 1987	Specific features of the transferee's environment Specific features of the design function (capability)	Specific organizational features of the transferor	Inherent features of the knowledge and know-how	Inherent features resulting from the conflicting interests of both sides
Kedia and Bhagat, 1988	Absorptive capacity		Organizational culture-based differences Characteristics of technology: process-embodied, product-embodied and people-embodied	
Wolff, 1989	Prospective users involvement	Willingness to provide resources	Packaging technology so that it is accessible to users	Users' participation in R&D Providing formal training Following up throughout process Working collectively and sharing experience with users Transferring people
Madu, 1989	Needs and Objectives Capabilities Education, Training and R&D		Appropriateness of technology	Management process

Source	Recipient Characteristics	Source Characteristics	Technology Characteristics	Relationship Characteristics
Reddy and Zhao, 1990	Base elements of host country	Base elements of home country	Base elements of transaction	
Agmon and von Glinow, 1991	In-house technological capability		Microorganizational channels (inter-organizational transfer mechanism)	Macrovehicles for ITT (infrastructure or environmental factors)
Smilor and Gibson, 1991	Motivation	Motivation	Distance: geographical and cultural proximity or separation Equivocality: technology concreteness	Communication (both passive and active links) between transmitters and receptors
Cutler, 1991				The exchange of technological information The exchange of people The importance of credibility, champion, and communication
Large and Barclay, 1992	Organizational environment factors: - Receptivity to outside ideas - Crowded R&D agenda - Need to generate excitement - Need for cooperation - R&D director as a key influencer	Transfer team member attributes: - Business empathy - Credibility - Commitment	Transfer proposal attributes: - Sustainable profit for recipient - Strategic, marketing, & financial fit - End-user value - Reasonable transfer price - Prototype efficacy	
Tsang, 1994	Investment policy Technical absorptive capability	Firm size Global strategy Cultural and geographical distance Size of the supplying firm	Maturity of technology Sophistication of technology	Entry mode choice
Cusumano and Elenkov, 1994	In-house technological capability Organizational capability Policy and strategy choices		The selection of technology Technological complexity Technology package Organizational modes for transfer	Continuous and intensive contacts Communication patterns Degree of team-dependence Socio-economic environment Relationships and interaction

### **2.3.3 The relevance of ITT research in this study**

Cross-border capability transfer can be regarded as a form of ITT, if technology is broadly defined in terms of firm-specific capabilities. From a recipient's perspective, this process of technology transfer from external sources can also be regarded as an organizational learning process through which the firm acquires technology or knowledge, improves it within specific organizational and environmental contexts, and finally applies this distinct competence towards particular objectives (Klein et al., 1991; Cusumano and Elenkov, 1994: 196).

ITT research deals with transfer issues between asymmetrical parties, and it has well-established theoretical foundations and specific constructs to explain the success of technology transfer. From Table 1 it is clear that the most relevant studies of cross-border capability transfer can be found in the literature on international technology transfer, which is in the domain of technology management. Therefore, this study adopts a theoretical framework (see Fig. 4) based on a source-destination perspective of the ITT literature.

However, most of the previous research on international technology transfer has either been based on the country-level analysis or has focused on intra-organizational transfer - usually the voluntary transfer of technology from headquarters to their subsidiaries. In reality, the process of capability transfer does not exist in government-to-government relationships, nor in government-to-company relationships, but rather it exists in company-to-company interactions, on a daily

basis. As McGee and Thomas (1989) have argued that firms should be the intermediaries who take technology and transfer it, it is also the author's belief that future ITT research will benefit from a managerial perspective through which a cohesive set of understandings at the firm-level can be obtained.

Another gap in ITT literature is its focus on the transfer of technological knowledge. In fact, what a firm really cares about is not merely the discrete technological knowledge, but the capabilities required to utilize firm-specific assets or skills to contribute to its overall competence and to achieve better operational performance. Therefore, research in the ITT field needs to adopt a broader definition of "technology" to address the critical issues in practice, rather than narrowing the research scope for researchers' convenience.

Finally, the existing ITT research predominantly focuses on voluntary transfer modes (Zander, 1991) such as licensing, mergers and acquisitions, or DFI, in which the transferred target (technology) has been priced by the sources. As already argued from the resource-based paradigm (Barney, 1986), resources which have been priced in the markets cannot bring in additional economic rents (surplus) for the acquirer, nor can they be the foundations for sustainable competitive advantages (Dierickx and Cool, 1989). Conversely, the involuntary inter-organizational transfer (such as contract manufacturing alliances in which technology or capability transfer is not the designated task) may be more profitable to the technology acquirer because the transferred technology usually is not priced in an OEM agreement. By the same token, the main task base (working platform) in an

OEM/ODM arrangement lies with the manufacturer, while the buyer only provides necessary assistance to solve the manufacturer's problems. Under such circumstances, this involuntary technology transfer mode may be more helpful for the manufacturer's asset stock accumulation, and the learning outcome may therefore be the foundation of the technology acquirer's sustainable competitive advantage. In short, the indirect and informal routes of technology transfer may be more profitable, more effective, and more strategic than the direct and formal routes. However, such a possibility has, as yet, neither been recognized nor studied in the ITT literature.

#### **2.4 Review of the Literature - Conclusion**

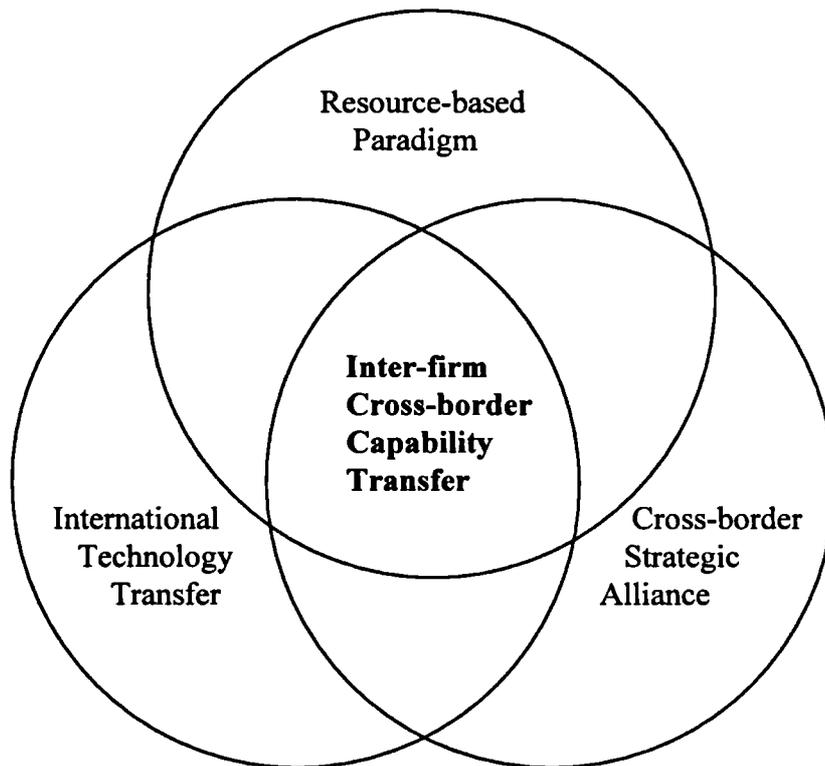
The phenomenon of inter-partner learning or capability transfer through cross-border alliances has gradually gained increasing attention<sup>11</sup>. Although the existing literatures do not provide direct insights into this issue, these fragmented literatures from different disciplines can serve as foundations to explore further the issue of cross-border inter-partner learning.

The theoretical foundation of this study is based on the intersection of the literatures of the resource-based paradigm, cross-border strategic alliance, and international technology transfer. The relationship between the research on inter-firm cross-border capability transfer and the above literatures is depicted in Fig. 2.

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<sup>11</sup>For example, more than 10 papers related to this research topic were presented at the Strategic Management Society's 15th Annual International Conference in October, 1995.

Fig. 2: Relationship of the current research to existing bodies of knowledge



In sum, an interdisciplinary study on inter-firm cross-border capability transfer (or inter-partner learning) is broadly based on the existing literatures mentioned above. The findings of such a study may serve as a bridge to link perspectives from different disciplines and deepen our insights into the important but complex phenomenon of inter-partner learning through cross-border alliances.

## **Chapter III: RESEARCH FRAMEWORKS AND HYPOTHESES**

Having introduced the practical phenomenon of inter-partner learning in Chapter I, and briefed its relevant literatures in Chapter II, two theoretical frameworks (a macro framework and a micro framework) are proposed in this chapter. Such frameworks can be regarded as the author's lens to explore this phenomenon. In order to test the validity and reliability of the proposed micro framework, detailed definitions and hypotheses regarding the constructs and variables in the framework are also raised.

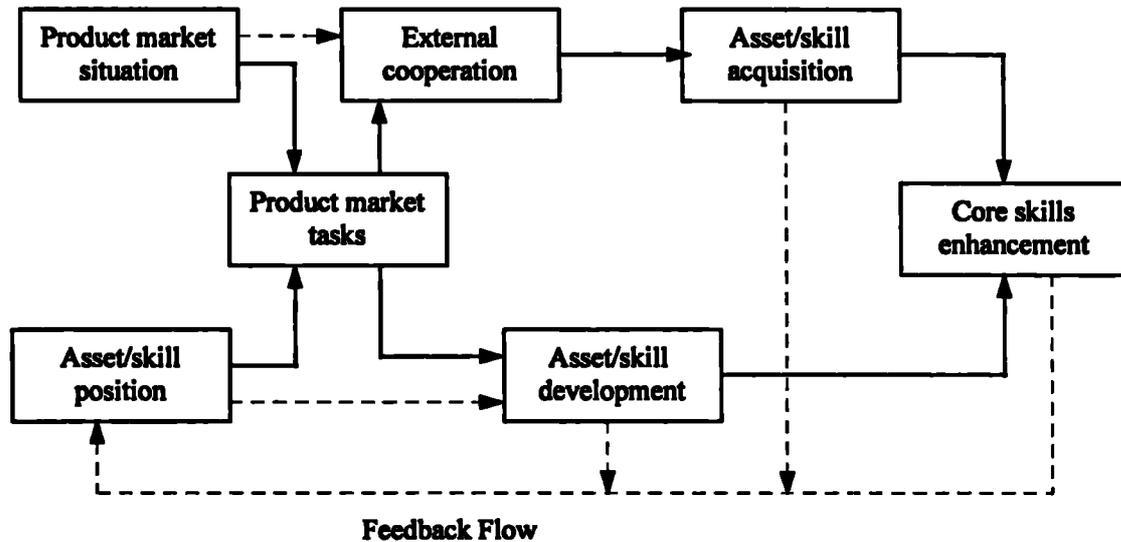
The research frameworks, both from a macro and a micro perspectives, are proposed and explained in section 3.1. Then the variables in the micro framework are defined, and their measures and hypotheses are delineated, in section 3.2. This process is detailed but essential, because it lays the foundation for subsequent data collection and data analysis, which lead to the answers to the research questions.

### **3.1 Research Frameworks**

#### **3.1.1 Macro framework - process of competence enhancement**

This research aims to explore the determinants of a firm's competence enhancement through cross-border contract manufacturing alliances. From a broader perspective, this process of competence enhancement can be theorized as an ongoing integration of a firm's existing competence with its new assets or skills, either internally developed or externally acquired. Such a process can be depicted in Fig. 3.

**Fig. 3: Macro framework - Process of competence enhancement**



The assumptions and explanations for the proposed competence enhancement process can be briefed as follows:

1. A firm's overall competence is the foundation of its competitiveness. All firms strive to enhance competencies in order to effectively compete in product-markets.
2. Based on their existing assets/skills, firms may need new assets and skills (or to improve the existing ones) in order to complete specific product-market tasks.
3. Firms have two routes to enhance their assets/skills in order to achieve the product-market tasks: external acquisition and internal development, which are not mutually exclusive (Porter, 1991: 108; Simkoko, 1992).
4. For firms with limited assets/skills, the route through external acquisition is usually preferred to the internal development route. Learning from alliances is particularly important because all cooperative activities involve some forms of "asset/skill exchanges", which provide opportunities to acquire new assets/skills.

5. Firms have internal organizational learning mechanisms to deploy and merge available assets and skills into higher-level competencies. Through this process the acquired assets/skills are internalized and embedded into firm-specific "core skills".
6. The results of a firm's external asset/skill acquisition, its internal asset/skill development, and its integrated core skill enhancement contribute directly to its asset/skill base, which can be used in other product-market tasks.

This research focuses on the external acquisition route, particularly the process from external cooperation to asset/skill acquisition, with some preliminary findings on issues regarding core skills enhancement.

### **3.1.2 Micro framework - determinants of alliance performance**

The above macro framework is useful as a conceptual map to exhibit the position of this specific research; but such an overview does not provide detailed directions for operational purposes. In order to explore further the determinants of inter-partner learning through cross-border alliances, a micro framework is needed to incorporate most of the relevant variables which may affect the learning results.

According to the existing literature (including technology transfer or transfer of best practice, and inter-partner learning), the factors affecting capability transfer can be categorized into four major groups, which are summarized below and will be detailed in the following sections.

### **1. Sources**

- Transparency, intent (Hamel, 1991)
- Transfer team member attributes (Large and Barclay, 1992).

### **2. Recipients**

- Receptivity, intent (Hamel, 1991)
- Recipient's organizational factors (Large and Barclay, 1992).

### **3. Quality of Transferred Entities**

- Transfer proposal attributes (Large and Barclay, 1992)
- Codified-tacit, individual-organizational, mobile-embedded, openly available-proprietary (Alic, 1993).

### **4. Contingent (or Environmental) Factors**

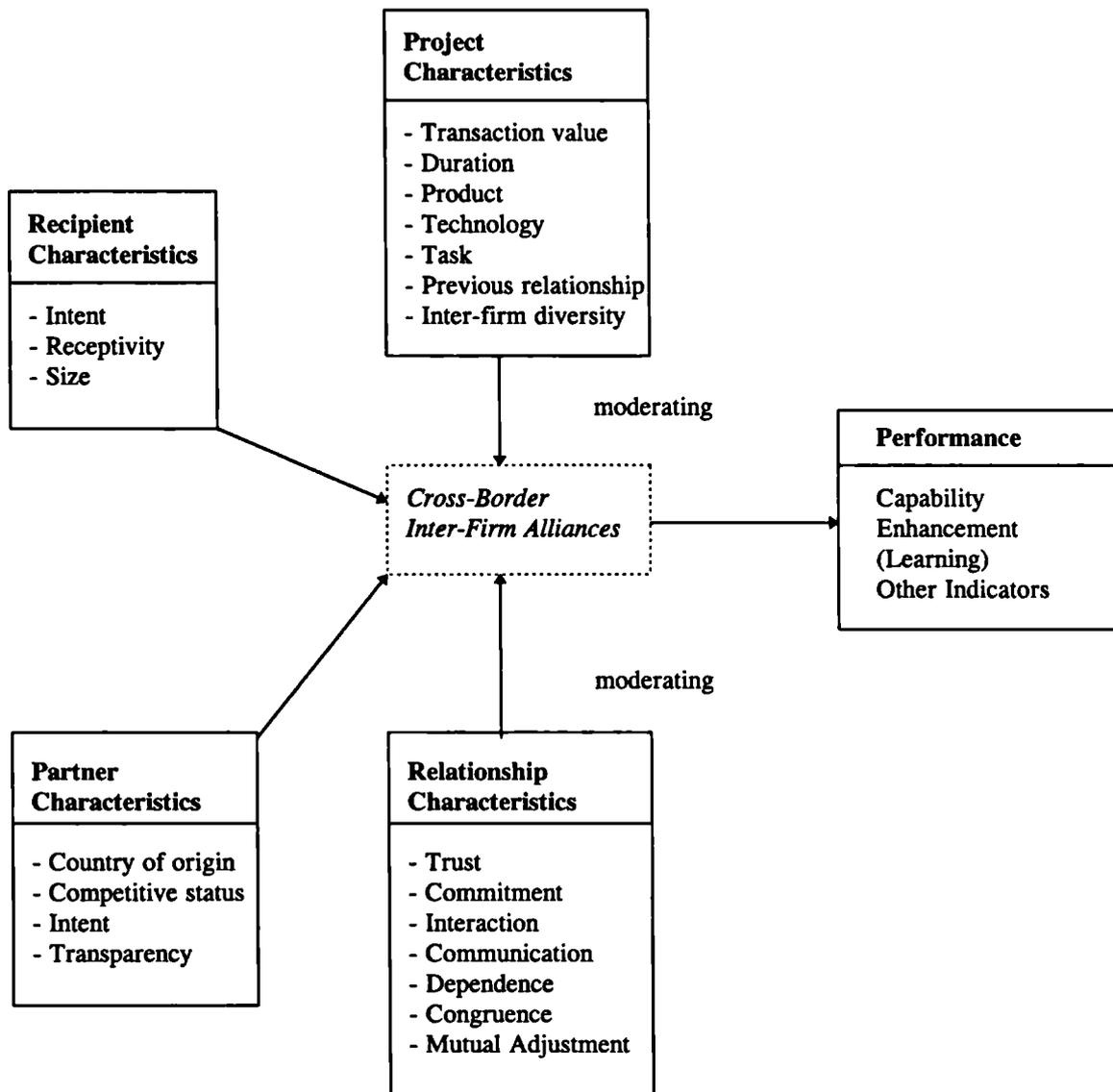
- Relationships between interacting parties (Benvignati, 1983)
- Infrastructure or environmental factors (Agmon and von Glinow, 1991)
- Transfer mechanism (Voll, 1980; Agmon and von Glinow, 1991)

With respect to the factors affecting the results of cross-border contract manufacturing projects between MNCs and their offshore suppliers, in-depth classifications of these factors are required. After a further literature review, four groups of determinants emerge. Among them, the characteristics of the recipient and its source are still hypothesized as the variable-groups directly affecting the

results of cross-border OEM alliances. The variable-group “qualities of transferred entities” can be included in the project characteristics (i.e., product and technology characteristics). Among the contingent factors, traditionally studied rarely because of their complexity, this research focuses on the emerging relationships between partners, representing the characteristics of their cooperative process throughout project duration. The transfer mechanism, as another contingent factor, is controlled in this research by focusing solely on the specific mode of contract manufacturing cooperation.

Conceptually, determinants of alliance performance can be categorized into four variable-groups: Recipient Characteristics, Partner Characteristics, Project Characteristics, and Relationship Characteristics. These four variable-groups can be regarded as major sources of the variance for alliance performance. From the existing literature, variables which may affect alliance performance have also been identified (in section 3.2) and classified under the four variable-groups. Based on all the literature reviews, a micro framework can be presented below, and the definition and measurement of each variable will be explained subsequently in section 3.2.

**Fig. 4: Micro framework - Determinants of alliance performance**



### 3.2 Variable Definition and Hypotheses

In order to enhance the construct validity and measurement validity (Bacharach, 1989) of the questionnaire, and to ensure the questions approximate the underlying theoretical concepts without bias (Lubatkin et al., 1993), three steps have been taken in the subsequent variable definition section.

**Step 1:** Understanding the definitions and contents of each variable from existing literature; selecting an operational definition and the specific dimensions to measure for each construct or variable.

**Step 2:** Constructing the most relevant questions which measure the operationalized variables with satisfactory measurement validity (see Survey Questionnaire, Appendix 1).

**Step 3:** Proposing research hypotheses.

For the determinants of alliance performance (research question 4, see section 1.2), the following five propositions are first proposed.

P1: In an alliance, capability enhancement (learning outcome) is positively correlated with satisfaction, sales growth, and change of cooperative strength.

P2: Recipient characteristics have significant impact on capability enhancement and other alliance performance indicators.

P3: Partner characteristics have significant impact on capability enhancement and other alliance performance indicators.

P4: Project characteristics have significant impact on capability enhancement and other alliance performance indicators.

P5: Relationship characteristics have significant impact on capability enhancement and other alliance performance indicators.

Subordinate hypotheses, which verify the above propositions, are also proposed after the variable definition in the following section.

### **3.2.1 Capability enhancement and other alliance performance indicators**

Performance measurement is always a difficult but crucial issue in management research (Bryman, 1989). In practice, executives usually rank performance by considering a package of different indicators. In this study, the focused alliance performance indicator is a firm's capability enhancement (hereafter also labeled "learning"). For comparative purposes, three other performance indicators - satisfaction, sales growth, and change of cooperative strength, are also included to enrich the study by assessing alliance outcomes from multiple angles. The definition and measurement of each performance indicator is detailed in the following section.

#### ***Learning (as an indicator of a firm's capability enhancement)***

Learning is a process that must be studied over time, as rates of improvement are critical indicators of organizational learning (Berggren, 1994). Therefore, one of the major assumptions of this research is that learning can be appropriately assessed by the enhancement of capabilities - the difference between a firm's capability before and after the alliance.

A firm should be most concerned with its overall competence, which has been defined as *the integrated capacity of a firm encompassing and utilizing all the assets and skills under its control*. The learning performance of an alliance, therefore, is presumably best measured by the change of a firm's overall competence before and after its cooperative project.

To measure this elusive notion of overall competence, its decomposition is necessary. Skills have a hierarchical nature: some lower level skills (usually more specific) are the prerequisites of other higher level skills (usually more general), and assets are usually the building blocks to establish and enhance skills. By conceptualizing a firm as a value creation system consisting of a reservoir of different assets and skills, we can decompose a firm's overall competence into three distinct elements, which may be labeled: **value-conception skills, value-realization skills and value-delivery skills**. These three bundles of skills are in line with Moss-Kanter's (1995) three areas where a firm or a community can become world class: **thinking, manufacturing, and trading**. In this research, these three groups of skills are called the "core skills".

These core skills are the ultimate summation of other assets and skills, and they contribute directly to a firm's overall competence. They are consistent with Hamel's sources of core competencies (see Stonham, 1993), and are not confined to traditional business functions of R&D, production, and marketing. Thus this notion can be derived from Porter's value chain (1980), but it is different from the value

chain in that the notion suggests value activities cannot be compartmentalized. In other words, a core skill cannot be determined by any single business function; it is the product of coordination among different business functions, utilizing a bundle of different assets and skills (Bartmess and Cerny, 1993). Such a holistic view of the orchestration of firm-specific assets and skills is the starting premise with which to analyze a firm's overall competence.

From a detailed literature review, the contents (capability indicators) of each core skill (capability dimension) are specified below. Most of these capability indicators have been proposed as the sources or foundations of a firm's sustainable competitive advantages.

#### 1. Value-conception skills

The value-conception skills are **the capabilities to identify, conceptualize, and design customer-perceived values into products**. They mainly come from the interface of marketing and R&D. Customer intimacy, concept innovation, and R&D know-how are the prerequisites for identifying market potential and exploring new values to customers. In order to design manufacturable products, R&D engineers also need to know the manufacturing process. Thus value-conception skills are related to production capability as well. Some of the most important value-conception skills and their encompassing capabilities, identified in existing literature, can be summarized.

**R&D capability in terms of product design and functionality:**

- Product characteristics and differentiation (Aaker, 1989)
- Design for manufacturability (Hamel, 1991: 88)
- Product leadership (Treacy and Wiersema, 1993)
- The capability to provide high performance products (Miller and Roth, 1994)
- Ability to differentiate products by building in valuable attributes (Towner, 1994).

**Speed of new product development and introduction:**

- Product realization skills: speeding new products to market (Stalk et al., 1992: 66)
- Rapid, high-technology product R&D and rollout (Bartmess and Cerny, 1993)
- Time to market (Towner, 1994)
- Speed-to-market (Brown and Karagozoglu, 1993; Kogut and Kulatilaka, 1994)
- Product flexibility: general ability to make multiple products (Upton, 1994)
- Design flexibility: rapid design changes and introduction (Miller and Roth, 1994).

**Knowledge and grasp of customer needs and market trends:**

- Customer orientation/feedback/market research (Aaker, 1989)
- Insight into evolving customer needs (Stalk et al., 1992)
- Customer intimacy (Treacy and Wiersema, 1993)
- Market trend identification capability (Bartmess and Cerny, 1993).

## 2. Value-realization skills

The value-realization skills are the capabilities required to actualize intangible concepts or customer-perceived values in tangible products. It is about production skills but also strongly related to R&D skills, because product cost, quality, and production flexibility are not only realized through the production function, they are also pre-determined by product design. In addition, supplier chain management (in particular, parts procurement) is an important supporting link to value-realization skills, for it is the whole production constellation that decides a firm's capability to realize customer-perceived value. Some of the most important value-realization skills and their encompassing capabilities identified in existing literature can be summarized.

### Capability to mass-produce reliable products with consistent quality:

- The consistency of product quality (Stalk et al., 1992)
- Continuous quality improvement (Carman, 1993; Bartmess and Cerny, 1993)
- Total manufacturing quality as the source of competitiveness (Belohlav, 1993)
- Quality as a vital issue in contract manufacturing (Johnson, 1994).
- Conformance: the capability to offer consistent quality (Miller and Roth, 1994).

### Flexible and speedy production capability:

- Efficient, flexible production/operations, adaptable to customer (Aaker, 1989)

- Operational flexibility (Bartmess and Cerny, 1993)
- Volume flexibility: quick response to swings in volume (Miller and Roth, 1994)
- Dependability: to deliver on time as promised (Miller and Roth, 1994)
- Manufacturing flexibility: to change or react with little penalty (Upton, 1994).

**Low-cost manufacturing capability:**

- Low-cost production (Aaker, 1989)
- Continual cost control and reduction (Bartmess and Cerny, 1993)
- Low cost: the capability to compete on price (Miller and Roth, 1994)
- Stock control covering procurement, inventory control and production planning and scheduling (Johnson, 1994).

**3. Value-delivery skills**

**The value-delivery skills are the capabilities required to distribute, maintain, or even enhance the customer-perceived value embedded in products after they are manufactured. They are primarily about marketing skills, although they are also connected to flexible production skills. To enhance these skills, firms must utilize brandname, service, and channel, as well as other marketing-related infrastructure or assets. In addition, it is very common that product engineers need to support sales and provide trouble-shooting services as part of a joint marketing effort. Therefore, value-delivery skills cannot be independent of R&D skills either. Some**

of the most important value-delivery skills and their encompassing capabilities identified in existing literature can be summarized.

**Experience in international sales, service, and product support:**

- Overall marketing skills (Aaker, 1989)
- Constantly improving customer service (Bartmess and Cerny, 1993)
- Capability to train and manage sales personnel (Bartmess and Cerny, 1993)
- Higher levels of customer service and product support (Towner, 1994)
- The capability to provide after-sale services (Miller and Roth, 1994).

**Capability in establishing and enhancing international brandname:**

- Effective advertising and promotion (Aaker, 1989)
- Name recognition and high profile (Aaker, 1989)
- Building up and maintaining brand equity (Aaker, 1994)
- The capability to advertise and promote the product (Miller and Roth, 1994).

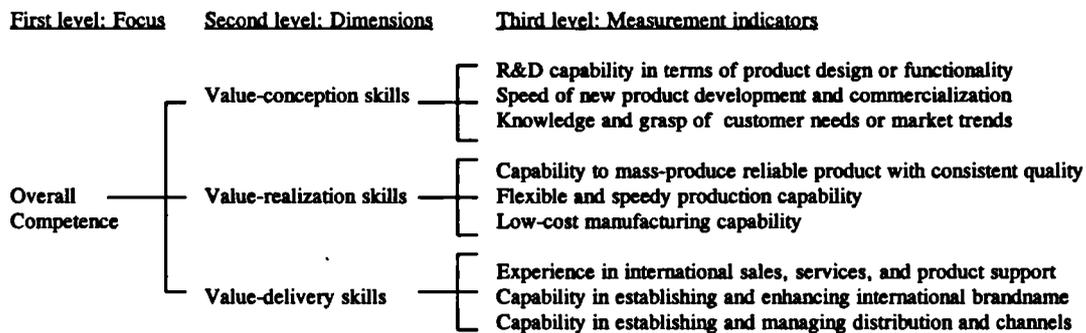
**Capability in establishing and managing international distribution and channels:**

- Good distributor relations (Aaker, 1989)
- Capability in dealer management (Stalk et al., 1992)
- Tailored logistics: to serve customers well and profitably (Fuller et al., 1993)
- On-time delivery as a vital factor to the contract manufacturer (Johnson, 1994)

- Distributing the product broadly and quickly (Miller and Roth, 1994).

Although the author has striven to incorporate as many of the important skill indicators as possible, the incompleteness of such a skill-indicator list is fully acknowledged. The main point here is to devise an analytical structure such that the elusive firm-specific overall competence can be objectively measured. To achieve this purpose, a conceptual competence hierarchy (competence tree) of a firm can be depicted as follows:

Fig. 5: The dimensions and indicators of a firm's overall competence



In this research, a firm's learning is defined as its capability enhancement in the above three levels of capability indicators, and the inter-partner learning results are evaluated by the project managers of sample firms.

***Other performance indicators of cross-border contract manufacturing alliances***

Most of the research on cross-border buyer-supplier relationships relies on either subjective satisfaction or objective sales revenue as indicators of partnership success

(Mohr and Spekman, 1994). In this research, change of cooperative strength after the project is also included as another performance indicators. Although determinants of these performance indicators can also be identified (in order to compare with the determinants of learning), it is probably more important to understand the relationships between learning and other performance indicators in this research.

### 1. Satisfaction

Anderson and Narus (1984: 66) has defined satisfaction in a partnership as “*a positive affective state resulting from the appraisal of all aspects of a firm’s working relationship with another firm.*” They proposed (1984; 1990) that satisfaction with respect to the working relationship between partners can serve as a proxy for partnership success. Studying the vertical partnerships between dealers and manufacturers, Mohr and Spekman (1994) also used subjective satisfaction as one of the indicators for partnership success. Therefore, satisfaction is included in this research as a complementary alliance performance indicator; and it is measured directly by the respondent’s subjective perception of the firm’s overall contentment with the project.

### 2. Sales growth

Economic performance indicators such as sales revenue or profit are widely used as surrogates of a firm’s operational success. In Mohr and Spekman’s channel

research (1994), dyadic sales have been used as another performance indicator for partnership success, in addition to satisfaction. For growth-oriented Taiwanese IT firms, sales growth is probably the most relevant indicator of the firms' economic performance. Because of the lagging effect of an alliance on a firm's sales, only the *ex post* sales revenue should be used as an indicator of alliance performance. Therefore, the supplier's sales growth after project is used as another complementary indicator for alliance performance in this research. Such a sales growth rate is assessed in terms of the respondent's judgment, because precise measurement of this indicator is both difficult and unnecessary in the current research.

### 3. Change of Cooperative Strength

The cooperative performance should also be reflected in the strength of subsequent cooperation between a specific pair of partners. If an alliance project expands or deepens a firm's subsequent cooperation with its partner, the project should be regarded as successful *per se*. With this in mind, a firm's change of cooperative strength with its contract manufacturing partner is measured by the change in their relationship after the specific project. From existing entry mode research in international management literature (e.g., Dunning, 1993) and cooperative modes studied in strategic alliance literature (e.g., Contractor and Lorange, 1988), a wide range of different inter-firm relationships can be identified.

Although the relative strength of each relationship has not been explicitly reported in literature, Taiwanese IT managers did not seem to have difficulty in sorting these relationships according to their perceived orders of cooperative strength. From the first interview, the author confirmed and screened several important types of cross-border cooperation indigenous IT firms can form with their foreign partners. These different types of relationships are listed below according to their relative cooperative strength (in ascending order).

1. No previous contact
2. Occasional trading or contract manufacturing
3. Brandname, technology, or patent licensing
4. Frequent transactions or agency relationship
5. Personal or social ties between managements or shareholders
6. Long-term cooperation or central-satellite relationships
7. Joint ventures in other business
8. Minority equity investment (unilateral or cross-investment)

Applying Powell's (1990) notions of market, network and hierarchy, relationship 2, 3, and 4 can be regarded as relationships under the governance of market mechanism; relationship 5 and 6 are network arrangements, and relationship 7 and 8 are close to a governance mechanism of hierarchy, because the two organizations are closely linked through investment activities - no wonder marriages have been used as a metaphor for joint ventures by researchers in strategic alliance literature (e.g., Ohmae, 1989). The above classification of different types of inter-firm cooperation also provides theoretical justification for an ordinal measure of the cooperative strength between partners, because it is reasonable to assume that an arm's-length market relation is more distant than a network relation, while a

network relation is more distant than a relation in which both parties have equity commitment.

*The possible relationships between learning and other alliance performance indicators*

If a supplier has a learning intent in a cross-border alliance, its learning result should be positively correlated with its overall satisfaction towards the project. In addition, since a supplier's learning (capability enhancement) strengthens its competitiveness, it is also reasonable to expect that a firm's learning will positively correlate with its sales growth after project. By the same token, if a supplier has learned something from the partner, such a positive result should provide incentives for the supplier to strengthen subsequent cooperation with the partner.

Therefore, the learning outcome of an alliance should be positively correlated with other performance indicators (satisfaction, sales growth, and change of cooperative strength). In fact, all four performance indicators can be hypothesized as positively correlated; better alliance performance means higher levels of learning, satisfaction, sales growth, and change of cooperative strength.

*H1-1: For contract manufacturing suppliers, learning is positively correlated with satisfaction, sales growth, and change of cooperative strength.*

### **3.2.2 Recipient characteristics**

In practice, some firms seem to be better “learners” than others. This may be credited to their managers’ “dominant logic” (Prahalad and Bettis, 1986) or firm-specific “corporate genetics” (Hamel and Prahalad, 1994: 49); or simply because of their superior asset/skill (resources) bases. Senge (1993) believes that building such a knowledge-generating organization requires at least four levels of attention: philosophy, attitudes and beliefs, skills and capabilities, and tools and artifacts. Anyway, it is clear that the characteristics of a capability recipient are expected to influence its alliance performance.

#### ***Learning intent***

The motivation of alliances has been studied by many previous researchers. Some important research on alliance motivation can be summarized in Table 2.

**Table 2: Strategic alliance motivations**

	Reducing transaction costs	Reducing risks	Sharing costs	Resource/skill complementarity	Blocking competition	Market entry	Overcoming institutional barriers	Flexibility by quasi integration	Organizational learning
Williamson, 1975	*								
Pfeffer & Salancik, 1978		*							
Contractor, 1986		*	*	*	*	*	*	*	
Teece, 1986				*					
Porter & Fuller, 1986		*	*	*		*	*		
Hennart, 1988	*								
Kogut, 1988	*				*				*
Badaracco, 1991a		*	*	*	*	*	*		*
Hamel, 1991									*
Hagedoorn, 1993		*	*	*		*			*
Burgers et al., 1993	*	*		*	*	*			

Hamel (1991) has concluded that there are two different types of cooperative motivations behind an alliance. A firm can either take a “substitution intent” in an alliance and get access to the critical resources by borrowing the partner’s capabilities; or it can adopt an “internalization intent”, aiming to internalize critical assets or skills from the partner. Using these criteria to evaluate the alliance motivations listed in Table 2, only the motivation of organizational learning through alliances can be regarded as an internalization intent. The other motivations are simply substitution intents. These substitution intents are also short-term oriented, in the sense that firms with such intents tend to treat alliances as means to solve

current operational problems. Consequently these firms can have access to the partners' skills to solve their operational problems only when the alliances exist.

Like Hamel's (1991) distinction between substitution intent and internalization intent, the specific goals of suppliers in cross-border contract manufacturing alliances (identified from existing literature) can be classified into two groups: Goals which are to utilize partners' capabilities for operational purposes, and goals which are aimed for capability enhancement (learning).

#### Non-learning goals

- To increase sales (Weller, 1981; Burgers et al., 1993)
- To reduce demand uncertainty or competitive uncertainty (Burgers et al., 1993)
- To fully utilize manufacturing capacity (Weller, 1981)
- To be approved by buyers (Jancsurak, 1992).

#### Learning-related goals

- To enhance international sales and marketing experience (Weller, 1981)
- To enhance product R&D capability (Weller, 1981; Cavinato, 1989)
- To enhance process capability (Weller, 1981; Cavinato, 1989; Bergstrom, 1993)
- To benchmark partner to improve overall competencies (Kleiner, 1994).

The above goals can be seen as a supplier's explicit demonstration of its learning intent in alliances. As for the implicit measures of a firm's learning intent, Hamel (1991: 92) believes that the following factors might account for observed

differences in intent: 1) whether the firm views collaboration as a permanent alternative or as a temporary vehicle for improving its competitiveness vs. its partner; 2) its relative resource position vs. its partner; 3) its calculation of the payoff to learning; and 4) its preference for balanced vs. asymmetric dependence within the alliance.

In sum, an intent of a recipient is a clearly formulated or planned intention to achieve specific goals from an alliance. Here a supplier's learning intent is not only explicitly assessed by its cooperative goals, but more importantly, such a learning intent is measured by the firm's implicit inclination for learning: its perceived resource gap relative to its partner, its perceived benefit of learning, and the extent of its internalization needs.

Some scholars have asserted that the motivation of the partners is related to the outcomes of alliances (Hamel et al., 1989; Lei, 1993), and there should be a positive correlation between a partner's learning intent and its learning performance in the alliance.

*H2-1: Suppliers with stronger learning intent in cross-border manufacturing alliances tend to exhibit higher capability enhancement.*

## ***Receptivity***

Hamel (1991: 90) defines receptivity as a partner's capacity for learning, or its absorptiveness. He asserts that receptivity of the recipient determines its capacity to learn. In the technology transfer literature, many scholars have found that the technology capability of the receiving parties (countries or firms) is crucial to the success of technology transfer projects (Voll, 1980; Madu, 1989; Agmon and von Glinow, 1991). Studying the cross-border intra-organizational transfer of best practice, Szulanski (1993: 9) also concludes that the technical gap between the MNC's subsidiaries is a key obstacle to the success of its intra-firm best-practice transfer.

As for the measurement of a firm's receptivity in an alliance, there is no conclusion in existing literature. Even a firm's technological capability is difficult to measure objectively, let alone its elusive competencies. However, Hamel (1991: 87, proposition 5.b) has proposed that *"Receptivity is a function of the skills and absorptiveness of the receptors, of exposure position, and of parallelism in facilities"*. Following this proposition, a supplier's receptivity can be operationally measured by its past experience and exposure in the learning area, and its familiarity of language and business practice with the partner. It is expected that a supplier's receptivity is positively correlated with its learning outcome.

*H2-2: Recipients with higher levels of receptivity tend to exhibit higher capability enhancement.*

## *Size*

It is assumed that a recipient's size is related to its asset/skill base, and thus can affect its alliance characteristics and performance. In this research, a recipient's size is represented by its annual sales revenue, and it is expected that a recipient's size is positively correlated with its capability enhancement.

*H2-3: Recipients of larger size tend to exhibit higher capability enhancement.*

### **3.2.3 Partner characteristics**

Partner selection has been proposed to be critical to the success of cross-border alliances by scholars (e.g., Geringer, 1991; Kumar, 1995) as well as by consultants (e.g., Devlin and Bleackley, 1988). As the source of capabilities to be learned, the contract manufacturing buyer plays the role of a “teacher” in a cross-border alliance. Therefore, the characteristics of the partner are proposed to affect the supplier's alliance performance. If this group of variables are significant determinants of alliance performance, the supplier should search for the “ideal partner” according to these selecting criteria. In this way, a supplier can maximize its gains from the alliance.

### *Country of origin*

In their research on strategic sourcing in the automobile industry, Blenkhorn and Noori (1990) have found that the OEM buyer-supplier relationships of U.S. firms and those of Japanese firms are different in the areas of skills, style, staff, and superordinate goals. The U.S. buyer-relationships are more market-oriented, and buyer-supplier interactions or technical staff exchanges are less so, compared with their Japanese counterparts. They conclude that the success of the Japanese hinges on the way they manage these relationships. Based on 447 managers from automobile firms in the U.S. and Japan, Bensaou (1994) empirically examined buyer-supplier coordination in the U.S. and Japanese automobile industries, from the OEM buyers' perspective. The results also show that the buyer-supplier relationships within the U.S. automobile industry are very different from those of Japan. The Japanese manufacturers (OEM buyers) exhibit higher levels of dependence on their suppliers, while U.S. suppliers show higher dependence on their manufacturers.

Because many comparative studies have shown that firms of different country origins demonstrate different preferences and behavioral styles (Ozawa, 1979; Schneider and De Meyer, 1991; Hamel, 1991), and anecdotal evidence of such national differences is also abundant (e.g., *Business Week*, 1989), cooperations with partners of different countries of origin are expected to be associated with different alliance characteristics and even different alliance results.

In this research, the national origin of a contract manufacturing buyer is defined by the location of its headquarters, and a set of hypotheses are proposed to test the differences in cooperating with partners of different nationalities.

*H3-1: Cooperations with partners of different country origins tend to exhibit:*

- a. different levels of learning in different capabilities,*
- b. different levels of satisfaction,*
- c. different levels of sales growth after projects,*
- d. different levels of change of cooperative strength.*

#### *Competitive status*

Welch (1992) found that cooperating with partners differing in terms of size and competitive status, affects the alliance management process and internationalization performance. Kumar (1995) also confirmed that partner's market share is one of the determinants of successful technology transfer. Other studies have found that MNCs adapt their strategic decisions and behavior in different stages of their internationalization (Stopford and Wells, 1972; Egelhoff, 1988). Therefore, the size and global competitive status of MNCs can be hypothesized to account for their different preferences which affect the alliance outcome. While traditional wisdom believes that relative size is a good proxy for relative skill level, some scholars (e.g., Hamel, 1991) believe that MNCs' global competitiveness should be a better proxy for their relative skill level.

In this study, the competitive status of a contract manufacturing buyer is defined in terms of its global market share in the manufactured product-market. Cooperations with partners of higher levels of overall competence are expected to result in higher levels of capability enhancement for indigenous suppliers.

*H3-2: Indigenous firms cooperating with more globally-competitive partners tend to exhibit higher capability enhancement.*

### ***Partner's intent***

In the existing literature, the motivations behind MNCs' offshore outsourcing can be classified into two broad categories: operational or strategic. The former motivation emphasizes short-term operational needs and the latter is mainly for long-term competitiveness. Such a dichotomy may be simplistic, but it is generally in line with Hamel's (1991) classification between substitution intent and internalization intent. From the OEM buyer's perspective, its cooperative goals (identified from existing literature) can be classified as either operational or strategic:

### **Operational goals**

- To cope with competition with other MNCs (Cole, 1988; Johnson, 1994)
- To reduce costs (Olesen, 1985; Johnson, 1994)
- To minimize investment (Johnson, 1994; Matthyssens and Ven den Bulte, 1994)
- To utilize partners' manufacturing capability (Olesen, 1985)

### Strategic goals

- To enhance local sales and marketing (Powell, 1990; Bleeke & Ernst, 1991)
- To enhance competence by learning from local partners (Hamel, 1991; Lei, 1993)
- To win alliances and establish global business networks (Kotabe and Swan, 1994).

Here, a partner's intent is defined as its perceivable intention or attitude towards its supplier, which is measured by its network approach (the extent the MNC treats the supplier as a member of its own operational network) and its short-term attitude towards the project. The OEM buyer's intent is measured through the perception of their local suppliers.

When an OEM buyer treats its supplier as a network insider, such a cooperation attitude is expected to facilitate the supplier's learning, simply because the buyer will be more willing to share its know-how with its supplier. On the other hand, if the buyer adopts a short-term approach in cooperation with the supplier, the buyer does not have any incentive to help the supplier beyond the current project. Such a cooperative attitude is expected to negatively affect the supplier's learning from the partnership.

*H3-3: Indigenous firms cooperating with partners who treat suppliers as network members tend to exhibit higher capability enhancement.*

*H3-4: Indigenous firms cooperating with partners who treat cooperation as a short-term solution tend to exhibit lower levels of capability enhancement.*

### ***Partner's transparency***

Hamel (1991: 90) believes that the knowability or openness of each firm in an alliance is crucial to its partner's learning. In other words, partner transparency determines the potential for learning. He also claims that "*transparency can be influenced through the design of organizational interfaces, the structure of joint tasks, and the 'protectiveness' of individuals*" (Hamel, 1991:87, proposition 4.b).

In this research, partner's transparency is defined as the openness of the partner and its employees to its indigenous suppliers, which is measured by the willingness of the partner's personnel in providing required information, and (negatively) by the partner's guardedness in dealing with the supplier. In addition, the "communication windows" or interfaces (Hamel, 1991: collaborative membrane; Metcalf et al., 1992: coordinating links) of the partners will also be studied to evaluate partner's transparency.

Naturally, the partner's openness is expected to be positively correlated with the supplier's capability enhancement through the project; and the partner's protectiveness should be negatively correlated with the supplier's capability enhancement.

*H3-5: Indigenous firms cooperating with more transparent partners tend to exhibit higher capability enhancement.*

*H3-6: Indigenous firms cooperating with more protective partners tend to exhibit lower levels of capability enhancement.*

### **3.2.4 Project characteristics**

The values of this group of variables are determined when the contract for the project is signed. These project characteristics are less likely to change throughout the project duration. Therefore, they are the initial project characteristics. If these variables are significant determinants of a supplier's capability enhancement, the findings will support the argument that the arrangement and structure of the projects will pre-determine the outcomes of alliances. In this case, deal-structuring and partner-matching are critical to the alliance success.

#### ***Transaction value***

In a contract manufacturing project, the size of the deal, defined as the total monetary transaction value, is generally recognized as an indicator of the significance or importance of the project to both sides. Therefore, it is assumed that the deal size of the project will influence its performance, especially from the seller's perspective.

Because larger projects usually require more capability inputs from both the buyer and the supplier, and the supplier also pays more attention to larger projects, it is expected that the transaction value of a project will be positively correlated with the supplier's capability enhancement.

*H4-1: Alliances of higher transaction value tend to exhibit higher capability enhancement.*

### ***Project Duration***

Another characteristic of a contract manufacturing project is its duration, which is the time span of the project. As well as being the time for which the two organizations cooperate, the project duration may also be regarded as an indicator of the project's importance. Therefore, it is reasonable to hypothesize that project duration will influence the performance of cooperation. The length of project duration is supposed to be positively correlated with the supplier's capability enhancement.

*H4-2: Alliances of longer duration tend to exhibit higher capability enhancement.*

### ***Product***

In the electronics and IT industries, firms manufacturing different product items can be regarded as in different sub-industries. Because these different sub-industries have different industrial structures and market demands, cross-border manufacturing alliances in these different environments are expected to exhibit different cooperative characteristics, and even to result in different alliance performance.

On the other hand, the product life cycle theory suggests that in a mature market, price competition is fierce, and thus outsourcing is more likely to be a viable solution for cost reduction. However, such a mature market generally represents

stagnant technology with a lower level of buyer-supplier technology exchange (Gordon et al., 1991), therefore a negative correlation is expected between the market maturity of the manufactured product and the capability enhancement of the supplier.

In this study, the characteristics of the manufactured product are measured by: 1) the category of manufactured products (e.g., systems vs. components; C&C products vs. traditional electronics); and 2) the degree of its market maturity.

*H4-3: Contract manufacturing alliances for different product items tend to exhibit different capability enhancement.*

*H4-4: Contract manufacturing alliances in mature product-markets, compared with alliances in growing product-markets, tend to exhibit lower levels of capability enhancement.*

### ***Technology***

Technology is a highly complex notion for which it is difficult to develop neat generalizations (McGee and Thomas, 1989). The variable “technology”, in this research context, can be evaluated in two ways: one is the uniqueness of the product technology and the other is in terms of those of the partner’s capabilities which can be learned by the supplier (i.e., the transferred entities).

Scholars in the technology management field (e.g., Abernathy and Utterback, 1978; Dosi, 1982) tend to describe industrial technological evolution as having a pattern similar to that of scientific evolution. In the early stage of industry development, product design is fluid and production requires only general-purpose capital. The focus of competition is mainly on product design and its functionality. After a period of selection in the market, the most acceptable design which meets most of the market requirements will emerge and become the dominant design. Production then requires specialized capital and the basis of competition shifts from design to price.

According to Teece (1986), the relative importance of the complementary assets (manufacturing and marketing assets) may outweigh the core technological know-how (R&D assets) after a dominant design emerges and the product becomes standard. He implies that the producers and distributors may appropriate the economic rents away from the innovators after product standardization. Also, Matthyssens and Faes (1985) have found that the buying process for nonstandard components tends to involve an active market search for suitable suppliers and long negotiations. Their research suggests that OEM buyers adopt different approaches in handling standard or nonstandard products. Therefore, whether or not the product is of a proprietary design (containing unique and non-standard technology) might affect the performance of an alliance. Conceptually, the uniqueness of the manufactured product is expected to be positively correlated with the supplier's capability enhancement.

*H4-5: Contract manufacturing alliances in non-standard or proprietary products tend to exhibit higher capability enhancement.*

Technology transfer research has given much attention to the nature of the transferred technology. Some scholars (e.g., Kojima, 1978; Ozawa, 1979) have claimed that the Japanese-style of technology transfer is more effective to Asian LDCs because of its relatively more "appropriate" (usually lower-end) technology. This "appropriate technology" argument is generally supported by research in the ITT field (e.g., Voll, 1980; Chanaron and Perrin, 1987; and Madu, 1989).

Scholars adopting the resource-based approach also have intensive discussion over the nature of resources. They are especially interested in the imitability, mobility, or tradability of strategic resources (Barney, 1986; Dierickx and Cool, 1989; Chi, 1994) because they believe that if a strategic resource can be traded or imitated through factor markets, it cannot sustain competitive advantage for its owner. Chi (1994: 276) has summarized the prior research and concluded that there are three characteristics that make resources hard to imitate: 1) **Tacitness**: resources or capabilities whose creation and replication rely heavily on learning by doing; 2) **Complexity**: arising from the existence of many different and interrelated skills and organization routines within a firm; and 3) **Specificity**: a resource is specialized to the needs of specific transactions, either within the firm or between the firm and its suppliers or customers. Chi's summary is compatible with the different dimensions of transferred capabilities (i.e., articulable/tacit, simple/complex,

independent/systemic) identified by other researchers (Winter, 1987; Garud and Nayar, 1994).

Von Hippel (1994) has defined the "stickiness" of transferred capabilities as the degree that capabilities are costly to acquire, transfer, and use in a new location. This stickiness dimension is also one of Hamel's three criteria (see Stonham, 1993) for core competencies (i.e., hard to imitate). The other two criteria: disproportionate value contributed by the partners and gateway to future opportunities, should also be considered as important characteristics of a technology or a capability.

In this study, technology is measured not only by the technological maturity of the product, but more importantly it is broadly measured by the capabilities contributed (by the OEM buyer) to the project. The more valuable the partner's contributed capabilities (perceived by the supplier) are, the better the supplier's capability enhancement should be.

*H4-6: Contract manufacturing alliances with partners who contribute more valuable capabilities tend to exhibit higher capability enhancement.*

### ***Task***

In practice, contract manufacturing projects can be classified into different types according to the different task requirements of the suppliers. For example, some

complicated or urgent projects require higher degrees of joint action (Heide and John, 1990: 25) or coordination between the partners, in order to meet market demands. Therefore, task interdependency can be regarded as a potential determinant of the supplier's capability enhancement because it affects the degree of joint action or coordination between partners. There should be a positive correlation between the extent of task interdependency and the supplier's capability enhancement.

Another distinction lies in the degree of product completion in a project. A component supply project requires the supplier to manufacture work-in-progress which then becomes the input to the buyer's production system. A relabeling project, on the other hand, requires the supplier to manufacture the finished product which then will be sold under the buyer's brandname without additional processing work. The former is a traditional industrial buyer-supplier project, while the latter is an emerging form of cross-border contract manufacturing alliance, which is increasingly popular with Taiwanese IT suppliers and their MNC buyers. It is therefore interesting to make comparisons between these two types of manufacturing alliance.

Still another distinction is the supplier's involvement in product design. Suppliers taking part in product R&D tasks are working on so-called ODM (original design manufacturers) projects with their ODM clients, while in traditional OEM projects the buyers provide product designs and the suppliers are only involved in manufacturing. After studying the changing relationships between Ford Motor Co.

and its suppliers, Cole (1988) concludes that aggressive suppliers will have more opportunity to participate in the design-and-build process as full team members. Therefore, it is reasonable to hypothesize that suppliers engaged in ODM projects should have better alliance performance compared with suppliers engaged in OEM projects, especially in their learning results.

In this study, task characteristics are measured by: 1) the project's task interdependence, 2) the extent of product completion by the suppliers, and 3) the extent of the supplier's involvement in R&D activities. Because the difference between relabeling projects and component-supply projects is not clear, only two hypotheses are proposed regarding the task characteristics of contract manufacturing projects.

*H4-7: Contract manufacturing projects with higher degrees of task interdependence tend to exhibit higher capability enhancement.*

*H4-8: Contract manufacturing projects requiring suppliers to contribute more in the area of product R&D tend to exhibit higher capability enhancement.*

#### ***Previous relationship***

Matthyssens and Faes (1985) found that previous cooperation experience is an asset in an OEM buyer-supplier relationship. Similarly, Dwyer et al. (1987) have also found that the buyer-seller relationships evolve from discrete exchanges to relational exchanges as working experience increases. Anderson and Narus (1990) assert that

cooperation is an antecedent rather than a consequence of trust in a cross-border partnership. Partners with past cooperation experience tend to show higher level of trust. Therefore, the previous relationship has a bearing on the state of the partnership when the current project started, thus it can be hypothesized that the previous relationship is positively correlated with alliance performance.

Another way to measure the strength of a previous relationship is to assess the closeness between partners. Varadarajan and Rajaratnam (1986) have defined the closeness between partners as the proximity of the previous relationship and the ties that bind the working relationship between partners. Furthermore, Heide and John (1990: 25) have suggested that the closeness of a partnership can be identified by the process of supplier verification - the scope of efforts undertaken by the buyer *ex ante* to verify the supplier's ability to perform as expected.

In the present context, previous relationship is measured on two dimensions: the previous working experience and the process of supplier selection. It is expected that alliances with stronger previous relationships produce higher capability enhancement.

*H4-9: Contract manufacturing alliances with stronger previous relationships between partners tend to exhibit higher capability enhancement.*

### ***Inter-firm diversity***

Previous research has found that a motivational fit between partners is critical to the alliance results (Sharif and Haq, 1980; Smilor and Gibson, 1991; Hamel, 1991). Many researchers have claimed that choosing partners with complementary skills and markets is critical to the success of strategic alliances (Bleeke and Ernst, 1991; Lei, 1993). Williams and Lilley (1993) term this inter-organizational complementarity as "strategic compatibility" and believe that it is one of the most important criteria in partner selection.

Parkhe (1991) labels the strategic compatibility between partners as type I diversity - the differences (complementarity) that partnerships are created to explore - and believes it is positively correlated to partnership performance. However, he also finds another type of differences which he calls "type II diversity" and defines them as *"the comparative inter-organizational differences on certain attributes or dimensions that continually shape the pattern of interaction between them"* (Parkhe, 1991: 582). The major dimensions of this type of inter-firm diversity include corporate culture or values, management style and practices, organizational structure, and operating policies and systems. Parkhe concludes that the type II diversity can severely impede the ability of companies to work jointly and effectively.

Here, inter-firm diversity is defined as the differences between two cooperating firms, including both the "type I" diversities (strategic compatibility) and "type II"

diversities (inter-organizational differences). According to the literature, inter-partner strategic compatibility is expected to be positively correlated with the supplier's capability enhancement, while inter-organizational differences are expected to affect capability enhancement negatively.

*H4-10: Indigenous firms perceiving higher levels of product-market competition with their partners tend to exhibit lower levels of capability enhancement.*

*H4-11: Indigenous firms of higher degrees of skill complement with their partners tend to exhibit higher capability enhancement.*

*H4-12: Indigenous firms of lower inter-organizational diversity (higher cultural or organizational similarity) with their partners tend to exhibit higher capability enhancement.*

### **3.2.5 Relationship characteristics**

A cross-border contract manufacturing project can be regarded as a process through which the OEM buyer and the supplier work jointly to achieve their goals. The working relationships between partners evolve with the progress of the projects and these relationships cannot be determined beforehand. Therefore, the relationship variables are the emerging characteristics of an alliance. According to some marketing scholars (e.g., Anderson and Narus, 1990; Mohr and Spekman, 1994), relationship management is crucial to partnership success. In the strategic alliance research area, Devlin and Bleackley (1988) also claim that alliance management is critical to the success of alliances. In this research, if this set of variables are significant determinants of the supplier's capability enhancement, the findings will

support the argument that the alliance process and its relationship-management are important to alliance success. If this is the case, managers should put more emphasis on management of the collaborative exchange process, instead of simply focusing on the form and structure of alliances (Hamel, 1991: 101).

### *Trust*

The concept of "trust" has been mentioned by many studies in different fields, and researchers have found that trust is particularly important in establishing a long-term buyer-supplier relationship (e.g., Blenkhorn and Noori, 1990; Dyer and Ouchi, 1993; Ganesan, 1994). Some researchers (see Slowinski's talk in Wolff, 1994) even conclude that no alliance can survive without trust.

Many researchers (Metcalf et al., 1992; Moorman et al., 1993; Wolff, 1994) have found that interpersonal factors lay the foundation for trust, which sets the path towards mutual adaptation and leads to goal achievement. Empirical research (Moorman et al., 1993) has confirmed that the perceived integrity, sincerity, capability, and accountability, along with other interpersonal factors, are strongly associated with trust. Ganesan (1994: 3) has further condensed these factors into two distinct components: credibility and benevolence. The former is the belief in the partner's expertise and reliability in performing its job effectively, and the latter is about a firm's belief in the partner's motives and intentions behind the relationship. The construct "credibility" is similar to Sako's (1992) notion of "competence trust", and the construct "benevolence" can be regarded as a

combination of "contractual trust" and "goodwill trust", termed by Sako (1992). According to Sako's definition, the contractual trust is the extent of the partner's trustworthiness in fulfilling specific written or oral agreements, while the goodwill trust is the expectation that the partner is committed to take initiatives to exploit new opportunities (for the benefit of its counterpart) over and above what was explicitly promised.

According to Moorman et al. (1993), trust is a willingness to rely on an exchange partner in whom one has confidence, and it is critical in facilitating exchange relationships. In the present research, trust is defined as the degree of belief or assured reliance on the partner's credibility and trustworthiness. Because "goodwill trust" is difficult to verify (Sako, 1992: 39), especially in the setting of cross-border contract manufacturing alliances, only "competence trust" and "contractual trust" are measured in this research. Both the supplier's trust in the partner and the partner's trust in the supplier are measured from the supplier's perspective. Because mutual trust eliminates unnecessary self-guarding mechanisms, it is expected to facilitate a supplier's capability enhancement and other aspects of alliance performance.

*H5-1: Alliances with higher levels of mutual trust tend to exhibit higher capability enhancement.*

## ***Commitment***

Commitment is an intensively-studied topic in the organizational behavior field, especially in the context of the exchange relationships between employees and organizations (e.g., Porter et al., 1974; Angle and Perry, 1981). In Angle and Perry's (1981) definition, commitment in a partnership can be defined in terms of a partner's identification with and involvement in the relationship. According to Porter et al. (1974), commitment can be measured by three dimensions: 1) Strength of belief in the goals and value of such a cooperative relationship; 2) A willingness to exert considerable effort on behalf of the relationship; and 3) A definite desire to maintain the relationship.

An important source of commitment is the "sunken cost" or previous investment of a partner in a relationship. This is what Williamson (1985) terms "asset specificity" - a notion that has been applied to the research of buyer-supplier relationships (Anderson and Weitz, 1992: *idiosyncratic investments*; Ganesan, 1994: *specific investments*; Lohtia and Krapfel, 1994: *transaction-specific investments*) and treated as an exit barrier (Dwyer et al., 1987) in a relationship. Since commitment is an independent variable in this research, the focus will be on its measurement, rather than on its determinants. Therefore, although these idiosyncratic investments have been found to have a strong effect on a firm's commitment to a relationship, they are not used to measure a firm's level of commitment to a relationship in this research.

Commitment is defined, in this research, as a desire to develop a stable relationship and a willingness to make sacrifices for the maintenance of the relationship (Anderson and Weitz, 1992: 19). It is measured by a partner's efforts for continuing cooperation and (negatively) by the extent of its opportunistic dealings with its counterpart. Again, both the supplier's commitment and the buyer's commitment are measured from the supplier's perspective. Because mutual commitment usually represents the longevity and stability of a partnership, it is expected to be positively correlated with the supplier's capability enhancement.

*H5-2: Alliances with higher levels of mutual commitment tend to exhibit higher capability enhancement.*

### ***Interaction***

Studying the intra-firm technology transfer from R&D departments to operational units, Leonard-Barton and Sinha (1993) found that user involvement in development, and adaptation between users and developers, are two major determinants of transfer effectiveness. Other scholars (Ettlie and Reza, 1992; Adler and Cole, 1993) also support this, finding that the interaction between different value-added functions promotes productivity and innovation. Similarly, Pinto et al. (1993: 1281) even claim that "*cross-functional cooperation is a significant predictor of both perceived task and psychosocial project outcome.*"

In an intra-firm transfer, the source and destination are usually different functional departments (e.g., from R&D to manufacturing), but in an inter-firm transfer, interactions usually happen between corresponding departments (such as R&D to R&D, and manufacturing to manufacturing). As for the mechanisms of interaction, Cunningham and Tynan (1992) believe that the exchange of information and interpersonal contacts are effective ways to facilitate alliance performance.

Here interaction is defined as the reciprocal contact or action between partners, and it is measured by the intensity of information sharing and personnel exchanges between corresponding functional departments of the partners. Naturally, the level of inter-partner interaction is expected to be positively correlated with the supplier's capability enhancement.

*H5-3: Alliances with higher levels of interaction tend to exhibit higher capability enhancement.*

### ***Communication***

Communication between partners affects the content and quality of their interaction and thus is crucial to the results of alliances (Cummings, 1984: 383; Mohr and Nevin, 1990; Mohr and Spekman, 1994). To evaluate communication between partners, three major dimensions of communication have been identified from the literature: 1) **Communication quality** (Moorman et al., 1992; Johnson, 1994), which can be evaluated in terms of its timeliness, accuracy, and adequacy; 2)

**Communication media** (Lengel and Daft, 1988); and 3) **Communication frequency** (Mohr and Nevin, 1990; Cunningham and Tynan, 1992).

In this research, communication is defined as the transmission of information between partners through a common system of language and media, and it is measured along three dimensions: quality, media, and frequency. It is expected that the quality and frequency of inter-partner communication are positively correlated with the supplier's capability enhancement.

*H5-4: Alliances with better quality of communication tend to exhibit higher capability enhancement.*

*H5-5: Alliances with greater frequency of communication tend to exhibit higher capability enhancement.*

### ***Dependence***

The relative dependency (or bargaining power) of a partner can be posited both as an independent variable which affects learning, or as a dependent variable which is affected by learning. Hamel (1991: 88) believes there is a close link between learning and bargaining power. He found that as a firm's learning progressed, its bargaining power over its partner also grew. Borys and Jemison (1989) propose that the performance of a supplier arrangement is determined primarily by the alliance's ability to create and manage reciprocal interdependencies between suppliers and buyers (p. 240, research proposition 8B). Dyer and Ouchi (1993)

believe one major reason for Japanese firms' global competitiveness is their recognition of the need for interdependence. Ganesan (1994) tests this empirically, and finds that mutual dependence, together with mutual trust, is the major factor which encourages long-term orientation in buyer-supplier relationships.

In this research, dependence is defined as being influenced or determined by the partner; and dependence is measured by the relative importance of each partner in the eyes of its cooperative counterpart. Although dependence posture (relative bargaining power between partners) in an alliance is posited to be a determinant of alliance performance, it is also possible that the alliance performance will affect the dependence posture between partners. Because mutual dependency represents the strength of a partnership, it is expected to be positively correlated with the supplier's capability enhancement.

*H5-6: Alliances with higher levels of mutual dependency tend to exhibit higher capability enhancement.*

### ***Congruence***

Congruence has been intensively studied in the field of organizational behavior. It refers to the fit, match, agreement, or similarity between two conceptually distinct constructs (Edwards, 1994: 51). Congruence between employee attributes and organizational factors has been one of the salient research streams in the organizational behavior field, and it is considered as a predictor of outcomes

relevant to the employee or organization (for a review, see Assouline and Meir, 1987).

In this research, congruence is defined as the quality or state of agreeing, coinciding, or being compatible with the partner, and it is measured on both individual and organizational levels.

On the organizational level, Cunningham and Tynan (1992) found that the cooperative atmosphere between buyer and supplier sets the stage for mutual adaptation and enhances cooperation effectiveness. In an empirical study on manufacturer-supplier relationships, Heide and John (1992) confirm the importance of supportive norms in structuring economically efficient relationships between independent firms. Following a similar rationale, Dyer and Ouchi (1993) advocate Japanese-style partnerships and ascribe Japanese firms' success to their developing bonding mechanisms to build trust and goal congruence between partners. It is therefore reasonable to expect a positive correlation between organizational congruence and the capability enhancement of the suppliers.

*H5-7: Alliances with higher levels of organizational congruence tend to exhibit higher capability enhancement.*

On the individual level, most of the studies suggest that personnel congruence is positively linked with cooperation performance. Studying intra-organizational technology transfer, Leonard-Barton and Sinha (1993) suggest that the mutual

adaptation (congruence) between R&D and manufacturing personnel results in improved production output. However, individual congruence might be a misleading determinant of alliance performance, as Hamel (1991: 88) has pointed out that "*just as contentiousness does not, by itself, indicate collaborative failure..., an abundance of harmony and good will does not mean both partners are benefiting equally in terms of enhanced competitiveness. Collaborative success could not be measured in terms of a 'happiness index'.*" Therefore, it will be interesting to test the effect of personal congruence on capability enhancement.

*H5-8: Alliances with higher level of personal congruence tend to exhibit higher capability enhancement.*

### ***Mutual Adjustment***

The evolution of an inter-partner relationship can be conceptualized as a mutual adjustment process between partners. In this study, inter-partner mutual adjustment is represented by the extent of inter-firm conflict, and also by the extent of joint conflict resolution between partners. While more conflicts may signify poor mutual adjustment between partners, more joint conflict resolution may provide a remedy.

Contrary to the notion of congruence, conflict is generally viewed as dysfunctional and harmful to partnership success (Anderson and Narus, 1984; Mohr and Spekman, 1994). In this research, inter-firm conflict is defined and measured by the extent of disagreement between the suppliers and their partners throughout their

cooperative projects, and it is expected to be negatively linked with a supplier's capability enhancement.

*H5-9: Alliances with more inter-partner conflicts tend to exhibit lower levels of capability enhancement.*

In practice, some level of conflict is just another part of doing business (Dwyer et al., 1987; Anderson and Narus, 1990). Given that conflict is almost inevitable in a partnership, the question of how such conflict is resolved becomes important (Borys and Jemison, 1989). Among different conflict-resolution techniques, joint conflict resolution has been found positively correlated with partnership success (Anderson and Narus, 1990; Mohr and Spekman, 1994). In this research, joint conflict resolution is defined and measured by the extent to which solutions are worked out jointly and equally by both parties, and it is expected to be positively correlated with the supplier's capability enhancement.

*H5-10: Alliances with more joint conflict resolution tend to exhibit higher capability enhancement.*

## Chapter IV: RESEARCH METHOD

### **4.1 Research Design**

With regard to the research topic and methodology, the issues of relevance and rigor have long plagued the field of strategic and international management. On the one hand, some scholars emphasize case methods to explore issues of practical importance. They view traditional deductive-analytic research as narrow in scope and straight-jacketed by methodological rigidity. On the other hand, other scholars emphasize large-sampled quantitative research. This group views case-based research as merely journalistic, claiming it is descriptive and lacks analytical rigor. They hold that this is a symptom of methodological deficiencies.

To harmonize this academic disagreement, one needs to separate two related but different issues: research topic and research methodology. Since strategic management is fundamentally an interdisciplinary subject with an emphasis on practice and application (Schendel, 1994: 2), it is reasonable for scholars to consider the practical contributions of their research. Therefore, the practical value of research should be one of the major considerations in selecting a research topic. With regard to research methods, they should be considered as tools for achieving the specific needs of the researcher. Just as every tool has its strengths and limitations, and is most effective when appropriately used, a research method should be tailored to suit its research needs (Parkhe, 1993). Different research methods should be and can be academically rigorous if they are used appropriately.

Researchers should also consider the development stage of the research topic in choosing appropriate methodology, because the knowledge accumulation process usually follows a "life-cycle" pattern. When the level of knowledge about a subject is low, researchers have to explore the phenomena and try to generate an appropriate theoretical framework. In-depth case studies are most appropriate at this stage. As more and more exploratory research has been done on the subject, more competing paradigms will emerge. Much theory testing and revision work will be needed to falsify these existing paradigms. At this stage, statistical testing of detailed and specific hypotheses is also very common. Such a falsification process may take a long time until one paradigm survives all rigorous tests and still cannot be proved wrong, thus the paradigm can be established as a generally accepted theory. It is therefore clear from the above description that the stage of a research field will condition the methods researchers can employ. When knowledge is elusive, case studies are used to describe the phenomenon and to extract research propositions for further exploration and testing. As knowledge of the subject increases, the research emphasis will shift from theory development to theory testing, and this generally requires the application of large-sample statistical analysis (Stobaugh, 1976).

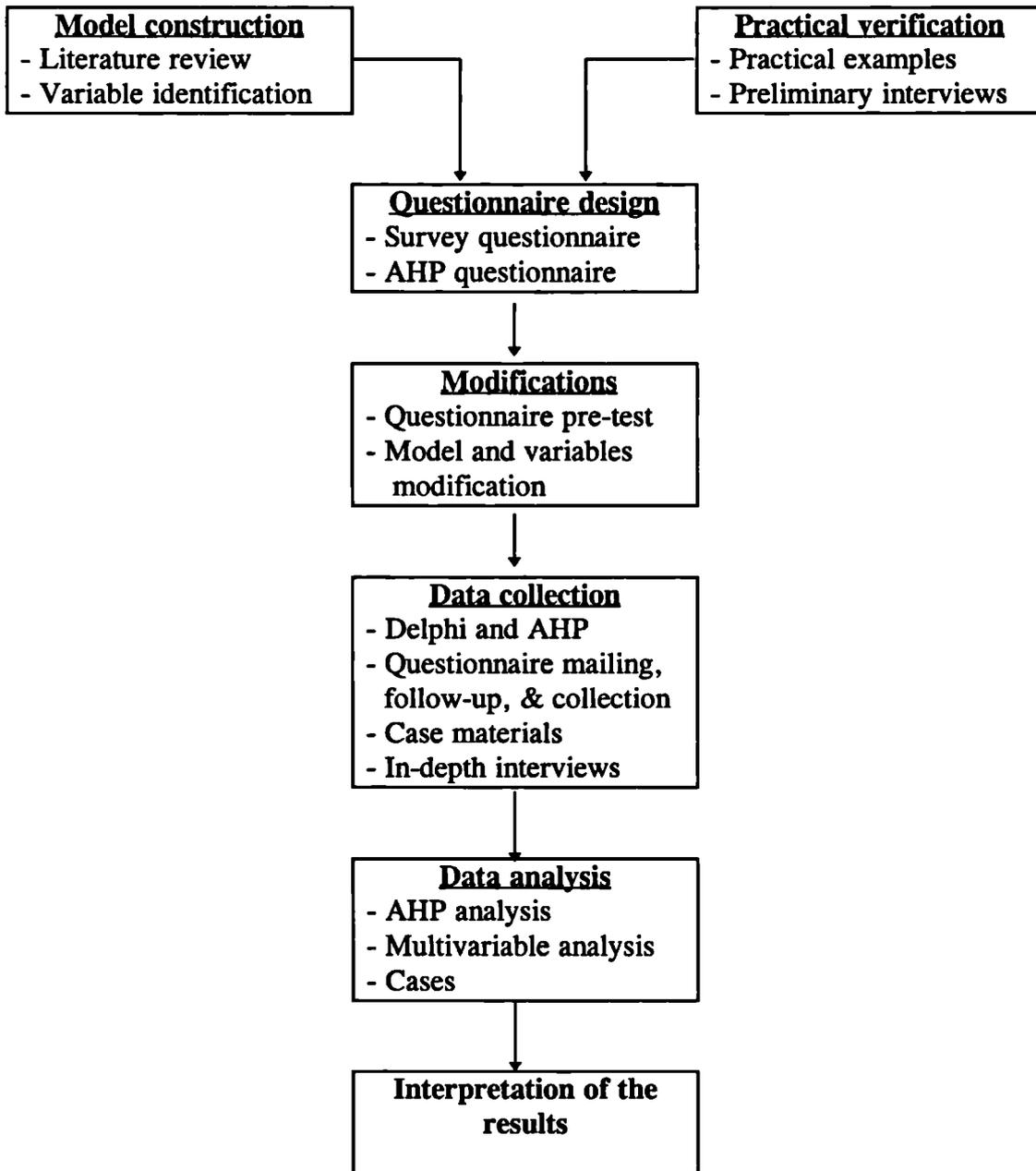
The research field of international management is still in its developmental stage and many strategic issues are only dimly perceived within the academy (Rumelt et al., 1991: 22). The phenomenon of cross-border inter-partner learning is a research area that lacks established theory. Therefore exploratory research is still necessary

to reveal the full range of the phenomena. However, Hamel (1991) has made a significant contribution by proposing a basic framework developed through in-depth case studies with nine international alliances. Some basic dimensions of inter-partner learning have been identified and the alliance processes and mechanisms have been illuminated. Following previous research, this study aims to extend existing knowledge on the issue of inter-partner learning and, more importantly, to test empirically the proposed theoretical framework (see section 3.1).

The dual purpose of this research requires a versatile research design. As Schollhammer (1973: 30) has pointed out that: "*the most significant contributions in the international business field have generally been made with empirical studies from which the researchers used a variety of methodological approaches to data collection such as questionnaire surveys and subsequent interviews or detailed accounts of a particular case*", this research relies mainly on an empirical questionnaire survey, which is then supplemented by in-depth interviews and six case studies.

Cooper and Zmud (1990) have suggested two ways to conduct a study of strategy implementation: factors and process. The factors approach attempts to identify static forces which lead to successful implementation; and the process approach focuses on the dynamics of implementation, examining the behavior of stakeholders over time. This research adopts mainly the factors approach - using a questionnaire survey to identify the critical factors. In other words, this research is designed mainly as a piece of strategy content research which is further supplemented by

some strategy process research techniques (Chakravarthy and Doz, 1992). Such a versatile research design intends to accommodate both the breadth and depth necessary to understand the issue of inter-partner learning. The research plan of this study is explained in Fig. 6: Research flow chart, as follows:



#### **4.1.1 Delphi and AHP**

In order to measure objectively the influences of different independent variables on the major dependent variable - learning - a method is first needed to gauge intangible learning (overall competence enhancement). Adopting an Analytic Hierarchy Process (AHP) survey will assist in overcoming this difficulty (For more details on AHP see Saaty and Kearns, 1985).

AHP is a technique by which an intangible construct (in this case: "firm-specific competence") is first decomposed hierarchically and then re-integrated by finding relations through informed judgment (Saaty, 1988). The AHP questionnaire is a list of pairwise comparisons between different dimensions and indicators at the same level (see Appendix 2). The data collected from this AHP questionnaire are to be calculated (by the AHP computer program) into relative weights for different dimensions and their subordinate indicators in the hierarchy.

The AHP process is necessary to measure more objectively the overall competence of the sample firms. Since the score (1-7) for each capability indicator (see the measures of Learning: v261 - v269 in Appendix 1) can be obtained from the survey questionnaires and the weight of each indicator (%) can be calculated through the AHP program, a composite (weighted) score can be assigned to each functional learning area (capability dimension) and be further aggregated into a final learning score. This score represents the sample firm's overall competence enhancement, which is the surrogate for learning through the contract manufacturing project.

This process of AHP in this research includes:

1. *Establishing the hierarchic structure of capability dimensions and their subordinate indicators*: Capability dimensions (value-conception, value-realization, and value-delivery skills) and their measurement indicators are first identified through literature review (see section 3.2.1).

2. *Selecting a group of experts who understand the nature of the competition in the electronics and IT industries for reference*: This process is similar to the Delphi technique which uses the opinions of a panel consisting of industrial experts. The experts are expected to serve two functions: one function is to confirm the relevance of the capability dimensions, subordinate indicators, and their measures; the other is to prioritize these dimensions and indicators through a series of pairwise comparisons (see Appendix 2).

3. *Data analysis of the AHP questionnaires*: Using the AHP computer package, the priorities (weights) of each dimension and indicator can be calculated respectively.

#### **4.1.2 Questionnaire survey**

The major work of this research is a large-sample survey on Taiwanese contract manufacturing suppliers. The details of this survey are listed below:

### *Sample Firms*

The research sample consists of indigenous (foreign equity less than 50%) electronics and IT manufacturers in Taiwan. A list of major Taiwanese electronics and IT manufacturers was obtained from a variety of sources. There are three major reasons for using larger firms (in terms of sales) in the sample: 1) They are the leading firms among Taiwanese electronics and IT manufacturers. 2) They have more cross-border cooperation experience with MNCs than the small firms. 3) They tend to be more willing to disclose the details of foreign cooperation than the smaller manufacturers, and secondary public data about them is also more available.

### *Contacts and Respondents*

In order to enhance the response rate and to gain better attention from respondents, the researcher has leveraged and mobilized all possible "*Gwan-Xi*" (connections) in the targeted industries to build up a contact data base. Prior to the questionnaire mailing, telephone calls to all targeted firms were necessary to screen the sample firms and get consent from the appropriate respondents.

From previous interviews and questionnaire pre-tests, the account officers (coordinators) appeared to hold most of the information regarding specific contract manufacturing projects. Although technical staff were also involved in most of the projects, many of them were reluctant to complete the questionnaires because of a lack of overall understanding or simply not feeling they were in a position to answer

questions on behalf of their firms. Therefore, the appropriate respondents in the sample firms were mostly project managers or sales personnel in charge of international business (clients).

#### **4.1.3 Overview of research design for the following analyses**

A systematic analysis of the collected data is necessary to transform it into information which sheds light on the research questions.

In the rest of this chapter, section 4.2 presents the results of descriptive analyses, including the results of the AHP and the questionnaire survey. Then factor analysis is applied to extract the underlying factors from four groups of independent variables in 4.3. The preliminary descriptive analysis reveals the exploratory findings regarding suppliers' alliance performance, in addition to the realities of contract manufacturing projects between Taiwanese IT suppliers and their foreign buyers. The factor analysis is necessary to reduce the number of independent variables and, more importantly, to extract the underlying factors which may affect the alliance performance. All these efforts set the foundations for the subsequent analyses.

The subsequent analyses are carried out on two different but complementary levels - variables and factors. The analyses on the level of original variables show the detailed relationships between individual variables and alliance performance, while the analyses of the extracted factors reveal the influences of underlying constructs.

Just like studying a forest, the variable-level analyses examine each individual tree, while the factor-level analyses enable us to investigate different patches of the forest.

The main purpose of the correlation analyses, in Chapter V, is to understand the relationships between the independent variables and the dependent variables. Through such an overall correlation analysis, the possible determinants of alliance performance can be identified. The results then can be used as the inputs to subsequent regression analyses, through which the determinants of alliance performance can be compared and identified. The correlation analyses can also be used as preliminary tools for hypothesis testing. An overall testing of the relationships between each independent variable and each dependent variable is intended to cover the breadth of the proposed theoretical framework, with the acknowledgement that such an approach will unavoidably lose some degree of rigor in hypothesis testing.

The correlated variables and factors, identified from the correlation analyses, are further used for the stepwise regression analyses in Chapter VI. The stepwise regression is used mainly as a tool to select and prioritize the determinants of alliance performance, rather than specifying regression models with satisfactory explanatory power. Through such a procedure, attention can be focused on a smaller number of possible determinants, and possible interpretations for the results can also be obtained. The key determinants of different levels of alliance performance can be systematically examined through a series of stepwise

regressions, both on the factor level and on the variable level. To maximize our understanding of the ultimate underlying determinants of alliance performance, another factor analysis is applied to further condense the first-stage factors into the second-stage factors. Performance determinants from these second-stage factors are then identified through regression analyses.

Finally, Chapter VII is dedicated to the search for an improved theoretical framework for inter-partner learning. Here the attention is focused on the explanatory power of different sources of determinants and the overall explanatory power of different theoretical frameworks, instead of the determinants themselves. Using Hamel's (1991) basic framework as a reference point, in which only the characteristics of the cooperating parties are proposed as performance determinants, other possible sources of performance determinants are systematically added into the existing framework. The regression results of these different regression models (representing different theoretical frameworks) are compared; thus the additional contribution of each new variable-group is assessed. Through this procedure, the extent of theoretical improvement resulting from the proposed holistic framework can be assessed.

To sum up, section 4.2, 4.3, and Chapter V can be considered mainly as the preparations and foundations for the subsequent analyses, although insightful findings can also be extracted from this exploratory process. In Chapter VI, a deductive approach is adopted to identify the determinants of alliance performance. The research design is like a sieve through which the most important determinants

of alliance performance are gradually sifted out from the proposed holistic theoretical framework. In comparison, the design of Chapter VII is basically inductive, starting from specific factors and aiming at evaluating the appropriateness of the proposed holistic framework for inter-partner learning. Through the interplay of both deductive and inductive methods, this piece of research can shed more light on the issue of inter-partner learning.

## **4.2 Survey Results and Descriptive Analysis**

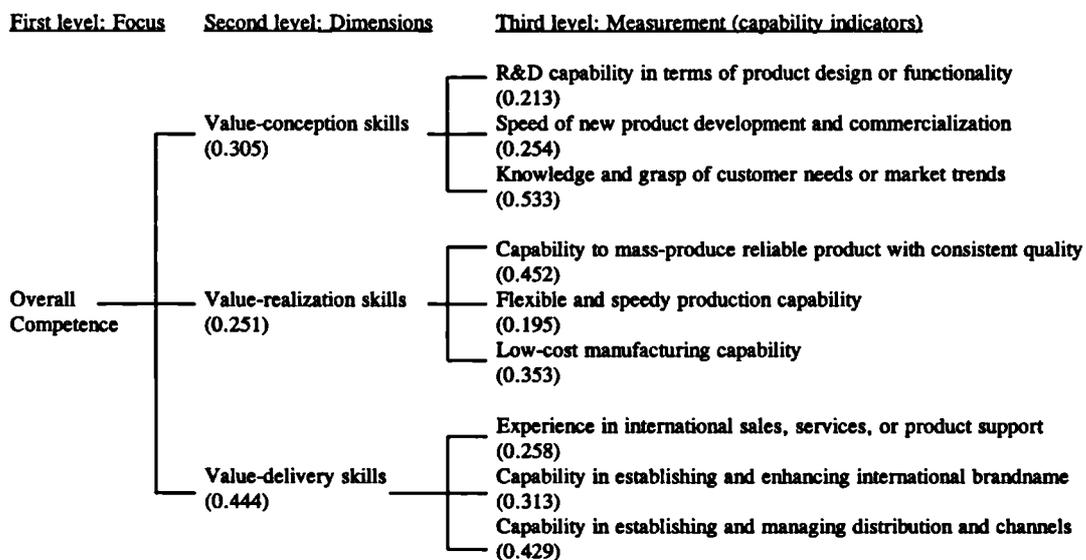
### **4.2.1 AHP results**

With the assistance of the Chinese Management Association, two panels were called in May, 1995. Twelve senior managers in IT and electronics industries (four managers in the first panel and eight in the second) spent three hours completing the AHP questionnaires and discussing issues regarding cross-border technology transfer.

In the first part of the AHP questionnaire (see Appendix 2), panel members were asked to evaluate the appropriateness of each indicator and the clarity of its measure. The results show all members agreed that these capability indicators adequately reflect the overall competence of Taiwanese IT or electronics firms, with only some minor modifications in the wording of some measuring statements.

The pairwise comparisons of relative importance between indicators were first converted into 9-scale scores. In this way, the 12 completed AHP questionnaires were compiled into 12 comparison matrices. Using the geometric averaging method, the 12 individual matrices were then aggregated into one pairwise comparison matrix, which represents the group opinion of the two panels. After running the AHP computer program, the final results of AHP analysis are shown in Fig. 7.

Fig. 7: The weights of dimensions and indicators of a firm's overall competence



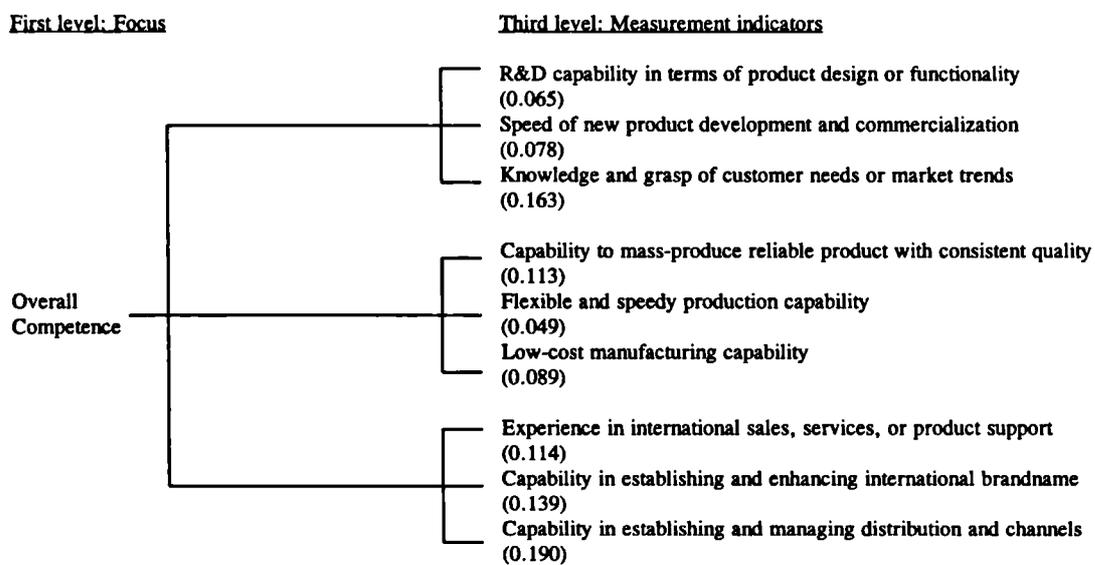
N.B.: Numbers in the parentheses represent weights or priorities of the indicators.

The consistency ratio (C. R.) of the second-level dimensions (value-conception, value-realization, and value-delivery skills) to the first-level focus (overall competence) is 0.026. The C. R. of the 9 third-level indicators to their second-level dimensions are 0.001, 0.006, and 0.002 respectively. The consistency ratio of the whole hierarchy is 0.014. All the consistency ratios are far less than the upper limit

of 0.1, indicating that the comparisons are very consistent and the results have a high level of internal validity.

With the above weights in Fig. 7, the relative importance (priority) of each capability indicator (third-level factor) to the overall competence (first-level focus) can be calculated by multiplying the priorities of the second-level dimension with that of the third-level indicators. The final results of the capability indicators and their relative weights are listed below.

Fig. 8: The weights of capability indicators to a firm's overall competence



N.B.: Numbers in the parentheses represent weights or priorities of the indicators.

In sum, the marketing capability (especially in the area of international channel management) appears to be the most valuable learning area for Taiwanese IT firms, while end-customer intimacy and manufacturing quality are also areas needing enhancement. The capabilities with higher weights can also be regarded as the

Taiwanese IT suppliers' weaker points, recognized by the panels. These weights are used to calculate the learning scores of sample firms, from the questionnaire survey, for further analysis.

#### **4.2.2 Survey results**

A list of 266 Taiwanese electronics and IT manufacturers was first obtained from TEAMA (Taiwan Electronics and Appliance Manufacturers Association) Buyers' Guide 1993-1994, in conjunction with a members list provided by the Taiwan Computer Association. The majority of these sample firms are manufacturers with import/export turnover exceeding US\$3 million in 1992.

#### *Contacts and Respondents*

The Taiwan Computer Association has provided the names and telephone numbers of the contact persons of 132 IT member firms. Through the alumni networks of both National Taiwan University and National Chengchi University (the author also being a member of both organizations), and with some help from previous business contacts, the author was able to identify additional contact persons. At the end, it was possible to identify at least one contact person in most of the sample firms. For the rest of the firms, direct calls to the international sales departments were used in the last resort.

Telephone calls were then made to the contact persons in the sample firms. The main purpose of such calls was to introduce the research project and to establish the

key informants or respondents so that the questionnaires could be mailed to the appropriate people. Of the 266 companies, 38 were uncontactable, closed, or were disqualified because they were not indigenous manufacturers, 34 firms claimed they had never had contract manufacturing experience with foreign clients, and 12 firms simply refused to participate in the research.

Among the 182 firms who agreed to participate, some had more than one business unit and some had contract manufacturing experience with clients from the U.S., Europe and Japan. Upon the agreement of the key informants (who agreed to distribute questionnaires to appropriate colleagues) and respondents, different numbers of questionnaires (ranging from one to three copies) were then mailed to each one of them from April 25th to May 15th, 1995. The author personalized each mailing by writing a semi-structured letter reflecting the specific context of each telephone conversation. In addition, a recommendation letter from Professor Seetoo of National Chengchi University (the author's ex-supervisor and a renowned management scholar in Taiwan), was also included to enhance the credibility of this research. Altogether 349 copies of the questionnaire were mailed to the key informants or respondents at the 182 sample firms.

Within two months 192 questionnaires were returned from 113 companies. Among them, 5 were so incomplete that they had to be excluded from data analysis. This left 187 usable questionnaires and set the valid response rate as 53%. Most of the questionnaires were well completed when returned, but some still had the question

of transaction value and project duration unanswered. The author then made follow-up calls to obtain most of the missing answers.

#### **4.2.3 Descriptive analysis of the survey results**

The following summaries are selected from the descriptive statistics obtained from the data analysis using SPSS for Windows 6.1. For detailed understanding, the following section should be read in conjunction with the variables and their measuring questions in Appendix 1.

##### ***The alliance performance***

##### **Learning (v261 - v269<sup>12</sup>)**

The majority of respondents perceived significant improvement in their firms' overall competence through the projects. Using a 7-point scale ranging from capability deterioration (scale 1) to very high capability enhancement (scale 7), the respondents' perceived capability changes of their firms through the projects are:

<b>Capability Indicator</b>	<b>Mean</b>	<b>Standard Deviation</b>
v264: Manufacturing quality	4.87	1.14
v263: End-customer intimacy	4.73	1.09
v267: Marketing experience	4.51	1.28
v268: Brandname management	4.45	1.39
v266: Low-cost manufacturing	4.34	1.29
v265: Manufacturing flexibility	4.26	1.35
v261: Product R&D technology	4.24	1.23
v269: Channel management	4.12	1.41
v262: R&D speed	4.06	1.37

<sup>12</sup> The following labels in parentheses are variable names. See Appendix 1.

The means of capability enhancement through a project are between scale 4 (moderate enhancement) and scale 5 (substantial enhancement). Somewhat counterintuitively, the results seem to indicate a rather comprehensive learning effect among a wide array of operational activities. For indigenous suppliers, the learning benefit of cross-border contract manufacturing cooperation is not limited to manufacturing; rather it spills over to other value-added activities in R&D as well as in marketing area.

Specifically, manufacturing quality and end-customer intimacy are the capability areas that are most helped through contract manufacturing alliances. The relatively lower standard deviations of these two indicators also reveal the consensus among the respondents. Channel management and product R&D speed are, by comparison, the areas which benefited least from contract manufacturing alliances. Their relatively higher standard deviations also show that the opinions among the respondents are more fragmented on these issues.

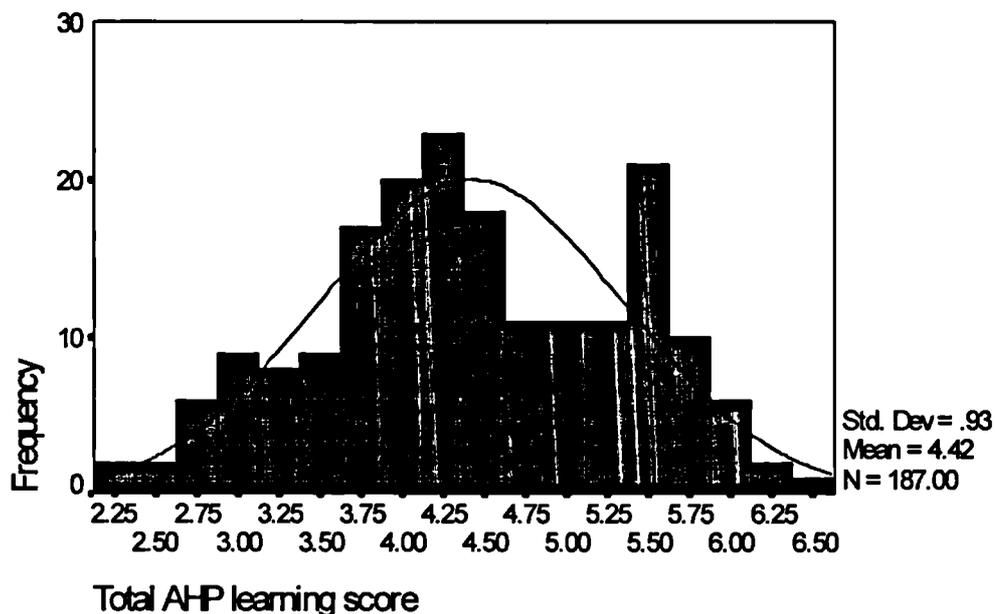
Weighted by the AHP priorities, learning in different capability dimensions (major operational functions) can be shown as follows.

<b>Capability Dimension</b>	<b>Mean</b>	<b>Standard Deviation</b>
R&D capability learning	4.45	1.03
Manufacturing capability learning	4.56	0.98
Marketing capability learning	4.32	1.24

Among the three capability dimensions, the supplier's manufacturing capability appears to be enhanced the most through contract manufacturing alliances, and respondents' opinions are fairly consistent. The second most benefited area is suppliers' R&D capability, and the respondents' opinions are also a little more diverse. The least benefited area, not surprisingly, is suppliers' marketing capabilities, and here the opinions also seem to be the most diverse. Compared with the AHP results, marketing capabilities appear to be the most valuable and the most sticky capabilities in the perception of local managers.

Further exploration of the overall competence enhancement of the sample firms demonstrates a pattern close to a normal distribution, with a mean of 4.42 (between moderate capability enhancement and substantial capability enhancement).

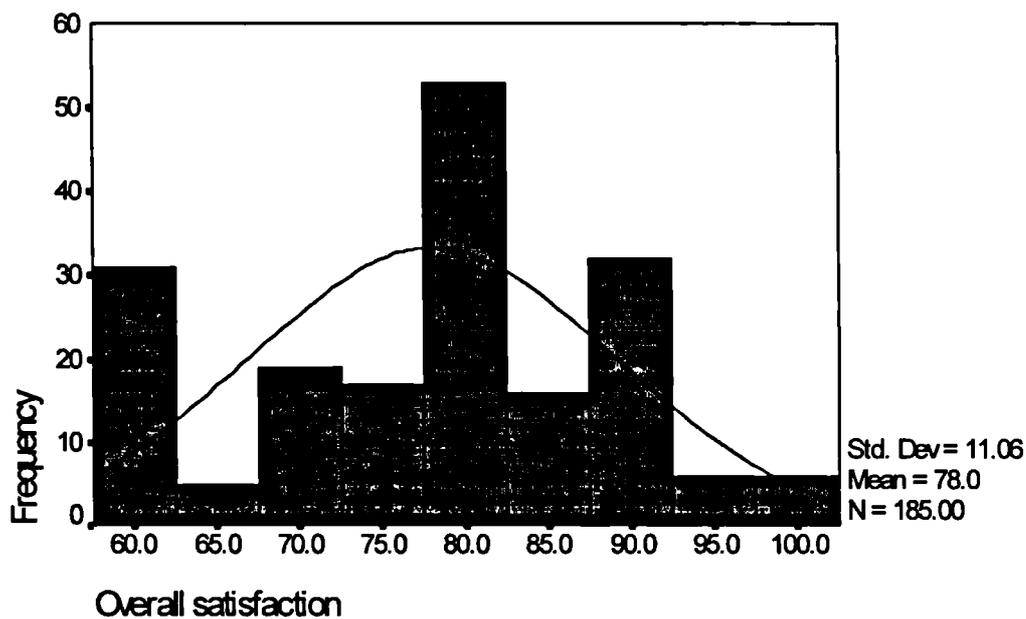
Fig. 9: Sample firms' overall learning scores



About 30% of the respondents rated the extent of their firms' capability enhancement through the projects as at least "substantial enhancement", while only 6.4% rated their capability enhancement below "low enhancement". Because the score only reflects the learning effect in one specific contract manufacturing project, the aggregated learning effect of all the projects (about 50% of the sample firms have experience of more than 10 contract manufacturing projects) should be much more significant. Therefore, the overall learning effect through cross-border contract manufacturing alliances is strongly confirmed by the respondents.

**Satisfaction (v24)**

Fig. 10: Sample firms' project satisfaction

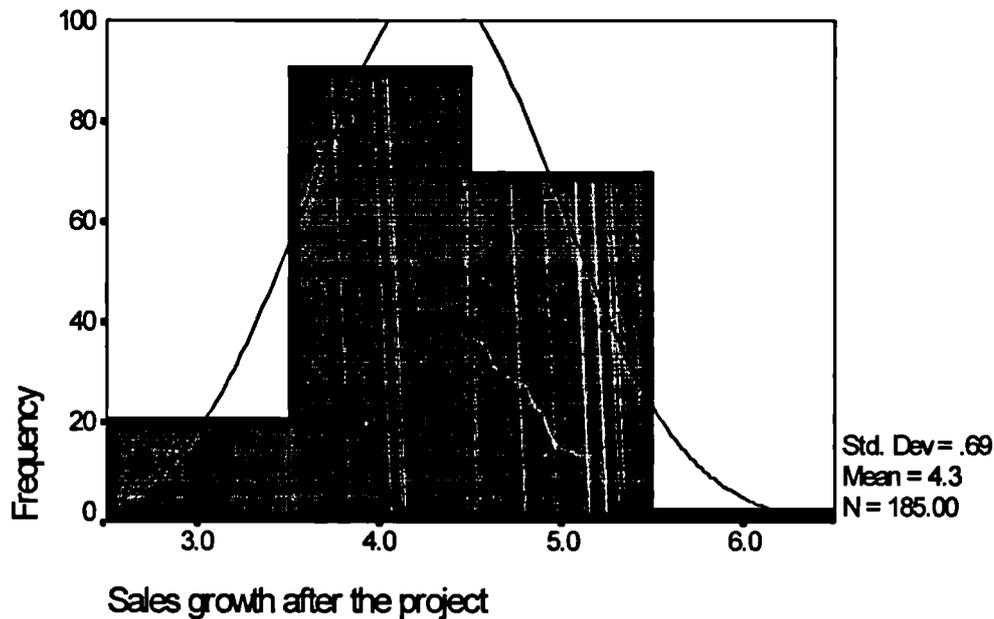


Out of the 185 completed answers, only one respondent scored his firm's overall satisfaction below 60. However, 29.7% of the respondents still rated their satisfaction score as 70 or below, indicating relative dissatisfaction. The averaged

satisfaction score of the sample firms was 78, representing general satisfaction of indigenous firms towards their projects.

### Sales Growth (v23)

Fig. 11: Sample firms' sales growth after projects



Suppliers' sales growth after the projects was rated as medium growth by 49.2% of the respondents, and by only 11.4% as low growth. As many as 39.4% rated their firms' sales growth as high or very high growth. The subjective self-ranking result is also in line with the high sales growth experienced by many Taiwanese IT firms in recent years.

### Change of cooperative strength (v151 - v158; v221 - v228)

The percentages of respondents' perceived forms of cooperation with their specific foreign partners, both before and after the projects, can be summarized:

Type of cooperation	Before-project relationship (%)	After-project relationship (%)	% increase (decrease)
No contact	44.9	7.0	- 37.9
Occasional trading	26.2	26.7	+ 0.5
Licensing	3.7	4.3	+ 0.6
Frequent transaction	15.5	44.9	+ 29.4
Personal ties	16.6	18.2	+ 1.6
Long-term or central-satellite	12.3	39.6	+ 27.3
Joint ventures	0.5	1.1	+ 0.6
Equity investment	4.3	4.8	+ 0.5

As many as 93% of the sample firms still maintain some kind of further cooperation with their contract manufacturing clients after the projects, regardless of the fact that 44.9% of them didn't have any previous cooperation with the partners before the projects. The results indicate that contract manufacturing cooperation is a very effective initiating or entry mode for indigenous suppliers to develop subsequent cooperation with their foreign clients. In addition, although it does not seem to be very helpful in developing equity relationships such as joint ventures or mutual investment, contract manufacturing cooperation does appear to be very effective in strengthening transactional relationships such as frequent transactions and long-term or central-satellite arrangements.

Another interesting finding is the unexpected low percentages of licensing, joint ventures, or equity investment (resulting from cross-border M&A or foreign direct investment activities) between sample firms and their foreign contract manufacturing clients. Although these business activities have been intensively

studied in the international management or cross-border strategic alliance literature, less than 5% of the respondents have reported such relationships with their contract manufacturing clients, either before or after the projects.

It is clear from the data that the most common business relationships between OEM partners are still buyer-supplier transactional relationships. Other relationships (licensing, personal ties, joint ventures, and equity investment) are both rare and unaffected by contract manufacturing alliances. In order to measure the change in the strength of cooperation between each pair of partners, four transactional relationships representing different levels of trading intensity (both before and after the projects) are used to calculate the change of cooperative strength:

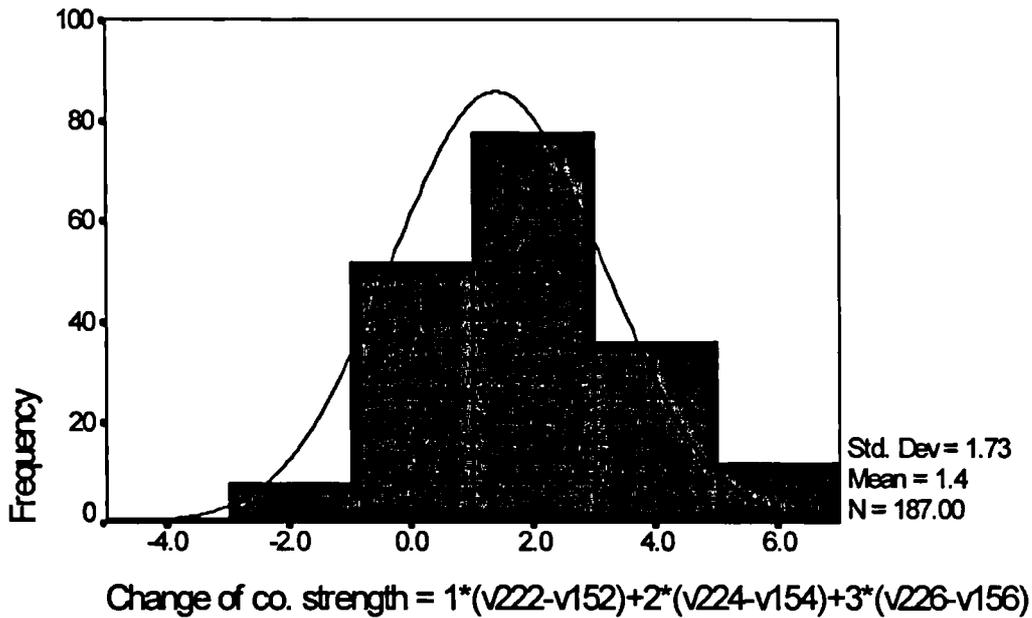
1. No contact (v151) or no further cooperation (v221)
2. Occasional trading or occasional contract manufacturing cooperation (v152,v222)
3. Frequent transaction or agency relationship (v154, v224)
4. Long-term transaction partnership or central-satellite relationship (v156, v226).

To reflect the relative strength of each relationship, weights of 0, 1, 2, or 3 are assigned to the above four levels of transactional relationship respectively. Using a simple weighting calculation<sup>13</sup>, changes in the strength of relationship represent the evolving strength of a specific partnership. The descriptive statistics show that the change of cooperative strength between partners is close to a normal distribution.

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<sup>13</sup> Change of Cooperative Strength =  $0*(v221 - v151) + 1*(v222 - v152) + 2*(v224 - v154) + 3*(v226 - v156)$

Fig. 12: Sample firms' change of cooperative strength after projects



Comparing the relationship changes of the sample firms, as many as 67.4% of the sample firms had strengthened their cooperation with their OEM partners after the contract manufacturing projects, while only 7.5% of them weakened. This finding confirms the assumption that contract manufacturing projects are effective in cementing or even enhancing inter-partner cooperation, especially in terms of buyer-supplier transactional relationships.

***The characteristics of the recipients (indigenous suppliers)***

**Annual sales in 1993 (Sales93)**

Within the 113 sample firms, 81 (71%) had 1993 sales revenue below US\$100 million. In fact, only one firm had reached US\$1 billion and three firms had sales of over US\$500 million. The results show that almost all sample firms are relatively small in terms of sales revenue, particularly compared with MNCs.

**Intent (v91 - v98, v10a, v10b, v10c)**

Among the eight suggested reasons for suppliers' cooperation with foreign partners, the percentages for each reason chosen by respondents can be summarized:

<b>Priority</b>	<b>Supplier's Intent</b>	<b>Percentage</b>
1	To increase sales	82.9
2	To be approved by international firms	67.4
3	To enhance process capabilities or quality standards	57.2
4	To fully utilize existing capacity and to reduce unit production cost	52.4
5	To utilize partner's brandnames or channels to expand markets	46.5
6	To learn or absorb partner's product R&D capabilities	28.9
7	To reduce R&D or marketing costs	18.2
8	To learn partner's international sales and marketing experience	16.0

Among these cooperative motives, sales increase (v92) and MNCs approval (v98) are operational goals, although the latter may have longer-term impact on the supplier's business. Motives No. 3, 6, and 8 (representing process learning, R&D

learning, and marketing learning, respectively) can be regarded as learning-related goals because these motives suggest an intent to gain some capabilities through cooperation. As many as 57.2% of the respondents have chosen process learning (v97) as a major motive for cross-border contract manufacturing alliance, and 28.9% of them have identified R&D learning (v94) as a major motive; but only 16% have chosen marketing learning (v93). At first sight, indigenous firms seem to be mostly concerned about their sales, and their non-learning goals (i.e., to use the partner's capabilities instead of internalizing them) seem to dominate.

In fact, the results reveal a rather strong learning intent, judging from the reality that learning capabilities from partners should not be explicit motives in contract manufacturing alliances at all. Although specific functional learning (with the exception of process learning) does not seem to be a popular and explicit intent in their cross-border contract manufacturing alliances, indigenous suppliers reveal their learning aptitude implicitly through the demonstration of their humility in terms of their own capability and the admiration of their partners' capabilities. Significant capability gaps between their firms and foreign partners were perceived by 73% of the respondents (v10a); 69% believed absorbing partner's superior capabilities crucial to the future competitiveness of their firms (v10b); and 57% believed the relationship with foreign partners was only short-term, thus controlling key capabilities is necessary (v10c). These summaries generally support the assumption that indigenous firms are prone to adopt an learning intent in their cross-border alliances.

### Receptivity (v13, v14, v17)

Of the sample firms, 50.8% had fewer than 10 cross-border contract manufacturing projects prior to the projects surveyed. However, there were still 23.5% of them with over 50 cross-border contract manufacturing experiences. The results show that although most of the sample firms were relatively inexperienced in cross-border contract manufacturing business, there were still quite a few very experienced EMS firms in Taiwan.

Without specifying partner's national origins, overall 54% of the respondents indicated that their employees were familiar with the partner's language and business practices before the projects (v14). As for the designated OEM task forces, 71.7% of the sample firms had some kind of dedicated team to handle cross-border contract manufacturing business (v17). The result shows the prevalence and importance of contract manufacturing business to Taiwanese IT manufacturers. Among these firms, 82.8% had sales or managerial staff as the project leaders (account officers), compared with 47.8% using R&D engineers, and only 12.7% using process engineers. The popular combinations in a supplier's project task force are: 1) pure marketing staff (50%), 2) a dual leadership shared between marketing and R&D staff (23.13%), and 3) pure R&D staff (14.18%). The dominance of marketing staff as the key coordinators is obvious, although they are often complemented by R&D staff. The finding is consistent with the impression (from interviews) that sales staff are most likely to have an overall understanding of a contract manufacturing project, because they are the inter-firm sales personnel

conducting industrial marketing. Therefore, the choice of focusing on sales/marketing staff as the respondents is supported and justified by this finding.

***The characteristics of the partners (foreign OEM clients)***

**Country of Origin (Partner)**

Among all the foreign partners, 42.8% were U.S. based firms, 27.3% were European firms, and 25.1% were Japanese firms. This result is generally in line with the export market distribution of Taiwanese electronic and IT products. Therefore, there is no indication that respondents' selection of the project was biased.

**Partner's Competitive Status (v4)**

From the respondents' perception, 72.7% of the partners are large multinationals, and as many as 36.9% are in the top ten companies in the global IT industry, in terms of market share in the contracted manufactured products.

**Partner's Intent (v111 - v118, v12a, v12b)**

Among the eight suggested reasons (v111 - v118) for the partner's using overseas contractors, the priority and percentage of each reason are summarized below.

<b>Priority</b>	<b>Partner's Intent</b>	<b>Percentage</b>
1	To reduce cost	84.5
2	To utilize suppliers' capacity	61.0
3	To utilize suppliers' product R&D speed or production flexibility	47.6
4	To maintain or increase sales or market share	42.8
5	To develop suppliers into a part of its global operational network	18.2
6	To learn or absorb the process capabilities of the suppliers	14.4
7	To penetrate local markets through cooperation with local suppliers	11.8
8	To absorb the overall operational capability of overseas suppliers	6.40

Since the top four reasons are all operational goals aiming to get access to suppliers' capabilities for OEM buyers' operational benefits, the result shows that respondents perceived their foreign partners' predominant concern as being to utilize suppliers' strength for operational purposes, while strategic goals reflecting the partner's learning intent (measured by reasons No. 5, 6, 7, and 8) are almost nonexistent. The stark contrast between the operational goals and the strategic goals reveals that Taiwanese IT firms perceived their OEM buyers as partners of very limited learning intent - foreign partners did not even intend to develop or absorb indigenous suppliers into their global operational network when the project started.

However, as many as 50% of the respondents felt that their firms had been treated as members of the partner's global operational network (v12a); and only 19.9% thought the partners took a short-term view and had no intention to develop a long-term relationship with suppliers (v12b). These findings show a tight integration between Taiwanese IT suppliers and their foreign buyers in practice, and such a high degree of integration seems to contradict the previous perception of foreign partners' cooperative motives as purely operational, thus implying a short-term

approach. Possible explanations of this contradiction may lie in the high switching costs of changing partners in a vertical alliance, since both parties have invested in transaction-specific assets. The explanations may also lie in the disparity between intention and behavior: Although foreign buyers do not intend to develop long-term and strategic relationships at first, they have to maintain intimate relationships with offshore suppliers in order to reap the full benefits from the alliances

Generally speaking, Taiwanese suppliers and their foreign OEM clients still regard each other as players in different markets (or in different competition levels), and the complementarity between them overrides the potential for future competition. In reality, foreign OEM clients are much more concerned about the current challenges posed by other international competitors than about the potential competition from Taiwanese suppliers. Therefore, although MNCs naturally have reservations about treating suppliers as intimate partners, they are usually forced into such relationships by competition. In addition, although OEM clients may not have strong intentions to absorb indigenous suppliers as parts of their global operational networks at the beginning, they tend to develop closer and longer-term relationships with the suppliers as the cooperation evolves. In fact, only 7% of the sample firms do not have any form of further cooperation after the projects (v221), while a significant number of sample firms have developed frequent transaction relationships (44.9%), or even relationships similar to a central-satellite linkage (39.6%) after the projects.

### Partner's Transparency (v12c, v18d - v18g, v16)

Counterintuitively, only 13% of the respondents felt that the partners had been sensitive and careful to protect their own technology in dealing with suppliers (v12c), treating their firms as potential competitors. Furthermore, the openness of the partner's staff in different areas can be explored as follows (v18d - v18f).

- 90.3% agreed that the partner's technical staff were willing to discuss and solve technical problems with suppliers' engineers.
- 88.2% agreed that the partner's technical staff were willing to provide requested product specification or product technology data/documentation.
- 83.3% agreed that the partner's technical staff were willing to provide requested QC or process technology data/documentation.

Such a high degree of technical transparency is exceptional in inter-firm alliances. One of the reasons for the high percentage of perceived technical openness may be the nature of contract manufacturing business, in which 93% of the respondents believed that the projects required constant communication and coordination between partners (v18a). However, foreign partners seemed to be more protective about their customer or market information in contract manufacturing alliances. Only 61% of the respondents perceived OEM clients' willingness to share market information with them (v18g).

As for the partner's communication window, 40.1% reported partners' marketing and R&D staff as the interface, 21.9% chose only marketing staff, and 15% reported that both R&D and process engineers were the interfaces. Overall, the percentages of partners' personnel as interfaces by function, were 69% R&D staff, 32.1% process staff, and 73.8% marketing or management staff. The high level of partners' R&D staff as an organizational interface is counterintuitive and may also contribute to partners' technical transparency.

All the results seem to suggest strongly that the foreign partners had been quite transparent to their Taiwanese contract manufacturing suppliers, especially in technical areas.

### *The characteristics of the project*

#### Transaction Value (v31)

The total transaction value of each project varied greatly, ranging from NT\$1.2 million to NT\$5 billion. The average value was about NT\$546 million (about US\$20 million). However, the average value was somewhat overestimated by some very long-term or very large deals. When the effect of project duration was excluded, the averaged monthly transaction value was NT\$32 million. When the extremely large deals (monthly value over US\$5 million) were removed, the averaged monthly transaction value became NT\$23 million, and the median was only NT\$10 million. Apparently, most of the projects were relatively small, with

averaged monthly transaction value below US\$400,000, but there were still some very large deals (eight projects had monthly value exceeding US\$5 million).

#### Duration (v32)

The averaged project duration in this research was 18.5 months. Again, the distribution is one with a long right tail. Most of the deals had a duration of 12 months (the median and mode were both 12 months), but there were still 15.8% of the projects last longer than three years.

#### Product (v1, v2b)

Among the 187 projects, 49.7% of the main contract manufactured products were computer and communication systems or peripherals such as PCs, mother boards, monitors, faxes, modems, mouses, scanners, and key-boards - evidence of the vitality and global linkages of Taiwanese IT firms in this particular sector. To a lesser degree, 30.5% of the products were parts and components in the C&C-related (Computer and Communication) field, such as add-on cards, PC boards, connectors, cables, cases, power supplies, and so on. Most products classified as "Others" were traditional electronic products, which account for 12.3% of the sample, and IC-related products accounting for only 7.5%.

As for the market situation of the contract manufactured products, 56.7% were perceived as products in mature markets, while 43.3% were in growing markets.

This finding generally supports the traditional wisdom that most of the outsourced products are in the mature stage, where price is the main concern.

#### Technology (v2a, v8A, v8B, v8C)

With regard to product technology, 53.5% of the contracted manufactured products were regarded as standard, and 46.5% were products with proprietary designs. The implication may be that most of the projects do not require foreign partners to provide unique product R&D technology. This assumption is confirmed further by the finding that 78.9% of the sample firms reported that they had contributed substantially to the product R&D tasks of the projects (v18c) - evidence to show that many of the projects were close to being ODM projects.

As for the respondents' perception of partners' contributed capabilities to the value of end products (v8Aa, v8Ba, v8Ca), 62.9% of the respondents perceived that the partners' R&D capabilities made disproportionate contributions to the final value of the end product, 54.1% perceived such contributions in partners' process capabilities, and 84.9% in partners' marketing capabilities. Not surprisingly, the partners' major contribution to the projects is their marketing capability. However, most respondents still believed that foreign partners also made disproportionate contributions to contract manufacturing projects, in R&D as well as in the process area.

With regard to the reusability of these partners' contributed capabilities to the suppliers' future product-markets (v8Ab, v8Bb, v8Cb), as many as 77.3% of the respondents believed that the partners' marketing capability, if learned, can be used to market future products, compared with a 54% approval rate for the reusability of partners' R&D capability, and 55.1% for partners' process capability. Once again, marketing capability is the most reusable capability in the respondents' perception. This result may also at least partially explain why the industrial experts of the AHP panels have rated value-delivery skill (mainly marketing capability) the most important area (weight: 0.444) among the three major skill areas (see Fig. 7). Such a perception may also be the result of Taiwanese IT suppliers' relative deficiency in international marketing.

Finally, about the stickiness of partner's contributed capability (v8Ac, v8Bc, v8Cc), 42.6% of the respondents conceded that their partners' marketing capability is difficult to learn. By comparison, only 30.6% experienced such learning difficulty in partners' R&D capability, and 25.9% in partner's process capability. Again, marketing capability is considered to be the most "sticky" capability among the three.

From the above results, it is fair to conclude that marketing capability is the deepest (the most valuable, reusable, and immobile) "core capability" among all major skill areas in the perception of local OEM project managers. This may provide some explanation for the slow progress in Taiwanese IT firms' marketing capability. Because of the different natures of these three functional capabilities, although

Taiwanese IT firms have enhanced their R&D and process capabilities greatly during the past decades, they haven't enhanced their marketing capability proportionally.

Further analysis on the perceived barriers to capability transfer in different business functions (v8Ac1-5, v8Bc1-5, v8Cc1-5) can be summarized in Table 3:

Table 3: Respondents' perceived barriers to capability transfer

	Barrier to R&D Skill Learning	Barrier to Process Skill Learning	Barrier to Marketing Skill Learning
Tacitness	<b>49</b>	<b>48</b>	<b>38</b>
Complexity	<b>52</b>	<b>43</b>	<b>37</b>
Specificity	29	28	<b>61</b>
Legal Protection	<b>45</b>	29	<b>70*</b>
Partner's Secrecy	19	15	19

Numbers denote No. of respondents choosing the corresponding answers; strong responses in bold.

\* Trade marks, brandnames, and other legal protection.

The respondents seem to perceive complexity and tacitness as the main barriers to R&D skill learning, while legal protection such as product technology patenting is also effective. By the same token, the embedded know-how of operational details (tacitness), in conjunction with the related technology or skills required (complexity), tend to be the major barriers to process skill learning. As for the barriers to marketing skill learning, the respondents believe that brandname is the major barrier (classified as a legal protection), and specific marketing environment (environmental specificity of different markets) also poses an effective barrier.

Although based on the subjective experience of a group of Taiwanese IT managers, the above results are helpful in tracing the root of capability stickiness. These findings, however preliminary, can still shed some light on the issues of why some skills are more difficult to transfer, and the implications are important to both the transferors and the transferees. According to the results, the barriers to transfer of technological capabilities, such as R&D and process, are predominantly the complexity of related technology and the tacitness of capability. The barrier of complexity seems to slightly outweigh the barrier of tacitness in R&D capability transfer, while tacitness seems to play a more important role in process capability transfer. However, environmental specificity emerges as a more influential barrier than either tacitness or complexity to marketing skill learning; and brandname seems to be the prerequisite of effective marketing capability in the perception of the respondents.

Another interesting finding is that a relatively low percentage of respondents have chosen partner's secrecy (protectiveness) as one of the major barriers to skill learning (10.2% in R&D, 8.1% in Process, and 10.2% in Marketing). The explanation seems to be that either skills couldn't be effectively protected, or partners didn't bother to guard against skills "leaking" to suppliers, or both. Empirical evidence seems to support the argument that knowledge or capability are difficult for the owners to retain exclusively once cooperation such as contract manufacturing exists.

### **Task (18a, 18b, 18c)**

As many as 93% of the respondents thought their projects required both sides to communicate and coordinate constantly. In other words, very high percentage of contract manufacturing projects demonstrate high task interdependency. In 62.9% of the projects, only minor completion by the partners was required before selling the finished products to the market (close to being so-called “re-labeling projects”); and 78.9% of the projects had a substantial R&D contribution from the indigenous suppliers (close to being ODM projects).

### **Previous Relationships (v151 - v158, v6, v7)**

The relationships between suppliers and their foreign partners before the projects can be summarized:

- No previous contact (44.9%)
- Occasional trading or contract manufacturing (26.2%)
- Brandname, technology, or patent licensing (3.7%)
- Frequent transactions or agency relationship (15.5%)
- Personal or social ties between managements or shareholders (16.6%)
- Long-term cooperation or central-satellite relationships (12.3%)
- Joint ventures in other business (0.5%)
- Minority equity investment (unilateral or cross-investment) (4.3%).

The results show that most of the sample firms didn't have close relationships with foreign partners before the projects. This is also reflected in the result (v7) that 95.7% of the indigenous suppliers had to compete to secure the contract manufacturing deals. As for the initiator (v6), 46.8% of the collaborations had

been initiated by the foreign buyers, 38.7% by indigenous suppliers, and 14.5% by third parties. The result seems to show that more indigenous suppliers had been "pulled" into contract manufacturing business than had "pushed" hard to get OEM/ODM business overseas. In other words, although the importance of contract manufacturing business was recognized (v191), many Taiwanese IT firms had not taken the initiative to develop overseas contract manufacturing business.

#### Inter-firm Diversity (v5a, v5b, v5c, v5d)

In respect of strategic compatibility between partners, only 19.4% of the respondents perceived foreign partners as direct competitors (v5a), and 85.6% thought the partners' strength was complementary to theirs (v5b). The findings seem to imply that a high degree of strategic compatibility between partners is almost a prerequisite for cross-border contract manufacturing alliances.

As for inter-organizational diversity, the results show that there were still significant differences between cross-border partners. In 55.1% of the respondents it was perceived that organizational culture or corporate value systems between partners were similar (v5c), while 43.9% perceived a similarity in management style or organizational structure (v5d).

### ***The characteristics of inter-partner relationships***

#### **Trust (v20a, v20b, v20c, v20d)**

The respondents predominantly (93%) agreed that the foreign partners had the capability to carry out their tasks faithfully and effectively (v20a). Although partner's trustworthiness (v20b) is somewhat lower than partner's credibility in respondents' perception, scoring an 87.7% approval rate, it is still high enough to conclude that the respondents had high levels of trust in their partners' credibility and trustworthiness.

As for the partner's trust of the supplier, 96.8% of the respondents thought their partners had trust in their firms' capability (v20c), and as many as 97.8% believed their partners thought their firm trustworthy (v20d).

#### **Commitment (v20e, v20f, v20g, v20h)**

It was agreed by 87.6% of the respondents that foreign partners intended to develop continuing relationships (v20e), but as many as 52.2% believed that the partners would have switched to another supplier if other suppliers had offered a better deal (v20f). These seemingly conflicting results reveal the reality of cross-border contract manufacturing alliances. Although most suppliers believed that foreign partners intend continuing cooperation, they also recognized a rather opportunistic approach taken by their foreign partners. If the suppliers fail to offer the best deals

in the market, 52.2% of the respondents believed they will lose their clients to other competitors. As for the supplier's commitment to their partners, 98.4% of the respondents believed that their firms had tried to develop continuing relationships with their foreign partners (20g), and only 21% thought their firms would have switched to another buyer if better deals have been offered (v20h).

**Interaction** (v20i, v20j, v20k, v20l, v21e, v21f, v21g, v21h)

It was concluded by 76.8% of the respondents that their R&D staff had the opportunity to exchange information or ideas with their counterparts from the foreign partners, while the percentages of perceived interaction were 62.4% for process, 69.4% for sales/marketing, and 85.5% at the management level, respectively. Generally speaking, the results support the assumption that contract manufacturing projects are good opportunities for indigenous staff to exchange information and ideas with their foreign counterparts, and the interaction is quite comprehensive, covering a wide array of different operational functions. The above assumption is also supported by the findings in inter-partner personnel exchanges:

Respondents (%)	Never	Rare	Sometimes	Common	Very Common	Frequent	Very Frequent
Partner's technical staff visiting supplier	9.6	9.1	30.5	18.7	10.2	13.9	8.0
Partner's non-technical staff visiting supplier	7.0	12.4	28.0	26.3	9.1	8.6	8.6
Supplier's technical staff visiting partner	10.2	12.4	28.5	22.0	11.8	9.7	5.4
Supplier's non-technical staff visiting partner	10.8	11.3	29.0	21.5	9.1	12.9	5.4

In spite of the costs of cross-border personnel exchanges, it is not unusual for both sides to exchange personnel throughout the process of contract manufacturing alliances.

**Communication** (v20m, v20n, v20o, v21a, v21b, v21c)

Communication with foreign partners was regarded as timely by 87.1% of the respondents, while 81.3% believed the communication was accurate, and 87.2% thought it was adequate. The results depict high quality communication between partners in contract manufacturing alliances.

As for the communication media and their frequencies of utilization (v21a - v21c), the statistical results are:

Respondents (%)	Never	Rare	Sometimes	Common	Very Common	Frequent	Very Frequent
Communication by letter or document	1.6	17.8	15.7	7.0	9.2	20.5	<b>28.1</b>
Communication by telephone or fax	0	0	1.6	7.5	11.2	27.3	<b>52.4</b>
Communication by formal meetings	1.1	4.8	<b>25.7</b>	18.7	18.2	21.4	10.2

Apparently, the most common communication was through informal media such as telephone and fax. Formal communication media such as letters or meetings appear to be less frequent. Anyway, the results do show intimate communication between partners throughout the process.

### Dependence (v191, v192)

The relative importance of each firm in the eyes of its partner reveals the mutual dependency in a partnership. Foreign partners were perceived to be mostly or absolutely important to their firms by 86.6% of the respondents. The perceived importance of their firms, in the foreign partners' views, was comparatively lower (74.3% mostly or absolutely important). A pairwise comparison reveals an asymmetric bargaining position between indigenous suppliers and their foreign partners. While 32.6% of the respondents perceived that their firm's importance (in the partner's view) was lower than the partners' importance (in the supplier's view), only 5.3% perceived their firm's bargaining power as stronger than the partner's.

### Congruence (v20p, v20q)

On the organizational level, 89.3% of the respondents reported harmonious cooperative atmosphere between firms. The percentage was as high as 93% for the confirmation of harmonious personal relationships throughout the projects. All in all, both organizational and personal congruence are confirmed by the respondents.

### Mutual Adjustment (v20r, v20s)

Only 17.2% of the respondents conceded that conflicts or disagreements were common between partners. Even when conflicts did arise, as many as 81.5% of the respondents experienced joint resolutions with the partners, rather than one party

dominating the process. The results portrait a high degree of mutual adjustment between OEM buyers and suppliers.

### **4.3 Factor Analysis**

In order to enhance internal validity, more than one question has been asked to measure similar variables or constructs. From the preceding descriptive analyses, it is also clear that variables in each of the four variable-groups (Recipient Characteristics, Partner Characteristics, Project Characteristics, and Relationship Characteristics) may be correlated. Therefore, the first step in statistical analysis is to condense the measured variables so that the underlying factors can be extracted for further analysis. Factor analysis has been used to this end.

#### **4.3.1 Factors of Recipient Characteristics**

The data on six recipient variables (Sales93, v10a, v10b, v10c, v13, v14) were first tested to ensure their adequacy for the application of factor analysis. The value of the Bartlett's Test of Sphericity is 111.55, very significant (significance level: 0.00001) to prove that the data are correlated and suitable for factor analysis. Using principal components extraction method, three factors with eigenvalues greater than 1 were first extracted from these six variables. Altogether, these three factors explain 67.4% of total variance. According to Timm (1975, pp. 534-536), it would be a very satisfactory result if more than 70% of total variance could be explained by five or six factors. Therefore, the result of this factor analysis should be considered acceptable.

According to the criteria of simple structure, and in order to get explicable factors, the varimax rotation (an orthogonal rotation) method was applied to rotate the data and to find a set of more meaningful and more interpretable underlying factors. The rotated factor matrix can be seen in Table 4:

Table 4: Rotated factor matrix of recipient characteristics

	Factor 1	Factor 2	Factor 3
v10b: supplier's perceived benefit of learning	.8894		
v10a: supplier's perceived capability gap	.8847		
v10c: need to control key capabilities		-.7203	
Sales93: supplier's sales revenue in 1993		.7101	
v14: supplier's language and practices familiarity			.8664
v13: supplier's past OEM experience		.4801	.5850

According to the factor loading of each variable, factors 1-3 can be labeled:

Recip1: Supplier's Learning Intent

Recip2: EMS Supplier<sup>14</sup>

Recip3: Supplier's Receptivity.

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<sup>14</sup>Suppliers that do not perceive the importance of controlling critical competence, that have relatively high sales revenue, and that have more experience in contract manufacturing business are more likely to be electronic manufacturing service (EMS) suppliers for MNCs. Recip2's correlations with v12a: Partner's network approach ( $r = .20$ ,  $p = .006$ ); with v12b: Partner's short-term attitude ( $r = -.38$ ,  $p = .000$ ); and with v12c: Partner's guardedness ( $r = -.14$ ,  $p = .047$ ) further confirm this label.

### 4.3.2 Factors of Partner Characteristics

Using the same factor analysis procedure, eight partner variables can be reduced to three factors. The value of the Bartlett's Test of Sphericity is 327.72, significant at 0.00001 which also indicates adequacy of applying factor analysis. Altogether the three extracted factors explain 64.5% of the variance.

Table 5: Rotated factor matrix of partner characteristics

	Factor 1	Factor 2	Factor 3
v18e: partner's R&D document provision	.8580		
v18d: partner's technical staff openness	.8222		
v18f: partner's process document provision	.8160		
v12b: partner's short-term attitude towards project		.8064	
v12c: partner's guardedness against supplier		.6988	
v18g: partner's concealment of market information	-.3968	.5441	
v12a: partner's network approach	.2583	-.5431	.3210
v4: partner's competitive status			.9549

According to the factor loadings, factors 1-3 can be labeled:

Partner1: Partner's Transparency

Partner2: Partner's Protectiveness

Partner3: Partner's Competitive Status.

### 4.3.3 Factors of Project Characteristics

From 14 project-related variable six factors have been extracted. The value of the Bartlett's Test of Sphericity is 453.44, significant at 0.00001 and indicates adequacy for applying factor analysis. Altogether the six extracted factors explain 65.9% of the variance and the rotated factor matrix can be seen in Table 6:

**Table 6: Rotated factor matrix of project characteristics**

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
v5c: inter-firm culture similarity	.9104					
v5d: inter-firm management similarity	.8369					
v5b: inter-firm skill complement	.5734		.2045		-.4721	
v8Ba: partner's process contribution		.8772				
v8Aa: partner's R&D contribution		.8698				
v18a: project's task interdependence			.6968			
v18c: supplier's contribution to R&D task			.6827			
v18b: degree of product completion	.2367		.5637	-.4611		
v8Ca: partner's marketing contribution	.2122	.2590	.3783		-.2707	-.2133
v31: transaction value			.2170	.7957		
v32: project duration				.7322		
v5a: inter-firm direct competition					.7963	
v151-158 (previous cooperation) <sup>15</sup>	.3146		-.3125		.4136	-.3315
v7: No. of alternative suppliers						.9136

According to the factor loadings, factors 1-6 can be labeled:

**Project1: Inter-Partner Similarity**

**Project2: Partner's Technical Contribution**

**Project3: Symbiotic Partnership<sup>16</sup>**

**Project4: Project Scale**

**Project5: Collaborative Competition<sup>17</sup>**

**Project6: Businesslike Supplier Selection**

<sup>15</sup>Previous cooperation = 0\*v151 + 1\*v152 + 2\*v153 + 3\*v154 + 4\*v155 + 5\*v156 + 6\*v157 + 7\*v158

<sup>16</sup>A close and complementary partnership requiring significant inter-firm interaction, exhibiting a high level of supplier's R&D involvement and manufacturing to product completion, while the buyer concentrates on marketing task, is labeled a "symbiotic partnership".

<sup>17</sup>A partnership with previous cooperation but a high degree of direct inter-firm competition and a low degree of skill complementarity indicates a state of collaborative competition.

### 4.3.4 Factors of Relationship Characteristics

Similarly, rotated factor analysis was used to factorize 21 relationship variables, to extract six factors.

Table 7: Rotated factor matrix of relationship characteristics

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
v20o: adequate communication	.9027					
v20n: accurate communication	.8699					
v20m: timely communication	.6990	.2418				.2259
v20p: organizational congruence	.6941	.4556	.2163			
v20q: personal congruence	.6716	.4663				
v20r: inter-firm conflict	-.5887				.4491	
v20d: supplier's trustworthiness	.2182	.7912				
v20b: partner's trustworthiness		.7666				.2381
v20c: supplier's credibility		.7354	.2869			-.2143
v20a: partner's credibility	.2176	.6241				.3016
v20e: partner's effort for relationship	.2525	.5768	.3431	.2184		.2068
v191: partner's importance to supplier		.2110	.8024			
v20g: supplier's effort for relationship	.3245	.2821	.6641			
v192: supplier's importance to partner		.3300	.6152	.2674		
v20l: management interaction			.5632	.2082		.4814
v20j: process interaction				.7812		
v20i: R&D interaction			.3130	.7434		
v20s: joint conflict resolution	.2310	.3013		.6432		-.2030
v20h: supplier's opportunism					.8022	
v20f: partner's opportunism		-.2396			.7754	
v20k: marketing interaction						.7782

According to the factor loadings, factors 1-6 can be labeled:

Rela1: Harmonious Communication

Rela2: Mutual Trust

Rela3: Mutual Dependency

Rela4: Technical Interaction

Rela5: Opportunism

Rela6: Marketing Interaction.

The value of the Bartlett's Test of Sphericity is 1846.44, very significant (at 0.00001) for proving that data are correlated and suitable for factor analysis.

Altogether the six factors explain 68.3% of total variance.

The purpose of factor analysis in this research is to reduce the number of variables in the proposed model. Using the regression method, the scores of all the above factors were assigned to the sample firms (187 cases) for subsequent analysis.

#### **4.4 Chapter Conclusion**

In this chapter, the research design of this study has been elucidated, and the justifications for adopting different research approaches have also been explained. Because research into inter-partner learning is in transition from an emerging stage to its developing stage, a study aiming at both theory extension and theory testing is appropriate.

Although both qualitative and quantitative methods are employed, the emphasis of this research is on the large-sample questionnaire survey - a factors approach. The interviews and case studies are only used as complementary research tools to deepen our understanding of the subtlety of inter-partner learning. The processes and descriptive results of both the AHP and survey questionnaires have been detailed and documented in section 4.2. Although generalized conclusions are difficult to extract directly from the results of this fact-finding, these results are nevertheless useful in providing an overall picture of what the data say, and setting the foundation for the subsequent analyses.

Among other findings, the suppliers' significant capability enhancement through contract manufacturing projects, across a variety of firm-specific capabilities, is one of the most important findings in this chapter. The results sufficiently reflect the contribution and importance of cross-border contract manufacturing business to Taiwanese IT suppliers. Manufacturing alliances with foreign buyers have significantly facilitated the capability enhancement of the indigenous suppliers in this study.

The results also demonstrate a subtle relationship between suppliers and buyers in which the buyers usually are very transparent to their suppliers, in spite of the existence of buyers' opportunism. In other words, a contract manufacturing alliance is generally depicted as a businesslike relationship with a high degree of transparency by the respondents. The reasons for this high degree of buyers' transparency deserve further investigation.

Another notable finding is the result of perceived barriers to different functional learning. Marketing capability is the most valuable, applicable, and immobile capability among the three functional capabilities. While complexity and tacitness are perceived as the major barriers to effective R&D learning and process learning, environmental specificity is regarded as the major barrier to marketing learning by the respondents. Such a finding may have important implications for both suppliers and buyers when each is designing their respective strategy for extracting competencies from within the partnership.

Finally, the concise factor analyses in section 4.3 set the foundation for subsequent analyses. The relative ease of attaching meaningful labels to the extracted factors also reflects the appropriateness of the factor analyses.

## **Chapter V: CORRELATION ANALYSIS AMONG VARIABLES**

The chapter is dedicated to testing the following propositions concerning the determinants of alliance performance:

**P1: In an alliance, capability enhancement (learning outcome) is positively correlated with satisfaction, sales growth, and change of cooperative strength.**

**P2: Recipient characteristics have significant impact on capability enhancement and other alliance performance indicators.**

**P3: Partner characteristics have significant impact on capability enhancement and other alliance performance indicators.**

**P4: Project characteristics have significant impact on capability enhancement and other alliance performance indicators.**

**P5: Relationship characteristics have significant impact on capability enhancement and other alliance performance indicators.**

In this study, four aspects of alliance performance are measured: Learning (Capability Enhancement), Satisfaction, Sales Growth, and Change of Cooperative Strength. Values for these four dependent variables are obtained in the following way:

### *Learning*

Nine areas (indicators) of firm-specific capabilities, which contribute to a firm's overall competence, have been identified from existing managerial literature (see section 3.2.1) and confirmed by the AHP panels of industrial experts (see section 4.2.1). In the survey, the respondents were asked to evaluate the extent of their firms' capability enhancement (1-7 scale) resulting from the projects, in the nine capability indicators. The scores collected from the questionnaires were then weighted by the relative importance (priorities) of each indicator calculated through the AHP procedure. In other words, a supplier's "learning" through an alliance is measured by a composite score of its capability enhancement (through a specific project) in different levels of business activities, weighted by their relative importance to the supplier's overall competence.

### *Satisfaction*

The respondents were asked to score their firm's overall satisfaction with the project from 1 to 100. Note that in Taiwan's educational system, a score of 60 is the lowest hurdle to pass a subject and a score of 80 or above usually indicates relative satisfaction.

### *Sales Growth*

The respondents were asked to scale their firm's sales revenue growth after the projects, on a six-scale measure. Although the score is not the specific sales growth rate, it does reflect the relative speed of a supplier's business expansion after the project.

### *Change of cooperative strength*

This variable gauges the extent of change of cooperative strength between a supplier and its specific foreign partner. A firm's cooperative relationship with its partner after the project was compared with their cooperation before the project. To measure objectively such a relationship change, four levels of transactional relationship ("no contact", "occasional trading", "frequent transaction", and "long-term transactional partnership") are compared before and after the contract manufacturing project. In order to account for the relative strength of different relationships, weights from 0 to 3 were assigned to these four levels of transactional relationships. In other words, the changes of inter-partner relationships were weighted (by their frequency of inter-firm transaction) to represent the change of cooperative strength through projects.

The correlation results in this chapter are obtained by means of two-tailed bivariate correlation analyses. Because all the dependent variables and most of the independent variables are interval scales and demonstrate a pattern close to normal

distributions, Pearson correlations are used to calculate the correlation coefficients (  $r$  ).

### 5.1 Relationships Among Different Performance Indicators

First of all, Learning is correlated with the other three performance indicators (Satisfaction, Sales Growth, and Change of Cooperative Strength). The correlation coefficient matrix of different performance indicators is presented below.

<b>r (p)</b>	<b>Satisfaction</b>	<b>Sales Growth</b>	<b>Change of co. strength</b>
<b>Learning</b>	.2886 (.000)	.2164 (.003)	.1239 (.091)
<b>Satisfaction</b>		.3288 (.000)	.0935 (.206)
<b>Sales Growth</b>			.0905 (.221)

The correlation results, based on suppliers' perception indicate that:

- (1) learning and satisfaction are positively correlated.
- (2) learning and sales growth are positively correlated.
- (3) learning and change of cooperative strength are also positively correlated,  
although such a correlation is significant at a  $p < .10$  level.

The findings strongly support hypothesis H1-1 that learning is positively correlated with other alliance performance indicators, in the perception of Taiwanese IT managers.

*H1-1: For contract manufacturing suppliers, learning is positively correlated with satisfaction, sales growth, and change of cooperative strength.*

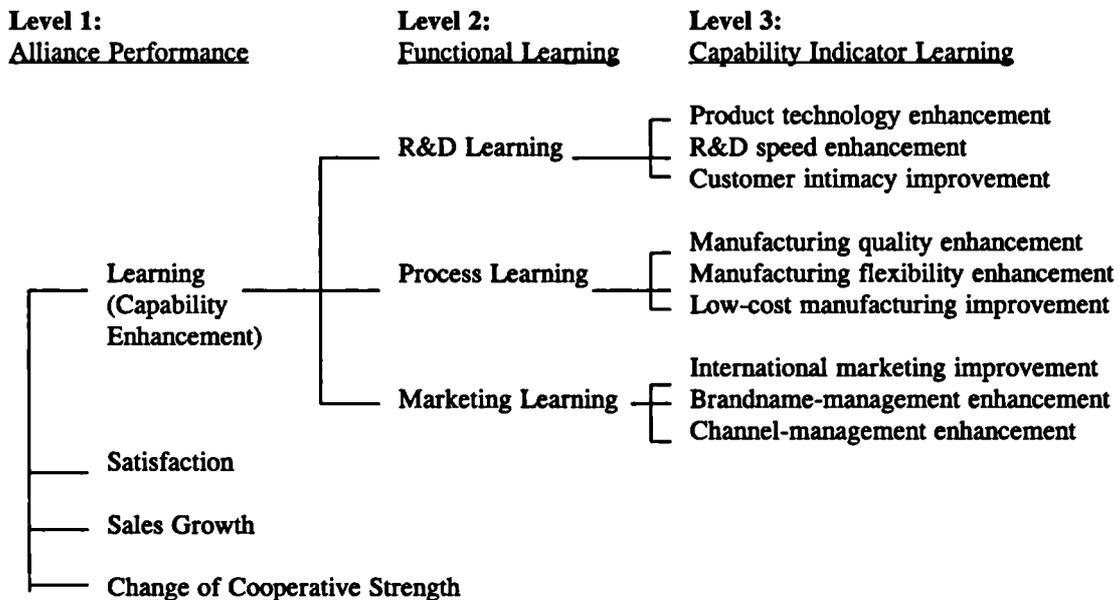
Correlation results suggest that learning (capability enhancement) is an important indicator for alliance performance in the respondents' perception. It is positively correlated with other alliance performance indicators. Although causal relationships between learning and other performance indicators cannot be established simply from correlation analysis, it is not farfetched to posit that the learning outcomes contribute to Taiwanese IT suppliers' sales growth, decide their project satisfaction, and affect their further cooperative strength with the partners. Such a result also provides further evidence that Taiwanese IT suppliers are learning-oriented in their cross-border contract manufacturing alliances with foreign partners.

In order to analyze the data from different angles, in the following sections (from 5.2 to 5.5) the independent variables are used on two different levels: the analyses on the level of the extracted factors (see section 4.3, factor analysis) and that of the original variables. The factor-level analyses reveal the correlations of dependent variables with the concise set of independent variables (factors), making the conclusions general and theoretically meaningful, while the latter show detailed

relationships between each dependent variable and each independent variable, containing specific findings and thus providing prescriptive directions.

In the factor-level analyses, different levels of dependent variables (alliance performance indicators) are correlated with the extracted factors respectively, in order to deepen our understandings. Such a hierarchical structure of alliance performance can be made clear in the following figure:

Fig. 13: Different levels of dependent variables



From section 5.2 to section 5.5, factor-level correlations on different levels of alliance performance indicators are presented, first on the level 1 of alliance performance, then on different levels of learning components. Detailed correlations between the alliance performance (level 1 indicators) and individual independent

variables are also presented to test the specific hypotheses, which have been proposed in sections 3.2.2 - 3.2.4.

## 5.2 Relationships Between Recipient Characteristics and Performance

### 5.2.1 Correlations between recipient factors and performance

#### *On Alliance Performance*

Recipient Factors	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
<i>Recip1: Learning Intent</i>	<b>.2360**</b>			<b>.2011**</b>
<i>Recip2: EMS Supplier</i>		<b>.1511*</b>	<b>.3272***</b>	
<i>Recip3: Supplier's Receptivity</i>	<b>.1574*</b>			

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

The general findings are:

1. A supplier's learning intent is positively correlated with its learning and change of cooperative strength with its OEM partner. The stronger a supplier's learning motivation, the higher is its capability enhancement. Stronger learning intent also motivates the supplier to strengthen relationship with the source of learning (the OEM client).

2. A supplier's position as an EMS firm is positively correlated with its overall satisfaction, and is strongly correlated with its sales growth. In other words, when a supplier adopts a submissive cooperation strategy with its MNC clients, or

positions itself as an EMS supplier in partners' global operational networks, it tends to enjoy higher levels of satisfaction as well as sales growth.

3. A supplier's receptivity is positively correlated with its learning. Suppliers with more contract manufacturing experience and with higher familiarity with partners' language and business practices tend to learn more from OEM projects.

*On Components of Learning*

Further investigation into suppliers' capability enhancement on different levels (i.e., the breakdown of the components of learning, see Fig. 13) is necessary to gain in-depth insights into the issue of learning. The learning outcomes of the three capability dimensions (functional learning) can be presented as follows:

Recipient Factors	Functional Learning		
	R&D learning	Process learning	Marketing learning
<i>Recip1: Learning Intent</i>	.2464**	.2875***	
<i>Recip2: EMS Supplier</i>			
<i>Recip3: Supplier's Receptivity</i>	.1855*		

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

Stronger learning intent is significantly correlated with higher levels of learning in both the areas of R&D and process, but not in marketing. Again, the result confirms the hypothesis that capability acquisition is more attainable in the areas of R&D and process but more difficult in the area of marketing for Taiwanese IT

firms. When indigenous suppliers undertake contract manufacturing alliances with strong learning intent, they tend to result in significant capability enhancement in R&D and process. However, the enhancement of a supplier's marketing capability is not significantly correlated with its learning intent.

Supplier's receptivity is only weakly correlated with a supplier's R&D learning. In the area of R&D, a certain level of familiarity with the partners and experience in similar tasks seem to contribute to effective learning.

The correlations of the lower-level capability indicators and recipient factors disclose further the learning effects in a contract manufacturing project.

Recipient Factors	R&D Learning		
	v261: Technology	v262: R&D speed	v263: Customer Intimacy
<i>Recip1: Learning Intent</i>	.3227***	.2412**	.1521*
<i>Recip2: EMS Supplier</i>			
<i>Recip3: Supplier's Receptivity</i>		.2159**	.1611*

*Correlation coefficients (r)* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Although a supplier's learning intent is positively correlated with all three capability indicators in the R&D area, the learning effect is most significant in the area of product R&D technology. Interestingly, a supplier's receptivity is not significantly correlated with its learning in product R&D technology. The implication seems to be that as long as Taiwanese IT firms have strong learning intent, they can improve on product technology through contract manufacturing alliances, regardless of their

receptivity. However, a higher level of familiarity with partners and/or similar OEM experience seem helpful to the improvement of a supplier's R&D speed and end-customer intimacy.

Recipient Factors	Process Learning		
	v264: Quality	v265: Flexibility	v266: Low Cost
<i>Recip1: Learning Intent</i>	.2896***	.2252**	.1648*
<i>Recip2: EMS Supplier</i>			
<i>Recip3: Supplier's Receptivity</i>			.1893*

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

A supplier's learning intent is positively correlated with all three capability indicators in the area of manufacturing, particularly in manufacturing quality. A supplier of strong learning intent tends to improve its manufacturing quality and flexibility significantly through contract manufacturing alliances. While a supplier's learning intent is also somewhat correlated with its low-cost manufacturing capability, its receptivity seems to be a stronger determinant of its low-cost manufacturing capability.

Recipient Factors	Marketing Learning		
	v267: Marketing Experience	v268: Brandname Mgt.	v269: Channel Mgt.
<i>Recip1: Learning Intent</i>		.1727*	
<i>Recip2: EMS Supplier</i>			
<i>Recip3: Supplier's Receptivity</i>			

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Overall, recipient factors are not significant determinants of a firm's marketing capability enhancement except that there is a weak correlation between supplier's learning intent and its brandname-management enhancement.

### **5.2.2 Correlations between recipient variables and performance**

Specific correlations between the original (unfactorized) variables and the four alliance performance indicators can help reveal the detailed relationships between individual independent variables and the first-level alliance performance. The results are helpful in examining the hypotheses proposed in section 3.2.

In the following section, correlations are calculated between the individual variables within the variable-group of Recipient Characteristics and each of the four alliance performance indicators. The results not only can show the association between the whole group of recipient characteristics and alliance performance, but also reveal the detailed relationships between each recipient variable and alliance performance. Thus these results provide specific insights into the issue of possible determinants of alliance performance.

Table 8: Correlations between recipient variables and alliance performance

Recipient Variables	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
<i>Supplier's Learning Intent</i>				
v91: cost reduction			.2102**	
v92: sales increase				
v93: marketing learning	.2301**			
v94: R&D learning				
v95: marketing exploitation				
v96: capacity utilization				
v97: process learning				
v98: MNCs approval			.1535*	
v10a: perceived capability gap	.1935**			
v10b: perceived benefit of learning	.1931**			.1830*
v10c: capability-control need		-.1473*	-.1765*	
<i>Supplier's Receptivity</i>				
v13: past OEM experience			.2228**	
v14: language/practices familiarity				-.1779*
v17: task force				
<i>Sales93: supplier's size</i>			.2654***	

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

According to the correlation results, the following conclusions can be drawn.

**The effects of Recipient's Learning Intent on Performance:**

*H2-1: Suppliers with stronger learning intent in cross-border manufacturing alliances tend to exhibit higher capability enhancement.*

(1) Suppliers with stronger marketing-learning intent exhibit a higher level of learning. As marketing learning from foreign partners is not a common goal in cross-border contract manufacturing alliances, only 30 respondents (about 16% of the sample) explicitly reported that marketing learning is a major cooperative goal

for the project. However, this group of firms does demonstrate a significantly higher degree of inter-partner learning, not only in marketing ( $r = .23$ ,  $p = .001$ ) but also in R&D ( $r = .16$ ,  $p = .026$ ) and process ( $r = .14$ ,  $p = .050$ ) capabilities.

Comparisons between suppliers with marketing-learning intent (v93) and those with R&D or process-learning intent (v94 or v97) reveal that the marketing-learning suppliers are smaller but more eager to control critical capabilities. Their partners are less globally competitive, and the project values (contract manufacturing deal size) are also smaller. Another stark contrast is in the perceived partners' capability contribution. The marketing-learning suppliers perceived higher partners' contribution in marketing, while the R&D or process-learning suppliers perceived significant partners' contribution in R&D or process capabilities.

Interpretations for the above statistical results are: Small but learning-motivated suppliers can significantly improve their overall competence by teaming up with second-tier OEM buyers who contribute a disproportionate value in marketing. Another possible explanation is that because these small and eager-to-learn suppliers usually have relatively lower asset/skill bases, their perceived capability enhancement through cross-border contract manufacturing tends to be higher.

(2) Suppliers perceiving greater capability gaps with partners (v10a) tend to exhibit higher learning. As with individual learning, humility is almost a prerequisite for organizational learning too.

(3) The significant correlation between a supplier's perceived benefit of learning (v10b) and its learning result also supports the assumption that the higher a supplier's perceived value of inter-partner learning, the better is its learning performance. In addition, if a supplier's perceived benefit of learning from the partner is high, the supplier tends to strengthen subsequent cooperation with the partner.

(4) Counterintuitively, a supplier's perceived need to control key capabilities (v10c) is not significantly correlated with its learning; but this controlling motive is negatively correlated with a firm's project satisfaction and sales growth. The explanation may be that suppliers eager to control or appropriate the partners' capabilities tend to have high expectations for the partnerships, thus ending up with lower satisfaction. On the other hand, their strong (maybe even explicit) learning intent may antagonize existing buyers, resulting in their losing business. As one R&D manager of a leading Taiwanese PC maker put it: *"Effective learning comes from unnoticed but continuing assimilation of partners' strength. But you must proceed with care for there is only a fine line between learning and stealing"*. Therefore, explicit learning intent beyond the defined boundary of contract manufacturing alliances may be perceived negatively by the buyers. Given the negative correlation ( $r = -.1942$ ,  $p = .008$ ) between a supplier's perceived need to control key capabilities and its past OEM experience (v13), it is also possible that a supplier's key-capability controlling mentality may simply reflect its lack of key capabilities or its inexperience in cross-border alliances. Therefore such a controlling need is negatively correlated with a supplier's sales growth.

In sum, although Taiwanese IT suppliers do not show a strong learning intent in their explicit cooperative goals (v91 - v98), they do demonstrate a strong learning intent through their inclination for learning (v10a, v10b). Such an implicit learning intent is positively correlated with a supplier's capability enhancement. However, there is also evidence to show the negative impacts of a firm's strong and explicit learning intent (v10c) on its project satisfaction and on its sales growth.

Other significant findings regarding a supplier's cooperative goals are:

a. Suppliers intending to reduce R&D or marketing costs (v91) tend to demonstrate higher sales growth. One possible explanation is the effect of "focus" under a global division of labor. Suppliers limiting their R&D or marketing expenditure may focus more on their manufacturing capability, thus attracting more contract manufacturing business and achieving higher sales growth. This finding is in line with the strong correlation between the EMS suppliers (Recip2) and their sales growth ( $r = .3272, p < .001$ ).

b. The goal of gaining MNCs approval (v98) is found to be positively correlated with sales growth. The result implies that a contract manufacturing track record is very important for suppliers to get further international orders, and subsequently to increase sales. A similar conclusion can be found in the positive correlation between previous contract manufacturing experience (v13) and sales growth.

**The effects of Recipient's Receptivity on Performance:**

*H2-2: Recipients with higher levels of receptivity tend to exhibit higher capability enhancement.*

(1) It is intuitive to assume that if a recipient has too wide a capability gap with the source, it may not be able to learn even if the source is willing to teach it. Nevertheless, the correlation results do not support such an intuitive assumption. Conversely, the perceived capability gap with partners (v10a) is found to be positively correlated with suppliers' learning, seemingly indicating that the wider the capability gap, the higher a supplier's capability enhancement can be in cross-border contract manufacturing alliances. The result may be explained by the nature of contract manufacturing business in that foreign partners always screen and select qualified suppliers beforehand; thus competence disparity is minimized and does not pose an insurmountable barrier to learning. The "appropriate technology" argument (Kojima, 1978, and Ozawa, 1979) which claims that lower-end technology is more suitable and assimilable to LDCs does not seem to be applicable to Taiwanese IT suppliers.

(2) By the same token, familiarity in language and business practices or past OEM experience do not seem to be prerequisites for effective learning, and whether or not a supplier has a designated department to handle cross-border OEM business does not significantly affect its alliance performance either.

(3) The significant correlation between OEM experience (v13) and sales growth underlines the importance of contract manufacturing business to Taiwanese IT suppliers. The more OEM experience a supplier has, the higher is its sales growth.

Generally speaking, Hypothesis 2-2 concerning the effects of a recipient's receptivity on its capability enhancement is only weakly supported by the factor-level analysis, but not significant enough on the individual variable-level analyses.

#### The effects of Recipient's Size on Performance:

*H2-3: Recipients of larger size tend to exhibit higher capability enhancement.*

The size of a supplier does not significantly affect its alliance performance except that larger suppliers tend to be associated with higher sales growth. The finding indicates the importance of critical mass to the sales growth of Taiwanese IT firms. There seems to be a virtuous circle (positive feedback loop) between a Taiwanese IT supplier's size and its sales growth.

### **5.3 Relationships Between Partner Characteristics and Performance**

#### **5.3.1 Correlations between partner factors and performance**

The following correlation analyses reveal the learning effects of each partner factor (extracted from factor analysis, see section 4.3) in different levels of alliance performance indicators.

*On Alliance Performance*

Partner Factors	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co.strength
<i>Partner1: Partner's Transparency</i>	<b>.3263***</b>	<b>.1699*</b>		<b>.2407**</b>
<i>Partner2: Partner's Protectiveness</i>	<b>-.2127**</b>	<b>-.2541**</b>	<b>-.2325**</b>	<b>-.2002**</b>
<i>Partner3: Partner's Competitive Status</i>				

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

The general findings are:

1. As expected, partner's transparency is strongly correlated with a supplier's learning and change of cooperative strength; it is also correlated with a supplier's satisfaction. When partners are more open about providing technical documents, and when partners' technical staff are more open to their counterparts, suppliers tend to exhibit higher levels of learning, satisfaction, and positive change of cooperative strength.
2. Likewise, partner's protectiveness is negatively and significantly correlated with all of the four alliance performance indicators.
3. Partner's competitive status is not significantly correlated with any alliance performance indicator.

*On Components of Learning*

Partner Factors	Functional Learning		
	R&D Learning	Process Learning	Marketing Learning
<i>Partner1: Partner's Transparency</i>	.3288***	.3261***	.2149**
<i>Partner2: Partner's Protectiveness</i>	-.1781*	-.1493*	-.1890*
<i>Partner3: Partner's Competitive Status</i>		.1702*	

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

Partner's transparency is significantly correlated with learning in all three functional areas (capability dimensions), particularly in the more technical areas of R&D and process. From another angle, partner's protectiveness is only weakly (and negatively) correlated with functional learning, especially in the manufacturing area where two parties tend to have intensive interaction. The implication is that while partner's transparency is very helpful to a supplier's learning, partner's protectiveness is less effective in suppressing a supplier's learning in contract manufacturing alliances.

As for the effect of partner's competitive status, it is correlated only with the supplier's process learning. The supplier's process capability enhancement is linked with the global competitive status of its partner. The result implies that learning from globally-competitive partners is only significant in the manufacturing area.

Furthermore, the effects of partner factors on capability indicators can be examined:

Partner Factors	R&D Learning		
	v261: Technology	v262: R&D speed	v263: Customer Intimacy
<i>Partner1: Partner's Transparency</i>	.3484***	.1700*	.3312***
<i>Partner2: Partner's Protectiveness</i>			-.1839*
<i>Partner3: Partner's Competitive Status</i>			

Correlation coefficients (*r*) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Partner's transparency is strongly correlated with a supplier's product technology enhancement and end-customer intimacy improvement, and weakly correlated with a supplier's R&D speed enhancement. In contrast, partner's protectiveness is found only weakly (and negatively) correlated with a supplier's end-customer intimacy enhancement. The only R&D capability which a partner's protectiveness can effectively prevent its supplier from learning is end-customer intimacy, while no significant deterrence effect has been found in a supplier's product technology learning or R&D speed enhancement.

Partner Factors	Process Learning		
	v264: Quality	v265: Flexibility	v266: Low Cost
<i>Partner1: Partner's Transparency</i>	.3415***	.2041**	.2021**
<i>Partner2: Partner's Protectiveness</i>			-.1818*
<i>Partner3: Partner's Competitive Status</i>	.1666*		

Correlation coefficients (*r*) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Similar to the results in R&D learning, partner's transparency is significantly correlated with all three process capability indicators; while partner's protectiveness

is only weakly correlated with a supplier's low-cost manufacturing improvement. Another interesting finding is that partner's competitive status is positively correlated with a supplier's manufacturing quality enhancement. The possible explanation may be that contract manufacturing for partners with higher global market shares tends to require higher quality standards, thus leading to significant quality improvement for suppliers.

Partner Factors	Marketing Learning		
	v267: Marketing Experience	v268: Brandname Mgt.	v269: Channel Mgt.
<i>Partner1: Partner's Transparency</i>	.1738*	.1949**	.2068**
<i>Partner2: Partner's Protectiveness</i>	-.1934**		-.1907**
<i>Partner3: Partner's Competitive Status</i>			

*Correlation coefficients (r)* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

In the area of marketing learning, partner's transparency is still positively correlated with a supplier's learning. Partner's protectiveness, however, seems to be more effective in that it is more strongly (and still negatively) correlated with two marketing capability indicators: marketing experience and channel management. When a partner is cautious in safeguarding itself against its supplier, the supplier's marketing learning can be significantly inhibited. Compared with the results in R&D or process learning, partner's protectiveness seems to be more effective in curbing a supplier's marketing learning than preventing the supplier from technological learning in R&D or manufacturing areas.

Another interesting finding is that the learning effect resulting from a partner's technical openness is not limited to technical functions such as R&D and manufacturing. Although less significant, partner's transparency (representing mainly a partner's technical openness) is still positively correlated with all three marketing-capability indicators. This might arise from the close linkage among business functions, especially in the IT industry. It implies that learning in one functional area will very much likely be diffused to another because of the nature of the cross-functional task interdependence within the supplier.

### 5.3.2 Correlations between partner variables and performance

Correlations between alliance performance and individual variables of partner characteristics are presented below.

Table 9: Correlations between partner variables and alliance performance

Partner Variables	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
<i>v4: competitive status</i>			.1595*	
<i>Partner's Intent</i>				
v111: cost reduction				
v112: sales increase				
v113: process learning				
v114: networking				
v115: capacity use				
v116: flexibility use				
v117: local market		-.1491*		
v118: overall learning		-.1871*		
v12a: network approach	.3437***	.1810*	.1926**	.2810***
v12b: short-term attitude	-.1999**	-.2926***	-.3130***	-.1905**
<i>Partner's transparency</i>				
v18d: technical staff openness	.2453**	.1808*		.1789*
v18e: R&D document provision	.3342***	.2254**		.2801***
v18f: process document provision	.2710***	.1620*	.1455*	.1773*
v12c: partner's guardedness		-.2078**		
v18g: marketing concealment	-.2264**		-.2190**	-.2204**

Correlation coefficients (*r*) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

#### The effects of Partner's Country of Origin on Performance:

*H3-1: (All hypotheses on different partners are examined in Appendix 4.)*

**The effects of Partner's Competitive Status on Performance:**

*H3-2: Indigenous firms cooperating with more globally-competitive partners tend to exhibit higher capability enhancement.*

The effect of partnering with stronger partners (v4) is only significant in the area of a supplier's sales growth. Indigenous firms cooperating with more globally-competitive partners do not exhibit higher capability enhancement

**The effects of Partner's Intent on Performance:**

*H3-3: Indigenous firms cooperating with partners who treat suppliers as network members tend to exhibit higher capability enhancement.*

The more a partner treats its supplier as a network member (v12a), the higher is the supplier's alliance performance. When a supplier is accepted by the foreign partner as an "insider" in the partner's global operational network, the supplier tends to enjoy much higher learning ( $r = .3437, p < .001$ ), become more satisfied, achieve higher sales growth, and naturally, develop closer future cooperation with the partner.

*H3-4: Indigenous firms cooperating with partners who treat cooperation as a short-term solution tend to exhibit lower levels of capability enhancement.*

As expected, when the partner's cooperative intent is perceived as only short-term, and low on long-term commitment, indigenous suppliers tend to learn less, become less satisfied, exhibit much lower after-project sales growth, and reduce its cooperative strength with such a short-term partner.

In sum, partner's intent, especially the ways partners treat their indigenous suppliers, appears to have a significant effect on suppliers' alliance performance.

Other significant findings about partner's cooperative goals are:

a. Partner's goal to penetrate the local market (v117) is negatively correlated with a supplier's overall satisfaction - probably because it is more likely that the partners will become direct competitors to suppliers under this circumstance.

b. Likewise, a partner's overall learning goal (v118) is negatively correlated with satisfaction. In this case, the limited number (12 cases, or 6.4% of total sample) of partners with overall learning intent suggests that very rarely will a foreign partner position itself as a "student" in a cross-border contract manufacturing cooperation. However, even if a foreign partner does appear to be a "student", the indigenous supplier may regard it as a weaker partner and thus becomes less satisfied with the partnership.

**The effect of Partner's Transparency on Performance:**

*H3-5: Indigenous firms cooperating with more transparent partners tend to exhibit higher capability enhancement.*

(1) The openness of a partner's technical staff (v18d) is positively correlated with a supplier's learning, satisfaction, and change of cooperative strength with its partner. The correlation is relatively stronger with a supplier's learning.

(2) Similarly, partner's R&D document provision (v18e) is positively correlated with a supplier's learning result, its overall satisfaction, and change of cooperative strength. The correlation is particularly strong with a supplier's learning ( $r = .3342, p < .001$ ).

(3) Partner's process document provision is positively correlated with all four alliance performance indicators. Again, the correlation is particularly strong in the area of a supplier's learning ( $r = .2710, p < .001$ ).

(4) Using One-Way ANOVA to analyze whether different forms of the partner's communication windows (different combinations of partner's R&D, process, and marketing personnel as major respondents) will affect alliance performance, it is found that partner's window significantly affects a supplier's R&D learning ( $F = 3.1553, p = .0058$ ) and a supplier's process learning ( $F = 2.4103, p = .0289$ ).

Using Dunn's multiple comparison, it is found that when partner's R&D engineers are included in partner's communication window, a supplier's R&D learning becomes significantly higher (pooled t value = .3072, pooled t probability = .002). This can be interpreted as further evidence supporting the argument that partner's technical openness affects a supplier's learning, especially in the R&D areas.

In sum, partner's transparency is very significantly correlated with a supplier's alliance performance, especially in the realm of learning. Hypothesis 3-5 is strongly supported by this research.

*H3-6: Indigenous firms cooperating with more protective partners tend to exhibit lower levels of capability enhancement.*

(1) Although partner's guardedness (v12c) is not significantly correlated with a supplier's learning result, it is negatively correlated with a supplier's overall satisfaction.

(2) Partner's concealment of marketing information is negatively correlated with a supplier's learning result, sales growth, and change of cooperative strength. However, it is not significantly correlated with a supplier's satisfaction, implying that in a contract manufacturing alliance the buyer usually will not provoke its supplier simply by refusing to share market information. A sales manager of a Taiwanese PC manufacturer described the sensitive nature of buyers' market information sharing: *"Don't expect your buyers to share market information*

*voluntarily. After all, marketing can be their only remaining advantage. [In order to get their marketing information] You got to have something to exchange.”*

In sum, the construct “partner's protectiveness” is moderately and negatively correlated with a supplier's capability enhancement.

#### 5.4 Relationships Between Project Characteristics and Performance

##### 5.4.1 Correlations between project factors and performance

*On Alliance Performance*

Project Factors	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
<i>Project1: Inter-partner Similarity</i>	<b>.2127**</b>	<b>.1942*</b>		
<i>Project2: Partner's Technical Contribution</i>			<b>.1623*</b>	
<i>Project3: Symbiotic Partnership</i>	<b>.2929***</b>		<b>.1787*</b>	<b>.2888***</b>
<i>Project4: Project Scale</i>			<b>.1971**</b>	
<i>Project5: Collaborative Competition</i>		<b>-.1526*</b>		<b>-.2792***</b>
<i>Project6: Businesslike Supplier Selection</i>				

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

The general findings are:

1. Partnerships with higher levels of inter-partner similarity exhibit higher levels of suppliers' learning and satisfaction. When a contract manufacturing project is

conducted with a partner of similar culture and management, the supplier tends to enjoy higher levels of learning and satisfaction.

2. Although projects in which partners contribute valuable R&D or process capabilities do not significantly correlate with higher supplier's learning, they are found to be positively correlated with suppliers' future sales growth.

3. Forming a symbiotic partnership is found to be positively correlated with a supplier's learning, sales growth, and change of cooperative strength. When the project requires more coordination between partners, when the project is closer to an ODM arrangement, and when the supplier is responsible for the complete manufacturing function while the partner focuses on the marketing task, the supplier tends to learn much more effectively, achieve higher sales growth, and develop stronger cooperation with the partner.

4. Larger project scale (higher transaction value or longer duration) is correlated only with higher sales growth.

5. Undertaking projects of the nature of collaborative competition tends to negatively affect a supplier's satisfaction and very significantly decreases the strength of subsequent cooperation between the partners.

*On Components of Learning*

Project Factors	Functional Learning		
	R&D Learning	Process Learning	Marketing Learning
<i>Project1: Inter-partner Similarity</i>	.2373**	.2027**	
<i>Project2: Partner's Technical Contribution</i>			
<i>Project3: Symbiotic Partnership</i>	.3298***	.3378***	.1504*
<i>Project4: Project Scale</i>	.1577*	.1484*	
<i>Project5: Collaborative Competition</i>			
<i>Project6: Businesslike Supplier Selection</i>			

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

Further exploration of the learning effects of project characteristics in different functional areas (capability dimensions) reveals that symbiotic partnership strongly facilitates a supplier's R&D and process learning, while inter-partner similarity contributes moderately to capability enhancement in these two areas, and project scale is weakly correlated with both R&D and process learning. However, in the area of marketing learning, only weak correlation is found with symbiotic partnership, highlighting the difficulty in structuring an ideal project or matching with an ideal partner to facilitate marketing learning.

The correlations between project factors and capability indicators shed more light on the issue of capability enhancement.

Project Factors	R&D Learning		
	v261: Technology	v262: R&D speed	v263: Customer Intimacy
<i>Project1: Inter-partner Similarity</i>		.1917*	.2586**
<i>Project2: Partner's Technical Contribution</i>	.1698*		
<i>Project3: Symbiotic Partnership</i>	.2758***	.2011**	.3469***
<i>Project4: Project Scale</i>	.2192**		
<i>Project5: Collaborative Competition</i>			
<i>Project6: Businesslike Supplier Selection</i>			

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Of the three R&D capability indicators, all three are strongly correlated with symbiotic partnership; while inter-partner similarity facilitates a supplier's R&D speed enhancement and end-customer intimacy improvement, both partner's technical contribution and project scale are positively correlated with supplier's product technology enhancement. For a firm pursuing product technology enhancement, it is advisable to form a symbiotic partnership, and involvement in larger or longer projects may also be helpful.

Project Factors	Process Learning		
	v264: Quality	v265: Flexibility	v266: Low Cost
<i>Project1: Inter-partner Similarity</i>		.1958**	.1764*
<i>Project2: Partner's Technical Contribution</i>			
<i>Project3: Symbiotic Partnership</i>	.3510***	.2252**	.2049**
<i>Project4: Project Scale</i>		.1858*	
<i>Project5: Collaborative Competition</i>			
<i>Project6: Businesslike Supplier Selection</i>			

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

In the area of process learning, symbiotic partnership is still strongly correlated with all three process capability indicators. Inter-partner similarity improves a supplier's process flexibility and low-cost manufacturing, while larger or longer projects are helpful to a supplier's process flexibility enhancement.

Project Factors	Marketing Learning		
	v267: Marketing Experience	v268: Brandname Mgt.	v269: Channel Mgt.
<i>Project1: Inter-partner Similarity</i>			
<i>Project2: Partner's Technical Contribution</i>			
<i>Project3: Symbiotic Partnership</i>	.2131**	.1568*	
<i>Project4: Project Scale</i>			
<i>Project5: Collaborative Competition</i>			
<i>Project6: Businesslike Supplier Selection</i>	.1958**		

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Again, fewer project factors are significantly correlated with a supplier's marketing learning. Only symbiotic partnership is moderately correlated with a supplier's marketing experience and weakly correlated with the supplier's brandname-management improvement. Interestingly, partner's businesslike supplier selection is positively correlated with a supplier's marketing experience enhancement, indicating the learning effect resulting from a market competition. OEM contract competition with other suppliers not only helps a supplier improve its industrial marketing capabilities in OEM business, it also helps improve the supplier's marketing experience in the end-market.

### 5.4.2 Correlations between project variables and performance

Table 10: Correlations between project variables and alliance performance

Project Variables	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
<i>v31: transaction value</i>			.2388**	
<i>v32: duration</i>				
<i>monthly project value</i>			.1956**	
<i>Product</i>				
v1: product item♣				
v2b: market maturity				
<i>Technology</i>				
v2a: product uniqueness				
v8Aa: partner's RD contribution	.1708*		.1538*	.1867*
v8Ba: p's process contribution	.1698*		.1450*	.1541*
v8Ca: p's mkt'ing contribution	.2302**			.2193**
<i>Task</i>				
v18a: task interdependence	.1518*			.2564***
v18b: product completion				
v18c: supplier RD contribution	.2698***		.2165**	
<i>Previous Relationships</i>				
v151-8 previous cooperation <sup>18</sup>				
v6: initiator♣	.36*(1-2)	4.44* (1-2)		
v7: No. of alternatives				
<i>Inter-firm diversity</i>				
v5a: direct competition				
v5b: skill complement	.1758*	.2699***		.2406**
v5c: culture similarity	.1906**	.1628*		
v5d: management similarity	.1920**	.1656*		

Correlation coefficients (*r*) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

♣: The results of v1 and v6 were calculated by Dunn's multiple comparison method (One-Way ANOVA).

<sup>18</sup> Previous cooperation =  $0*v_{151} + 1*v_{152} + 2*v_{153} + 3*v_{154} + 4*v_{155} + 5*v_{156} + 6*v_{157} + 7*v_{158}$ . Because the change of cooperative strength is defined as the strength of after-project cooperation minus the strength of previous cooperation, there is a negative correlation between previous cooperation and change of cooperative strength by definition.

#### The effects of Transaction Value on Performance:

*H4-1: Alliances of higher transaction value tend to exhibit higher capability enhancement.*

Deal size, both in terms of total value and monthly value, is only positively correlated with a supplier's sales growth after a project, indicating the contribution of large-sized projects to a supplier's sales growth. However, the learning effect of larger deals is not confirmed.

#### The effects of Project Duration on Performance:

*H4-2: Alliances of longer duration tend to exhibit higher capability enhancement.*

Duration of a project is not significantly correlated with any performance indicator. This result supports the argument that longevity may be an inappropriate measure of partnership success (Hamel, 1991).

#### The effects of Product Characteristics on Performance

*H4-3: Contract manufacturing alliances for different product items tend to exhibit different capability enhancement.*

Contract manufacturing projects in different categories of product items (v1) do not exhibit significantly different alliance performance.

*H4-4: Contract manufacturing alliances in mature product-markets, compared with alliances in growing product-markets, tend to exhibit lower levels of capability enhancement.*

The market maturity of the manufactured product (v2b) is not significantly correlated with any alliance performance.

The effects of Technology on Performance:

*H4-5: Contract manufacturing alliances in non-standard or proprietary products tend to exhibit higher capability enhancement.*

Similar to market maturity, the uniqueness of product technology of the manufactured product (v2a) is not significantly correlated with any alliance performance.

*H4-6: Contract manufacturing alliances with partners who contribute more valuable capabilities tend to exhibit higher capability enhancement.*

(1) Partner's R&D contribution (v8Aa) is positively correlated with a supplier's learning, sales growth, and change of cooperative strength.

(2) Likewise, partner's process contribution (v8Ba) is positively correlated with a supplier's learning, sales growth, and change of cooperative strength.

(3) Partner's marketing contribution (v8Ca) is strongly correlated with a supplier's learning and change of cooperative strength. The result may imply that suppliers tend to rely on, and develop closer relationships with, partners of stronger marketing capability.

In sum, partner's capability contribution in a partnership is positively correlated with the supplier's capability enhancement.

**The effects of Task Characteristics on Performance:**

*H4-7: Contract manufacturing projects with higher degrees of task interdependence tend to exhibit higher capability enhancement.*

The task interdependence of a project (v18a) is positively correlated with a supplier's learning result and strongly correlated with its change of cooperative strength with its partner.

*H4-8: Contract manufacturing projects requiring suppliers to contribute more in the area of product R&D tend to exhibit higher capability enhancement.*

A supplier's R&D involvement in a contract manufacturing alliance (v18c) is positively and strongly correlated with its learning result and sales growth. The

results seem to support the argument that ODM business is more beneficial to suppliers than OEM business, both in terms of short-term sales and long-term capability enhancement.

Not surprisingly, the degree of product completion (v18b) does not have a significant effect on any alliance indicator. There is no evidence to claim that the relabeling projects are significantly different from the traditional component-supply projects in terms of capability enhancement or other alliance indicators.

**The effects of Previous Relationship on Performance:**

*H4-9: Contract manufacturing alliances with stronger previous relationships between partners tend to exhibit higher capability enhancement.*

(1) The strength of a previous relationship is not significantly correlated with alliance performance. The result suggests that the success of an alliance does not lie in the previous relationship between partners, but rather hinges on the project's own merits.

(2) Compared with suppliers approached by foreign partners, suppliers taking the initiative to approach foreign partners tend to demonstrate higher levels of learning and satisfaction.

(3) The number of alternative suppliers before signing up an OEM deal (v7) is not significantly correlated with any performance indicators. In other words, inter-firm closeness does not guarantee alliance performance.

Generally speaking, previous relationship is not significantly correlated with alliance performance in this research.

The effects of Inter-firm Diversity on Performance:

*H4-10: Indigenous firms perceiving higher levels of product-market competition with their partners tend to exhibit lower levels of capability enhancement.*

Suppliers' perceived competition with foreign partners does not significantly affect its alliance performance with foreign partners. In fact, less than 20% of the respondents perceived their OEM partners as direct competitors.

*H4-11: Indigenous firms of higher degrees of skill complement with their partners tend to exhibit higher capability enhancement.*

Suppliers perceiving higher skill complementarity with foreign partners tend to demonstrate higher levels of learning, satisfaction, and change of cooperative strength.

Skill complementarity between partners (v5b) is found to be positively correlated with alliance performance, except with sales growth, in this research.

*H4-12: Indigenous firms of lower inter-organizational diversity (higher cultural or organizational similarity) with their partners tend to exhibit higher capability enhancement*

(1) Suppliers perceiving a closer business culture or similar values (with foreign partners) tend to demonstrate higher levels of learning and satisfaction.

(2) Likewise, suppliers perceiving a closer management style or organizational structure (with foreign partners) also tend to demonstrate higher levels of learning and satisfaction.

In sum, inter-organizational diversity (Parkhe, 1991: Type II diversity) is found to be negatively correlated with a supplier's learning and satisfaction.

## 5.5 Relationships Between Relationship Characteristics and Performance

### 5.5.1 Correlations between relationship factors and performance

#### *On Alliance Performance*

Relationship Factors	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co.strength
<i>Rela1: Harmonious Communication</i>		.1811*		
<i>Rela2: Mutual Trust</i>	.1604*	.2644***		.2427**
<i>Rela3: Mutual Dependency</i>	.2644***			.2316**
<i>Rela4: Technical Interaction</i>	.1720*	.1694*		
<i>Rela5: Opportunism</i>		-.2224**		
<i>Rela6: Marketing Interaction</i>	.1915**		.1660*	

*Correlation coefficients (r)* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

The general findings are:

1. Harmonious communication is only significantly correlated with a supplier's satisfaction. In other words, this "feel-good" factor does not seem to be of much practical use for the alliance success of indigenous suppliers. The finding supports the argument that alliance success could not be measured in terms of a "happiness index" (Hamel, 1991).

2. Mutual trust is found, not surprisingly, to be strongly correlated with a supplier's satisfaction and change of cooperative strength. It is also positively correlated with

a supplier's learning. Because mutual trust is positively correlated with partner's transparency (Partner1,  $r = .2027$ ,  $p = .006$ ) and negatively correlated with partner's protectiveness (Partner2,  $r = -.2702$ ,  $p < .001$ ), it seems that mutual trust is related to partner's transparency. This may provide some explanation for the correlation between mutual trust and a supplier's learning.

3. Mutual dependency is strongly correlated with a supplier's learning and change of cooperative strength. When suppliers are important to partners and partners are also important to suppliers, both sides are more equal and have something to exchange. Such a strategic symmetry and mutual need naturally strengthen subsequent cooperation and facilitate inter-partner learning. Although the causality between learning and mutual dependency may be difficult to establish from this research, it is reasonable to posit a positive feedback loop between them as supplier's learning magnifies partner's importance, and partner's importance motivates the supplier to fulfill partner's requests - an organizational "stretch" leading to further capability enhancement. On the other hand, the significant correlation between mutual dependency and partner's transparency ( $r = .2872$ ,  $p < .001$ ) also suggests that higher degree of mutual dependency requires the partner to be more open, thus facilitating a supplier's learning.

4. Technical interaction is positively correlated with both a supplier's learning and satisfaction. The strong correlation between technical interaction and partner's transparency ( $r = .4889$ ,  $p < .001$ ) reveals that the respondents perceived technical interaction as an indicator of partner's technical openness, and/or vice versa.

5. Somewhat surprisingly, opportunism does not seem to be a factor significantly affecting alliance performance. Although it is negatively correlated with a supplier's satisfaction, opportunism is not significantly correlated with learning, sales growth, or even change of cooperative strength. In addition, although opportunism is weakly (negatively) correlated with partner's transparency ( $r = -.1447$ ,  $p = .049$ ) and positively correlated with partner's protectiveness ( $r = .2135$ ,  $p = .004$ ), a businesslike relationship alone does not effectively impede a supplier's learning.

6. Marketing interaction is positively correlated with a supplier's learning and sales growth. The implication may be that through the interaction with foreign partner's sales/marketing staff, suppliers can have their international marketing experience enhanced and channel management strengthened - a consequence which certainly affects positively a supplier's future sales, as marketing is the bottleneck of indigenous suppliers. The finding strongly suggests the importance of marketing interaction to a supplier's short-term and long-term benefits.

#### *On Components of Learning*

Further investigation into the correlations between the extracted relationship factors and a supplier's capability indicators sheds more light on the issue of the specific relationship between a supplier's learning and the characteristics of its cooperative process with its partner.

Relationship Factors	Functional Learning		
	R&D Learning	Process Learning	Marketing Learning
<i>Rela1: Harmonious Communication</i>			
<i>Rela2: Mutual Trust</i>			.1524*
<i>Rela3: Mutual Dependency</i>	.3019***	.2616***	.1543*
<i>Rela4: Technical Interaction</i>	.2347**	.2607***	
<i>Rela5: Opportunism</i>			
<i>Rela6: Marketing Interaction</i>			.2108**

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Mutual dependency and technical interaction are very beneficial to a supplier's learning, both in the area of R&D and in the area of process. Mutual trust and dependency are helpful to a supplier's marketing learning, while marketing interaction appears to be another, and seemingly more influential, determinant of a supplier's marketing learning. Interestingly enough, neither harmonious communication nor opportunism significantly affect any functional learning, indicating that learning is a practical issue which cannot be decided by affective factors in a relationship.

The detailed impacts of relationship factors on indicators are summarized further:

Relationship Factors	R&D Learning		
	v261: Technology	v262: R&D speed	v263: Customer Intimacy
<i>Rela1: Harmonious Communication</i>			
<i>Rela2: Mutual Trust</i>			.1479*
<i>Rela3: Mutual Dependency</i>	.2683***	.1913**	.3062***
<i>Rela4: Technical Interaction</i>	.2716***		.2303**
<i>Rela5: Opportunism</i>			
<i>Rela6: Marketing Interaction</i>			

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Product technology enhancement is strongly correlated with the intensity of mutual dependency and technical interaction in a partnership. While R&D speed is only affected by mutual dependency, end-customer intimacy can be enhanced through higher levels of mutual dependency, technical interaction, and even mutual trust.

Relationship Factors	Process Learning		
	v264: Quality	v265: Flexibility	v266: Low Cost
<i>Rela1: Harmonious Communication</i>			
<i>Rela2: Mutual Trust</i>	.1676*		
<i>Rela3: Mutual Dependency</i>		.2050**	.3233***
<i>Rela4: Technical Interaction</i>	.3286***	.1802*	
<i>Rela5: Opportunism</i>			
<i>Rela6: Marketing Interaction</i>			

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

In the process-learning area, a supplier's manufacturing quality is strongly affected by the level of technical interaction in a partnership, and to a lesser degree, by their mutual trust. As manufacturing quality is almost a mandate in cross-border contract manufacturing alliances with MNCs, partners' technical interaction (even intervention) is very helpful to suppliers' manufacturing quality improvement. The supplier's manufacturing flexibility is correlated with the mutual dependency and technical interaction, while low-cost manufacturing is strongly correlated with the level of mutual dependency in a partnership. The results seem to support the assumption that cooperating with partners of stronger bargaining power tends to push suppliers relentlessly to be more flexible and cost-effective in manufacturing.

Relationship Factors	Marketing Learning		
	v267: Marketing Experience	v268: Brandname Mgt.	v269: Channel Mgt.
<i>Rela1: Harmonious Communication</i>			
<i>Rela2: Mutual Trust</i>	.1572*		
<i>Rela3: Mutual Dependency</i>	.1578*		
<i>Rela4: Technical Interaction</i>			
<i>Rela5: Opportunism</i>			
<i>Rela6: Marketing Interaction</i>	.1670*		.2514**

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

A supplier's international marketing experience is correlated with the level of mutual trust and mutual dependency, as well as the marketing interaction with its

partner. However, these correlations are comparatively weak. The brandname-management enhancement seems to be independent of any relationship factors, while channel management is correlated with inter-partner marketing interaction.

### 5.5.2 Correlations between relationship variables and performance

Table 11: Correlations between relationship variables and alliance performance

Relationship Variables	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
<i>Trust</i>				
v20a: partner's credibility	.2309**	.2097**	.1813*	.2791***
v20b: partner's trustworthiness		.2828***		.2029**
v20c: supplier's credibility	.2239**	.2306**		.2718***
v20d: supplier's trustworthiness	.2309**	.2838***		.2936**
<i>Commitment</i>				
v20e: p's effort for relationship	.2657***	.3799***	.2042**	.3168***
v20f: partner's opportunism		-.2582***	-.1948**	-.1462*
v20g: s's effort for relationship	.3045***	.2241**	.1742*	.2161**
v20h: supplier's opportunism		-.1533*		
<i>Interaction</i>				
v20i: R&D interaction	.2956***	.2027**	.2093**	.1924**
v20j: process interaction	.1836*	.2109**		
v20k: marketing interaction	.2958***	.2000**	.1960**	
v20l: management interaction	.2110**			.2701***
<i>Communication</i>				
v20m: timely communication	.3134***	.2280**	.1959**	.2051**
v20n: accurate communication		.1996**		.1679*
v20o: adequate communication		.2123**		.1583*
<i>Dependence</i>				
v191: partner's importance	.3130***			.3088***
v192: supplier's importance	.2113**	.2475**		
<i>Congruence</i>				
v20p: organizational congruence	.2258**	.2825***		.2396**
v20q: personal congruence		.3083***		.2313**
<i>Mutual Adjustment</i>				
v20r: inter-firm conflict		-.2132**		
v20s: joint conflict resolution		.1524*	.1535*	

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**The effects of Trust on Performance:**

*H5-1: Alliances with higher levels of mutual trust tend to exhibit higher capability enhancement.*

(1) Partner's credibility (a supplier's competence trust in its partner) is positively correlated with a supplier's learning and satisfaction and, to a lesser degree, correlated with the supplier's sales growth. It is also strongly correlated with the supplier's change of cooperative strength with its partner.

(2) Likewise, supplier's credibility (a partner's competence trust in its supplier) is positively correlated with a supplier's learning result, satisfaction, and change of cooperative strength.

(3) Both partner's trustworthiness (a supplier's contractual trust in its partner) and supplier's trustworthiness (a partner's contractual trust in its supplier) are positively correlated with satisfaction and change of cooperative strength.

(4) Partner's perception of supplier's trustworthiness is found to be positively correlated with a supplier's learning, but the supplier's perceived trustworthiness of the partner is not. The explanation may be that when partners perceive suppliers to be trustworthy, the partners tend to be more open, thus facilitating suppliers' learning. This explanation is supported by the findings that the supplier's

trustworthiness is positively correlated with the partner's technical openness ( $r = 0.3315$ ,  $p < .001$ ), and negatively correlated with partner's protectiveness ( $r = -.2643$ ,  $p < .001$ ).

In sum, Hypothesis 5-1 is strongly supported by the correlation results.

#### The effects of Commitment on Performance:

*H5-2: Alliances with higher levels of mutual commitment tend to exhibit higher capability enhancement.*

(1) Partner's effort for a continuing relationship (v20e) is positively correlated with all four performance indicators. It is particularly strongly correlated to a supplier's satisfaction and its change of cooperative strength with its partner.

(2) A supplier's effort for a continuing relationship (v20g) is positively correlated with all four performance indicators and it is particularly strongly related to the supplier's learning result. Further examination reveals that supplier's effort for a continuing relationship is strongly correlated with partner's importance to supplier ( $r = 0.5372$ ,  $p < .001$ ). To understand the reason for a supplier's commitment, the partner's contributions in different functional areas (v8Aa, v8Ba, v8Ca) have been correlated with supplier's effort for continuing relationship. The only significantly correlated variable is partner's marketing contribution ( $r = 0.3358$ ,  $p < .001$ ). The result seems to underline the importance of the partner's marketing

contribution to a supplier. Further investigation into the relationships among supplier's commitment (v20g), partner's importance (v191), and partner's marketing contribution (v8Ca) reveals strong correlations among the three variables:

<i>Correlation coefficients (p)</i>	Supplier's effort for continuing relationship	Partner's importance to supplier	Partner's marketing contribution
Supplier's effort for continuing relationship		.5372 (p < .001)	.3358 (p < .001)
Partner's importance to supplier			.4085 (p < .001)

Such strong correlations among these three variables suggest that a partner's marketing contribution is what its supplier values, and it decides the partner's importance to the supplier. When the partner is important to the supplier, the supplier tends to make every effort for a continuing relationship, and consequently it has to enhance its capabilities in order to serve the partner better.

(3) Partner's opportunism is negatively correlated with a supplier's satisfaction, sales growth, and change of cooperative strength; but interestingly, it does not significantly affect the supplier's learning from cooperating with the opportunistic partner.

In sum, Hypothesis 5-2 is generally supported by the findings and commitment is correlated with alliance performance.

The effects of Interaction on Performance:

*H5-3: Alliances with higher levels of interaction tend to exhibit higher capability enhancement.*

(1) All functional interactions are correlated with a supplier's satisfaction, with the only exception of management interaction.

(2) Only R&D interaction and marketing interaction are significantly correlated with a supplier's after-project sales growth. The finding seems to suggest that inter-partner interaction in the areas of weaker functions (indigenous suppliers are relatively weak in R&D and marketing) tends to result in better sales growth for the suppliers.

(3) Only R&D interaction and management interaction are significantly correlated with change of cooperative strength between partners. The finding outlines the importance of inter-partner R&D and management interaction to the further cooperative strength within an OEM partnership. Although sometimes management interaction is caused by insoluble conflicts from below (this may be the reason why management interaction and satisfaction are not significantly correlated), as long as the management become more familiar with each other, the chance of strengthening subsequent cooperation is still higher.

(4) Interaction appears to be a key determinant of a supplier's learning in that all four functional interactions have significant learning effects. Further exploration is necessary to understand fully the specific learning effects of interactions between different functional areas. Detailed correlations between different functional interactions and different learning areas can be summarized:

Capability Indicators	Interaction			
	v20i: R&D Interaction	v20j: Mfg Interaction	v20k: Mkt'g Interaction	v20l: Mgt Interaction
<b><i>R&amp;D Learning</i></b>	<b>.3707***</b>	<b>.1952**</b>	<b>.2255**</b>	<b>.2670***</b>
v261: Technology	.4157***	.2330**		.2037**
v262: R&D Speed	.1792*		.1850*	.1671*
v263: Customer Intimacy	.3704***	.1772*	.2291**	.2874***
<b><i>Process Learning</i></b>	<b>.3161***</b>	<b>.3055***</b>		<b>.1757*</b>
v264: Quality	.3213***	.3227***	.1562*	
v265: Flexibility	.2315**	.2279**		.2149**
v266: Low Cost	.1879*	.1650*		.1456*
<b><i>Marketing Learning</i></b>			<b>.3178***</b>	
v267: Mkt'g Experience			.2774***	
v268: Brandname Mgt.			.2346**	
v269: Channel Mgt.	.1467*		.3334***	.1776*

Correlation coefficients (r) \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

The table above reveals some interesting insights into the issue of inter-partner interaction:

- The interaction between R&D engineers is strongly correlated with a supplier's R&D learning, and the learning effect seems to diffuse to a supplier's process

learning as well. Reciprocally, interaction between process staff is also positively correlated with a supplier's R&D learning. These findings suggest that R&D and process are intertwined and inter-correlated in the IT industry. Learning in one area complements learning in the other. A supplier's manufacturing quality, the manufacturability of its products, and even the cost of products are affected not only by its process interactions, but also by its R&D interactions with its partners.

- Interaction between process (manufacturing) staff is found to be strongly correlated with a supplier's process learning. Of all the process capability indicators, a supplier's manufacturing quality is strongly correlated with its process interaction with the partner. It indicates that manufacturing quality is the area gaining most benefit from inter-partner process interaction. Again, low cost manufacturing seems to be the area to benefit least. One justification may be that foreign partners are less concerned about reducing manufacturing costs once contracts have been signed. The other justification may simply be that partners' process engineers are not good at reducing manufacturing cost.

- Interaction between marketing staff is strongly correlated with a supplier's marketing learning. Channel management and international marketing experience are the areas most likely to benefit from inter-partner marketing interaction. Marketing interaction is also correlated with R&D capabilities such as end-customer intimacy and R&D speed. One explanation may be that through marketing interaction, a supplier's marketing staff may get important information about market demands and product trends. These types of information are helpful to the supplier

in shortening the time to market of new products. In addition, marketing interaction also helps a supplier know customer's emphases and requirements for product features - knowledge that helps the supplier improve manufacturing quality.

- Interaction between partners' managerial levels is correlated with a supplier's R&D learning and process learning. The correlations indicate that through managements' interaction the supplier is significantly helped in the areas of end-customer intimacy, manufacturing flexibility and product technology.

The means and frequency of inter-partner exchanges are also found to be positively correlated with alliance performance. The statistical results are summarized:

Inter-partner Personnel Exchanges	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
v21e: partner's technical staff visiting supplier	.2560***	.2547***	.2824***	
v21f: partner's non-tech. staff visiting supplier	.3463***	.1510*	.1992**	
v21g: supplier's technical staff visiting partner	.3572***		.1789*	
v21h: supplier's non-tech. staff visiting partner	.2746***		.2416**	

*Correlation coefficients (r)* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

The results also strongly support an interaction-learning argument. All inter-partner personnel exchanges are positively correlated with a supplier's learning. Interestingly, personnel exchanges are found to be positively correlated with the supplier's sales growth, indicating the importance of mutual visitation to a supplier's business expansion.

In sum, interaction is found to be a very significant determinant of alliance performance, especially in learning. Hypothesis 5-3 is strongly supported.

The effects of Communication on Performance:

*H5-4: Alliances with better quality of communication tend to exhibit higher capability enhancement.*

The quality of inter-partner communication is strongly correlated with a supplier's satisfaction and change of cooperative strength. However, among the three communication quality indicators, only timely communication is significantly correlated with learning and sales growth. The difference between timely communication and accurate/adequate communication lies in the findings that timely communication is significantly correlated with both mutual trust (Rela2,  $r = .2423$ ,  $p = .001$ ) and marketing interaction (Rela6,  $r = .2260$ ,  $p = .002$ ), while accurate/adequate communication is not. It seems that in respondents' perception, timely communication is a gesture of mutual trust and an indicator of marketing interaction.

To conclude, timely communication emerges as the only communication quality indicator significantly correlated with learning in this research. Such a finding may have something to do with the nature of time-based competition in the IT industries.

*H5-5: Alliances with greater frequency of communication tend to exhibit higher capability enhancement.*

Means and Frequency of Inter-partner Communication	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
v21a: letter or document		.2014**	.1503*	
v21b: telephone or fax	.2396**			.2144**
v21c: formal meeting	.2103**		.1999**	

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

Among the different communication media, the frequencies of telephone and fax, followed by formal meeting, are found to be correlated with learning. The results seem to imply that learning is higher through more interactive communication media such as telephone, fax, and formal meetings, while communicating by less interactive media, such as letters or documents, is correlated with satisfaction.

The frequency of telephone or fax communication is positively correlated with change of cooperative strength, implying these informal media are effective tools to develop intimate working relationships. Formal meeting, by comparison, is correlated with sales growth. The correlation between the frequency of formal meeting and the supplier's sales ( $r = .2566, p < .001$ ) suggests that formal meetings with OEM buyers are more common among larger suppliers. Since there is high correlation between a supplier's size and its sales growth, it is not surprising to find correlation between a supplier's frequency of formal meeting and its sales growth.

In sum, the frequency of communication between partners is moderately correlation with a supplier's learning.

The effects of Dependence on Performance:

*H5-6: Alliances with a higher level of mutual dependency tend to exhibit higher capability enhancement.*

(1) Both partner's importance and supplier's importance (i.e., the strategic importance each perceives the other to have for its own future well being) are significantly correlated with a supplier's learning result. The findings imply that a supplier's evaluation of the partner may affect its learning intent. In fact, such an assumption can be confirmed by the significant correlation ( $r = .2158$ ,  $p = .003$ ) between the supplier's perceived importance of its partner (v191) and the supplier's learning intent (Recip1). On the other hand, the strong correlation ( $r = .3518$ ,  $p < .001$ ) between supplier's importance (v192) and partner's transparency (Partner1) indicates that the partner tends to be more transparent when the supplier's importance is recognized. These results further support the finding that a supplier's learning may be greatest when there is a high degree of mutual dependency.

(2) Supplier's importance to its partner is positively correlated with a supplier's satisfaction; while partner's importance to its supplier is positively correlated with change of cooperative strength.

In sum, Hypothesis 5-6 is strongly supported.

**The effects of Congruence on Performance:**

*H5-7: Alliances with higher levels of organizational congruence tend to exhibit higher capability enhancement.*

As expected, organizational congruence is significantly correlated with a supplier's learning. It is also positively correlated with a supplier's satisfaction and change of cooperative strength, but not with its sales growth.

*H5-8: Alliances with higher levels of personal congruence tend to exhibit higher capability enhancement.*

Personal congruence is strongly correlated with a supplier's satisfaction and predicts change of cooperative strength, but it is not significantly correlated with learning or sales growth. Individual harmony within an alliance does not predict organizational learning, nor does it significantly contribute to a firm's future sales.

### The effects of Mutual Adjustment on Performance:

*H5-9: Alliances with more inter-partner conflicts tend to exhibit lower levels of capability enhancement.*

The frequency of inter-firm conflicts is not significantly correlated with alliance performance, except with satisfaction.

*H5-10: Alliances with more joint conflict resolution tend to exhibit higher capability enhancement.*

The degree of joint conflict resolution does not significantly correlate with a supplier's learning or change of cooperative strength; but it is weakly correlated with satisfaction and sales growth.

### Reciprocity:

Another interesting finding about relationship characteristics is the strong reciprocity between partners. Pairwise correlations between a supplier's perception of its partner and the supplier's perception of partner's attitude towards itself are:

<b>Correlation Between</b>	<b>r</b>	<b>p</b>
v191 (partner's importance to supplier) and v192 (supplier's importance to partner)	.5397	.000
v20a (partner's credibility) and v20c (supplier's credibility)	.3600	.000
v20b (partner's trustworthiness) and v20d (supplier's trustworthiness)	.5618	.000
v20e (partner's effort for continuing relationship) and v20g (supplier's effort for continuing relationship)	.5114	.000
v20f (partner's opportunism) and v20h (supplier's opportunism)	.3926	.000

The results clearly reveal the nature of reciprocity in a cross-border strategic alliance. The suppliers' perception or attitudes towards their foreign partners are strongly correlated with their perception of the partners' attitudes towards themselves. The results seem to suggest that a buyer usually gets the supplier it deserves.

## **5.6 Chapter Conclusion**

In this chapter, the relationships between the independent variables (factors) and the dependent variables have been scrutinized through correlation analyses. Some possible interpretations for the correlation findings have also been derived. The correlated variables and factors will be used as the inputs to stepwise regression analyses in Chapter VI, to identify the determinants of alliance performance.

In addition, the hypotheses regarding the determinants of a supplier's capability enhancement and their test results in this chapter are summarized in the following table.

Table 12: Hypotheses on learning determinants and their test results

Hypotheses	Result
H1-1: For contract manufacturing suppliers, learning is positively correlated with satisfaction, sales growth, and change of cooperative strength.	+++
H2-1: Suppliers with stronger learning intent in cross-border manufacturing alliances tend to exhibit higher capability enhancement.	++
H2-2: Recipients with higher levels of receptivity tend to exhibit higher capability enhancement.	+
H2-3: Recipients of larger size tend to exhibit higher capability enhancement.	X
H3-1: (All hypotheses on different partners are examined in Appendix 4.)	X
H3-2: Indigenous firms cooperating with more globally-competitive partners tend to exhibit higher capability enhancement.	X
H3-3: Indigenous firms cooperating with partners who treat suppliers as network members tend to exhibit higher capability enhancement.	+++
H3-4: Indigenous firms cooperating with partners who treat cooperation as a short-term solution tend to exhibit lower levels of capability enhancement.	++
H3-5: Indigenous firms cooperating with more transparent partners tend to exhibit higher capability enhancement.	+++
H3-6: Indigenous firms cooperating with more protective partners tend to exhibit lower levels of capability enhancement.	++
H4-1: Alliances of higher transaction value tend to exhibit higher capability enhancement.	X
H4-2: Alliances of longer duration tend to exhibit higher capability enhancement.	X
H4-3: Contract manufacturing alliances for different product items tend to exhibit different capability enhancement.	X
H4-4: Contract manufacturing alliances in mature product-markets, compared with in growing product-markets, tend to exhibit lower levels of capability enhancement.	X
H4-5: Contract manufacturing alliances in non-standard or proprietary products tend to exhibit higher capability enhancement.	X
H4-6: Contract manufacturing alliances with partners who contribute more valuable capabilities tend to exhibit higher capability enhancement.	++
H4-7: Contract manufacturing projects with higher degrees of task interdependence tend to exhibit higher capability enhancement.	+

Hypotheses	Result
H4-8: Contract manufacturing projects requiring suppliers to contribute more in the area of product R&D tend to exhibit higher capability enhancement.	+++
H4-9: Contract manufacturing alliances with stronger previous relationships between partners tend to exhibit higher capability enhancement.	X
H4-10: Indigenous firms perceiving higher levels of product-market competition with their partners tend to exhibit lower levels of capability enhancement.	X
H4-11: Indigenous firms of higher degrees of skill complement with their partners tend to exhibit higher capability enhancement.	+
H4-12: Indigenous firms of lower inter-organizational diversity (higher organizational similarity) with their partners tend to exhibit higher capability enhancement.	++
H5-1: Alliances with higher levels of mutual trust tend to exhibit higher capability enhancement.	+++
H5-2: Alliances with higher levels of mutual commitment tend to exhibit higher capability enhancement.	++
H5-3: Alliances with higher levels of interaction tend to exhibit higher capability enhancement.	+++
H5-4: Alliances with better quality of communication tend to exhibit higher capability enhancement.	+
H5-5: Alliances with greater frequency of communication tend to exhibit higher capability enhancement.	++
H5-6: Alliances with a higher level of mutual dependency tend to exhibit higher capability enhancement.	+++
H5-7: Alliances with higher levels of organizational congruence tend to exhibit higher capability enhancement.	++
H5-8: Alliances with higher levels of personal congruence tend to exhibit higher capability enhancement.	X
H5-9: Alliances with more inter-partner conflicts tend to exhibit lower levels of capability enhancement.	X
H5-10: Alliances with more joint conflict resolution tend to exhibit higher capability enhancement.	X

+++ : Strongly supported    ++ : Moderately supported    + : Weakly supported  
X: Not supported by this research

It is important to note, at this stage, that correlation analysis is not a very rigorous research tool for hypothesis testing. Therefore, the conclusions in Table 12 should only be considered as tentative and will benefit from more rigorous testing in the future.

Because many variables in the research framework are significantly correlated with a supplier's capability enhancement, the necessity of including different sources of variables and the relevance of the proposed micro framework (see Fig. 4) is generally supported. Although correlation analyses cannot establish the causal relationships between variables, there are reasons to posit that these correlated independent variables may be important determinants of learning and other performance indicators. In this regard, the interviews and cases studies are helpful for understanding the causality.

One limitation of the correlation analysis is that the relative impacts of different correlated variables on performance cannot be assessed and compared. This could be a serious problem in a holistic and complex model containing a large number of correlated variables. Simply to know all the possible determinants is not enough, because such general findings provide only limited insights both theoretically and practically. A deeper question following the findings of this chapter should be: *“What are the key determinants of alliance performance among all these correlated variables?”* The next chapter endeavors to provide some answers to this specific question.

## **Chapter VI: DETERMINANTS OF ALLIANCE PERFORMANCE**

In order to identify the most significant independent variables (key determinants) affecting alliance performance (particularly suppliers' capability enhancement), stepwise regression is used for variable selection from section 6.1 to section 6.3. In section 6.4, regression is applied further to a group of new factors in order to conclude our searching for the determinants of alliance performance.

The preparation for the stepwise regression is to identify the relevant independent variables, which have been obtained from bivariate correlation analysis in Chapter V. Then the correlated independent variables are included in the stepwise regression process. The stepwise regression algorithm starts by finding the most significant single-variable regression model. In other words, the most strongly correlated variable will enter the model first. Then the second variable included into the model is the one which contributes the highest additional explanatory power to the existing model. This procedure minimizes the multicollinearity among the independent variables in the model. Whenever a new variable is added into the model, the stepwise regression process reevaluates automatically the significance of every existing variable in the model, to see if these variables meet preset significance standards for staying in the model. If any existing variable loses the required significance after the inclusion of a new variable, the existing variable is dropped from the model. This combined process of forward selection and backward elimination is executed by the computer program until no variables

outside the model can be entered and no variables inside can be eliminated. The most suitable regression model is thus established.

As there are two sets of independent variables in this research - the extracted factors and the original individual variables, two sets of stepwise regression are executed and compared to maximize insights from different approaches. The regression on the extracted factors reveals the determinants at a broader and more abstract level, while the regression on individual variables explores the determinants in a deeper and more specific way. In the section following, the regression results are presented both on the abstract (general) level and on the concrete (specific) level. The former contributes to academic research in that it extracts theoretical determinants from a complicated phenomenon, while the latter is useful to business practice in that it generates specific indications to the question of how to improve alliance performance.

The following section presents significant independent variables included in the final stepwise regression models. They are the possible key determinants of the dependent variable (alliance performance). Because there is a hierarchy of performance indicators in this research (see fig. 13), the regression results of the first-level alliance performance (learning, satisfaction, sales growth, and change of cooperative strength) are presented in section 6.1, followed by the regression results on functional learning (R&D learning, process learning, and marketing learning) in section 6.2, and the detailed regression results on each capability indicator in section 6.3. Finally, using a different approach - a two-stage data reduction

strategy (Hill et al., 1992: 509) - regression is applied on a condensed set of factors so that the determinants of alliance performance can be identified from another different angle.

### 6.1 The Determinants of the Alliance Performance

The first step of the stepwise regression process is to identify the input variables which may provide some explanatory power for the dependent variable. For this purpose, the results of the bivariate correlation analysis in Chapter V are used as the inputs for the stepwise regression. The correlated independent variables and factors, categorized into different variable-groups, can be summarized:

#### The correlated factors of different alliance performance

Correlated Factor	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
Recipient Characteristics	Recip1 Recip3	Recip2	Recip2	Recip1
Partner Characteristics	Partner1 Partner2	Partner1 Partner2	Partner2	Partner1 Partner2
Project Characteristics	Project1 Project3	Project1 Project5	Project2 Project3 Project4	Project3 Project5
Relationship Characteristics	Rela2 Rela3 Rela4 Rela6	Rela1 Rela2 Rela4 Rela5	Rela6	Rela2 Rela3

The correlated variables of different alliance performance

Correlated Variable	Alliance Performance			
	Learning	Satisfaction	Sales Growth	Change of co. strength
Recipient Characteristics	v93, v10a, v10b,	v10c	Sales93, v91, v98, v10c, v13	v10b, v14
Partner Characteristics	v12a, v12b, v18d, v18e, v18f, v18g	v117, v118, v12a, v12b, v12c, v18d, v18e, v18f	v4, v12a, v12b, v18f, v18g	v118, v12a, v12b, v18d, v18e, v18f, v18g
Project Characteristics	v8Aa, v8Ba, v8Ca, v18a, v18c, v5b, v5c, v5d	v5b, v5c, v5d	v31, v8Aa, v8Ba, v18c, v153	v8Aa, v8Ba, v8Ca, v18a, v5b
Relationship Characteristics	v20a, v20c, v20d, v20e, v20g, v20i, v20j, v20k, v20l, v20m, v191, v192, v20p	v20a, v20b, v20c, v20d, v20e, v20f, v20g, v20h, v20i, v20j, v20k, v20m, v20n, v20o, v192, v20p, v20q, v20r, v20s	v20a, v20e, v20f, v20g, v20i, v20k, v20m, v20s	v20a, v20b, v20c, v20d, v20e, v20f, v20g, v20i, v20l, v20m, v20n, v20o, v191, v20p, v20q

The results of stepwise regression against different alliance performance can be seen in the next section. Note that the regression on the extracted factor level is labeled “Model 1”, while the regression on the original variable level is denoted “Model 2”. Variables (factors) in the table represent the ones with the highest explanatory power for the variance of the dependent variables. The meaning and measure of each variable (factor) can be found in Appendix 1.

### 6.1.1 Key determinants of overall learning

#### *Regression results on Learning:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip1* (.15) Recip3* (.13)	Partner1** (.20)	Project1* (.13)	Rela3* (.16) Rela6** (.17)	24.6% (21.9%) [.0000] DW: 1.67♣
<i>Model 2 Variables</i>	v93** (.49)	v18e* (.11) v12a* (.08)	v5d* (.08) v18c* (.07)	v191* (.22) v20k*** (.11)	34.2% (31.6%) [.0000] DW: 1.64

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

♣: DW = Durbin-Watson Test

The first variable included in Model 1 is partner's transparency (Partner1) which is the most important factor because of both its significance and slope (B = .20). Model 2 reveals further that partner's transparency can be improved through partner's technical document provision (such as R&D document provision: v18e) and partner's network approach (v12a). Suppliers aiming for capability enhancement through cross-border alliances should endeavor to solicit technical documentation, and to establish themselves within partners' global operational networks.

Another very significant factor in Model 1 is inter-firm marketing interaction (Rela6), which can be enhanced through the daily exchange of information and ideas between sales and marketing staff of the two organizations (v20k). In other

words, like technical engineers, sales and marketing staff are also important learning agents who are both the carriers and accumulators of tacit knowledge. In order to exploit fully the learning opportunities within cross-border alliances, firms should entrust their marketing teams with the mission of information collection and capability absorption, instead of simply selling products.

Other factors which contribute to a supplier's overall learning include supplier's learning intent (Recip1), supplier's receptivity (Recip3), inter-partner similarity (Project1), and mutual dependency (Rela3). A supplier's learning intent is reflected by its marketing-learning intent (v93). It is also noteworthy that the inter-partner similarity correlates with a supplier's receptivity ( $r = .2306$ ,  $p = .002$ ). Therefore, cooperating with partners of similar culture, management, and complementary skills may enhance a firm's receptivity, and consequently contribute to its learning. As for the factor of mutual dependency, a partner's importance to its supplier (v191) has significant explanatory power for a supplier's learning result. Although the causality cannot be established, the result reveals the importance of taking partners seriously in a partnership.

Both overall learning models have satisfactory explanatory power (R-squares are 24.6% and 34.2%) and they are also very significant (significance level  $< .0001$ ). All four variable-groups make a significant contribution to the explanation of a firm's overall learning, indicating the necessity of a more holistic model to incorporate different sources of learning determinants.

### 6.1.2 Key determinants of overall satisfaction

*Regression results on Satisfaction:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>		Partner2√ (-1.56)		Rela1** (2.06) Rela2*** (2.72) Rela4* (1.64) Rela5** (-2.57)	22.6% (20.3%) [.0000] DW: 1.86
<i>Model 2 Variables</i>		v117** (-6.76)	v5b** (1.78)	v20e**** (3.59)	23.6% (22.2%) [.0000] DW: 1.95

√ p < .1, \* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

Although the first factor put into Model 1 is partner's protectiveness (Partner2), which negatively affects a supplier's overall satisfaction, the relationship factors appear dominant. Partner's protectiveness is consistently robbed of its explanatory power by the inclusion of several relationship factors throughout the stepwise regression process. In other words, although partner's protectiveness is the most significant factor affecting a supplier's satisfaction, it can be explained and replaced by a group of relationship factors. Among these relationship factors, mutual trust (Rela2) appears to be the most important determinant in the final model, followed closely by opportunism (Rela5). Other relationship factors such as harmonious

communication (Rela1) and technical interaction (Rela4) are also determinants of a supplier's overall satisfaction.

Model 2 reveals that a supplier's satisfaction is subject to its partner. Partner's effort for continuing relationship (v20e) is the most important determinant of satisfaction. While skill complement (v5b) is helpful to a supplier's satisfaction, partner's local market penetration intent (v117) reduces the level of satisfaction.

In sum, the variable-group of relationship characteristics dominates the outcome of a firm's satisfaction in a partnership. Relationship-management proves to be very important to a supplier's subjective evaluation of its partnership.

### 6.1.3 Key determinants of sales growth after project

*Regression results on Sales Growth:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip2**** (.23)		Project3* (.10)	Rela6** (.12)	18.0% (16.5%) [.0000] DW: 1.90
<i>Model 2 Variables</i>	Sales93** (.002) v91* (.26)	12b*** (-.11)	v18c** (.07)	v20k* (.05)	24.8% (22.5%) [.0000] DW: 1.85

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

On the abstract level (Model 1), the extent of a supplier's position as an EMS supplier (Recip2) is found to be the key determinant of its sales growth after a project. Analyzed in conjunction with another determinant, symbiotic partnership (Project3), a very interesting and important scenario can be depicted: a submissively cooperative strategy with MNC clients pays off in terms of sales growth. A typical dilemma challenging a resource-limited and niche-capability supplier is the trade-off between short-term business and long-term competitiveness. While aggressively pursuing competence enhancement through external asset/skill acquisition helps a supplier to upgrade its long-term competitiveness, such a strategy is not often welcomed by its OEM partners and can even jeopardize future sales opportunities. In a cross-border contract manufacturing alliance, the foreign buyer tends to place orders with ease when its supplier concentrates on manufacturing, improves its R&D contribution, but gives up the intent of developing its own marketing capability and relies on the buyer's.

While capability enhancement in the marketing area is vital for the future competitiveness of Taiwanese IT firms, it is also important to acknowledge the fact that a supplier may achieve satisfactory sales growth by simply defining itself as an EMS supplier, and embedding itself in its partner's global business network. Upgrading from the status of a contract manufacturer to becoming an independent global player is a process full of costs and risks, a game that many indigenous suppliers find either unaffordable or undesirable. No wonder that although the value of marketing capabilities is fully acknowledged, only a small portion (16%) of the respondents have chosen marketing learning (v93) as one of their firm's major

goals. The majority (as many as 82.9%) of Taiwanese IT suppliers still claimed sales increase (v92) as the major goal for cross-border contract manufacturing alliances. It is because of this trade-off between marketing-learning and sales that many resource-limited suppliers have chosen to remain in the contract manufacturing business, even to develop themselves into captive EMS suppliers of global players. This finding is also in line with the market trend of the flourishing contract manufacturing business and the emergence of EMS suppliers.

Nevertheless, there are still ways for resource-limited suppliers to enhance their marketing capability without provoking their partners. Marketing interaction (Rela6) with existing clients appears to be one. Through the sharing of information or ideas between sales/marketing staff, the suppliers not only can serve their existing clients better, but also can accumulate invaluable knowledge and experience in international marketing. Such marketing interaction is beneficial both to supplier's overall learning and sales growth.

Another interesting finding is the importance of critical mass in the global arena. As Taiwanese IT firms are partnering with larger MNCs, size (in terms of sales) is becoming important to secure and deliver cross-border business. The virtuous circle of "sales-induce-sales" is made clear by the significance of supplier's annual sales (Sales93). As the IT industry is consolidating, larger suppliers tend to grow even faster than smaller ones.

Other findings such as the negative sales effect of partner's short-term attitude (v12b) and the positive sales effect of ODM business (v18c) are also meaningful. These results suggest that finding long-term partners or maintaining cooperation with existing ones, and if possible, shifting from OEM business to ODM, should be the right strategic choices for suppliers in pursuit of sales growth.

#### 6.1.4 Key determinants of change of cooperative strength

*Regression results on Change of Cooperative Strength:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>			Project3*** (.47) Project5*** (-.47)	Rela2* (.29)	21.0% (19.6%) [.0000] DW: 1.82
<i>Model 2 Variables</i>	v14** (-.21)	v118* (-1.00) v12a* (.18)		v191** (.55) v20e* (.25)	23.0% (20.8%) [.0000] DW: 1.94

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

On the abstract level of Model 1, the change of cooperative strength in a partnership hinges mainly on the degree of strategic compatibility between partners. On the one hand, the destructive effect of collaborative competition (Project5) in a partnership is magnified through its negative slope (-.47) and significance ( $p = .0001$ ) in the final model. The implication is that a partnership cannot be deepened when there is (even potentially) direct competition between partners, or when the partners' skills are not complementary but overlapping. On the other hand, when a symbiotic

partnership (Project3) is formed in which both sides have strong interaction and joint R&D involvement, and in which the foreign partner concentrates on marketing while the indigenous supplier provides complete manufacturing services, a relationship tends to be strengthened after the project. The findings suggest that partner-matching may well pre-determine the future of a specific partnership.

The regression result also shows the importance of mutual trust (Rela2) to change of cooperative strength in a partnership. Mutual trust, which is gradually developed through the alliance process, is beneficial to subsequent cooperation within a partnership. Such a result also shows the influence of relationship-management to the subsequent cooperation between partners.

The result under Model 2 reveals the dynamic nature of subsequent cooperation. The first variable selected into the model is partner's importance to supplier (v191), followed by partner's effort for continuing relationship (v20e). The results seem to highlight the important role of the partner in deciding subsequent cooperation between OEM partners, thus indicating the reactive position of the supplier in this process. When the OEM buyer is important to the supplier and the buyer intends to continue cooperation, the model indicates that the cooperation between partners tend to be strengthened. By the same token, partner's network approach (v12a) towards its supplier contributes to the strengthening of an existing OEM partnership.

The other side of the story is decided by the suppliers, who tend to reduce cooperative strength with foreign partners from whom the suppliers have little to

learn (instead, the partners expect to learn from the suppliers: v118). This is additional evidence suggesting the learning-oriented cooperative intent of Taiwanese IT suppliers.

## **6.2 The Determinants of Learning in Different Functional Areas**

When attention is focused on learning, further analysis is needed to explore the determinants of specific learning areas and indicators. In the following section, determinants of the three functional learning areas are examined first, followed by further investigation into the determinants of learning given by specific capability indicators. For comparison purposes, the same stepwise regression process as in the previous section is applied, to reach the following results. Through bivariate correlation analysis the correlated factors and variables are identified and then used as the inputs for the stepwise regression.

The correlated factors of learning in different functional areas

Correlated Factor	Learning		
	R&D Learning	Process Learning	Marketing Learning
Recipient Characteristics	Recip1 Recip3	Recip1	
Partner Characteristics	Partner1 Partner2	Partner1 Partner2 Partner3	Partner1 Partner2
Project Characteristics	Project1 Project3 Project4	Project1 Project3 Project4	Project3
Relationship Characteristics	Rela3 Rela4	Rela3 Rela4	Rela2 Rela3 Rela6

The correlated variables of learning in different functional areas

Correlated Variable	Learning		
	R&D Learning	Process Learning	Marketing Learning
Recipient Characteristics	v93, v10a, v10b, v14	v91, v93, v10a, v10b	v93, v96,
Partner Characteristics	v12a, v12b, v18d, v18e, v18f, v18g	v12a, v18d, v18e, v18f	v117, v12a, v12b, v18d, v18e, v18f, v18g
Project Characteristics	v31, v8Aa, v8Ba, v8Ca, v18c, v158, v5b, v5c, v5d	v31, v8Aa, v8Ba, v8Ca, v18a, v18b, v18c, v5b, v5c, v5d	v8Ca, v5d
Relationship Characteristics	v191, v192, v20a, v20c, v20d, v20e, v20g, v20i, v20j, v20k, v20l, v20m, v20p	v191, v192, v20a, v20b, v20c, v20d, v20e, v20g, v20i, v20j, v20l, v20m, v20n, v20p, v20q	v191, v20a, v20c, v20d, v20e, v20g, v20k, v20m, v20p

The results of stepwise regression against learning in different capability dimensions can be seen in section 6.2 below.

## 6.2.1 Key determinants of R&D learning

*Regression results on R&D Learning:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip1* (.17)	Partner1** (.23)	Project1* (.17)	Rela3** (.21)	27.4% (24.8%) [.0000] DW: 1.72
	Recip3* (.15)		Project4* (.18)		
<i>Model 2 Variables</i>	v14* (.08)		v18c** (.12)	v191** (.32)	30.3% (27.8%) [.0000] DW: 1.56
			v5d* (.10)	v20i* (.10)	
				v20k* (.07)	

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

In Model 1, partner's transparency (Partner1) and mutual dependency (Rela3) are the key determinants of a supplier's R&D learning, followed by other significant factors such as project scale (Project4), supplier's learning intent (Recip1), supplier's receptivity (Recip3), and inter-partner similarity (Project1). These findings on the abstract level are clarified further by the determinants in Model 2.

In Model 2, the variable most strongly correlated with a supplier's R&D learning is inter-firm R&D interaction (v20i), indicating the importance of creating opportunities for R&D engineers of both sides to work together. However, the explanatory power of R&D interaction is greatly reduced by the inclusion of supplier's contribution to R&D task (v18c). The result suggests that after the supplier's R&D capability has reached a certain level and the contract

manufacturing business has gradually shifted from OEM to ODM, the supplier can speed up its R&D learning through participation in and contribution to the task of contract manufactured product development. Under such circumstances, working with the partner's R&D engineers becomes less critical to a supplier's R&D learning. Instead, inter-firm marketing interaction (v20k) becomes more important because of the increasing value of market information to the quality and speed of product R&D.

Throughout this process, inter-firm management similarity (v5d) and the supplier's language and practices familiarity with its partner (v14) set the path for better communication and thus facilitate interaction. Another critical variable is partner's importance to supplier (v191). When the supplier acknowledges the importance of the partner, it tends to utilize its best efforts to serve the client. Efforts including more R&D involvement and compliance with customer's requests in product specifications will not be spared, thus the supplier's R&D capability is "forced" to improve.

Overall, both models have satisfactory explanatory power for a supplier's R&D learning (R-squares are 27.4% and 30.3%), indicating good fitness of the models.

## 6.2.2 Key determinants of process learning

*Regression results on Process Learning:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip1* (.15)	Partner1* (.19)	Project1* (.17) Project3* (.18)		20.7% (18.8%) [.0000] DW: 1.83
<i>Model 2 Variables</i>	v93** (.46)	v12a** (.12) v18e* (.12)	v31* (1.63E-10) v18c* (.08)	v20j** (.09)	28.9% (26.4%) [.0000] DW: 1.91

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

The first factor put into Model 1 is symbiotic partnership (Project3) , indicating the importance of a well-matched partnership to a supplier's process learning. When the partner takes care of marketing, the supplier provides complete manufacturing services, and both sides collaborate in R&D, the supplier tends to achieve a higher level of process learning. Not surprisingly, partner's transparency (Partner1) and supplier's learning intent (Recip1) are also determinants of process learning, while inter-partner similarity (Project1) strengthens further this learning effect.

Since Model 1 has only a moderate explanatory power (R-square = 20.7%), it is important to examine the results of Model 2 (R-square = 28.9%) in order to gain more insights into the issue of a supplier's process learning. Firstly, technical document provision (represented by partner's R&D document provision, v18e) is the most strongly correlated variable in the model, followed by partner's network

approach (v12a) and inter-firm process interaction (v20j). These three determinants reveal the nature of process learning in which a supplier can benefit from the partner's openness by partner's technical document (production parameters, quality standards, or R&D specification, etc.) provision, by the interaction between process engineers, and especially by the partner's insider treatment.

Unexpectedly, the supplier's R&D contribution (v18c) emerges as another determinant of its process learning. The result may be explained by the close linkage between R&D and manufacturing in the IT industry, in which product quality and manufacturability are more or less pre-determined in the R&D stage. Therefore, the supplier's involvement in R&D activities is related to its process capability enhancement. By the same token, the inclusion of supplier's marketing-learning intent (v93) in the final model may seem odd at first glance, but it becomes understandable when v93 is interpreted as the representation of a supplier's ambition to upgrade itself to the ranks of independent global players.

Finally, the inclusion of transaction value (v31) in the model shows the impact of deal size on a supplier's process learning. A large-sized order tests and improves a supplier's process capability. This is one of the reasons why suppliers value large orders placed by MNC clients, even though these orders usually are less profitable and perhaps more risky.

### 6.2.3 Key determinants of marketing learning

*Regression results on Marketing Learning:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>		Partner1** (.26)		Rela6** (.25)	8.6% (7.6%) [.0000] DW: 1.66
<i>Model 2 Variables</i>	v93** (.68) v96* (-.37)	v12a* (.11)		v191* (.26) v20k*** (.17)	23.1% (21.0%) [.0000] DW: 1.83

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

Marketing learning is a sensitive issue in a contract manufacturing alliance. The partner is usually very careful to guard against the possibility of cultivating another competitor in the market, while the supplier always has an incentive for forward integration and tries to reduce the dependence on low-margin contract manufacturing business. Because of these sensitivities, marketing learning from the partner is more difficult through a contract manufacturing alliance, therefore the relatively weak explanatory power of these regression models is not surprising. This is in line with the survey results that, compared with the results of suppliers' R&D or process learning in contract manufacturing alliances, the marketing-learning effect is less significant and more diverse (see section 4.2.3).

Model 1 explains only 8.6% of the variance of a supplier's marketing learning, and only two factors are included in the final model: marketing interaction (Rela6) and

partner's transparency (Partner1). It seems that marketing learning is relatively independent of recipient and project characteristics, although partner's transparency and marketing interaction still help. From the interviews, many local managers believe that the improvement of marketing capability takes long-term commitment and consistent investment from the suppliers. One CEO of a mid-sized handy scanner maker showed his dismissal of the possibility of marketing learning from OEM partners: *"... no buyer is willing to freely share its marketing know-how with contractors. Even if it does, how can we absorb and use this know-how if we don't even have an international brandname or existing marketing channels?"*

However, the results of Model 2 (R-square = 23.1%) still suggest some possibilities of marketing-learning from OEM buyers. Firstly, inter-firm marketing interaction (v20k) proves to be the most influential single-variable of marketing learning, indicating the importance of information exchange among sales and marketing staff on a day-to-day basis. Secondly, supplier's marketing-learning intent (v93) is also important, although only 16% of the sample firms have indicated their marketing-learning intent. Thirdly, a supplier can learn a greater marketing capability if it is treated as a network insider by its partner (v12a). Fourthly, a supplier's valuation of the partner (v191) also affects its marketing learning. When the value of the partner is fully appreciated, the supplier tends to serve the client with extra care, thus becoming more responsive to customer needs and improving its marketing capability. Last, but not least, a supplier's capacity utilization intent (v96) is found to affect its marketing learning negatively. When a supplier has idle capacity, it tends to rely more on contract manufacturing business as a short-term

operational solution, instead of enhancing its own marketing capability to absorb the extra capacity. The result seems to show that local managers tend to yield to the short-term pressure of idle capacity, and by relying on the contract manufacturing business this impedes the long-term commitment to their own marketing capability enhancement. In fact, a Catch-22 situation of capacity investment has been confirmed from interviews with Taiwanese managers. In order to secure large OEM orders, a supplier usually needs to expand its capacity or upgrade its production facilities; and because of this additional capacity investment the supplier is under greater pressure to get more contract manufacturing business once the designated OEM projects are completed or downsized. In this sense, an EMS strategy may not originate from a deliberate strategic choice, rather it is an inevitable result of "muddling through" this Catch-22 cycle.

From the above findings, it can be concluded that although indigenous endeavor is critical to upgrade a supplier's marketing capability, learning from the partner can still play a catalytic role in a supplier's marketing capability enhancement.

### **6.3 The Determinants of Learning in Different Capability Indicators**

From a practical point of view, it would be useful to identify the key determinants of different firm-specific capabilities. The nine capability indicators, which constitute a firm's overall competence, are going to be treated as dependent variables in the following regression analyses. As in the previous section, their

correlated factors and variables, identified by bivariate correlation analyses, are used as the input for the stepwise regression.

### 6.3.1 Determinants of R&D-related capabilities

#### The correlated factors of learning in different R&D indicators

Correlated Factor	R&D Learning		
	Product technology	R&D Speed	Customer Intimacy
Recipient Characteristics	Recip1	Recip1 Recip3	Recip1 Recip3
Partner Characteristics	Partner1	Partner1	Partner1 Partner2
Project Characteristics	Project2 Project3 Project4	Project1 Project3	Project1 Project3
Relationship Characteristics	Rela3 Rela4	Rela3	Rela2 Rela3 Rela4

#### The correlated variables of learning in different R&D indicators

Correlated Variable	R&D Learning		
	Product technology	R&D Speed	Customer Intimacy
Recipient Characteristics	v94, v10a, v10b	v93, v10a, v10b, v14	v93, v14
Partner Characteristics	v12a, v18d, v18e, v18f, v18g	v12a, v18d, v18e, v18g	v12a, v12b, v18d, v18e, v18f, v18g
Project Characteristics	v31, v8Aa, v8Ba, v8Ca, v18c, v158, v5b,	v8Ca, v18c, v158, v5b, v5c	v31, v8Ba, v8Ca, v18a, v18c, v5b, v5c, v5d
Relationship Characteristics	v191, v192, v20a, v20e, v20g, v20i, v20j, v20k, v20l, v20m	v191, v20c, v20g, v20i, v20k, v20l, v20m, v20p	v191, v192, v20a, v20c, v20d, v20e, v20g, v20i, v20j, v20k, v20l, v20m, v20p, v20q

The results of stepwise regression are presented in the following section.

## Key determinants of product technology enhancement

### *Regression results on Product Technology Enhancement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip1*** (.29)	Partner1*** (.31)	Project4** (.26)	Rela3* (.20)	24.9% (23.2%) [.0000] DW: 1.90
<i>Model 2 Variables</i>	v10b*** (.19)			v191* (.25) v20i**** (.24)	25.1% (23.8%) [.0000] DW: 1.83

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

The major determinants of a supplier's product technology enhancement are partner's transparency (Partner1) and supplier's learning intent (Recip1). Since most Taiwanese IT firms have greatly enhanced their R&D capability in recent years, receptivity does not seem to be an obstacle to their product technology learning. As long as the partner is open and the supplier has learning intent, the supplier can achieve significant product technology enhancement, even through manufacturing alliances. In addition, larger-scale projects (Project4) are more helpful to a supplier's product technology enhancement, and mutual dependency (Rela3) is another facilitator.

In Model 2, inter-firm R&D interaction (v20i) appears to be the most influential determinant of product technology enhancement. Suppliers aiming for product technology enhancement should maximize the interaction of their R&D engineers

with those of the partner. The second determinant, supplier's perceived benefit of learning (v10b), underlines the importance of the supplier's learning intent. Likewise, taking the buyer seriously (v191) is also the prerequisite of effective product technology learning.

However, not all indigenous suppliers have a high regard for their partners' product technology. The interviews with local managers confirm that as most of the indigenous suppliers have shifted their business focus from OEM to ODM, some of them have become increasingly self-confident (or even conceited) in their product technology. Irritated by the buyers' slow and incompetent product R&D, one president of a major Taiwanese PC makers complained: *"A Japanese company has been interested in one of our products, and so we made them an offer. Then they did two or three months of testing. But by the time they came back to place an order, we had to say, 'Sorry, the product is already obsolete.'...And it's happened several times."*

From this research, it is clear that such a self-content mentality could adversely affect the supplier's product technology enhancement. When the supplier regards its partner highly (v191), and when the value of learning from the partner (v10b) is appreciated, the supplier tends to learn more of product technology. Technology humility is still a prerequisite of technology learning.

Overall, both models provide satisfactory explanatory power (R-squares = 24.9% and 25.1%) and thus the conclusions above are valid.

## Key determinants of R&D speed enhancement

### *Regression results on R&D Speed Enhancement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip1** (.30) Recip3** (.31)			Rela3* (.24)	14.4% (12.8%) [.0000] DW: 1.86
<i>Model 2 Variables</i>	v10b** (.18) v14* (.12)		v8Ca* (.17)	v20k* (.11)	15.4% (13.5%) [.0000] DW: 1.86

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

A supplier's new product R&D speed does not seem to be significantly enhanced through contract manufacturing alliances, judging from the relatively low explanatory power of both models (R-square = 14.4% and 15.4%). Among all relevant factors, the extent that a supplier adjusts its own R&D activities to meet the buyer's requests emerges as the determinant of its R&D speed enhancement. When a supplier's learning intent (Recip1) and/or receptivity (Recip3) are high, and mutual dependency (Rela3) in the partnership is high, the supplier tends to adjust its R&D activities for the partner more, thus enhancing its R&D speed.

In Model 2, partner's marketing contribution (v8Ca) is the first variable in the model, showing that working with partners of strong marketing capability helps the supplier speed up its new product roll-out. While supplier's familiarity with the

partner's language and practices (v14) facilitates such a process, supplier's perceived benefit of learning (v10b) is a more influential variable, indicating the importance of supplier's learning intent. In addition, inter-firm marketing interaction (v20k) not only provides the supplier with updated market information, but it also adds pressure to the supplier's new product roll-out, especially with ODM projects in which the supplier's new product time-to-market is a critical selection criterion for most clients.

Although a supplier may find it difficult to learn to speed up new product roll-out from the partner, the supplier may be forced into such a time-based competition through the pressure of its OEM buyer. In other words, it is mainly market competition that shapes the supplier into a responsive innovator, and a demanding contract manufacturing client can drive a supplier's R&D speed enhancement.

### Key determinants of end-customer intimacy improvement

#### *Regression results on End-Customer Intimacy Improvement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>		Partner1* (.19) Partner2** (-.20)	Project1** (.24) Project3*** (.28)		24.6% (22.8%) [.0000] DW: 1.71
<i>Model 2 Variables</i>	v14* (.08)	v12a* (.10) v18e* (.12)	v18c**** (.17) v5d** (.11)	v20g* (.19)	32.9% (30.5%) [.0000] DW: 1.59

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

On the abstract level, end-customer intimacy is most significantly affected by the degree of symbiotic partnership (Project3), which is characterized by a high degree of task interdependence. Secondly, inter-partner similarity (Project1) opens the way for better coordination and communication and thus also helps improve the suppliers' end-customer intimacy. Finally it appears that partner's protectiveness (Partner2) impedes a supplier's end-customer intimacy improvement, while partner's transparency (Partner1) facilitates it.

Looking at the specific variables, supplier's R&D contribution (v18c) appears to be the most influential variable. When a supplier is directly involved in the product R&D task, it needs to have a full grasp of customer needs and market trends. Therefore involvement in ODM business not only requires suppliers to sharpen their product technology, but also forces them to be more sensitive to the market, thus enhancing their end-customer intimacy. Since partner's transparency conditions the extent to which the supplier can get sufficient and timely market feedback, partner's network approach (v12a), the extent of inter-firm management similarity (v5d), and supplier's language and practices familiarity (v14), all facilitate the supplier's end-customer intimacy improvement. The supplier can also benefit from the partner's R&D document provision (v18e) in which customer needs are embedded, or if the supplier intends to maintain the continuing relationship with the partner (v20g).

Both models have satisfactory explanatory power (R-square = 24.6% and 32.9%) for a supplier's improvement in end-customer intimacy.

### 6.3.2 Determinants of manufacturing-related capabilities

The correlated factors and variables are first identified through bivariate correlation analysis, and then used as the input for the following stepwise regression.

#### The correlated factors of learning in different manufacturing indicators

Correlated Factors	Process Learning		
	Manufacturing Quality	Manufacturing Flexibility	Low-cost Manufacturing
Recipient Characteristics	Recip1	Recip1	Recip1 Recip3
Partner Characteristics	Partner1 Partner3	Partner1	Partner1 Partner2
Project Characteristics	Project3	Project1 Project3 Project4	Project1 Project3
Relationship Characteristics	Rela2 Rela4	Rela3 Rela4	Rela3

#### The correlated variables of learning in different manufacturing indicators

Correlated Variable	Process Learning		
	Manufacturing Quality	Manufacturing Flexibility	Low-cost Manufacturing
Recipient Characteristics	v93, v94, v97, v98, v10a, v10b	v91, v10a, v10b	v10b, v14
Partner Characteristics	v4, v111, v12a, v18d, v18e, v18f	v12a, v18e	v12a, v18e, v18f
Project Characteristics	v31, v8Aa, v8Ba, v18a, v18b, v18c, v151, v5b	v31, v18a, v18c, v5b, v5c, v5d	v31, v8Aa, v8Ca, v18c, v5b, v5c
Relationship Characteristics	v191, v20a, v20c, v20d, v20e, v20g, v20i, v20j, v20k, v20m, v20n, v20p, v20q, v20s	v191, v20a, v20g, v20i, v20j, v20l, v20m, v20p	v191, v192, v20a, v20c, v20e, v20g, v20i, v20j, v20l, v20p

The results of stepwise regression are summarized in the section below.

### Key determinants of manufacturing quality enhancement

*Regression results on Manufacturing Quality Enhancement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>			Project3*** (.33)	Rela4*** (.28)	17.9% (16.9%) [.0000] DW: 1.83
<i>Model 2 Variables</i>	v93** (.57) v10a* (.12)	v12a* (.10)	v18c* (.10)	v20j*** (.13) v20a* (.19)	30.1% (27.6%) [.0000] DW: 1.94

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

Although only two factors are included in Model 1, both are very significant and the explanatory power of the whole model is as high as 17.9%. Forming and cultivating a symbiotic partnership (Project3) with the partner is very beneficial to a supplier's manufacturing quality improvement. Almost as important is the extent of inter-firm technical interaction (Rela4), through which the supplier's manufacturing quality can be examined and enhanced.

The specific Model 2 provides much stronger explanatory power (R-square = 30.1%) than Model 1. In the specific model, a supplier's manufacturing quality can be enhanced primarily through its inter-firm process interaction (v20j) with the

partner. When the process engineers share information or ideas, aiming to fix process quality problems or improve process control, the supplier can benefit from such coordination and learn from the partner's engineers. The basis for this is partner's credibility (v20a) in that the partner has the capability to examine product quality or help the supplier to fix quality problems. When the perceived capability gap (v10a) is large, a supplier can improve process quality simply by working with a partner who has higher process quality standards. Either through organizational isomorphism (the supplier benchmarks itself against the partner) or from the partner's requirements, the supplier's process improves.

The significance of supplier's marketing-learning intent (v93) is also noteworthy. For indigenous contract manufacturers, improving product quality usually is the first hurdle for successful international marketing. Therefore, contract manufacturers intending to market their products independently may need to work hard for process quality improvement first. Another interesting finding is that supplier's R&D contribution (v18c) robs perceived capability gap (v10a) of its explanatory power, showing that the supplier's R&D involvement bridges its capability gap with the partner; and at the same time, facilitates its process quality improvement.

## Key determinants of manufacturing flexibility enhancement

### *Regression results on Manufacturing Flexibility Enhancement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip1* (.20)	Partner1* (.26)	Project1** (.25) Project4* (.23)		14.9% (12.9%) [.0000] DW: 1.88
<i>Model 2 Variables</i>		v12a** (.17)	v31* (2.57E-10)	v20j** (.14)	16.7% (15.3%) [.0000] DW: 1.93

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

In Model 1, a supplier's manufacturing flexibility enhancement is affected by four factors: partner's transparency (Partner1), inter-partner similarity (Project1), project scale (Project4), and supplier's learning intent (Recip1). Even with four significant factors in the model, the overall explanatory power of Model 1 is still relatively low. It is also difficult to get meaningful insights from the factors. Overall, the results seem to suggest two determinants of a supplier's manufacturing flexibility enhancement: the supplier's rapport with the partner and the scale of the project.

Compared with Model 1, the specific Model 2 provides a better explanation for a supplier's learning in manufacturing flexibility. Partner's network approach (v12a) appears to be the most influential determinant, showing that when the supplier perceives itself being treated as an "insider", it tends to make greater adjustments to its manufacturing activities for the partner. The supplier also enhances its

manufacturing flexibility through the daily interaction between process engineers of the two organizations (v20j). Finally, one interesting finding is the significance of transaction value (v31) in influencing a supplier's manufacturing flexibility. This may result from the experience of handling a large volume of throughput with a fixed manufacturing capacity, or from suppliers' operational stretch or adjustments made for larger projects in which buyers usually enjoy higher bargaining power.

Although some determinants have been identified through the stepwise regression, neither model seems to provide substantial explanatory power for manufacturing flexibility enhancement (R-squares = 14.9% and 16.7%). Such results imply that a supplier's manufacturing flexibility enhancement cannot be satisfactorily explained by the proposed theoretical framework.

### Key determinants of low-cost manufacturing improvement

#### *Regression results on Low-Cost Manufacturing Improvement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>	Recip3** (.24)			Rela3**** (.42)	15.6% (14.6%) [.0000] DW: 2.12
<i>Model 2 Variables</i>		v18e* (.17)		v191*** (.47)	12.8% (11.8%) [.0000] DW: 2.09

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

Low-price supply is an indispensable evil for most contract manufacturers. While no manufacturer would like to be positioned purely as a low-cost source and be consistently pressed for a lower price, it seems to be equally true that no contract manufacturer can secure cross-border business without a certain level of low-cost manufacturing capability. From the result of Model 1, further cost reduction seems to be subject to the bargaining power of the two parties. When mutual dependency (Rela3) is high, and when the supplier is experienced in OEM business or familiar with the partner (Recip3), the supplier tends to yield to the pressure of further cost reduction. Although Model 1 only has limited explanatory power for a supplier's low-cost manufacturing improvement (R-square = 15.6%), both included factors seem to be quite significant.

The specific Model 2 (R-square = 12.8%) does not provide more useful insight as only two variables are included: partner's importance to supplier (v191), and partner's R&D document provision (v18e). Since 84.5% of the partners are perceived to cooperate for the purpose of low-cost sourcing, it is reasonable to assume the partner will consistently press the supplier for lower-cost manufacturing. When the partner is very important to the supplier, the supplier has to comply with the partner's demands and is relentlessly required to reduce its manufacturing cost. This is why partner's importance is a determinant of a supplier's low-cost manufacturing improvement. Another major source of cost reduction in the IT industry comes from the change of parts and components in the product - which can be more easily achieved if the buyer is willing to provide R&D documentation to

the supplier. This fact may explain why the partner's R&D document provision is a determinant of the supplier's low-cost manufacturing improvement.

### 6.3.3 Determinants of marketing-related capabilities

Again, the correlated factors and variables are identified through bivariate correlation analysis, and then used as the input for the stepwise regression.

#### The correlated factors of learning in different marketing indicators

Correlated Factor	Marketing Learning		
	Marketing Experience	Brand Name	Distribution Channel
Recipient Characteristics		Recip1	
Partner Characteristics	Partner1 Partner2	Partner1	Partner1 Partner2
Project Characteristics	Project3 Project6	Project3	
Relationship Characteristics	Rela2 Rela3 Rela6		Rela6

#### The correlated variables of learning in different marketing indicators

Correlated Variable	Marketing Learning		
	Marketing Experience	Brand Name	Channel
Recipient Characteristics	v93	v93, v96, v10a	v93, v96
Partner Characteristics	v12a, v12b, v18e, v18f	v117, v12a, v12b, v18e, v18f	v117, v12a, v12b, v18e, v18f, v18g
Project Characteristics	v18c, v151, v7	v8Aa, v8Ba, v8Ca, v152	v5d
Relationship Characteristics	v191, v20a, v20c, v20d, v20e, v20g, v20k, v20m	v191, v20a, v20c, v20d, v20e, v20g, v20k, v20m, v20p	v191, v20c, v20d, v20e, v20g, v20i, v20k, v20l, v20m

The stepwise regression results are presented in the section below.

### Key determinants of international marketing improvement

#### *Regression results on International Marketing Improvement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>		Partner2* (-.20)	Project3** (.28) Project6* (.23)		10.9% (9.3%) [.0002] DW: 1.85
<i>Model 2 Variables</i>	v93** (.60)	v12a** (.13)	v151* (.34) v7* (.21)	v20g* (.25) v20k** (.13)	22.5% (19.8%) [.0000] DW: 1.69

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

Model 1 provides relatively low explanatory power for a supplier's marketing experience improvement (R-square = 10.9%), although three factors are significant. The most influential factor is symbiotic partnership (Project3), within which a supplier can learn from its marketing partner, although the supplier itself is responsible for manufacturing. In addition to the linkage between manufacturing and marketing, another good learning interface may be joint R&D involvement. Somewhat ironically, partner's businesslike supplier selection (Project6) helps (or forces) the supplier to gain more marketing experience. In this sense, fierce OEM order competition among qualified suppliers is beneficial to a supplier's marketing learning. Finally, partner's protectiveness (Partner2) proved to be more effective in

limiting the supplier's marketing experience enhancement, compared with its effect on a supplier's capability enhancement in the R&D or process areas.

On the concrete level, the specific Model 2 provides much improved explanatory power for a supplier's international marketing improvement (R-square = 22.5%). Inter-firm marketing interaction (v20k) is the first variable in the model, followed by partner's network approach (v12a), and supplier's marketing-learning intent (v93). These determinants confirm the assumptions that the more frequently its sales and marketing staff exchange information with the partner, the more transparent its partner is, and the stronger its marketing-learning intent is, the more a supplier can improve its marketing experience. The other determinants are less intuitive. However, the degree of market competition with other suppliers prior to the projects (v7), the supplier's effort for continuing relationship (v20g), and the challenge of serving a new customer (v151) all contribute to a supplier's marketing experience enhancement. Such results seem to suggest that suppliers' international marketing experience can be polished through the competitive process of securing orders and serving customers through the market mechanism.

## Key determinants of brandname-management enhancement

### *Regression results on Brandname-Management Enhancement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>		Partner1* (.27)			3.6% (3.1%) [.0113] DW: 1.83
<i>Model 2 Variables</i>	v93** (.76) v96* (-.47)	v12b* (-.13) v18f* (.16)		v20m* (.20)	19.1% (16.9%) [.0000] DW: 1.92

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

Model 1 provides very limited explanatory power for the variance of a supplier's brandname-management enhancement. Among all the factors, only partner's transparency (Partner1) has significant explanatory power. It seems that a supplier's international brandname-management enhancement cannot be sufficiently explained by Model 1.

However, Model 2 deepens our insight into the issue of brandname-management enhancement with much improved explanatory power (19.1%) and five significant variables. The positive significance of timely communication (v20m), partner's process document provision (v18f), and the negative significance of partner's short-term attitude (v12b) reveal that only when the partner is transparent and supportive can a supplier enhance its brandname-management through the alliance. Apparently, the supplier's determination to improve marketing capability (v93) is

also critical, and idle capacity (v96) can be a barrier to the supplier's in-house marketing commitment, thus hindering its brandname-management enhancement.

### Key determinants of channel-management enhancement

#### *Regression results on Channel-Management Enhancement:*

Determinant (B: slope)	Recipient Characteristics	Partner Characteristics	Project Characteristics	Relationship Characteristics	R <sup>2</sup> (Adj. R <sup>2</sup> ) [Sig. F Value]
<i>Model 1 Factors</i>		Partner1** (.28) Partner2* (-.22)		Rela6** (.31)	12.8% (11.3%) [.0000] DW: 1.68
<i>Model 2 Variables</i>	v93** (.69) v96* (-.47)	v12a* (.11) v18f* (.13)	v5d* (.14)	v20k*** (.20)	25.7% (23.2%) [.0000] DW: 1.90

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

A supplier's channel-management improvement is facilitated by inter-firm marketing interaction (Rela6) and partner's transparency (Partner1), and it is impeded by partner's protectiveness (Partner2). In a cross-border contract manufacturing alliance, it is not unusual for the foreign buyer to be thought of as the distribution channel. It is therefore not surprising to find that a supplier's channel-management improvement is, to a large extent, dependent on the support and cooperation of the partner.

On the concrete level, the specific Model 2 exhibits satisfactory explanatory power for a supplier's channel-management enhancement (R-square = 25.7%). Inter-firm marketing interaction (v20k) appears to be the most influential and the most

significant determinant. Supplier's marketing-learning intent (v93) is a facilitator, while its intent to utilize existing capacity (v96) becomes a barrier. Similar to brandname-management enhancement, partner's transparency and support also play important roles in a supplier's channel-management enhancement. The privileges of being treated as a network insider (v12a) and being provided with process document (v18f) reflect the partner's openness, and the support a supplier can receive. Inter-firm management similarity (v5d) is also helpful in that it facilitates the cooperative rapport and coordination between partners, and thus strengthens the relationship between the supplier and its partner who may be regarded as a distribution channel.

#### **6.4 A Complementary Approach for Determinants of Alliance Performance**

One problem with the previous method for determinant identification (i.e., stepwise regression on individual variables or factors) is that it tends to draw our attention to individual variables; but the aggregate explanatory power of correlated variables can be overlooked because once one variable is included in the regression model, its correlated variables have little chance to be included, regardless of their explanatory power for the dependent variable.

In order to overcome this problem, a two-stage data reduction strategy (see Hill et al., 1992: 509) is applied to extract further common factors from the existing factors (four sets of factors have been extracted from the first-stage factor analysis, see section 4.3). Using the same statistical procedure to reduce the 18 first-stage

factors, a set of six second-stage factors can be further extracted. Collectively, these six factors explain 54.3% of the variance in the data. The results are reported in Table 13.

**Table 13: Rotated factor matrix of the first-stage factors**  
*(Note: only loadings of 0.3 or greater are listed)*

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Project3: symbiotic partnership	.8310					
Rela3: mutual dependency	.7096					
Partner1: partner's transparency	.5826		.5623			
Project4: project scale		.7945				
Recip2: EMS supplier		.7039				
Partner3: partner's competitive status		.5918				
Rela4: technical interaction			.8157			
Project2: partner's technical contribution			.6525			
Partner2: partner's protectiveness		-.3232		.6395	-.3569	
Rela2: mutual trust				-.6272		
Project5: collaborative competition				.5608		
Project1: inter-partner similarity					.7263	
Recip3: supplier's receptivity					.5791	
Rela1: harmonious communication					.5647	
Project6: businesslike supplier selection						.7620
Rela5: opportunism				.4645		.4980
Recip1: supplier's learning intent	.4277					.4724
Rela6: marketing interaction						

According to the factor loadings, the second-stage factors 1-6 can be labeled:

- Factor 1: Symbiotic Mutual Dependency
- Factor 2: EMS for MNCs
- Factor 3: Technical Exchange and Support
- Factor 4: Protective Distrust
- Factor 5: Inter-Firm Similarity and Rapport
- Factor 6: Businesslike Approach.

The regression results of these six factors against different alliance performance indicators are reported below.

Alliance Performance	Learning	Satisfaction	Sales Growth	Change of Co Strength
Symbiotic Mutual Dependency	.33****			.51****
EMS for MNCs			.20****	
Technical Exchange and Support		1.56*	.11*	
Protective Distrust		-3.75****	-.12*	-.49***
Inter-Firm Similarity and Rapport	.23***	2.6**		
Businesslike Approach.	.17**			
Multiple R	.476	.434	.381	.412
R-square	.226	.188	.145	.169
Adjusted R-square	.212	.174	.130	.160
F Statistics	16.50****	12.95****	9.52****	17.40****
D-W Test	1.81	1.78	1.88	1.86

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

### *Determinants of Learning*

A supplier's learning is very significantly affected by the symbiotic mutual dependency between partners. The complementary division of labor between OEM buyers and suppliers (Project3: symbiotic partnership) is strongly associated with mutual dependency ( $r = .39$ ,  $p < .001$ ) and partner's transparency ( $r = .47$ ,  $p < .001$ ). Suppliers forming such symbiotic partnerships are equal partners of the OEM buyers; and because of the high task interdependence in such working relationships, the partners must be transparent to complete the projects successfully.

Involved in such a benevolent alliance, the supplier also demonstrates high learning intent. All the above conditions are favorable to a supplier's learning.

Inter-firm similarity and rapport is also a significant explanatory variable in the regression model of learning, indicating the importance of reducing inter-organizational diversity in an alliance. A supplier can benefit from partnering with firms of similar management or culture; it can also enhance capabilities based on previous OEM experience or familiarity with the partner's language and practices. Such an inter-organizational similarity or familiarity sets the path for harmonious communication and reduces the partner's protectiveness. All these conditions facilitate a supplier's learning from its partner.

Somewhat counterintuitively, the businesslike approach in a partnership is found to contribute to a supplier's learning. This finding may partially explain the improving competitiveness of Taiwanese IT suppliers through market-oriented OEM alliances with their foreign buyers. As these suppliers perceive their alliances with foreign buyers as businesslike or even opportunistic, they are under constant pressure to remain competitive in the market and continuously to enhance their own capabilities so that they can be assured of their survival. In other words, a learning-motivated supplier can learn even from a protective partner, or in a competitive environment.

Another surprise is the exclusion of the variable 'technical exchange and support' in the regression model, as technical interaction with partners and partners' technical

contribution should help suppliers enhance their capabilities. Further regression against the three functional learning indicators (R&D, process, and marketing) reveals that although the variable 'technical exchange and support' provides significant explanatory power for suppliers' R&D learning and process learning, it is insignificant in explaining suppliers' marketing learning. The implication is that technical exchange and support (from the buyers) is not helpful to suppliers' marketing learning. This finding may explain why Taiwanese IT firms have made much slower progress in their marketing capability enhancement, in spite of many years of successful contract manufacturing experience.

With only three variables the regression model explains 22.6% of suppliers' capability enhancement. The F-value is very significant, indicating a satisfactory model specification.

### *Determinants of Satisfaction*

Suppliers' satisfaction is seriously reduced by their perception of protective distrust in alliances. As expected, partners' protectiveness, opportunism and competition with suppliers all deepen the distrust in alliances, resulting in low levels of suppliers' satisfaction.

On the other hand, rather self-evidently, inter-firm similarity and rapport help enhance suppliers' satisfaction, and partners' technical exchange/support is regarded as a gesture of goodwill, all contributing to suppliers' satisfaction.

With three variables the regression model explains 18.8% of suppliers' satisfaction.

The F-value is very significant, indicating a satisfactory model specification.

### *Determinants of Sales Growth*

The results strongly suggest that suppliers taking up large-scale projects, defining themselves as professional contract manufacturers (EMS suppliers) for clients with high global market shares, tend to exhibit significant sales growth after projects. Such a strategy actually embeds the suppliers in OEM partners' global operational networks and the partners' protectiveness is thus decreased.

Partners' technical exchange and support are also important to suppliers' sales growth, as they are critical to the completion of current projects and may well affect the suppliers' chance of getting further business. In contrast, protective distrust is not only harmful to a continuing relationship with existing buyers, it may also ruin the suppliers' reputation and jeopardize future business with other foreign buyers.

The regression result shows that the six second-stage factors have relatively limited explanatory power for suppliers' sales growth after projects. The three included variables explain 14.5% of the variance. But the F-value is still very significant, and the three significant variables still provide some insights into the alliance effect on suppliers' sales growth.

### ***Determinants of Change of Cooperative Strength***

Symbiotic mutual dependency sets a solid foundation for a partnership, and the existence of such a quality in a partnership may well predict a strengthening relationship between partners. On the other hand, the quality of protective distrust is very destructive to the continuity and reinforcement of a partnership.

Although the whole model explains 16.9% of the variance of change of cooperative strength, only two variables are included in the model. Both variables therefore have a strong explanatory power for the dependent variable.

In conclusion, the findings in section 6.4 are complementary to the preceding findings in Chapter VI, because the determinants of alliance performance are identified at the most consolidated level. Such an effort further improves the validity of the research findings in this chapter.

### **6.5 Chapter Conclusion**

Following the correlation analyses in Chapter V, this chapter further investigates the determinants of alliance performance. Using stepwise regression the determinants of different levels of alliance performance have been identified, and possible interpretations have also been provided to explain the findings.

First of all, the determinants of a supplier's overall capability enhancement have been found in different variable-groups, indicating that learning is a complicated issue affected by different sources of influence. Such a finding underlines the necessity of adopting a holistic lens to explore inter-partner learning. Among all the input factors, constructs proposed by previous research such as the recipient's intent, receptivity, and the partner's transparency, are significant determinants in the regression model. However, other new constructs such as inter-partner similarity, mutual dependency, and marketing interaction are also important determinants.

As for the determinants of other performance indicators, interesting findings have also been obtained from the stepwise regression analyses. Relationship management appears to be critical to suppliers' project satisfaction, with harmonious communication, mutual trust, and inter-partner opportunism as the key determinants. An EMS strategy, focusing on contract manufacturing business, is very effective to boost the supplier's sales growth, while developing a symbiotic partnership and increasing marketing interaction are also helpful. Finally, project factors such as symbiotic partnership and collaborative competition pre-condition the change of cooperative strength in a specific partnership. These findings may have important implications for firms entering cross-border alliances.

Various findings on different capability indicators, both at the variable-level and at the factor-level, have also been obtained in this chapter. Specific implications regarding learning in different firm-specific capabilities can be derived from these

findings. When the analysis is focused on the specific capability indicators, inter-partner interaction emerges as the most significant determinant, across a variety of different functions. Such a result, in conjunction with the correlation results in Chapter V, strongly suggests the close link between inter-partner interaction and inter-partner learning, particularly at the detailed level.

In section 6.4 a different approach has been applied, leading to the identification of performance determinants in a different way. Using a two-stage factor analysis, following by regression analyses, the ultimate determinants of learning, satisfaction, sales growth, and change of cooperative strength, have been identified. A state of symbiotic mutual dependency emerges to the most important quality in a partnership. Such a quality, characterized by a symbiotic, mutually dependent relationship and a high degree of partner's transparency, not only strengthens the further cooperation between partners, but also facilitates the supplier's learning. The results of this section present a global view of the alliance determinants, thus it is complementary to the detailed findings from previous analyses in this chapter.

## Chapter VII: TOWARDS A HOLISTIC FRAMEWORK

One major aim of this study is to expand the existing theoretical framework of inter-partner learning. The existing framework of inter-partner learning has been built upon Hamel's (1991) propositions in which both Recipient Characteristics (Intent and Receptivity) and Partner Characteristics (Intent and Transparency) are proposed as the determinants of inter-partner learning. In this research, two additional variable-groups (Project Characteristics and Relationship Characteristics) have been proposed (see section 3.1.2 Micro framework), aiming to complement the existing framework. The four variable-groups (sources of explanatory variables) and the extracted factors representing each variable-group are shown below:

<b>Variable-group</b>	<b>Factors</b>
<b>Recipient Characteristics</b>	Recip1: Supplier's Learning Intent Recip2: EMS supplier Recip3: Supplier's Receptivity
<b>Partner Characteristics</b>	Partner1: Partner's Transparency Partner2: Partner's Protectiveness Partner3: Partner's Competitive Status
<b>Project Characteristics</b>	Project1: Inter-partner Similarity Project2: Partner's Technical Contribution Project3: Symbiotic Partnership Project4: Project Scale Project5: Collaborative Competition Project6: Businesslike Supplier Selection
<b>Relationship Characteristics</b>	Rela1: Harmonious Communication Rela2: Mutual Trust Rela3: Mutual Dependency Rela4: Technical Interaction Rela5: Opportunism Rela6: Marketing Interaction

The benefits of using factors to represent each variable-group are:

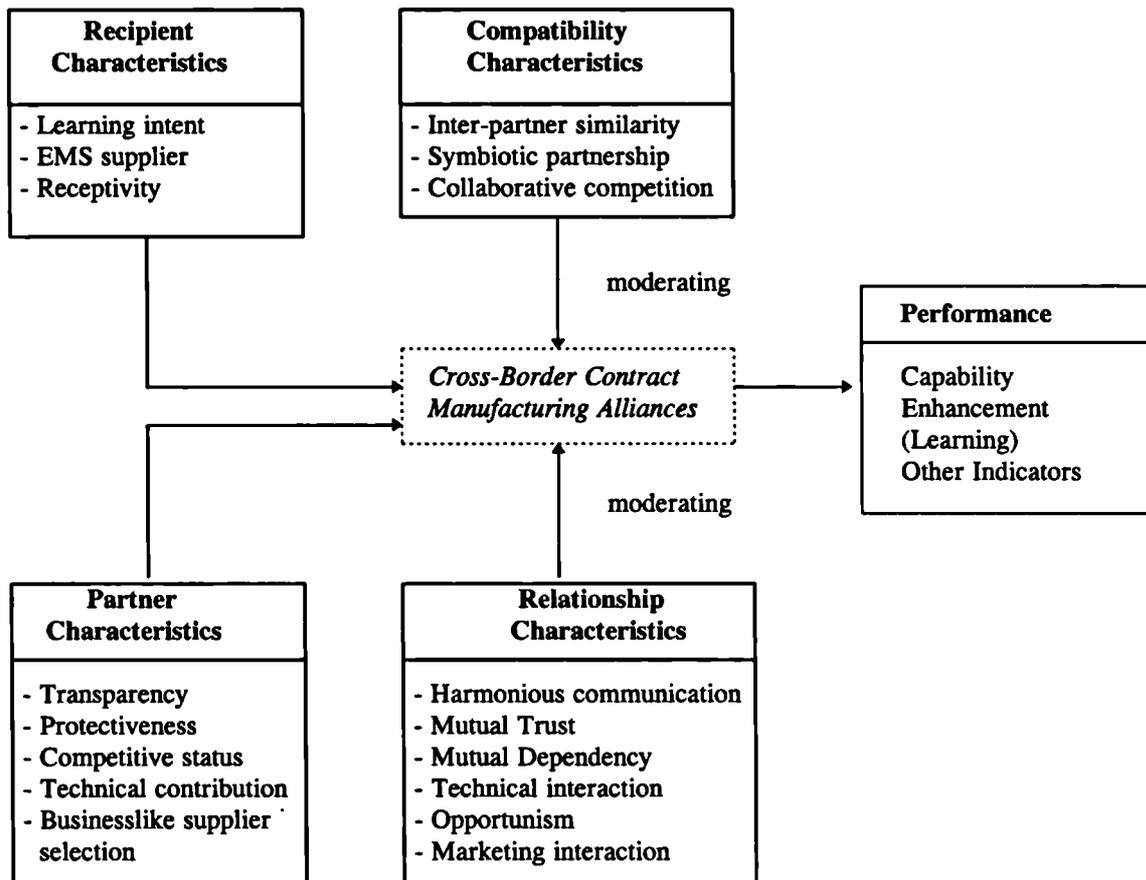
1. Each set of factors represents over 60% of the variance in each variable-group.
2. Each set of factors includes the influence of most variables in the same variable-group.
3. The rotated factors are mutually independent, thus the problem of multicollinearity in the regression models is minimized.
4. Unlike the intricate original variables, the extracted factors are more concise and thus the content of each variable-group can be clarified.

However, after reviewing the contents of each variable group, it is found that the factors in the variable-group of Project Characteristics represent a rather diverse group of constructs, and some of them may not be comfortably classified as project characteristics. Therefore, a further review of the six Project Factors is needed.

Among these six factors, Project1 (Inter-Partner Similarity), Project3 (Symbiotic Partnership) and Project5 (Collaborative Competition) represent the extent of inter-partner complementarity or compatibility. Therefore, they are classified into one distinct variable-group and be labeled “Compatibility Characteristics”, which represents and replaces the variable-group “Project Characteristics” in the following analyses. Harrigan (1988b) argues that ventures are more likely to succeed when partners possess complementary missions, capabilities, and other attributes that create a “strategic fit” in which the bargaining power of the partners is evenly matched. Similarly, this construct of inter-partner compatibility has been suggested (Parkhe, 1991; Williams & Lilley, 1993) to be a critical partner-selection criterion.

On the other hand, Project2 (Partner's Technical Contribution) and Project6 (Partner's Businesslike Supplier Selection) are classified into the variable-group of Partner Characteristics; and Project4 (Project Scale) is excluded from subsequent analyses because it cannot be reasonably classified into any variable-group. Because Project4 is not significantly correlated with any performance indicator (except with sales growth, but it is rather tautological), such an exclusion does not significantly affect the results of the following analyses. After the re-classification, a modified theoretical framework emerges:

**Fig. 14: Modified theoretical framework of inter-partner learning**



In order to examine the appropriateness of adding these two new variable-groups (Compatibility Characteristics and Relationship Characteristics), and to compare the relative contribution of each additional variable-group to the explanatory power of the existing framework, a two-pronged analysis strategy is conducted. Firstly, each variable-group is regressed in turn against the dependent variables. In this way, the explanatory power of each variable-group can be assessed and compared independently. Secondly, the variable-groups of Compatibility Characteristics and Relationship Characteristics are added into the existing framework in turn. The incremental explanatory power of the modified frameworks is assessed to reflect the contributions of adding these new variables. Consequently, the improved theoretical frameworks for different performance indicators will also emerge from this process.

### **7.1 Partial Explanatory Power of Different Variable-Groups for Performance**

The regression results of each variable-group, represented by their subordinate factors, are summarized below.

### 7.1.1 The explanatory power of individual variable-groups

*The learning component of alliance performance:*

Learning	Recipient Characteristics	Partner Characteristics	Compatibility Characteristics	Relationship Characteristics
Multiple R	.284	.411	.363	.413
R-square	.081	.169	.132	.171
Adjusted R-square	.065	.145	.117	.143
F Statistics	5.27**	6.93****	8.80****	6.19****
D-W Test	1.76	1.73	1.73	1.62

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

Individually, Compatibility Characteristics and Relationship Characteristics have more explanatory power for a firm's learning than Recipient Characteristics, and their explanatory power is comparable to Partner Characteristics. The results confirm that both Compatibility Characteristics and Relationship Characteristics are important variable-groups which provide significant explanatory power for the variance of inter-partner learning.

The relatively high R-squares of Relationship Characteristics and Partner Characteristics suggest that relationship-management and partner-selection are important to a firm's capability enhancement through an alliance. However, the inter-partner compatibility also seems to be quite important to successful learning, indicating that learning results cannot be decided unilaterally. In fact, all four variable-groups seem to provide satisfactory explanatory power for learning. Such results suggest that inter-partner learning is a complex issue which is affected by

variables from a variety of different sources. The previous study (Hamel, 1991), focusing on the characteristics of both partner (source) and recipient (destination), is limited and would benefit from further theoretical development.

*The satisfaction component of alliance performance:*

Satisfaction	Recipient Characteristics	Partner Characteristics	Compatibility Characteristics	Relationship Characteristics
Multiple R	.206	.328	.249	.442
R-square	.042	.108	.062	.196
Adjusted R-square	.026	.081	.046	.169
F Statistics	2.61	4.06**	3.79*	7.23****
D-W Test	1.97	1.96	1.84	1.93

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

As for overall satisfaction, Relationship Characteristics emerges as the variable-group with the highest explanatory power; and it provides much more explanatory power than any other variable-group, indicating the importance of relationship-management to suppliers' satisfaction. The contrast of the R-squares between Relationship Characteristics (19.6%) and Compatibility Characteristics (6.2%) reveals that the emerging relationship-management is more important than inter-partner compatibility (which is decided by initial deal-structuring) in determining a partner's overall satisfaction towards the partnership.

It is also noteworthy that although a supplier's satisfaction towards an alliance is significantly affected by the characteristics of its partner, the emerging relationship (cooperation experience or process) throughout the project is even more important

to the supplier's satisfaction. The results of correlation analyses between partner factors and relationship factors reveal that Partner's Transparency and Protectiveness are significantly correlated with the Mutual Trust and Mutual Dependency. It is therefore reasonable to suspect that relationship in an alliance is affected by the partner's attitude, although it is also possible that the relationship itself may affect the partner's cooperative attitude. If this is the case, the ultimate determinant of a supplier's satisfaction may be the partner's attitude, which is expressed through the working relationship between partners.

*The sale growth component of alliance performance:*

Sales Growth	Recipient Characteristics	Partner Characteristics	Compatibility Characteristics	Relationship Characteristics
Multiple R	.331	.322	.181	.284
R-square	.109	.104	.033	.080
Adjusted R-square	.094	.077	.016	.049
F Statistics	7.31***	3.91**	1.95	2.60*
D-W Test	1.83	1.80	1.72	1.70

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

As a supplier's sales growth is affected by many contingent factors, it is not surprising to find that no single variable-group seems to provide a large explanatory power for sales growth, and this is especially the case with Compatibility Characteristics and Relationship Characteristics. The aggregate explanatory power of the variables within these two variable-groups implies that neither the initial deal-structuring nor the emerging relationship-management has a significant impact on a partner's sales growth.

*The component of change of cooperative strength as alliance performance:*

<b>Change of Cooperative Strength</b>	<b>Recipient Characteristics</b>	<b>Partner Characteristics</b>	<b>Compatibility Characteristics</b>	<b>Relationship Characteristics</b>
Multiple R	.229	.338	.402	.375
R-square	.052	.114	.161	.140
Adjusted R-square	.036	.088	.147	.112
F Statistics	3.30*	4.40***	11.12****	4.91***
D-W Test	1.75	1.73	1.77	1.89

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

The individual comparison among different variable-groups shows that Compatibility Characteristics has the strongest explanatory power for a firm's change of cooperative strength with its partner, followed closely by Relationship Characteristics. The two new variable-groups appear to provide more explanatory power than either Supplier Characteristics or Partner Characteristics. Because a successful partnership takes two to cultivate (though it may only take one to disrupt), the change of cooperative strength between OEM buyers and suppliers hinges on the compatibility and working relationship between partners. The regression results show that maintaining a "good" relationship is as important as structuring a "compatible" alliance, and both are more important than the characteristics of the cooperative parties, in the strengthening of subsequent cooperation between partners.

### 7.1.2 The partial explanatory power for learning indicators

Using the three functional learning indicators as the dependent variables, the explanatory power of each variable-group for different functional learning can be found as follows:

#### In the area of R&D Learning:

R&D Learning	Recipient Characteristics	Partner Characteristics	Compatibility Characteristics	Relationship Characteristics
Multiple R	.309	.409	.409	.425
R-square	.095	.167	.167	.180
Adjusted R-square	.080	.143	.153	.153
F Statistics	6.30***	6.85****	11.60****	6.62****
D-W Test	1.69	1.72	1.70	1.63

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

Compatibility Characteristics seems to have as much explanatory power (for the variance of supplier's R&D learning) as Relationship Characteristics, while Partner Characteristics appears to be equally significant. The findings suggest that both the compatibility and the relationship between partners are important sources of factors which affect a supplier's R&D capability enhancement through contract manufacturing alliances, in addition to the simplistic factors deciding by either Recipient Characteristics or Partner Characteristics.

**In the area of Manufacturing Learning:**

<b>Process Learning</b>	<b>Recipient Characteristics</b>	<b>Partner Characteristics</b>	<b>Compatibility Characteristics</b>	<b>Relationship Characteristics</b>
Multiple R	.309	.410	.395	.416
R-square	.095	.168	.156	.173
Adjusted R-square	.080	.144	.141	.146
F Statistics	6.30***	6.90****	10.67****	6.30****
D-W Test	1.91	1.94	1.85	1.92

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

For manufacturing learning, a result similar to that of R&D learning is found. Relationship Characteristics, Partner Characteristics, and Compatibility Characteristics seem to have similar explanatory power for suppliers' manufacturing capability enhancement.

Again, the results justify the inclusion of the two new variable-groups in the holistic model for inter-partner learning.

**In the area of Marketing Learning:**

<b>Marketing Learning</b>	<b>Recipient Characteristics</b>	<b>Partner Characteristics</b>	<b>Compatibility Characteristics</b>	<b>Relationship Characteristics</b>
Multiple R	.175	.303	.213	.313
R-square	.030	.092	.045	.098
Adjusted R-square	.014	.065	.029	.068
F Statistics	1.89	3.44**	2.75*	3.27**
D-W Test	1.79	1.80	1.82	1.64

\* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

As for marketing learning, although no single variable-group emerges as a significant determinant of a supplier's marketing learning, both Relationship Characteristics and Partner Characteristics appear to be more important than Compatibility Characteristics or Recipient Characteristics. Comparing the result with that of R&D learning or manufacturing learning, it seems to suggest that for suppliers' marketing learning, relationship-management in alliances is particularly important. In addition, Partner Characteristics also plays an important role in a supplier's marketing learning.

## **7.2 The Explanatory Power of Different Frameworks**

It is shown from the previous discussion that all the four sources (variable-groups) of performance determinants provide a certain level of explanatory power for the variance in suppliers' alliance performance. Since the existing theoretical framework emphasizes the influence of Recipient Characteristics and Partner Characteristics, one theoretical contribution of this study will be to show that other sources of variables (variable-groups) will improve the existing framework of inter-partner learning. To do so, the following question should be asked, and its answers are also the answers to the research question 5 (see section 1.2):

*How well do different cross-border inter-partner learning models (theoretical frameworks) explain the variance in alliance performance?*

To answer this question, factors within variable-groups Recipient Characteristics and Partner Characteristics are included in the basic regression model, which is called 'Basic Framework'. The results of this regression model not only verify the validity of the existing theoretical framework proposed by Hamel (1991), but also serve as the reference benchmark for the other modified frameworks.

In this research, there are four different theoretical frameworks to compare, and they are built into the regression models described below. A better framework is the one which explains more of the variance of the dependent variables (performance indicators).

### **1. Basic Framework**

The existing theoretical framework for inter-partner learning was proposed by Hamel (1991), in which receptivity, intent, and transparency were hypothesized to be the determinants of alliance performance. Based on Hamel's framework, the Basic Framework in this study includes other Recipient Characteristics (EMS supplier) and Partner Characteristics (partner's technical contribution, competitive status, and businesslike supplier selection). All the additional variables are either related to suppliers' intent or related to partners' teaching propensity. In other words, the Basic Framework is an enriched version of Hamel's framework. A regression model representing this Basic Framework can be established as:

$$\begin{aligned}
&\text{Alliance Performance} = f \text{ (Recipient Characteristics, Partner Characteristics)} \\
&= \alpha + \beta_1 (\text{Supplier's Learning Intent}) + \beta_2 (\text{Supplier's Position as an EMS}) \\
&\quad + \beta_3 (\text{Supplier's Receptivity}) + \beta_4 (\text{Partner's Transparency}) \\
&\quad + \beta_5 (\text{Partner's Protectiveness}) + \beta_6 (\text{Partner's Competitive Status}) \\
&\quad + \beta_7 (\text{Partner's Technical Contribution}) \\
&\quad + \beta_8 (\text{Partner's Businesslike Supplier Selection}) + \epsilon.
\end{aligned}$$

## 2. Modified Framework 1

Borrowing the concept of transfer mechanism or transfer mode from the research stream of international technology transfer, Project Characteristics was first proposed as another possible source of determinants of alliance performance. Then Compatibility Characteristics was extracted from Project Characteristics and was proposed to replace Project Characteristics as a new determinative variable-group. Because inter-partner compatibility is more specific than project characteristics, such replacement makes the results more meaningful. Modified Framework 1 is established by adding this extra variable-group into the Basic Framework.

$$\begin{aligned}
&\text{Alliance Performance} = f \text{ (Recipient Characteristics, Partner Characteristics,} \\
&\quad \text{Compatibility Characteristics)} \\
&= \alpha + \beta_1 (\text{Supplier's Learning Intent}) + \beta_2 (\text{Supplier's Position as an EMS}) \\
&\quad + \beta_3 (\text{Supplier's Receptivity}) + \beta_4 (\text{Partner's Transparency}) \\
&\quad + \beta_5 (\text{Partner's Protectiveness}) + \beta_6 (\text{Partner's Competitive Status}) \\
&\quad + \beta_7 (\text{Partner's Technical Contribution}) \\
&\quad + \beta_8 (\text{Partner's Businesslike Supplier Selection}) \\
&\quad + \beta_9 (\text{Inter-Partner Similarity}) + \beta_{10} (\text{Symbiotic Partnership}) \\
&\quad + \beta_{11} (\text{Collaborative Competition}) + \epsilon.
\end{aligned}$$

### 3. Modified Framework 2

Based on the channel management research in the marketing discipline, the inter-partner relationship is suggested to affect the alliance performance. After including Relationship Characteristics, the Basic Framework can be extended and expressed by the following regression model:

$$\begin{aligned} \text{Alliance Performance} &= f (\text{Recipient Characteristics, Partner Characteristics,} \\ &\quad \text{Relationship Characteristics}) \\ &= \alpha + \beta_1 (\text{Supplier's Learning Intent}) + \beta_2 (\text{Supplier's Position as an EMS}) \\ &\quad + \beta_3 (\text{Supplier's Receptivity}) + \beta_4 (\text{Partner's Transparency}) \\ &\quad + \beta_5 (\text{Partner's Protectiveness}) + \beta_6 (\text{Partner's Competitive Status}) \\ &\quad + \beta_7 (\text{Partner's Technical Contribution}) \\ &\quad + \beta_8 (\text{Partner's Businesslike Supplier Selection}) \\ &\quad + \beta_9 (\text{Harmonious Communication}) + \beta_{10} (\text{Mutual Trust}) \\ &\quad + \beta_{11} (\text{Mutual Dependency}) + \beta_{12} (\text{Technical Interaction}) \\ &\quad + \beta_{13} (\text{Opportunism}) + \beta_{14} (\text{Marketing Interaction}) + \epsilon. \end{aligned}$$

### 4. Holistic Framework

Finally, a Holistic Framework is proposed by adding both Compatibility Characteristics and Relationship Characteristics to the Basic Framework. The Holistic Framework can be represented by the following regression model:

**Alliance Performance = f (Recipient Characteristics, Partner Characteristics,  
Compatibility Characteristics, Relationship Characteristics)**

$$\begin{aligned} = & \alpha + \beta_1 (\text{Supplier's Learning Intent}) + \beta_2 (\text{Supplier's Position as an EMS}) \\ & + \beta_3 (\text{Supplier's Receptivity}) + \beta_4 (\text{Partner's Transparency}) \\ & + \beta_5 (\text{Partner's Protectiveness}) + \beta_6 (\text{Partner's Competitive Status}) \\ & + \beta_7 (\text{Partner's Technical Contribution}) \\ & + \beta_8 (\text{Partner's Businesslike Supplier Selection}) \\ & + \beta_9 (\text{Inter-Partner Similarity}) + \beta_{10} (\text{Symbiotic Partnership}) \\ & + \beta_{11} (\text{Collaborative Competition}) \\ & + \beta_{12} (\text{Harmonious Communication}) + \beta_{13} (\text{Mutual Trust}) \\ & + \beta_{14} (\text{Mutual Dependency}) + \beta_{15} (\text{Technical Interaction}) \\ & + \beta_{16} (\text{Opportunism}) + \beta_{17} (\text{Marketing Interaction}) + \epsilon. \end{aligned}$$

The regression results of different models against each performance indicator are summarized in the following sections.

### 7.2.1 Different models' explanatory power for learning

The regression results (of the four theoretical frameworks) against learning are:

<b>Learning</b> (B: slope)	<b>Basic Framework</b> Recipient + Partner	<b>Modified Framework 1</b> Recipient + Partner + Compatibility	<b>Modified Framework 2</b> Recipient + Partner + Relationship	<b>Holistic Framework</b> Recipient + Partner + Compatibility + Relationship
Supplier's Learning Intent EMS Supplier	.12√			
Supplier's Receptivity	.12√		.14*	.11√
Partner's Transparency	.28***	.21**	.21*	.20*
Partner's Protectiveness	-.17*	-.19**		-.13√
Partner's Competitive Status				
Partner's Technical Contribution				
Businesslike Supplier Selection	.11√			
Inter-Partner Similarity		.14*		.12√
Symbiotic Partnership		.14√		
Collaborative Competition				
Harmonious Communication				
Mutual Trust				
Mutual Dependency			.16*	
Technical Interaction				
Opportunism				
Marketing Interaction			.15*	.15*
Multiple R	.464	.515	.523	.559
R-square	.216	.266	.273	.313
Adjusted R-square	.177	.215	.209	.237
F Statistics	5.65****	5.30****	4.25****	4.15****
D-W Test	1.74	1.79	1.65	1.69

√ P < 0.1      \* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

The Basic Framework including Recipient and Partner Characteristics is found to be satisfactorily powerful in explaining the variance of inter-partner learning. The result provides some justification for the previous researchers' focusing on the characteristics of cooperative parties. Regression results show that Partner's

Transparency is the determinant with the highest explanatory power, followed by Partner's Protectiveness. To a lesser degree, Supplier's Learning Intent and Receptivity are also important. Such results confirm Hamel's (1991) propositions that Transparency, Receptivity, and Intent are determinants of inter-partner learning, and partner's transparency emerges as the dominant construct of inter-partner learning. Overall, the Basic Framework explains 21.6% of the variance in inter-partner learning and the F value is also very significant ( $P < .0001$ ). It therefore suggests that the Basic Framework has satisfactory explanatory power for the variance of suppliers' overall learning.

The inclusion of Compatibility Characteristics (Modified Framework 1) increases the explanatory power of the Basic Framework by 5.0% (the change in R-square), while the inclusion of Relationship Characteristics (Modified Framework 2) increases it by 5.7%. Compared with that of the Basic Framework, the adjusted R-squares of both Modified Frameworks also increase significantly, indicating the appropriateness of adding either the Compatibility factors or the Relationship factors. In Modified Framework 1, Compatibility factors Inter-Partner Similarity and Symbiotic Partnership contribute additional explanatory power to the Basic Framework. Similarly, Relationship factors Mutual Dependency and Marketing Interaction are also significant explanatory variables in Modified Framework 2.

Finally, the Holistic Model significantly enhances the explanatory power of the Basic Framework from 21.6% to 31.3%; even the adjusted R-square increases from 17.7% to 23.7%. This result shows that the Holistic Framework effectively

enhances the explanatory power of the Basic Framework, thus both Compatibility Characteristics and Relationship Characteristics should be included in the existing framework to explain inter-partner learning.

For comparison purposes, the author deliberately used the two new variable-groups as the Basic Framework and added Recipient Characteristics and Partner Characteristics into the Basic Framework respectively. The results exhibit a similar pattern to the previous regression.

<b>Learning</b> (B: slope)	<b>Framework A</b> Compatibility + Relationship	<b>Framework B</b> Compatibility + Relationship + Recipient	<b>Framework C</b> Compatibility + Relationship + Partner	<b>Holistic FW</b> Compatibility + Relationship + Recipient + Partner
Supplier's Learning Intent		.12√		
EMS Supplier				
Supplier's Receptivity		.14*		.11√
Partner's Transparency			.21*	.20*
Partner's Protectiveness				-.13√
Partner's Competitive Status				
Partner's Technical Contribution				
Businesslike Supplier Selection			.12*	
Inter-Partner Similarity	.14*	.12√	.14*	.12√
Symbiotic Partnership	.14√			
Collaborative Competition		.		
Harmonious Communication				
Mutual Trust	.14*	.14*		
Mutual Dependency	.17*	.18**		
Technical Interaction				
Opportunism				
Marketing Interaction	.18**	.18**	.15*	.15*
Multiple R	.473	.517	.528	.559
R-square	.223	.268	.278	.313
Adjusted R-square	.182	.213	.216	.237
F Statistics	5.35****	4.19****	4.44****	4.15****
D-W Test	1.66	1.72	1.65	1.69
√ P < 0.1	* P < .05	** P < .01	*** P < .001	**** P < .0001

There are some interesting similarities between the two sets of regression results: the explanatory powers of Frameworks A, B, and C are similar to that of Basic Framework, Modified Framework 1, and Modified Framework 2 in preceding analyses, respectively. Two Recipient factors (Supplier's Learning Intent and Receptivity) and two Partner factors (Partner's Transparency and Businesslike Supplier Selection) are significant in Framework B and Framework C, respectively. Such results suggest that the two sets of variable-groups (one set consists of Partner Characteristics and Recipient Characteristics, while the other consists of Compatibility Characteristics and Relationship Characteristics) complement each other (with almost equal strength) in explaining suppliers' learning. While it is difficult to separate these two sets of variable-groups because of their inter-correlation by definition (e.g., a relationship between partners is surely affected by the characteristics of both parties), it is evident from the preceding analysis that no one can completely replace the other, and in aggregate they provide better explanatory power for inter-partner learning.

## 7.2.2 Different models' explanatory power for satisfaction

The regression results (of the four theoretical frameworks) against satisfaction are:

Satisfaction (B: slope)	Basic Framework Recipient + Partner	Modified Framework 1 Recipient + Partner + Compatibility	Modified Framework 2 Recipient + Partner + Relationship	Holistic Framework Recipient + Partner + Compatibility + Relationship
Supplier's Learning Intent				
EMS Supplier				
Supplier's Receptivity				
Partner's Transparency	1.73√			
Partner's Protectiveness	-2.89**	-2.56**		
Partner's Competitive Status				
Partner's Technical Contribution				
Businesslike Supplier Selection				
Inter-Partner Similarity		1.47√		
Symbiotic Partnership				
Collaborative Competition				
Harmonious Communication			2.24**	2.12**
Mutual Trust			3.04***	3.13***
Mutual Dependency				
Technical Interaction			1.97√	1.93√
Opportunism			-2.77***	-2.82***
Marketing Interaction			1.41√	1.39√
Multiple R	.348	.378	.510	.520
R-square	.121	.143	.260	.270
Adjusted R-square	.078	.084	.194	.189
F Statistics	2.80**	2.42**	3.92****	3.34****
D-W Test	1.91	1.86	1.88	1.89

√ P < 0.1      \* P < .05      \*\* P < .01      \*\*\* P < .001      \*\*\*\* P < .0001

The Basic Framework's explanatory power for satisfaction is relatively weak, compared with its explanatory power for learning. However, Partner's Transparency and Protectiveness are still found significant in explaining the variance of satisfaction.

After the inclusion of Compatibility Characteristics (Modified Framework 1), the explanatory power of the whole model only increases 2.2%, indicating a limited contribution from the addition of the new variable-group. Although one new Compatibility factor (Inter-Partner Similarity) emerges as significant (at 0.1 significance level), the original factor Partner's Transparency is robbed of its explanatory power. In sum, inter-partner compatibility is not very helpful in explaining suppliers' satisfaction.

However, the inclusion of Relationship Characteristics greatly enhances the Framework's explanatory power from 12.1% to 26.0%. The six relationship factors have such strong explanatory power that not only does the explanatory power of the whole model double, but the original significant variables (Partner's Protectiveness and Transparency) are replaced by the new Relationship factors. The factors significantly affecting a firm's satisfaction in an alliance are Mutual Trust and Harmonious Communication, while Opportunism poses a threat to satisfaction. Because the Holistic Framework does not improve the explanatory power of Modified Framework 2 (the adjusted R-square actually drops in the Holistic Framework), Relationship Characteristics is found to be the major determinative variable-group of alliance satisfaction. The regression results seem to suggest that Relationship Characteristics alone can adequately complement or even replace the Basic Framework in explaining suppliers' satisfaction.

To verify the argument that Relationship Characteristics alone is adequate in explaining suppliers' project satisfaction, a regression model consisting of only

Relationship factors is used as the benchmark model; then Recipient Characteristics, Partner Characteristics, and Compatibility Characteristics are added to the benchmark model to see the changes of both R-squares and adjusted R-squares, and whether there are new significant explanatory variables in the new models. The results are reported below.

Satisfaction (B: slope)	Benchmark Regression Model Relationship	Modified Regression Model 1 Relationship + Recipient	Modified Regression Model 2 Relationship + Partner	Modified Regression Model 3 Relationship + Compatibility
-----				
Supplier's Learning Intent				
EMS Supplier				
Supplier's Receptivity				
-----				
Partner's Transparency				
Partner's Protectiveness				
Partner's Competitive Status				
Partner's Technical Contribution				
Businesslike Supplier Selection				
-----				
Inter-Partner Similarity				
Symbiotic Partnership				
Collaborative Competition				
-----				
Harmonious Communication	2.02**	1.93**	2.28**	2.08**
Mutual Trust	2.96***	2.97***	3.03***	3.46****
Mutual Dependency				
Technical Interaction	1.85*	1.79*	1.87*	1.85*
Opportunism	-2.5***	-2.41**	-2.71***	-2.73***
Marketing Interaction			1.35√	1.23√
-----				
Multiple R	.442	.475	.495	.497
R-square	.196	.226	.245	.247
Adjusted R-square	.169	.185	.194	.206
F Statistics	7.23****	5.55****	4.78****	6.02****
D-W Test	1.93	1.88	1.98	1.99
-----				
√ P < 0.1	* P < .05	** P < .01	*** P < .001	**** P < .0001

The regression results show that the Relationship factors alone explain the most variance of supplier's project satisfaction. The inclusion of other variable-groups

only slightly increases the explanatory power, and no additional variable has added significant explanatory power to the benchmark model. The implication of this finding is that alliance satisfaction cannot be pre-determined by any characteristics of the cooperative parties, nor can it be decided by inter-partner compatibility. Instead, it is the emerging cooperative relationship, throughout the duration of the project, that determines a partner's satisfaction towards the project.

### 7.2.3 Different models' explanatory power for sales growth

Sales Growth (B: slope)	Basic Framework Recipient + Partner	Modified Framework 1 Recipient + Partner + Compatibility	Modified Framework 2 Recipient + Partner + Relationship	Holistic Framework Recipient + Partner + Compatibility + Relationship
Supplier's Learning Intent				
EMS Supplier	.18**	.17**	.18**	.17**
Supplier's Receptivity				
Partner's Transparency				
Partner's Protectiveness	-.10√	-.11*		
Partner's Competitive Status				
Partner's Technical Contribution				
Businesslike Supplier Selection				
Inter-Partner Similarity				
Symbiotic Partnership		.12*		.10√
Collaborative Competition				
Harmonious Communication				
Mutual Trust				
Mutual Dependency				
Technical Interaction				
Opportunism				
Marketing Interaction			.12*	.13**
Multiple R	.407	.442	.452	.485
R-square	.165	.195	.204	.235
Adjusted R-square	.124	.140	.133	.151
F Statistics	4.04***	3.53***	2.88***	2.79***
D-W Test	1.90	1.94	1.91	1.93
√ P < 0.1	* P < .05	** P < .01	*** P < .001	**** P < .0001

The Basic Framework carries a certain explanatory power for a firm's sales growth. However, the significant determinants are EMS and Partner's Protectiveness, different from those determinants proposed by Hamel (1991). The interesting finding is the strong explanatory power of a supplier's position as an EMS. This finding provides a rationale for the strategic choice by some Taiwanese suppliers of remaining subcontractors for MNCs.

After the inclusion of Compatibility Characteristics (Modified Framework 1), the explanatory power of the whole model increases from 16.5% to 19.5%, indicating some but limited contribution from adding the new variable-group. Among the additional factors of Compatibility Characteristics, Symbiotic Partnership has the strongest explanatory power, indicating the sales effect of structuring alliances which require more interaction and more equivalent division of labor between partners. Similarly, the inclusion of Relationship Characteristics (Modified Framework 2) does not seem to be of great help in that the adjusted R-square only increases 0.9%, but Marketing Interaction also emerges as an additional explanatory variable.

Although separately the two new variable-groups do not seem to complement the Basic Framework very much, jointly they still provide improved explanatory power for suppliers' sales growth (R-square increases from 16.5% to 23.5%). Judging from the steady increase of adjusted R-square, the appropriateness of adding these new variables to the basic regression model is also validated. Notably, in the Holistic Framework, the Relationship factor Marketing Interaction emerges as a

significant determinant and the Compatibility factor Symbiotic Partnership is also important. Such results underline the importance of both relationship-management and inter-partner compatibility to a firm's sales growth.

#### 7.2.4 Different models' explanatory power for change of cooperative strength

The regression results (of the four theoretical frameworks) against change of cooperative strength are:

Change of Cooperative Strength (B: slope)	Basic Framework Recipient + Partner	Modified Framework 1 Recipient + Partner + Compatibility	Modified Framework 2 Recipient + Partner + Relationship	Holistic Framework Recipient + Partner + Compatibility + Relationship
<hr/>				
Supplier's Learning Intent				
EMS Supplier				
Supplier's Receptivity	-.26*	-.22√	-.27*	-.22√
Partner's Transparency	.42**			
Partner's Protectiveness	-.39**	-.29*		
Partner's Competitive Status				
Partner's Technical Contribution				
Businesslike Supplier Selection				
<hr/>				
Inter-Partner Similarity				
Symbiotic Partnership		.43**		.34*
Collaborative Competition		-.44***		-.42***
<hr/>				
Harmonious Communication				
Mutual Trust			.31*	.22√
Mutual Dependency			.30*	
Technical Interaction				
Opportunism				
Marketing Interaction				
<hr/>				
Multiple R	.383	.493	.449	.523
R-square	.147	.243	.201	.274
Adjusted R-square	.105	.191	.131	.194
F Statistics	3.54***	4.71****	2.85***	3.44****
D-W Test	1.82	1.87	1.86	1.90
<hr/>				
√ P < 0.1	* P < .05	** P < .01	*** P < .001	**** P < .0001

The Basic Framework has limited explanatory power for a firm's change of cooperative strength with its partner. Partner's Transparency appears to be the most important factor in the regression model, showing that partner's openness towards the supplier sets the path for more intimate cooperation, while a protective attitude may jeopardize even an existing cooperative relationship.

After the inclusion of Compatibility Characteristics (Modified Framework 1), the explanatory power of the whole model is significantly enhanced by 9.6%, indicating the contribution of the new variable-group. Among the included factors of Compatibility Characteristics, Symbiotic Partnership has a positive impact on change of cooperative strength, while Collaborative Competition and Partner's Protectiveness negatively affect the strength of subsequent cooperation.

The inclusion of Relationship Characteristics in the Basic Framework (Modified Framework 2) also seems to be helpful in that the R-square increases by 5.6%, and the adjusted R-square also increases. Among the relationship variables, Mutual Trust and Mutual Dependency emerge as the other significant explanatory variables, substantially robbing Partner's Transparency and Partner's Protectiveness of their explanatory power. The results suggest that Partner's Transparency or Protectiveness can be reflected by the quality of Mutual Trust and Mutual Dependency in a relationship. However, because of the correlations between the significant Partner factors (Partner's Transparency and Protectiveness) and the significant Relationship factors (Mutual Trust and Mutual Dependency), the new

variable-group Relationship Characteristics does not contribute much additional explanatory power to the regression model.

The Holistic Framework has satisfactory explanatory power for the change of cooperative strength. Compared with the Basic Framework, the Holistic Framework improves the model's explanatory power as much as 12.7%. Interestingly, both Partner's Transparency/Protectiveness and Mutual Dependency are substantially robbed of their explanatory power in the Holistic Framework by the Compatibility factors of Symbiotic Partnership and Collaborative Competition. The results suggest that inter-partner compatibility may decide partner's openness and relative bargaining power, and Symbiotic Partnership and Collaborative Competition are the two most significant explanatory variables for change of cooperative strength in a partnership. Such results also suggest that the initial deal-structuring or partner-matching influences the change of cooperative strength between a specific pair of partners. While cooperating with a direct or potential competitor, or with a partner of overlapping skills tends to doom an existing alliance, partnering with a "symbiotic" partner heralds a long-lasting and intensifying relationship.

### **7.3 Chapter Conclusion**

Unlike Chapter VI in which the main focus is on the determinants, this chapter shifts our attention to the explanatory power of different theoretical frameworks explaining the variance of alliance performance. To enhance validity in the

classification of variables into appropriate variable-groups, the factors were first examined and re-grouped into four sources of determinants - Recipient Characteristics, Project Characteristics, Inter-partner Compatibility, and Inter-partner Relationship. Then different regression models were applied to represent different frameworks, and their regression results were compared to evaluate the additional contribution of these new variable-groups to the existing framework, which only includes the characteristics of the cooperative parties.

Although the existing framework proposed by Hamel (1991) has moderate explanatory power for learning, the regression results in this chapter clearly show that the explanatory power of the holistic framework is significantly higher than the existing one. Therefore the existing theoretical framework can be improved by incorporating new variable-groups such as inter-partner compatibility and inter-partner relationship.

Compared with the existing framework, the holistic framework not only provides better explanatory power for learning, it also improves the explanatory power for other alliance performance indicators. The improvement is especially significant in satisfaction and change of cooperative strength. These results seem to suggest that the application of the proposed holistic framework is not limited to inter-partner learning. It is also appropriate to explain the variance of other alliance performance.

## Chapter VIII: CONCLUSIONS AND IMPLICATIONS

Viewing competencies or capabilities as the foundation of a firm's competitive advantages, this research started with the premise that alliances are important vehicles for capability transfer because capabilities cannot simply be bought outright from the factors markets. Under the condition that some critical capabilities cannot be developed internally because of limited in-house asset/skill base, a firm can only acquire these critical capabilities through imitating or learning from external sources.

Unfortunately, most of the valuable firm-specific capabilities defy straight imitation because of their characteristics of tacitness, complexity, and specificity. Because of the sticky natures of capabilities, inter-organizational capability transfer is only observed between parties in intimate and symmetric relationships (such as departments or business units within the same organization, or joint ventures), and usually the transfer process takes a long time. In this study, a special research setting is designed to examine the traditional wisdom concerning inter-partner learning. Conceptually, capability transfer should be very difficult in contract manufacturing projects because such alliances are market-oriented, project-based (therefore of short time-frame), and asymmetric.

The key questions in this research were: 1) Can capability transfer happen in a quasi-market, short-term, and asymmetric partnership such as a contract manufacturing alliance? 2) What factors affect the capability transfer process and

alliance performance? 3) How can the existing theoretical framework of inter-partner learning be enriched and extended? Existing theory of inter-partner learning or inter-firm capability transfer is still at an early stage, and empirical testing of the theory is particularly rare. As this research is aimed at both theory testing and theory extension, it is the author's ambition to generate results not only of empirical relevance but also of theoretical significance. Through theory testing, not only were variables and constructs tested, but also practical implications for the management of cross-border alliances were generated. Through theory extension, the existing conceptual framework has been enriched, and a more holistic framework of inter-partner learning proposed and examined. In this chapter, the theoretical conclusions and implications are presented first, followed by the practical conclusions and implications; then the contributions of this research, both to theory and to practice, are presented in section 8.3, together with research limitations. Finally, future research is suggested in section 8.4 to conclude this thesis.

## **8.1 Theoretical Conclusions and Implications**

### **8.1.1 Theoretical conclusions**

Borrowing from the *source-destination perspective* of the technology transfer literature, two groups of new variables - project characteristics and relationship characteristics - have been included in the existing theoretical framework of inter-

partner learning (Hamel, 1991) which focuses on the characteristics of cooperative parties. Using factor analysis, the independent variables in each variable-group were first extracted and reduced to factors. Correlation analysis was then applied to establish the relationships between these factors and alliance performance. The correlation results were then used as the inputs for subsequent stepwise regression, through which the most relevant factors and variables to each performance indicator were finally identified. The following conclusions have been drawn from the results of the above process.

*Significant learning in a market-oriented, project-based and asymmetric partnership*

Most capability transfer (or inter-organizational learning) studies are done either in the context of member firms of the same MNC or in a quasi-firm, long-term, and symmetric alliance (such as a joint venture). The rationale for choosing such research settings is simple: inter-organizational capability transfer is so difficult that its success requires an amicable and stable relationship between transferring parties. This research challenges such a traditional wisdom and the survey results support the argument that learning can happen in quasi-market (contract manufacturing buyer-supplier alliance), short-term (over 50% of the surveyed projects had duration shorter than one year), and asymmetric (Taiwanese IT suppliers vs. MNC buyers) partnerships. Exposed to working with a variety of best-in-class buyers, niche-capability Taiwanese IT suppliers can benchmark themselves with generic-capability MNCs. Through each one-to-one mentor-student relationship with an OEM buyer, Taiwanese IT suppliers can learn something different. Not only did suppliers

understand their customers (some may also be competitors) through these cross-border contract manufacturing alliances, but also they were inspired by each encounter. The aggregate effect of such a continuous benchmarking process is enormous. This may be one of the major reasons why Taiwanese IT suppliers have narrowed their capability gaps with world-class competitors in a short period of time.

#### *The key determinants of overall learning*

The conclusions of the stepwise regression analysis of extracted factors are that the most significant determinant of supplier's overall learning is partner's transparency, closely followed by inter-partner marketing interaction. Other constructs such as, mutual dependency, supplier's learning intent and supplier's receptivity, are also important determinants. The results not only support Hamel's framework (1991) in which transparency, intent, and receptivity were proposed as the determinants of inter-partner learning, but also identify other factors such as inter-partner interaction and mutual dependency as additional determinants of overall learning.

A partner's transparency is expressed through its willingness to exchange information with, and to provide know-how or assistance to, the supplier. Therefore it is closely linked with inter-partner interaction. Why then do the buyers want to be so open and helpful to suppliers? The answer mainly lies in the nature of the alliance task. A symbiotic partnership forces a buyer to work closely with its supplier, aligns the goals of these two organizations, and deepens mutual

dependency. Learning in such a partnership is further facilitated by other factors such as inter-firm similarity and the rapport between partners.

*The key determinants of satisfaction, sales growth, and change of cooperative strength*

A supplier's subjective satisfaction towards a partnership is predominantly decided by the working relationships between partners. Relationship factors such as harmonious communication, mutual trust, and restraint of opportunism are determinants of supplier's satisfaction. On the other hand, a supplier's sales growth is mainly determined by the supplier's position as an EMS firm, by its marketing interaction with its partner, and by the degree of symbiotic partnership in the project. As for the change of cooperative strength, it is pre-conditioned by the degree of collaborative competition between partners, by the formation of a symbiotic partnership, and by the development of mutual trust. In other words, inter-partner compatibility is critical to the continuity and strengthening of an existing partnership.

*Towards a holistic framework of inter-partner learning*

In order to examine further the explanatory powers of different inter-partner learning frameworks, regression models representing these different frameworks were built and regressed against alliance performance in Chapter VII. The conclusions are:

- Hamel's basic framework, consisting of only recipient characteristics and partner characteristics, is validated and has moderate explanatory power for inter-partner learning, but its explanatory power for other indicators of alliance performance such as satisfaction or change of cooperative strength, is limited.

- The Holistic Framework, incorporating four groups of independent variables, provides greater explanatory power for inter-partner learning than Hamel's framework. Both inter-partner compatibility (which is determined by initial deal-structuring) and emerging relationship-management are important to inter-partner learning. The inclusion of compatibility characteristics and relationship characteristics significantly improves the explanatory power of the basic framework, and such a significant improvement is not limited to learning but across all four indicators of alliance performance. The results confirm that inter-partner compatibility and inter-partner relationship are two major sources of influence on partnership success.

- The variable-group of compatibility characteristics is the major source of determinants of change of cooperative strength. The result implies that the initial efforts at deal-structuring or in partner-matching influence the possibility of change of cooperative strength between a pair of partners.

- The variable-group of relationship characteristics is the major source of determinants of supplier's satisfaction. The result implies that the emerging

relationship-management is of vital importance to a partner's overall satisfaction towards its partnership.

### **8.1.2 Theoretical implications**

The nature of the capability conditions both the ability of the source to retain it and its transferability to the recipient. It is evident from this research that marketing capability is so distinct from R&D or manufacturing capability that recipients need different transfer strategies to acquire different capabilities.

#### *The enhancement of marketing capabilities*

Marketing capabilities, compared with technical capabilities, are more environmentally specific and are difficult to learn through external sources. Although this research confirms that marketing capabilities are difficult to enhance significantly via external sources, the regression results do show that through interaction with the partner's marketing or sales staff, a learning-motivated supplier can still enhance its marketing capability somewhat without substantial investment in the marketplace. Because the extent of a supplier's marketing interaction with its partner is negatively correlated with the partner's competitive status, less competitive partners may be more open in sharing their market information or marketing know-how. In addition, mutual trust and mutual dependency also help suppliers improve marketing learning from the partners. The emerging

relationship-management with the OEM clients appears to play an important role in a supplier's marketing learning.

#### *The enhancement of R&D and process capabilities*

On the other hand, technical learning in the areas of R&D and process are equally determined by the characteristics of relationship, partner, and inter-partner compatibility. When the partners are more technically open or globally competitive, and when the inter-partner similarity is higher, the suppliers tend to exhibit significantly higher R&D and process learning. In the perception of the respondents, R&D and process capabilities are easier to learn, compared with marketing capabilities. Although tacitness and complexity of these technical capabilities are still barriers to effective learning, suppliers can overcome such obstacles through benchmarking buyers' practices, or through the voluntary assistance secured from their OEM buyers. This may be the reason why R&D and process learning is more significant in the survey results, and has better explanatory power in the proposed theoretical framework, compared with marketing learning.

#### *Interaction-learning effect*

The findings of this research strongly support an interaction-learning argument. Inter-firm interaction seems to be a necessary (though not sufficient) condition for inter-firm learning; and inter-personal interaction appears to be the prerequisite for inter-organizational learning. For example, the variable most strongly correlated

with a supplier's R&D learning is inter-firm R&D interaction, the variable most strongly correlated with marketing learning is marketing interaction, and one of the key determinants of process learning is process interaction. It seems to imply that learning embeds itself in the daily interaction among different levels of personnel between organizations. The interviews confirm that even when management intends to keep know-how proprietary, the technical personnel usually adopts high degree of openness in order to accomplish the joint task.

It is therefore fair to conclude that interaction exploits the learning potential embedded in an alliance. The theoretical implication for inter-partner learning is that a recipient should endeavor to increase interaction and deploy its learning agents (employees) at the frontiers, where both organizations interact.

#### *Improvement in cost, speed, and flexibility*

Niche-capability suppliers' competitive advantages: low-cost manufacturing, manufacturing flexibility, and R&D speed, seem to be driven less by their endogenous strategic choices than by their exogenous environmental pressure. Furthermore, demanding contract manufacturing clients have played important roles in shaping these lean and mean players into formidable potential competitors. The results of this research show that the competitive advantages of Taiwanese IT firms, based on cost, speed, and flexibility, are mainly the results of reactions to buyers' demand. When partners are more important to suppliers, when mutual dependency in the partnership is higher, when suppliers have stronger learning intent, and when

both sides have more intimate interaction, the suppliers tend to respond quickly to buyers' demands. Supplier's cost, speed, and flexibility seem to be enhanced more effectively under higher customer pressure. These niche capabilities are neither externally acquired nor internally invented, rather they are shaped and polished through daily operation, under the pressure from their OEM buyers.

### *The driving forces of inter-partner learning*

To conclude, a firm's capability enhancement through cross-border alliances seems to be driven by two major forces: partner pull and partner push. In the case of the partnerships between Taiwanese IT suppliers and their MNC clients, the drivers of the supplier's high learning intent are:

1. Partner pull: Benchmarking with competent and generic-capability partners helps Taiwanese IT suppliers discover their own weaknesses and inspires their ambition for greater operational excellence. Through daily dealings with their MNC counterparts, the employees of the suppliers can sense the performance gaps and be motivated to close such gaps - not just for their firms, but also for their own employability. Although benchmarking others alone will not be enough to create a leader, it is apparently effective in helping a follower challenge the status quo and narrow the gaps with the leaders. Suppliers heavily involved in cross-border contract manufacturing business may be pulled to achieve mimetic isomorphism with their benchmarking partners, regardless of whether it is achieved unintentionally or through deliberate strategic choice.

**2. Partner push:** The demands of OEM clients drive indigenous firms continually to deepen their strengths and correct their weaknesses. Interviews with Taiwanese IT suppliers confirm that contract manufacturers in this industry are under relentless competitive pressure and increasing customer demands. Suppliers face an imperative to improve performance with standards set by their MNC buyers. Such partner push is particularly great when the partner is globally competitive and commands strong bargaining power over its supplier. However, it is under such partner push that Taiwanese IT suppliers synchronize their capabilities with those of their competitive partners.

Through interaction with its generic-capability partner at the individual and organizational level, driven by the forces of both partner pull and partner push, the niche-capability firm is in fact going through a process of inter-partner isomorphism. This effect of organizational isomorphism is particularly significant in the setting of cross-border alliance in that a "cross-cultural socialization" process (Nonaka and Takeuchi, 1995: 209) provides an excellent learning opportunity for culturally heterogeneous partners.

#### *Staircase-styled capability enhancement as an internationalization process*

From the interviews and case studies in this research, an apparent life cycle pattern of cross-border contract manufacturing business does emerge. Such a hypothetical pattern is also in line with the survey findings. A resource-limited firm usually

needs to enhance capabilities at a steady and incremental pace - first creates a comparative advantage, then leverages the existing advantage to pursue another, until the firm can master all major value-added capabilities within its operational boundary. From this research, the internationalization process of Taiwanese IT suppliers can be categorized into three sequential stages:

**1. OEM stage:** From a limited asset/skill base in marketing and R&D capabilities, most Taiwanese IT manufacturers find it difficult to expand their business across borders. In this circumstance, OEM business usually is an effective way to exploit their low-cost manufacturing capability. Through this entry mode into international markets, suppliers cannot only test and improve their manufacturing capability but also gain access to OEM clients' R&D capabilities.

**2: ODM stage:** After accumulating technical capabilities to a certain level, some indigenous firms can start to attract ODM business with their own product designs. As their ODM clients gradually move from second-tier regional firms to first-tier global players, these suppliers are required to take up more responsibilities in different value-added activities, and they are required to deliver their services to world-class standards. ODM suppliers must work closely with their global clients to develop new products of intrinsic customer-perceived value within the window of market opportunity; they supply quality output in high volume and remain price competitive; and also importantly, suppliers must share the burden of MRO (Maintenance, Repair, and Operations) and even provide additional services such as financing and logistics.

3. OBM (Original Brand Manufacturer) stage: Through these stringent requirements, the ODM suppliers are gradually developed into full-fledged globally-operating manufacturers. If they make a strategic commitment to establish their own brandnames and further control distribution channels, the ambitious ODM suppliers have good chances to become even OBMs and create their own global value constellation (Normann and Ramirez, 1993) - just as their MNC clients.

Although not all indigenous manufacturers have gone through this internationalization process and only very limited number of Taiwanese IT suppliers have approached the OBM stage, no doubt they are in the process of evolving from low-cost assemblers into innovative manufacturers, and some of them are even striving to be creative marketers in the global arena. Such a staircase-styled capability enhancement process may set a useful example for other resource-limited firms in other LDCs/NICs.

## **8.2 Practical Conclusions and Implications**

### **8.2.1 Practical conclusions**

#### *The capability enhancement intent of Taiwanese IT suppliers*

Although learning R&D or marketing capabilities from OEM partners is not a major cooperative goal according to the explicit report of the respondents, suppliers do see manufacturing capability enhancement and MNC's approval as primary goals of their cross-border manufacturing alliances. In addition, the majority of respondents believed their firms have significant capability gaps with the partner, and absorbing or even controlling the partner's superior capabilities was crucial to their future. In view of the findings above, it seems fair to conclude that Taiwanese IT suppliers do see cross-border manufacturing alliances as a vehicle for capability enhancement. Compared with the existing buyer-supplier research (e.g. Blenkhorn and Noori, 1990; Bensaou, 1994), such a strong capability enhancement intent on the part of the supplier is distinct and worthy of further investigation. The disparity between learning intent and capability enhancement seems to suggest that learning (capability transfer) from the partner is not the only nor the direct route to the supplier's capability enhancement. Learning via the projects may be as important as learning from the partners.

*The mechanisms for the supplier's capability enhancement through manufacturing alliances*

From the survey results and interviews, there seem to be two types of capability enhancement for the supplier engaging in cross-border manufacturing alliances.

One type of capability enhancement can be called "spontaneous capability enhancement" or "project learning", which comes naturally from the requirements of the OEM projects. For example, the accumulated volume helps suppliers enhance manufacturing capabilities and reduce production costs because of the learning-curve effect; the credibility effect, originating from the track record of working with superior MNCs, not only helps suppliers secure future OEM orders, but also increases their potential for other modes of alliances; and by complying with the partner's stringent requirements (e.g., high quality standards or prompt product delivery), suppliers are forced into continuing improvement, especially in the areas of existing strengths.

The other type of capability enhancement through cross-border manufacturing alliances can be regarded as the "intended capability enhancement" or "partner learning". Some suppliers have used cross-border contract manufacturing alliances as a platform with which to build new capabilities beyond their existing strengths. These new capabilities can be deployed to serve other new product-markets, or they can be new competencies to enrich the asset/skill base of the niche-capability suppliers. For example, through the interaction and coordination with the partners'

staff, suppliers can gain product R&D technology or marketing experience from the buyers - new capabilities that do not come naturally and usually require the suppliers to learn on its own initiative.

*The benefits of cross-border contract manufacturing alliances to suppliers*

From the results of survey questionnaires and case studies, cross-border contract manufacturing alliances were found to be particularly beneficial to suppliers in the following areas:

Sales growth: To increase sales and to be approved by MNCs are found to be the top two motives for suppliers engaging in contract manufacturing business. As nearly 40% of the survey respondents have ranked their firms' sales growth after the projects as "high growth" or "very high growth", it is likely that contract manufacturing business does contribute greatly to Taiwanese IT firms' sales growth. Cooperating with partners of higher global market shares and upgrading alliances from OEM to ODM projects are also helpful to suppliers' sales growth. In addition, larger suppliers tend to exhibit higher sales growth, indicating the importance of operational scale; and firms adopting a submissive cooperative strategy, defining themselves as EMS suppliers, also tend to enjoy higher sales growth.

Change of cooperative strength with OEM clients: From the survey results on relationship changes, it is evident that contract manufacturing projects are effective

in strengthening transactional relationships, and contract manufacturing is particularly useful to suppliers as an entry mode for cross-border alliances. Because the issue of change of cooperative strength has to be decided by both parties, relationship characteristics such as mutual trust and harmonious communication were found to be important determinants, and project characteristics such as symbiotic partnership and collaborative competition between partners were also important factors influencing the change of cooperative strength in a partnership. In addition, as a supplier's credibility is key to change of cooperative strength, the OEM client's cooperative attitude is also critical.

Capability enhancement (overall learning): Suppliers' overall learning effect through cross-border contract manufacturing alliances has been confirmed. The regression results have shown that partner's transparency, represented by partner's R&D/process document provision and partner's network approach, is the determinant of the supplier's overall learning. Another determinant is inter-firm marketing interaction through which invaluable market information and marketing ideas are shared between sales and marketing staff. Other determinants include supplier's learning intent and receptivity, inter-partner similarity, and mutual dependency. Because partner's importance to supplier has significant explanatory power for a supplier's capability enhancement, it suggests that a supplier's learning may be the result of complying to its partner's requirements.

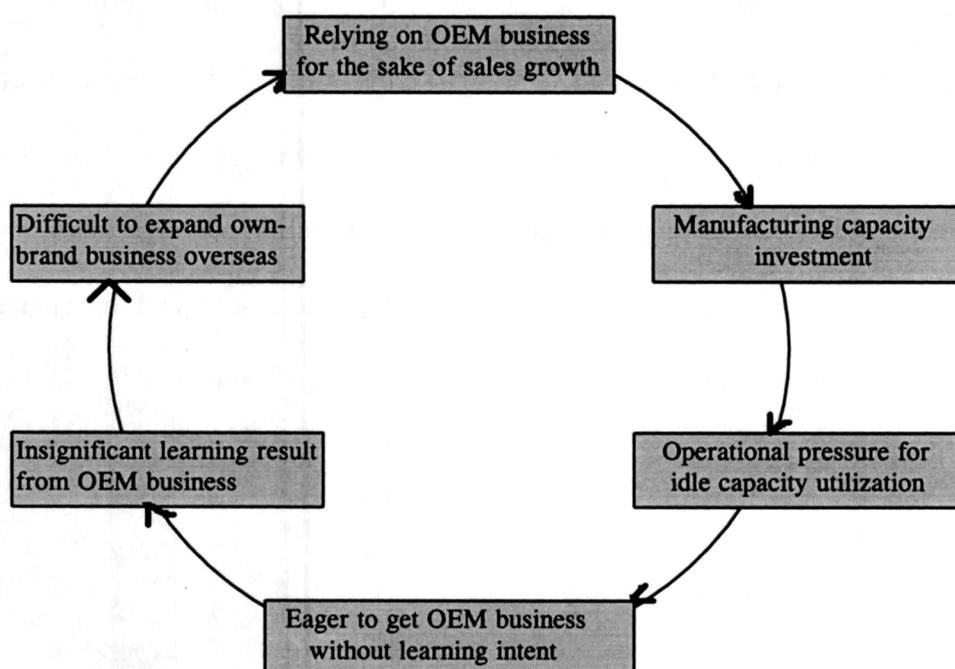
To conclude, capability transfer does happen in cross-border alliances, even in the market-oriented, project-based, and asymmetric alliances of contract manufacturing cooperation.

*The pitfalls of contract manufacturing business to suppliers*

However, OEM business is a mixed blessing to some suppliers. Not all of the resource-limited firms are learning-oriented and independent-minded. Some potential costs and risks of OEM business to suppliers have also been identified :

- The business risks of depending on a limited number of opportunistic buyers.
- The possibility of being captive and relying on stronger partners.
- Low margins and relentless pressure for lower costs and operational flexibility.
- A Catch-22 dilemma caused by excessive production capacity.
- Inertia to invest in self-owned marketing assets/skills.

In reality, contract manufacturing can draw a supplier into a negative cycle:



Suppliers relying on OEM business for sales growth usually have to expand or upgrade their manufacturing capacity in order to lure OEM buyers. However, once the designated projects finish, the suppliers are so often trapped with excess capacity which usually requires volume business to sustain. Because OEM manufacturers do not have large-volumes of ownbrand business to fully utilize their capacity, they become eager to get more OEM business. Consequently, OEM business is not a learning platform but a resort for capacity utilization, and the suppliers fail to invest in their own R&D or marketing capabilities. With limited learning results from OEM experience, these suppliers find it impossible to expand their ownbrand business, and difficult to upgrade from OEM to ODM business. Consequently, they have to depend on low-margin OEM business from second or third-tier buyers. Under these circumstances, if the suppliers can upgrade their niche capability (manufacturing), or successfully apply their manufacturing excellency from existing products to other new products, they can continue to grow, but only as EMS suppliers.

### *The ideal partner for learning*

The comparative studies of partner's country-of-origin effects on alliance performance (see Appendix 4) showed no significant difference between cooperating with American, European, or Japanese-based OEM clients. By the same token, neither did the partner's competitive status significantly affect alliance performance. Rather, it was the partner's capability contribution to the project that significantly affected outcomes of cross-border alliances. The recipients should either select

partners who are not only capable in the targeted activities but also willing to bring these capabilities into the partnerships, or they should seek to negotiate with their "capability sources" for more interaction in the targeted activities. Then the effects of benchmarking and isomorphism through operational interaction will narrow the capability gaps between partners, and the niche-capability partners can enhance overall capabilities through alliances with generic-capability firms.

### **8.2.2 Practical implications**

The capability enhancement effect of contract manufacturing alliances for niche-capability suppliers has been confirmed in this research. If cross-border strategic alliances are learning platforms for "capability-complementary" partners, both OEM clients and suppliers should have something to learn, and such learning should consequently improve their alliance performance. Therefore, findings from this research should have important implications for buyers as well as for suppliers. In addition, it is also the author's belief that the principles behind these implications can be applied to other forms of cross-border alliances, or to different geographic or industrial settings.

#### *Implications for OEM suppliers*

Intended capability-enhancement through cross-border alliances requires deliberate strategic planning; and choosing the right alliance mode is an important first step. Suppliers lacking R&D and marketing capabilities have limited strategic choice,

except for contract manufacturing, when going international. Contract manufacturing alliances are also appropriate for suppliers who have reasonable R&D capability, relatively strong process capability, but lack international marketing capability. Because of the interactive working relationships between OEM partners, cross-border contract manufacturing alliances have great potential for the supplier's learning, sales growth, and change of cooperative strength. The following practical implications derived from this research can be regarded as strategic suggestions for practitioners as well.

Select partners according to their contributed capabilities: The comparative studies in this research found that the ideal partner for learning is not determined by the partner's country of origin, nor by its competitive status, but by its contribution to the customer-perceived value of the final products. The implications are that suppliers should first select partners who will contribute a more-than-proportionate value in the capability areas that the suppliers intend to enhance; then the effects of inter-firm benchmarking and isomorphism, through operational interaction, tend to narrow their capability gaps. In this way, these "niche-capability" suppliers can enhance their overall level of competence through alliances with "generic-capability" partners.

Increase interaction with the competent partners: For niche-capability suppliers, their overall competence is enhanced through interaction with generic-capability partners who not only possess the targeted capability but who also bring it into the partnership in order to accomplish the joint task. Where there is interaction, there

is learning opportunity. Therefore, selecting partners who are open to sharing information or knowledge, regardless of whether the knowledge is explicit or tacit, is important. More interactive contract manufacturing alliances, such as ODM projects in which both parties collaborate on R&D and where suppliers are usually requested to provide some marketing support, are more beneficial to suppliers' capability enhancement because of the breadth and depth of inter-partner interaction. Another practical way to increase interaction is through personnel exchanges. Suppliers can improve the knowledge or skills of their own staff by deliberately creating interaction opportunities through inter-firm personnel exchanges, because employees are learning agents, and individual learning usually precedes organizational learning. With sufficient interaction, capability tends to diffuse from the more competent partner to the less competent partner.

Appreciate the value of demanding clients and enhance learning intent: Exposed to the learning opportunities embedded in cross-border alliances, suppliers acknowledging the importance of OEM clients tend to enjoy higher capability enhancement. In this sense, a demanding OEM client with strong bargaining power can be just what a supplier needs. Purposely or not, an OEM supplier is bound to enhance its capabilities under the pressure of a demanding MNC client. Once a hard-won partnership with a globally competitive client is established, the deal's transaction value and its reputation effect usually make it hard for any supplier to neglect the client's demands. Certainly, a learning-oriented supplier who takes initiative to internalize critical capabilities will strengthen its own competitiveness through alliances.

**Assess carefully the impacts of capacity expansion:** Idle capacity is an asset as well as a liability to suppliers. In practice, idle capacity can discourage a supplier's internal efforts for capability enhancement, especially capability enhancement in marketing activities. Under the pressure of idle capacity, a supplier tends to rely more on contract manufacturing business as a short-term operational solution, rather than on building up its own marketing capability to utilize extra capacity. In addition, because resources have been tied up in manufacturing, resource-limited suppliers may find it practically impossible to commit steady investment in other functional areas. Therefore, upgrading or expanding production capacity for large OEM orders is a strategic choice for suppliers. A supplier should carefully consider the potential costs and risks of such an irreversible strategic move. Idle capacity can suffocate a supplier's self-reliance and drive the firm into becoming a captive EMS supplier, whether it likes it or not.

**Be an independent insider:** It is shown in this research that an EMS strategy may pay off in terms of sales growth. A supplier can enjoy higher sales growth and harmonious relationships with its OEM clients by submissively incorporating itself into the global operational networks of stronger partners (see section 5.2.1). As a network insider, a supplier can have better access to its partner's resources and capabilities; but if the supplier becomes dependent on (or even captive to) the partner, by defining itself purely as an EMS supplier, it may lose the learning intent to stretch its asset/skill base and to leverage its partner for overall competence

enhancement. For ambitious suppliers, the key is to become an insider but, at the same time, not to confine itself or be confined as simply an EMS supplier.

Establish and maintain symbiotic partnership with the buyers: This research confirms a new form of strategic alliance is emerging between Taiwanese IT suppliers and their OEM clients - a new buyer-supplier relationship which is called "symbiotic partnership" in this study. The characteristics of such a partnership include:

- projects requiring intense coordination between partners,
- supplier's contribution to and participation in the product R&D activities,
- complementary division of labor in which the supplier is in charge of manufacturing the complete finished products while the partner concentrates on marketing.

Symbiotic partnership is different from the vertical OEM projects in which the suppliers provide only intermediate goods (parts and components) to assemblers; it is also different from the traditional OEM deals in which the clients control higher value-added activities of R&D and marketing, while the suppliers only participate as low-cost manufacturers. Rather, a symbiotic partnership is closer to an ODM project in which the supplier not only performs the full range of manufacturing services, but also contributes to product R&D tasks, and even provides necessary marketing support and services upon the requests of the buyer.

Strive to be a versatile partner of the MNC client: A broader participation in more value-added activities of the partnership may bear profound implications for suppliers: 1)The relative bargaining power of suppliers is increased, mutual dependency can be achieved, and more symmetric partnerships can be formed; 2) Suppliers are exposed to a wider range of interaction with partners in different value-added activities, thus overall learning is more likely to be achieved; and 3) Suppliers are asked to get involved in logistics, support, and services because products are designed and manufactured by them. In this way, suppliers with stronger and more balanced overall competence are more likely to be chosen as partners by MNCs.

*Implications for OEM buyers*

Acknowledge the importance of relationship-management in global strategy: The "mix and match" among players of different competitive levels, and among firms specialized in different value-added activities, has been an irreversible trend in the global IT industry as a result of intensifying competition. No company, no matter how strong, has sufficient resources to participate in every value-added activity, let alone the capabilities to excel in all these activities. Therefore inter-firm relationship-management has become increasingly important, particularly for the "nodal firms" which are in the pivotal positions of global value constellations (i.e., global operational networks).

Utilize suppliers' capabilities to compete with other direct competitors: Through the interplay of internal skill development and external skill acquisition, many suppliers in the NICs have emerged from being low-cost sub-contractors to becoming value-added partners, providing broader and more important services to a wider ranges of customers. As partners, although still resource-limited niche-capability players compared with MNCs, offshore suppliers have played important roles in MNCs' global competitive strategy, and no first-tier player can compete effectively in the IT industry without using some kinds of offshore outsourcing. The issue of strategic offshore outsourcing has become critical to MNCs' global competitiveness, and how MNCs manage these competitive collaborations in pursuit of their organizational goals has become a strategic challenge.

Instead of guarding against suppliers, appropriate suppliers' enhancing capabilities:

The interaction requirements of contract manufacturing alliances make it difficult for any competent MNC to be immune from undesirable "capability leakage" to a learning-oriented foreign partner. The traditional sourcing strategy of shopping around tends to increase transaction costs and reduce rapport; and OEM buyers who exploit the suppliers usually end up by weakening their own competitive base because such relationships have been important sources of MNCs' global competitiveness, particularly in IT industry. Therefore, it could be more beneficial to an OEM buyer to support rather than to suppress the capability enhancement of its suppliers. For far-sighted MNCs, the question of how to benefit from suppliers' growth potential, and how to leverage and appropriate suppliers' capabilities into MNCs' own competitive arsenal should be the ultimate strategic concerns. Closer

relationships such as central-satellite arrangements, joint ventures, or even cross-equity investments should be considered to help incorporate suppliers into MNCs' global operational networks. Winning supporters is crucial to the competitive performance of global players, and shifting attitudes from viewing alliance as a zero-sum game to adopting a joint-prosperity mentality is just the first step to winning supporters.

Treat suppliers as equal partners: Because suppliers are narrowing their capability gaps with buyers and are also participating in more value-added activities, it is important for the buyers to modify their strategic postures towards their offshore suppliers. As the asymmetric relationship gradually changes into more equal collaboration, it is time for buyers to treat the suppliers as they would like to be treated, because the suppliers will respond reciprocally. Such a reciprocal posture in cross-border partnerships has been found in this research; and losing suppliers to competitors, or forcing suppliers to become new competitors should be the last thing an OEM buyer would like to see happen.

## **8.3 Research Contributions and Limitations**

### **8.3.1 Research contributions**

The major contributions of this research, both to theory and to practice, can be briefly presented below. The contributions in the following section are arranged in a descending order according to their relative importance.

#### *Theoretical contributions*

1. A holistic framework for alliance performance was proposed, tested, and modified in this study.

Based on the previous framework for inter-partner learning proposed by Hamel (1991), a holistic theoretical framework was first proposed from a synthesis of existing literatures, then empirically tested and modified. The holistic framework is a combination of the characteristics of the cooperating parties proposed by previous researchers, and the two new sources of determinants (inter-partner compatibility and relationship-management) identified from other disciplines such as technology transfer and marketing channel studies. Such a holistic theoretical framework provides significantly greater explanatory power for different aspects of alliance performance than the existing framework. It is therefore clear from this study that the existing framework is simplistic and will benefit from further theoretical development and enrichment.

2. An analytical tool to measure a firm's overall competence was developed and tested.

A list of firm-specific capabilities were first screened from the literature, then confirmed by two panels of industry experts. Using the AHP technique, these capabilities were assigned priorities so that their relative importance to a firm's overall competence could be taken into consideration. With these efforts, the notion of firm-specific competence is no longer just a metaphor, but a measurable construct. Although it is still difficult to devise a set of universal standards to evaluate a firm's competence and to compare it with that of other firms, the study has shown that it is possible for a firm to assess its own capabilities in different operational activities. This hierarchical method of self-evaluation for a firm's competence may become a useful research tool for further research adopting the resource-based view of the firm.

3. Inter-partner compatibility and interaction have been identified as two additional determinants of alliance performance, in addition to existing constructs such as intent, receptivity, and transparency.

Determinants of inter-partner learning, satisfaction, sales growth, and change of cooperative strength within a partnership were identified through systematic deduction, both at the specific variable-level and at the abstract factor-level. The results of this study not only confirmed the validity of existing constructs, more

importantly, they also showed that inter-partner compatibility and inter-partner relationship are two major sources of influence on partnership success. Specifically, inter-partner compatibility and inter-firm interaction were identified as two major determinants of alliance performance. However, these constructs have not been included or studied in previous researcher's studies on inter-partner learning.

#### 4. Inter-partner learning is found in businesslike, short-term, and asymmetric partnerships of cross-border contract manufacturing alliances.

The research examined and confirmed the content and extent of inter-partner learning within the context of the cross-border contract manufacturing relationship - a quasi-market, short-term, and asymmetric partnership. The results support the argument that a strategic alliance can be structured and used as an effective learning platform. Although capability transfer may be facilitated by the closeness and symmetry between cooperating firms, and long duration may also help, these conditions are not the prerequisites of effective learning. In fact, the study of Taiwanese IT suppliers suggested that competition and asymmetry between partners actually motivate inter-partner learning and, with intensive interaction, learning can speed up even in an adversary partnership. In other words, learning opportunities are ubiquitous in alliances, and are not constrained by the mode, longevity, or symmetry of partnerships.

5. The comparative studies from a third party's perspective are complementary to existing comparative studies on buyer-supplier relationships.

The comparative studies on the alliance characteristics and performance of partnering with American, European, and Japanese MNCs are complementary to existing comparative studies on partnership sourcing. Although no stylized differences, neither partner's national origins nor partner's competitive status, had significant explanatory power for the variance of alliance performance, partner's capability contribution did appear to be a determinant of supplier's alliance outcomes. The insignificant findings of the partner-effect on performance may be mainly due to the different sampling strategy in this research. While most of the previous comparative studies obtained suggested or forced comparisons from the parties in comparison, this study made comparisons from the perspectives of third parties who themselves were not the targets of comparison.

*Practical contributions*

Because the research topic of this study is very relevant to business practice, the findings and conclusions are also very useful to business practitioners. Although it is studied from the perspective of the suppliers, the practical contributions of this research are not limited to the suppliers. MNC buyers can also gain knowledge about their offshore contractors and improve their supply chain management. Some of the practical contributions of this study are listed below.

1. The pros and cons of the contract manufacturing business to suppliers were examined, with an emphasis on capability enhancement. The findings are not only useful to numerous indigenous suppliers, they also provide important strategic implications for MNCs entering cross-border contract manufacturing alliances with their offshore counterparts.

2. The changing buyer-supplier relation was identified and its implications for both buyers and suppliers were presented. Different from the traditional captive OEM-supplier relationship, a symbiotic, open, and mutually-dependent collaborative relationship between Taiwanese IT suppliers and their MNC buyers was found, and such a relationship is found to be very favorable to a supplier's capability enhancement.

3. The key variables associated with partnership success (which was defined by different aspects of alliance performance) were identified through both correlation and regression analyses. With these findings, this research can provide detailed directions for firms intending to improve their performance (capability enhancement, satisfaction, sales growth, or strengthening cooperation) through cross-border alliances. These prescriptive directions can also be drawn on for the improvement of different areas and levels of firm-specific capabilities.

4. The question of ideal partners was at least partially answered in this research. The ideal learning partner is not characterized by its stylized or simplistic attributes such as its country of origin or competitive status; rather it is indicated by the

capacity and propensity to contribute valuable capabilities to the cooperative project.

In sum, although the findings and conclusions of this study will benefit from reinforcement via further research, they have shed additional light on inter-partner learning and the management of cross-border strategic alliances, both theoretically and practically.

### **8.3.2 Research limitations**

Because of the current status of inter-partner learning research, this study is positioned across the boundary between theory extension and theory testing. Such a position makes even more difficult the inherent problem of studying the elusive phenomenon of inter-partner learning. Although the contributions of this study have been elaborated in the preceding section, its limitations are also well recognized. Some possible systematic biases may arise from the research design and methods employed in this study:

1. The possible bias arising from picking a single respondent to represent the organization.

Although sales personnel in charge of OEM accounts are most knowledgeable about project details, and in the survey the respondents did not show difficulty in completing questionnaires, there is possible systematic bias caused either by the

respondents' insufficient knowledge or by the idiosyncrasy of sales personnel. The problem of selective perception and the problem of mis-representation may also result from individuals being required to answer the questions on behalf of their organizations. However, the relatively large sample size of this study should mitigate these potential biases to some degree.

## 2. The possible bias arising from reliance on suppliers' perceptions and judgements to evaluate alliances.

Another potential problem caused by respondent selection is the one-sided survey on an issue basically involving two parties. Out of the mechanisms of self-defence or self-justification, the suppliers may portray a biased picture of the alliance realities. Such a problem has been alleviated by some interviews with managers from some of the MNC buyers, but the research will certainly benefit from including other balancing views from the contract manufacturing buyers.

## 3. The limitations of relying mainly a questionnaire survey to explore the subtlety of inter-organizational dynamics.

A trade-off was made in this study by relying mainly on a questionnaire survey, leaving qualitative research methods as auxiliary tools. Such a choice inherently constrains the ability to explore the subtlety and dynamics in a partnership. Another limitation of such a cross-sectional approach lies in the difficulty of determining cause and effect, and such a limitation is also common in retrospective

research design (Leonard-Barton, 1990). Therefore, the most reliable findings of this research are the correlations between variables, while the causal relationships between variables are only hypothetical, with preliminary support from the interviews and case studies. It is also acknowledged that some problems of simultaneity (i.e., reciprocal causation or feedback) between variables may exist. In sum, the research should benefit from further complementary research - longitudinal case studies.

#### 4. Need to focus on a smaller number of variables for more rigorous testing work.

Because the exploratory nature of this research, many variables have been included in the holistic model. The large number of variables unavoidably defies multiple or precise measures of these variables, and subsequently affects the validity and reliability of this research. However, some key variables and constructs have been identified through this study, and more specific hypotheses can be drawn for further testing, in a more rigorous way. In other words, the results of this research have set the path for future research on a more focused group of variables.

#### 5. Concern for the generalizability of research findings from a specific research setting.

Because this research only studied Taiwanese IT firms' contract manufacturing alliances, whether or not the findings can be applied to other industries or other countries requires further complementary research. For example, different

capabilities may contribute differently to a firm's overall competence depending on the industry's characteristics or the nation's characteristics. In addition, findings from contract manufacturing alliances may not be directly applied to other cooperative modes, due to its special task natures. In view of this potential generalizability problem, although it is the author's belief that the principal findings are applicable to other research settings, complementary research on other modes, other countries, or other industries is still necessary.

#### **8.4 Future Research**

The units of analysis in this research were the cross-border alliances between Taiwanese suppliers and their foreign partners. While dyadic data from both sides is most desirable, the researcher chose to focus on the supplier's perspective only because of the practical concerns of confidentiality (Hamel, 1991: 85), and the limitations of time and expense (Mohr and Spekman, 1994). Therefore, dyadic research would be a natural extension of the current research, and further work on other alliance modes such as joint ventures or licensing could also be complementary to the current study.

On the other hand, although significant results have been found in this research, the conclusions and implications are still tentative and would benefit from further verification; and the proposed Holistic Framework needs to be further tested and refined. Limited by its factors approach, the main contribution of this research is in identifying the correlated factors (determinants) of alliance performance; an in-depth

study of the process and causation of learning is still needed. For example, this research has confirmed the importance of inter-partner interaction to learning; but the process of interaction, the content of information flows, and a firm's internal mechanism for transcending individual learning into organizational learning, is not yet clear.

With regard to research methodology, a complementary process approach using longitudinal case studies could not have been conducted properly in this research, mainly because of the relatively short duration of doctoral research. However, it is acknowledged that the longitudinal case study could be a powerful tool, and with such a tool the author intends to further explore the dynamic alliance process and the causes and effects of inter-partner learning.

- END -

## Appendix 1: List of Variables and the Survey Questionnaire

### A. List of Variables

<b>Variable Name</b>	<b>Label or Description</b>	<b>Question No. in Questionnaire</b>
partner	country of origin	-
v1	product item	1
v2a	product uniqueness	2-a
v2b	market maturity	2-b
v31	transaction value	3-1
v32	project duration	3-2
v4	partner's competitive status	4
v5a	inter-firm direct competition	5-a
v5b	inter-firm skill complement	5-b
v5c	inter-firm culture similarity	5-c
v5d	inter-firm management similarity	5-d
v6	project initiator	6
v7	No. of alternative suppliers	7
v8Aa	partner's R&D contribution	8-A-a
v8Ab	partner's R&D gateway	8-A-b
v8Ac	partner's R&D stickiness	8-A-c
v8Ac1-5	barriers to R&D learning	8-A-c-1~5
v8Ba	partner's process contribution	8-B-a
v8Bb	partner's process gateway	8-B-b
v8Bc	partner's process stickiness	8-B-c
v8Bc1-5	barriers to process learning	8-B-c-1~5
v8Ca	partner's marketing contribution	8-C-a
v8Cb	partner's marketing gateway	8-C-b
v8Cc	partner's marketing stickiness	8-C-c
v8Cc1-5	barriers to marketing learning	8-C-c-1~5
v91	supplier's cost reduction intent	9-1
v92	supplier's sales increase intent	9-2
v93	supplier's marketing-learning intent	9-3
v94	supplier's R&D-learning intent	9-4
v95	supplier's marketing exploitation intent	9-5
v96	supplier's capacity utilization intent	9-6
v97	supplier's process-learning intent	9-7
v98	supplier's MNCs approval intent	9-8
v10a	supplier's perceived capability gap	10-a
v10b	supplier's perceived benefit of learning	10-b
v10c	need to control key capabilities	10-c
v111	partner's cost reduction intent	11-1
v112	partner's sales increase intent	11-2
v113	partner's process-learning intent	11-3

<b>Variable Name</b>	<b>Label or Description</b>	<b>Question No. in Questionnaire</b>
v114	partner's global network extension	11-4
v115	partner's capacity utilization intent	11-5
v116	partner's flexibility exploitation intent	11-6
v117	partner's local market penetration intent	11-7
v118	partner's overall operational learning intent	11-8
v12a	partner's network approach	12-a
v12b	partner's short-term attitude towards project	12-b
v12c	partner's guardedness against supplier	12-c
v13	supplier's past OEM experience	13
v14	supplier's language and practices familiarity	14
v151	no previous contact (before project)	15-1
v152	occasional trading (before project)	15-2
v153	licensing (before project)	15-3
v154	frequent transaction (before project)	15-4
v155	personal ties (before project)	15-5
v156	long-term or central-satellite cooperation (b. p.)	15-6
v157	joint ventures (before project)	15-7
v158	cross equity investment (before project)	15-8
v16	partner's major coordinating staff	16
v17	supplier's task force for OEM business	17
v18a	project's task interdependence	18-a
v18b	project's degree of product completion	18-b
v18c	supplier's contribution to R&D task	18-c
v18d	partner's technical staff openness	18-d
v18e	partner's R&D document provision	18-e
v18f	partner's process document provision	18-f
v18g	partner's concealment of market information	18-g
v191	partner's importance to supplier	19-1
v192	supplier's importance to partner	19-2
v20a	partner's credibility	20-a
v20b	partner's trustworthiness	20-b
v20c	supplier's credibility	20-c
v20d	supplier's trustworthiness	20-d
v20e	partner's effort for continuing relationship	20-e
v20f	partner's opportunism	20-f
v20g	supplier's effort for continuing relationship	20-g
v20h	supplier's opportunism	20-h
v20i	inter-firm R&D interaction	20-i
v20j	inter-firm process interaction	20-j
v20k	inter-firm marketing interaction	20-k
v20l	inter-firm management interaction	20-l
v20m	timely communication	20-m

<b>Variable Name</b>	<b>Label or Description</b>	<b>Question No. in Questionnaire</b>
v20n	accurate communication	20-n
v20o	adequate communication	20-o
v20p	inter-firm organizational congruence	20-p
v20q	inter-firm personal congruence	20-q
v20r	inter-firm conflict	20-r
v20s	joint conflict resolution	20-s
v21a	communication by letter or document	21-a
v21b	communication by telephone or fax	21-b
v21c	communication by formal meeting	21-c
v21d	partner's technical advice	21-d
v21e	partner's technical staff visiting supplier	21-e
v21f	partner's non-technical staff visiting supplier	21-f
v21g	supplier's technical staff visiting partner	21-g
v21h	supplier's non-technical staff visiting partner	21-h
v221	no further contact (after project)	22-1
v222	occasional trading (after project)	22-2
v223	licensing (after project)	22-3
v224	frequent transaction (after project)	22-4
v225	personal ties (after project)	22-5
v226	long-term or central-satellite cooperation (a. p.)	22-6
v227	joint ventures (after project)	22-7
v228	cross equity investment (after project)	22-8
v23	supplier's sales growth after project	23
v24	supplier's overall satisfaction	24
v25	respondent's main role in the project	25
v261	product technology enhancement	26-1
v262	R&D speed enhancement	26-2
v263	end-customer intimacy improvement	26-3
v264	manufacturing quality enhancement	26-4
v265	manufacturing flexibility enhancement	26-5
v266	low-cost manufacturing improvement	26-6
v267	international marketing improvement	26-7
v268	brandname-management enhancement	26-8
v269	channel-management enhancement	26-9
Sales93	supplier's sales revenue in 1993	secondary sources

## B. List of Factors

<b>Factor Name</b>	<b>Label or Description</b>	<b>Major Variables</b>
Recip1	supplier's learning intent	v10b, v10a
Recip2	EMS supplier	v10c, Sales93, v13
Recip3	supplier's receptivity	v14, v13
Partner1	partner's transparency	v18e, v18d, v18f, 18g, 12a
Partner2	partner's protectiveness	v12b, v12c, v18g, v12a
Partner3	partner's competitive status	v4, 12a
Project1	inter-partner similarity	v5c, v5d, v5b
Project2	partner's technical contribution	v8Ba, v8Aa
Project3	symbiotic partnership	v18a, v18c, v18b, v8Ca
Project4	project scale	v31, v32
Project5	collaborative competition	v5a, v151 - v158, v5b
Project6	businesslike supplier selection	v7, v151 - v158
Rela1	harmonious communication	v20o, v20n, v20m, v20p, v20q, v20r
Rela2	mutual trust	v20d, v20b, v20c, v20a, v20e
Rela3	mutual dependency	v191, v20g, v192, v20l
Rela4	technical interaction	v20j, v20i, v20s
Rela5	opportunism	v20h, v20f
Rela6	marketing interaction	v20k, v20l

For details, see Chapter IV (4.3 Factor Analysis).

### C. Survey Questionnaire

Note: The original version of this questionnaire is in Chinese. The purpose of this translated English version is to list the questions and their measures for discussion purposes.

**For the following questions, please choose the contract manufacturing project for a foreign client with which you are most familiar or which impressed you most, and answer accordingly. (Please select a specific OEM/ODM order to answer the following questions: The national origin of the foreign client was:  American  European  Japanese  Others: \_\_\_\_\_ )**

1. What was the major product in this project? (Please tick only one. If the project covered more than one product, please tick the one with the highest sales volume.)

- IC chips or chip sets (ICs and related products).
- Communication and Computer (C&C) systems or peripherals (such as motherboards, monitors, faxes, modems, mice, scanners...etc.).
- C&C related parts and components (such as any kinds of add-on cards, power supplies, PCBs, connectors...etc.).
- Other products (please specify) :

2. What was the product-market situation of the product when it was contract manufactured by your firm?

a. The degree of product uniqueness was closer to (single choice):

- a standard product on the market without proprietary design
- a non-standard, proprietary, product of the client.

b. The market situation then was closer to (single choice):

- stable demand and mature market
- changing demand and growing market.

3. Total accumulated transaction value of the whole project was:  
NT\$ \_\_\_\_\_, and it took about \_\_\_\_\_ months to complete.

4. According to your client's global market share in the contract manufactured product, how would you rate the client's status?

- one of the top three global companies
- one of the top ten global companies (but not top three)
- one of the large multinational companies (but not top ten globally)
- a medium-sized multinational company
- a regional company (lacking the capability or experience of global operation).

5. To what extent do you agree with the following comparisons between the client and your firm when the OEM contract was signed?

- |  | strongly<br>disagree                  | neutral | strongly<br>agree |
|--|---------------------------------------|---------|-------------------|
| a. The partner was a direct competitor in our major product-market areas.                          | 1-----2-----3-----4-----5-----6-----7 |         |                   |
| b. The partner's strength in R&D and marketing was complementary to our strength in manufacturing. | 1-----2-----3-----4-----5-----6-----7 |         |                   |
| c. The partner's organizational culture or corporate value system was fairly similar to ours.      | 1-----2-----3-----4-----5-----6-----7 |         |                   |
| d. The partner's management style or organizational structure was fairly similar to ours.          | 1-----2-----3-----4-----5-----6-----7 |         |                   |

6. Who initiated the project (single choice)?

- Our firm took the initiative by contacting the partner first.  
 The partner took the initiative by contacting our firm first.  
 The collaboration was initiated by a third party.

7. According to your understanding, how many suppliers (including qualified suppliers in other countries) had been considered by the partner before they finally chose your firm as the contract manufacturer?

- Only our firm       1-3 suppliers       4-6 suppliers  
 7-10 suppliers       possibly more than ten suppliers.

8. To what extent do you agree with the following descriptions or evaluations of the partner's capabilities contributed to the project?

A. The partner's product technology and capability:

- |   | strongly<br>disagree                  | strongly<br>agree |
|---|---------------------------------------|-------------------|
| a. Their R&D capabilities contributed disproportionate value to the competitiveness or customer-perceived value of the product. | 1-----2-----3-----4-----5-----6-----7 |                   |
| b. Their R&D capabilities can be widely used to develop other products in the future.   | 1-----2-----3-----4-----5-----6-----7 |                   |
| c. Their R&D capabilities are difficult to imitate or be learned by other companies.  | 1-----2-----3-----4-----5-----6-----7 |                   |

If so, why do you think their R&D capabilities are difficult to learn or acquire (multiple choice)?

- They are difficult to articulate or record, and thus can only be accumulated through practice or experience.  
 They are relatively complex and can only be learned after acquiring other related technology or capabilities.  
 They are unique and can function well only in a certain national or organizational environment.  
 The partner owns patents or other legal protection on their product technology.  
 The partner was, in every respect, very protective of their product technology.  
 Other reasons (please explain):

**B. The partner's process technology and capability:**

strongly disagree strongly agree

- 
- a. Their process capabilities contributed disproportionate value to the competitiveness or customer-perceived value of the product. 1-----2-----3-----4-----5-----6-----7
- b. Their process capabilities can be widely used to manufacture other products in the future. 1-----2-----3-----4-----5-----6-----7
- c. Their process capabilities are difficult to imitate or be learned by other companies. 1-----2-----3-----4-----5-----6-----7

If so, why do you think their process capabilities are difficult to learn or acquire (multiple choice)?

- They are difficult to articulate or record, and thus can only be accumulated through practice or experience.
- They are relatively complex and can only be learned after acquiring other related technology or capabilities.
- They are unique and can function well only in a certain national or organizational environment.
- The partner owns patents or other legal protection on their process technology.
- The partner was, in every respect, very protective of their process technology.
- Other reasons (please explain):

**C. The partner's marketing experience or capabilities:**

strongly disagree strongly agree

- 
- a. Their marketing capabilities contributed disproportionate value to the competitiveness or customer-perceived value of the product. 1-----2-----3-----4-----5-----6-----7
- b. Their marketing capabilities can be widely used to market other products in the future. 1-----2-----3-----4-----5-----6-----7
- c. Their marketing capabilities are difficult to imitate or be learned by other companies. 1-----2-----3-----4-----5-----6-----7

If so, why do you think their marketing capabilities are difficult to learn or acquire (multiple choice)?

- They are difficult to articulate or record, thus can only be accumulated through practice or experience.
- They are relatively complex and can only be learned after acquiring other related technology or capabilities.
- They are unique and can function well only in a certain national or organizational environment.
- The partner owns trade marks, brandnames or other legal protection on their marketing capabilities.
- The partner was, in every respect, very protective of their marketing information.
- Other reasons (please explain):

**9. What were your firm's major expectations or motives in concluding this contract manufacturing project (multiple choice)?**

- To reduce R&D or marketing costs
- To increase sales
- To learn or absorb the partner's international sales and marketing experience
- To learn or absorb the partner's product R&D capabilities
- To utilize the partner's brandnames or channels to expand into new markets
- To fully utilize existing capacity and to reduce unit production cost
- To enhance process capabilities or quality standards
- To be approved by international firms so that more international orders can be developed.
- Others (please explain):

10. To what extent do you agree with the following statements regarding your firm's concepts or attitudes towards the partner?

- |  |                                       |         |                |
|--|---------------------------------------|---------|----------------|
|  | strongly disagree                     | neutral | strongly agree |
|  | 1-----2-----3-----4-----5-----6-----7 |         |                |
- a. We recognize that there are significant capability gaps between our firm and the partner, and there is much we can learn from them.
- b. To absorb their superior capabilities is crucial to our firm's future competitiveness.
- c. The relationship with the partner is only short-term, thus we cannot rely on them and we need to control the key capabilities.

11. According to your assessment, please choose your partner's major possible motives in contracting overseas manufacturers (multiple choice):

- To reduce production costs
- To maintain or increase sales or market share
- To learn or absorb the process capabilities of the suppliers
- To develop suppliers into a part of its own global operational network
- To utilize suppliers' capacity and reduce the cost/risk of capacity investments
- To utilize suppliers' new product development speed and production flexibility
- To penetrate local markets through cooperation with local suppliers
- To absorb the overall operational capability of overseas suppliers.
- Others (please explain):

12. According to your understanding or impression of the client, to what extent do you agree with the following statements regarding your partner's concepts or attitudes towards your firm or the project?

- |  |                                       |         |                |
|--|---------------------------------------|---------|----------------|
|  | strongly disagree                     | neutral | strongly agree |
|  | 1-----2-----3-----4-----5-----6-----7 |         |                |
- a. The partner treated our firm as a member of their global operational network.
- b. The partner regarded the project as a short-term contract; they have no intention of developing a long-term relationship with our firm.
- c. The partner treated our firm as a potential competitor, thus they were very sensitive and careful in dealing with us.

13. Using your best estimate, how many times had your firm had foreign contract manufacturing projects before the project?

- |                                      |                                      |  |
|--------------------------------------|--------------------------------------|--|
| <input type="checkbox"/> 0 times     | <input type="checkbox"/> 1-3 times   | <input type="checkbox"/> 4-10 times    |
| <input type="checkbox"/> 11-20 times | <input type="checkbox"/> 21-50 times | <input type="checkbox"/> over 50 times |

14. How familiar were your employees with the partner's language and business practices before the project?

Totally unfamiliar 1-----2-----3-----4-----5-----6-----7 totally familiar

15. What other forms of cooperation had your firm had with this partner before the contract manufacturing project (multiple choice)?

- No previous contact
- Occasional trading or occasional contract manufacturing cooperation
- Brandname, technology, or patent licensing
- Frequent transaction or agency relationship
- Personal or social ties between managements or shareholders
- Long-term transaction partnership or central-satellite relationship
- Joint ventures in other business
- Minority equity investment (unilateral or cross-investment).
- Other relationships (please specify):

16. Who were the major coordinators or respondents of the partner (multi-choice)?

- Product development or R&D engineers
- Import, procurement, or process engineers
- Sales/marketing or managerial staff
- No specific people in charge.

17. Did your firm have a department or task force in charge of the OEM/ODM business?

- Yes       No.

If yes, who was in charge (e.g., the Account Officer) (multiple choice):

- Product development or R&D engineers       Sales or managerial staff
- QC or process engineers.       Others (please specify):

18. How do your impressions agree with the following descriptions of the project?

- |   | disagree                              | neutral | agree |
|---|---------------------------------------|---------|-------|
| a. Due to the nature of the task, the project required constant communication and coordination between partners.                                  | 1-----2-----3-----4-----5-----6-----7 |         |       |
| b. The product needed only minor completion by the partner before selling it on to their clients.   | 1-----2-----3-----4-----5-----6-----7 |         |       |
| c. Our firm contributed substantially to the R&D for the product.   | 1-----2-----3-----4-----5-----6-----7 |         |       |
| d. Their technical staff were willing to discuss and solve technical problems with our engineers.   | 1-----2-----3-----4-----5-----6-----7 |         |       |
| e. Their technical staff were willing to provide product specifications or product technology data/documentation at the request of our engineers. | 1-----2-----3-----4-----5-----6-----7 |         |       |
| f. Their technical staff were willing to provide quality control or process technology data/documentation at the request of our engineers.        | 1-----2-----3-----4-----5-----6-----7 |         |       |
| g. Their personnel were not willing to reveal any information regarding customer or market demand.  | 1-----2-----3-----4-----5-----6-----7 |         |       |

19. Reviewing the cooperation process, how do you evaluate the importance of each party in the eyes of their partner?

	absolutely unimportant						absolutely important
The importance of the client in your firm's view.	1	2	3	4	5	6	7
The importance of your firm in the client's view.	1	2	3	4	5	6	7

20. Recalling the cooperation process, to what extent do you agree with the following statements regarding your partner or the cooperative relationship?

	strongly disagree						neutral				strongly agree
a. The partner and its employees had the capability to carry out their work faithfully and effectively.	1	2	3	4	5	6	7				
b. The partner and its employees were trustworthy; they would not break their promises in pursuit of their own interest.	1	2	3	4	5	6	7				
c. The partner believed that we had the capability to carry out our duties faithfully and effectively.	1	2	3	4	5	6	7				
d. The partner believed that we were trustworthy; we would not break our promises in pursuit of our own interest.	1	2	3	4	5	6	7				
e. The partner made every effort to establish and maintain a continuing relationship with our firm.	1	2	3	4	5	6	7				
f. The partner would have switched to another supplier if one had offered them better terms and conditions.	1	2	3	4	5	6	7				
g. Our firm made every effort to establish and maintain a continuing relationship with the partner.	1	2	3	4	5	6	7				
h. We would have switched to another client with similar qualifications if one had offered us better terms and conditions.	1	2	3	4	5	6	7				
i. During the cooperation, our R&D engineers had the opportunity to exchange information or ideas with their R&D engineers.	1	2	3	4	5	6	7				
j. During the cooperation, our process engineers had the opportunity to exchange information or ideas with their process engineers.	1	2	3	4	5	6	7				
k. During the cooperation, our sales and marketing staff had the opportunity to exchange information or ideas with their sales/marketing staff.	1	2	3	4	5	6	7				
l. During the cooperation, our managerial level had the opportunity to exchange information or ideas with their managerial level.	1	2	3	4	5	6	7				
m. During the cooperation, our communication with the partner was timely, and delays were rare.	1	2	3	4	5	6	7				
n. During the cooperation, our communication with the partner was accurate, and misunderstanding was rare.	1	2	3	4	5	6	7				
o. During the cooperation, our communication with	1	2	3	4	5	6	7				

the partner was adequate, and lack of communication was rare.

- p. During the cooperation, the cooperative atmosphere between the two firms was harmonious. 1-----2-----3-----4-----5-----6-----7
- q. During the cooperation, our personnel developed harmonious personal relationships with their personnel. 1-----2-----3-----4-----5-----6-----7
- r. During the cooperation, it was common to have disagreements between the partner and our firm. 1-----2-----3-----4-----5-----6-----7
- s. Whenever disagreements arose, the partner and our firm usually jointly worked out a solution; the process was not dominated by any one party. 1-----2-----3-----4-----5-----6-----7

21. Throughout the cooperation process, what media were used and how frequently did such communication or exchange occur between the two firms?

	never	rare	sometimes	often often	quite frequent	very frequent	
a. Communication through documents or letters	1	2	3	4	5	6	7
b. communication through telephone or fax	1	2	3	4	5	6	7
c. communication through formal meetings.	1	2	3	4	5	6	7
d. They provided advice on tooling, equipment, or machinery.	1	2	3	4	5	6	7
e. They sent technical staff specialized in product, process or quality control to our firm.	1	2	3	4	5	6	7
f. They sent non-technical staff such as procurement, marketing, or managerial staff to our firm.	1	2	3	4	5	6	7
g. We sent technical staff specialized in product, process or quality control to their firm.	1	2	3	4	5	6	7
h. We sent non-technical staff such as procurement, marketing, or managerial staff to their firm.	1	2	3	4	5	6	7

22. Has your firm had any form of business cooperation with the client after the contract manufacturing project (multiple choice)?

- No further cooperation
- Occasional trading or occasional contract manufacturing cooperation
- Brandname, technology, or patent licensing
- Frequent transaction or agency relationship
- Personal or social ties between managements or shareholders
- Long-term transaction partnership or central-satellite relationship
- Joint ventures in other business
- Minority equity investment (unilateral or cross-investment).
- Other relationships (please specify):

23. How would you describe your firm's sales growth following the completion of this contract manufacturing project (single choice)?

- negative growth     zero growth     low growth
- medium growth     high growth     very high growth.

24. Overall, how satisfied is your firm with this contract manufacturing project?

(Please score your answer from 1 to 100: 100 is the full score indicating full satisfaction; 60 means the lowest score of a satisfactory cooperation; and any score under 60 will indicate dissatisfaction.)

The overall satisfaction score of this contract manufacturing project is: \_\_\_\_\_ .

25. Your main role in this specific project was (single choice):

Managerial or sales/marketing coordinator       Product or process engineer.  
 Other (please explain):

26. In your own assessment, to what extent has your firm enhanced its capabilities, in terms of the following indicators, through the contract manufacturing project?

(This question is difficult to answer but very important. Please answer with care, and according to the perceived capabilities with respect to the specific contract manufactured product. Thank you.)

Degree of capability enhancement				
	nil	moderate	high	very
negative	low	substantial	high	high

- 
- R&D capability in terms of product design and functionality
  - Speed of new product development and introduction
  - Knowledge and grasp of customer needs and market trends
  - Capability to mass-produce reliable products with consistent quality
  - Flexible and speedy production capability
  - Low-cost manufacturing capability
  - Experience in international marketing, service or product support
  - Capability in establishing and enhancing international brandname
  - Capability in establishing and managing international distribution and channels
- =====

The questionnaire is finished here. If you would like a copy of the result of this questionnaire, please tick in the box->

Thank you very much for your assistance. Please check if any answer has been omitted, then fold, wrap, and post the questionnaire as soon as possible. Thank you.

## Appendix 2: AHP Questionnaire

[The original version of this questionnaire is in Chinese.]

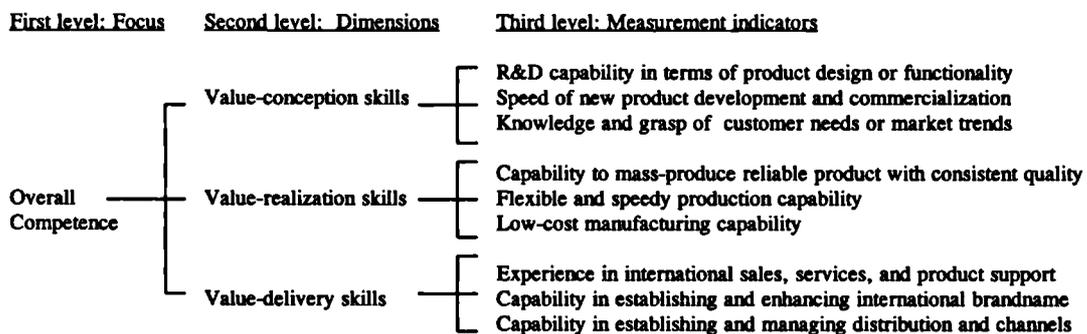
### **A Study on the Dimensions and Measures of a Firm's Operational Capabilities**

There is no widely-accepted definition of a firm's overall operational capability, let alone its measuring dimensions. This study aims to analyze this abstract but important construct, and subsequently to measure it.

The study views a firm's operation as a customer-perceived value creation process; and an individual firm is regarded as an organic combination of a multiplicity of firm-specific assets and skills. Based on the above concepts, a firm's overall operational capability is resolved into three main dimensions:

1. **Value-conception skills:** are the capabilities to identify, conceptualize, and design customer-perceived values into products. These capabilities are mainly about product R&D technology, but they are also related to a firm's familiarity with market demands.
2. **Value-realization skills:** are the capabilities required to actualize intangible concepts or customer-perceived values into tangible products. They are mainly about production capabilities.
3. **Value-delivery skills:** are the capabilities required to distribute, maintain, or even enhance the customer-perceived value embedded in products after they are manufactured. They are primarily represented by a firm's marketing capabilities.

Screened from existing literature, the three capability dimensions are further decomposed into the following measurement indicators:



[AHP Questionnaire]

According to your understanding of Taiwan's electronics and information technology industry, please provide your judgments on the following two groups of questions:

*1. Based on your own opinions, please give us your comments on the firm-specific operational capabilities [as measured by the measurement indicators].*

a. Do you think they are important capability indicators which affect a firm's overall operational capability or competitiveness?

Yes

No; please list the indicator(s) which are not important in practice.

b. Are the content and wording of each capability indicator understandable to practitioners?

Yes

No; which one is not easy to understand? Any suggestion for modifying it?

c. Is any important capability indicator absent? If so, please specify.

2. Please try your best to judge the relative importance of each pair of indicators below to their corresponding upper-level dimension [please refer to the hierarchical capability structure on the first page].

**a. The relative importance of the three capability dimensions to a firm's overall operational capability.**

( ) Value-conception skills, compared with ( ) value-realization skills; which are more important to a firm's overall operational capability?

(Please tick before the more important dimension; you may need to refer to the definitions of capability dimensions explained in the first page.)

What is their relative importance (single choice)?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) Value-conception skills, compared with ( ) value-delivery skills; which are more important to a firm's overall operational capability?

What is their relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important

( ) Value-realization skills, compared with ( ) value-delivery skills; which are more important to a firm's overall operational capability?

What is their relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

**b. The relative importance of the capability indicators to their higher-level dimensions.**

**\* To Taiwanese IT firms' value-conception skills enhancement in recent years:**

( ) R&D technology, compared with ( ) R&D speed; which is more important to a firm's value-conception skills?

(Please tick before the more important indicator; you may need to refer to the definitions of capability indicators explained in the first page.)

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) R&D technology, compared with ( ) end-customer intimacy; which is more important to a firm's value-conception skills?

What is its relative importance ?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) End-customer intimacy, compared with ( ) R&D speed; which is more important to a firm's value-conception skills?

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

**\* To Taiwanese IT firms' value-realization skills enhancement in recent years:**

( ) Manufacturing quality, compared with ( ) manufacturing flexibility; which is more important to a firm's value-conception skills?

(Please tick before the more important indicator; you may need to refer to the definitions of capability indicators explained in the first page.)

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) Manufacturing quality, compared with ( ) low-cost manufacturing, which is more important to a firm's value-conception skills?

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) Low-cost manufacturing, compared with ( ) manufacturing flexibility, which is more important to a firm's value-conception skills?

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

**\* To Taiwanese IT firms' value-delivery skills enhancement in recent years:**

( ) Marketing experience, compared with ( ) brandname management, which is more important to a firm's value-conception skills?

(Please tick before the more important indicator; you may need to refer to the definitions of capability indicators explained in the first page.)

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) Marketing experience, compared with ( ) distribution channel management, which is more important to a firm's value-conception skills?

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

( ) Distribution channel management, compared with ( ) brandname management, which is more important to a firm's value-conception skills?

What is its relative importance?

equally important     slightly more important     moderately more important  
 significantly more important     absolutely more important.

*Thank you very much for your precious time and for sharing your experience; may you be prosperous in whatever you do.*

### Appendix 3: Case Studies

The cases presented below are to complement the cross-sectional questionnaire survey. The main themes of these cases show some longitudinal observations in the context of the three research questions: 1) What have Taiwanese IT manufacturers obtained through cross-border contract manufacturing alliances with MNCs? 2) How did they achieve these results? 3) What are the differences in cooperating with different partners.

Although these are only "caselets", the costs and benefits of OEM business to Taiwanese IT suppliers are clearly presented. More importantly, contract manufacturing alliances with MNCs have played important, yet different, roles in these Taiwanese firms' global strategies. The essence of each case can be summarized as follows.

The case of Acer Inc. showed an indigenous manufacturer's internationalization process through OEM to ODM, and finally its approach to OBM. Although Acer has used a variety of cooperative modes with MNCs, its successful utilization of contract manufacturing apparently contributes greatly to its current status. In spite of its success in contract manufacturing business, Acer has never stopped its in-house efforts in global marketing. Its niche-market penetration and localized marketing strategy have paid off by establishing Acer as a global player. However, although Acer has successfully leveraged its "ownership-specific advantages" in the "peripheral" countries, how it can make inroads into the U.S. battlefield and Japanese fortress, except by contract manufacturing alliances, remains to be seen.

Being a relative latecomer in the PC market, FIC has shown how an indigenous manufacturer can establish itself as a valuable partner of MNCs in a short time, mainly through contract manufacturing alliances. Specializing in manufacturing excellence and with strong financial backup, FIC has the capacity to take huge orders at relatively low margins, and achieves high-speed growth. Leveraging its contract manufacturing alliances with MNC clients, FIC has built a world-class

manufacturing capacity, and even greatly enhanced its R&D. The challenge of international marketing will decide whether FIC can emerge from a "shadow supplier" into the rank of an independent global player.

The case of GVC Inc. demonstrated the flexibility of a lean and mean niche-capability supplier. Leapfrogging from one product to another, GVC's core competencies in manufacturing are tested and enhanced through continual encounters with its MNC clients, especially through contract manufacturing alliances. The case suggests that a "focus strategy" in terms of capability may be more important than a focus strategy in product.

The case of Kinpo showed the effect of captive contract manufacturing relationships with Japanese MNCs. Kinpo's mixed success, first in calculators then in fax machines, underlines the typical dilemma an EMS supplier faces - inertia with regard to its own international marketing capability in exchange for stable growth. Such a strategy and its associated dilemma have even diffused to Kinpo's new venture into the growing PC markets.

The case of Mitac gave a vivid illustration of the interaction process between the supplier and the buyer in a typical cross-border OEM alliance. This case showed that individual interaction is the starting point of inter-partner learning. Both a partner's transparency and a supplier's learning intent contribute to the supplier's learning results. Through team work and documentation, externally acquired knowledge is translated into organizational capability, and may be beneficial to the firm for years. With the subsequent job-migration of the personnel who have benefited from such knowledge, new practices are further diffused into other organizations - a channel for the spillover of the externalities of international technology transfer.

Finally, the case of Nan Ya showed a successful diversification of a traditional conglomerate into the high-tech area. Aggressively taking opportunities from MNC's outsourcing needs, in conjunction with technology purchases from

secondary technology sources, has helped Nan Ya successfully integrate into different but related areas. The case also revealed the fact that technology can be acquired through multiple sources and in different ways, if only the acquirer has the determination and basic in-house receptivity.

## Acer Inc.

For a firm claiming its employees as its most valuable assets, the year 1992 was probably the worst in Acer's history; it had to chop over 400 positions within one year. However, the prospect of Taiwan's largest high-tech group still seemed gloomy: huge overseas subsidiary and investment losses, piling inventory, bloated organization; even its product innovation and quality were in doubt. This once conceited firm finally resorted to land sales to keep itself in the black, after its core business had suffered two years of heavy losses.

Established in 1976 with 11 employees, the seven founders of Acer gathered together US\$25,000 and started their venture. In five years Acer designed a clone Apple II home computer. Because of its own R&D effort, Acer not only avoided Apple's piracy prosecution, but also achieved a 2000 units/month local sales record. The young indigenous firm soon started international exploration when it introduced its IBM PC/XT-compatible in 1983, only one year after IBM's path-breaking entry into the personal computer business. The technology of Acer's first IBM-compatible was the result of a joint industrial effort led and coordinated by ERSO (the Electronics Research and Service Organization) of ITRI (the Industrial Technology Research Institute), Taiwan's semi-governmental R&D powerhouse. Unfortunately, accused of violating IBM's BIOS (Basic Input-output Operational System) patent, the product was locked out of the U.S. market- a severe setback for the young company. To cope with this failure, Acer adopted a two-pronged marketing strategy: Externally, Acer started focusing on the more fragmented European and Asian market, a strategy its president Stan Shih called "*besieging the city through the countryside*"; and internally, through manufacturing investment, Acer was able to secure large OEM orders from international firms such as ITT and ADDS. Soon after these deals, Acer further expanded the capacity of its manufacturing arm, Acer Peripherals, to support its fast-growing OEM business.

Through the OEM business Acer not only upgraded its manufacturing capability but also absorbed some critical product technology and know-how. The head of Acer's R&D department, Fred Lin, always coaches his engineers: "*An OEM is a learning opportunity for which you don't have to pay tuition fees.*" In conjunction with its internal efforts such as setting up Acer Laboratories Inc., an in-house ASIC design center responsible for PC chip-set design, Acer soon beat IBM in announcing an in-house design for a 32-bit 386-based PC in 1986.

From 1986 to 1990 was Acer's high growth period. Even before it went public in 1988, Acer spared no effort in pursuing its goal to be a global player and promoted an ambitious long-term program, aiming at cultivating 100 CEOs and achieving US\$5 billion sales globally within 5 years. A series of global expansion steps then followed: In order to gain technology and to enter the minicomputer industry, Acer acquired Counterpoint Computers, a U.S. minicomputer R&D company, for US\$4.5 million in 1987; then in 1989 Acer entered into a joint venture with Texas Instruments for DRAM production, which was a US\$250 million major investment sponsored by the Taiwanese government; finally, Acer acquired multi-user systems leader Altos for US\$94 million in 1990, on the recommendation of the new CEO Leonard Liu. Acer even purchased large pieces of land in the suburbs of Taipei, as a step towards its dream of establishing an Acer headquarters and even an Acer community.

During this expansion process, Shih and his local managers gradually found themselves having difficulty keeping pace with the excessive expansion and coping with the challenges of global operations. It was a natural move to hire more senior managers from other global firms, especially from American companies. Even Shih himself relinquished the CEO position to an ex-IBMer, Leonard Liu. At one time Acer had over 40 vice presidents and many of them were hired expensively, from other international firms. During this drastic transformation period, Acer lost its spirit of entrepreneurship rapidly and became a bureaucratic and bloated organization. Although Acer's bad performance at least partially reflects the fierce global competition, the costs and risks of managing a globalizing organization are probably the main reasons for its blunder in the early 1990s. Conceding that Acer has paid

dearly for this valuable lesson, Shih later recalled: "*We can cope with anything but the difficulties of managing an internationalized organization. I myself simply don't have the capability to cover so many areas simultaneously.*"

However, these international efforts are not in vain. Acer's brand image and international channels are the best among Taiwanese high-tech companies, thanks to Shih's consistent obsession with international marketing. To Stan Shih, the OEM/ODM business is complementary to Acer's own-brand business. In his strategy, when price competition intensifies, contract manufacturing business can sustain Acer because of its volume; but in order to gain global presence and secure above-average profit, Acer needs eventually to control both channel and brandname. Because of this explicit intent, the top global players such as IBM and Compaq are somewhat reluctant to contract their OEM orders to Acer. However, because of Acer's manufacturing cost and volume, other players such as Apple, Canon, and NEC are still Acer's ODM clients. Actually, the percentage of Acer's OEM/ODM business has steadily increased from 25% (1992), to 32% (1993), to over 40% in 1994, and it is likely that the figure for 1995 will be even higher.

Although Shih said "*We want to be the manufacturer for the worldwide 'computerless computer companies'*", he intended to adopt a strategy different from those of other contract manufacturers. Convinced that there isn't much money to be made as a low-margin PC assembler, Shih wants Acer to be a world-class volume supplier for key components and design services, both to Acer's assembly plants overseas and to other global players. In other words, Acer has redefined its contract manufacturing business as one-stop sourcing services for MNCs. In order to maintain its relative price/performance advantages, Acer has aggressively moved its low-end assembly overseas while Taiwan remains the base for high-margin components and R&D. Before 1995, Acer had established 10 fabrication plants and more than 20 assembly plants all over the world. To avoid the risk of relying on a few OEM clients, Acer diversified its OEM business through different clients with a wider range of OEM products.

As for its own-brand business, Acer has designed an innovative approach labeled "local touch, global brand". Shih explained the strategy: "*In international markets, we want to franchise our own brands and form joint ventures with a variety of local distributors like a fast food franchise. In this way, jointly we can confront the big European and American restaurants.*" Internally, Shih wants to "deconstruct" the group, selling off majority stakes in 21 different business units in Asia and North America to local investors. "*The outsiders can make money for us as long as we can help them to make money*", said Shih. In the long run, Acer will only keep significant minority shareholdings in the member firms of its new global network. This is to achieve local responsiveness and efficiency without losing the necessary influence. In addition, relatively independent channels (instead of captive ones) will force the manufacturers to remain competitive, for the channels will not accept products that are not competitive in the market. With the help of such a strategy which leverages local strength, Acer has become the No. 1 brand in some countries such as Mexico and Malaysia by 1995; and it has established joint ventures responsible for assembling, marketing and supporting local markets in more than seven countries. Once the "countryside" has been conquered, Acer can start its siege of the "city" - the massive U.S. market.

Although Acer's brand recognition in the U.S. is still limited by its meager \$14 million advertising budget, its low-end Acros line of desktops has reached over 20,000 units a month since mid-1994, thanks to its alliances with some mass-channels. Compared with its rivals who depend on subcontractors, Acer not only enjoys a cost advantage, but also has more strategic flexibility. However, Shih doesn't think Acer can compete with other global players simply by imitating the competitors' strategy. "*We don't want to become a second-tier American company. We want to be a top global company with our own approach*", said Shih. The strategy of interplaying OEM and own-brand business has paid off so far. In 1993, Acer set new records for both revenue (US\$1.9 billion) and earnings (US\$77 million). Although 80% of the earnings came from TI-Acer, there was no doubt that Acer had survived the PC shake-out. By 1994, the whole Acer Group had achieved US\$3.3 billion sales and US\$120 million earnings. More importantly, according to IDC (International

Data Corp.), its shipment of 1.26 million PCs has surpassed Toshiba, Dell, and HP, leaving Acer ranked as the No. 7 supplier worldwide. Including OEM shipments, Acer has entered the ranks of the global top five PC makers. Acer's goal is to be within the top five brands in 1995 and to reach NT\$200 billion by the year 2000 - an ambitious but seemingly achievable goal for this young dragon.

## **FIC Inc.**

After earning his PhD in Electrical Engineering from U.C. Berkeley, Ming Chien and his wife Charlene Wang, daughter of Taiwan's industrial tycoon Y.C. Wang, came back to Taiwan to start their computer business - First International Corp. (FIC).

FIC was founded in 1979, firstly as a local agent for Prime 32-bit super-minicomputers. The new company's first significant business was from the Formosa Plastics Group, which is the largest Taiwanese industrial business group, headed by Charlene's father Y.C. Wang. From the experience of helping Formosa Group establish their computer integrated manufacturing system, FIC accumulated valuable know-how in factory automation and positioned itself as a local value-added systems integrator.

Only after 1989 did FIC decide to enter the fast-growing but competitive PC market. Because of its strong financial position relative to the other PC makers, FIC started with two aggressive approaches. For the local market, FIC took over many local dealers from other PC makers such as Copam and Plus & Plus which couldn't afford local channel investment due to their own financial difficulties. For the international market, FIC focused on motherboard OEM business with other global players. Because of the upstream support from Nan Ya's PCB business (an affiliate company of Formosa Group), FIC enjoyed comparative advantages in cost, quality, and delivery, and it became the largest mother-board producer in Taiwan in 1992. Before it entered the PC market in 1988, FIC's sales were only NT\$1.1 billion. Thanks to the success of its motherboards and desktop PCs, FIC had grown into a NT\$16.4 billion company in 1994, second only to Acer among Taiwan's numerous PC makers.

Although FIC had become the largest motherboard producer in Taiwan, Chien concedes that the margin on this product cannot support FIC's future growth. In order to make enough profit, FIC's product structure needs to be changed. Notebook PCs, multimedia, and IC testing and packaging, are its new business areas. Probably influenced by Formosa Group's successful integration growth strategy, FIC has spared

no effort in developing its upstream and downstream business. In 1993, FIC established its subsidiary firm in HsinChu Science-Based Industrial Park, focusing on the R&D and manufacture of IC chipsets and memory cards. By early 1995, the new plant had developed IC testing and packaging business. Although the current operation is still insignificant with an estimated sales (1995) of NT\$750 million, it will serve as the testing and packaging arm once the Group's 8" wafer fab (under construction by Nan Ya Technology Co.) comes into production in 1996. To show its support and to secure stable supply of the key components in the future, FIC further invested in the Asian Pacific Investment Co. (a NT\$12 billion investment firm aiming at technology transfer from Japan and other countries), and in Nan Ya Technology Co. which is Formosa's major venture in LCD and DRAM fabrication.

In its core business, FIC entered the notebook market relatively late. The mass-production of its own notebook PCs started in the summer of 1995; but before then FIC has been working on OEM projects with NEC for manufacturing the motherboards of NEC's proprietary (PC98) notebook PCs since 1994 - a business extended from previous desktop motherboard OEM business. Under the OEM agreement, NEC paid FIC lay-out expenses and even dispatched R&D engineers to help FIC modify its product design. Because of its strong sourcing capability, NEC also consigned key components such as the CPU and LCD to FIC for manufacturing. The price of FIC's contract manufacturing service was thus squeezed by NEC at a marginal level. However, FIC still cherished this order because it was its first OEM order for notebook PCs. From FIC's strategic thinking, once the product design and production process meet the strict requirements of NEC, FIC not only can have its own notebook PCs, but also the volume following such an OEM order will enable FIC to enjoy comparative advantages in component sourcing, and scale economy in manufacturing. Even its international marketing can be helped by the reputation effect resulting from the major cooperation with Japan's largest computer firm. Although eventually FIC didn't learn much from NEC in product design mainly due to the protective mentality of the Japanese partner, it has greatly enhanced its manufacturing capability in product miniaturization and quality control. The Japanese engineers visited FIC almost every month, until the final product was rolling

smoothly off the production line. Thanks to FIC's Japanese-speaking sales force, engineers from both sides can communicate without much difficulty.

For FIC, the potential of notebook ODM business comes from designing and manufacturing its own IBM-compatible models for other global players. NEC's OEM order can serve as a pilot run before mobilizing FIC's resources for future notebook business. FIC expects to develop more ODM clients with its own notebooks in the near future. According to Chief Operating Officer Horace Chiang, FIC's notebook business will reach 30,000 units/month in the summer, and then 60,000 units/month before the end of 1995. With such a record, the late-comer will have a chance to be the No. 2 notebook producer in Taiwan, second only to Acer; and the 1995 sales were expected to have been over NT\$20 billion.

FIC's success should be mainly credited to its professional manufacturing capability, although it did not seem to enjoy R&D superiority in the past. In addition, Chien strove to achieve both growth and stability at the same time. On the one hand, FIC is a business-oriented company. Different from the other engineering-oriented local PC makers, FIC is far from an innovator in new products. However, its competitive manufacturing capability and aggressive marketing approach have established the company as an invincible leader in the market of high-volume mass-products; on the other hand, because of FIC's relationship with the Formosa Group, it has the necessary financial strength to support its aggressive business expansion. This is one of the main reasons why FIC can grow at a neckbreaking pace without incurring operational or financial crises, a unique record in Taiwan's volatile IT industries. Because of its manufacturing capability and financial strength, FIC has become the long-term partner of NEC and AT&T, among other first-tier players.

Unlike the other local PC makers, FIC is good at leveraging the sources and markets both domestically and internationally. In the domestic market, FIC is the local agent of Prime's CAD/CAM solution, Stratus's non-stop computers, Fujitsu's automatic cashiers, Sun's workstation, and many other world-class products. With its strong systems integration capability, FIC can make money out of the local systems markets

with international product sources. In addition, its intensive domestic distribution channels have become invaluable assets for local market penetration. In the international market, FIC's sourcing and manufacturing capabilities enable it to export its PC related products to international distributors and OEMs/ODMs. Knowing the risks of the unpredictable contract manufacturing business, FIC promoted its own brand "LEO" even before it entered the PC manufacturing business. The brand has achieved some recognition in Europe and some LDCs, and Chien is determined to continue developing it into a global brand.

In order to penetrate the U.S. market with its own brand, FIC and the Wangs spent US\$2.3 million to buy out the troubled Everex Systems Inc. in late 1993. To ease the concerns of its existing OEM clients in the U.S. market, FIC had distanced itself from the deal. In spite of all the efforts in promoting its own products, FIC is far from giving up its expanding contract manufacturing business. In order to remain a low-cost high-volume producer for global brands, the Wangs and FIC had established monitor and motherboard plants in GuangDong and a mammoth plant in Shanghai with monthly capacity of 150,000 motherboards and 70,000 PCs. Once this capacity is fully utilized, FIC will be able to provide a wider range of contract manufacturing services and remain a major supplier in the global PC industry, regardless of the cost disadvantages of Taiwan.

FIC's strategy is simple but effective: vertical integration, efficient mass-production, and the utilization of global division of labor. This simple formula has worked well so far, judging from FIC's sales growth and stable profit. However as Stan Shih of Acer commented on his closest challenger: *"Money and mass production are important, but do they have the corporate culture to respond to rapid changes in technology and to manage people in a dynamic way?"* FIC's manufacturing strength has been proved by its track record, and its upstream integration is gradually materializing with the help of the whole Formosa Plastics Group. Traditionally an upstream material provider, the whole Formosa Group lacks face-to-face experience with the end-market. The relatively independent FIC may be the only likely pioneer and accumulator of these value-delivery capabilities for the whole group.

## **GVC Inc.**

Established in 1979, GVC was founded as a small Taiwanese videotape manufacturer. Within three years it became the largest videotape producer in Taiwan. Because of increasing labor costs and fierce price competition, GVC's founder Michael Y.C. Chiang sensed that GVC needed to switch to other new product areas in order to grow. With the money made from tape production, Chiang set up his R&D department in 1984, aiming at C&C products. Because of GVC's specialization in plastic molding, it chose telephone sets as the entry product into the C&C industry. Since the technology of the telephone set was already mature by then, the manufacturing-oriented GVC soon had its own telephone products and captured large OEM orders from the U.S. department store chain Macy's. To serve its North American OEM clients better, GVC even set up its product service center in New Jersey. This is the first time GVC attempted international marketing using its own brandname.

As a result of his electrical engineering background, Chiang started to be attracted by the emerging PC industry in the early 80s. To him, the telephone was just a stepping stone to another larger business. At that time, both PC motherboards and modems seemed to be attractive products. After evaluating capital requirement, competitors, and GVC's own strengths, Chiang selected the "telephone of PCs" - the modem - to be GVC's next "star". Indeed, the technology of the modem was still changing then, and there was no company in Taiwan capable of manufacturing modem in 1984.

To secure the necessary technology, Chiang set up a task force consisting of the heads of GVC's technology, manufacturing, marketing, and R&D departments. In fact, the whole company knew that this program would make or break GVC, therefore almost every employee participated in the transformation process. Although the technology in telephone production is somewhat related to that of modems, GVC still needed other more specialized technology to master modem production. The first challenge for GVC was how to obtain the advanced technology required. Recruiting some R&D staff from other local companies was the first step, which gave GVC some basic

product and process technology. The head of the R&D team, C. T. Lin, conceded that the young engineering team "invented" GVC's first modem through "reverse-engineering" some modems bought from abroad. With this limited technology base, GVC started its modem business and managed to get some small OEM orders from a few insignificant foreign clients. To Chiang, although GVC didn't make profits through these fragmented OEM deals, they were great opportunities for GVC to polish its product and process know-how.

The young GVC then started a daunting plan: it went to Hayes, the global leader of the modem industry, asking for OEM cooperation. This request was turned down flatly due to the resource gaps between these two firms. Frustrated by Hayes, Chiang decided to continue GVC's transformation plan by sending its young engineers to be trained by local and international C&C research institutes such as ITRI. Although external training was helpful, from his successful experience in videotape production, Chiang believed that only through mass-production could GVC accumulate the valuable know-how and make sufficient profit.

In 1985, through the introduction of an American distributor, GVC secured its first large OEM order from ATS Co. To Chiang's great delight, this cooperation later became an OEM deal with technology transfer content. During the deal's 18 months, the members of GVC's R&D department continuously researched the functionality of modem and telephone. They spared no effort in recording every detail learned from their partner. Because of this experience, Chiang claimed that "*Through OEM, we not only learn technology, but also gain a lot of valuable product marketing concepts.*"

By 1986, GVC had become the largest Taiwanese modem producer. Thanks to the standardization of communication products and the market's acceptance of the modem as a standard peripheral, once GVC had passed the security standards of the U.S. FCC, the Canadian DOC, the Japanese NTT, Singapore's TAC, Holland's PTT, and the Swiss PTT in 1988, GVC's low-cost and very high-volume production capability soon attracted many international OEM buyers. Its 1992 production volume of 1.62 million modems accounted for 60% of Taiwanese exports and 20% of

the worldwide market. Although Hayes was still the global leader in terms of value, GVC had surpassed Hayes in terms of volume. More importantly, although its NIBT was only 4.5% of sales (gross margin 14%) in 1992, GVC achieved an EPS over NT\$2 due to its relatively small capitalization and huge volume. This strong earning power (about three times that of Taiwan's IT industrial average) persisted in the succeeding years.

Chiang started his own trading company when he was still a student. His past experience makes him believe that as long as you can be a market leader, there is no product from which you cannot make a profit. This philosophy explains why GVC entered motherboard production in 1992 and monitors in 1994, while the other competitors were retreating from these maturing and competitive markets. Chiang explained these controversial decisions: *"A mature product is like 'rice', a commodity with huge demand but low margin. Because GVC has accumulated competitive manufacturing capability through many years of contract manufacturing cooperation with global players, it is not a difficult job to mass-produce another mature product. We simply provide a wider range of products to our clients."*

Chiang's practical character also reflects GVC's choice to be an OEM contractor. GVC's own-brand business only accounts for 20% of its annual sales, and it always sets prices of its own products higher than its OEM products in order to avoid direct competition with OEM clients. Chiang prides himself in business relationship management: *"In business cooperation, mutual trust and integrity are the most important principles in dealing with MNC clients or component suppliers. The relationships between GVC and our business partners stem from pure OEM or trading, and then go through strategic alliances, until we are truly good friends. These relationships enable GVC to maintain stable and long-lasting cooperation with our clients and suppliers. In this way, we enjoy special terms and conditions in our business operations."* In fact, because of this "insider strategy" which emphasizes the non-competition principle among business partners, all top ten global computer companies are GVC's clients and some of these relationships have lasted for more than 10 years. For example, its single largest client, Packard Bell, placed orders worth

NT\$505 million in 1991, NT\$612 million in 1992, NT\$1.9 billion in 1993, and then NT\$5.8 billion in 1994. The percentage of Packard Bell's orders to GVC's total revenue also increased from 23% in 1991 to 42% in 1994. Because of GVC's long-term cooperation with OEMs, its business expands as its clients grow.

Partially because of this non-confrontational approach, GVC also enjoys the privilege of developing new products with its OEM clients. Ex-CEO C. T. Lin believes that through the help of its OEM clients, GVC can easily identify market trends and develop new products in a timely and efficient way. According to Chiang's experience: *"As long as you spend extra effort, the technology sources are always around. The buyers who place orders and the component suppliers are actually the best information and technology providers."* On the other hand, GVC also needs to keep its attractiveness to these OEM clients. Superior manufacturing capabilities are thus of critical importance. Much effort has been spent in this respect. For example, in its ChungHo modem factory, GVC invented an automatic on-line computer testing system at the time Lin was in charge of the R&D department. This modem testing system has been continually improved by the succeeding R&D managers and the current system is beyond the tenth version. Now GVC boasts that its testing speed is at least twice as fast as its competitors. In addition, whenever GVC finds there are more efficient SMT machines, it replaces the existing ones in order to keep pace with the state-of-the-art production technology.

With all these capability enhancements through both external acquisition and internal development, GVC has emerged from being a small niche-player to become a global player and its sales revenue has grown from NT\$668 million in 1989 to NT\$13.8 billion in 1994, a stunning record of more than a 2000% increase within 5 years. GVC estimates its 1995 annual sales will even exceed NT\$18 billion. In the foreseeable future, GVC will still position itself as an electronics manufacturing service source, providing a wide range of products to meet the needs of its global clients.

## **Kinpo (and Compal) Electronics Inc.**

Before 1990, about 20 Japanese companies dominated the global fax market. All together they accounted for over 90% of the market worldwide. In contrast, the infrastructure of Taiwan's fax industry was very poor with only a number of low-end assemblers including the Taiwanese calculator maker Kinpo.

Kinpo started fax R&D in 1986, primarily to extend its product lines from the maturing calculator business to the growing C&C field. Although Kinpo had been the largest calculator manufacturer worldwide before 1986, supplying OEM/ODM services to most of the global calculator brands such as Sharp, TI, Canon, and Casio (1994 production volume: 35 million units), it never strove to become an own-brand player in the market. However, Rock S. S. Hsu - son of Kinpo's founder and now Chairman and CEO, was not satisfied with the status quo and C&C was his next arena for action.

Kinpo's successful calculator business was the result of a cooperative strategy with foreign competitors, especially with Japanese MNCs. As early as the mid 80s, Kinpo had positioned itself as an overseas manufacturing partner of many foreign MNCs. In order to attract orders from the first-tier calculator makers, Kinpo invested heavily in SMT, CAD/CAM, AIS (Auto-Inserting Systems) and ATE (Automatic Testing Equipment). This strategy paid off handsomely when the Japanese Yen gradually appreciated and many Japanese calculator producers had to move their assembly operation overseas in the 80s. Because the Hsu family had developed strong relationships with Japanese suppliers right from Kinpo's establishment in 1973, and partly because Kinpo had never promoted its own brandname outside Taiwan, the Japanese companies were quite comfortable working with Kinpo. Through these contract manufacturing experiences, Kinpo developed the necessary product R&D capabilities and its OEM business gradually changed to ODM business. However, although Kinpo's calculator R&D capability had been almost equal to its clients, it still defined itself as a world-class calculator manufacturer and refrained from international marketing activities. Even its overseas expansion into Thailand in 1989

was for low-end production. In this way, Kinpo can serve its OEM clients in spite of the increasing labor cost in Taiwan. Hsu justified Kinpo's OEM/ODM strategy: "*If the world's premier brand has to buy ODM products from you, what's the difference between ODM and own-brand business?*"

Different or not, one thing is certain: Kinpo has grown stably into a public listed company with 1994 sales of NT\$12.3 billion. In fact, calculator business has been the cash cow of Kinpo and this is one of the major reasons why Kinpo could support the high R&D expenditure on fax for more than seven years. Even after Kinpo's fax was commercialized in 1989, tens of millions of NT dollar have continued to be poured into product R&D on the new product each year.

In fax production, the cost of components accounts for 80% of the total cost of goods sold. Before 1992, Taiwanese fax producers relied heavily on Japanese suppliers for the CCD (Charge Coupled Device), CIS (Contact Image Sensor), and TPH (Thermal Printing Head) components, and even for modem chip-sets (the fax "engine"). It was therefore not surprising to find that most Taiwanese fax companies at that time were either the sub-contractors of Japanese OEMs, or the local agents for Japanese brands.

With more and more local companies entering the fax production business, the demand for lower prices and larger volume of key components is increasing. Many innovative new startups, using various technology sources, emerged to challenge the dominance of Japanese suppliers. Such efforts include, but are not limited to: spin-off new ventures from American MNCs (such as Dyna Image Co. which hired expertise from TI Taiwan); technology transfer from ITRI to Hualon Microelectronics (for CCD); the TPH technology sourcing from the U.S. by acquisition (Delta Electronics); and the fax engines (modem chip-sets) developed by UMC, to name but a few. Because of all these efforts, Taiwan is becoming self-sufficient in the key components for the production of low-end (thermal-type) faxes.

With help from local suppliers, Kinpo cautiously promoted its brandname. Acknowledging that the Japanese brands are well-established in the business market

(93% market share in Taiwan before 1990), and Kinpo's lack of international marketing prowess, Hsu selected the local family as Kinpo's market entry point. After Kinpo's fax production reached the critical mass, it introduced a simple model for under NT\$9,000 (about US\$350) in 1994, targeting local individual and family users. Now it is the local leader in this market segment. However, because of the limited size of the local market, Kinpo knew from the very beginning that the OEM/ODM business is still the key to developing this product line into a major business. After continually upgrading production facilities and obtaining the ISO 9001 and 9002 qualifications, Kinpo shipped 337,400 fax units in 1994, around 5% of the world production. The volume is estimated to reach 580,000 units in 1995, pushing it further into the ranks of the global top five producers. To meet the increasing demand, Kinpo is searching for a third production site, most likely to be in China or Vietnam.

However, sheer volume in low-end models does not guarantee Kinpo's success in the global fax market. In spite of the fact that key components of higher model plain-paper faxes such as ink-jet heads and laser engines, were beyond the capability of local suppliers until early 1995, Kinpo has licensed the basic technology of plain-paper fax machines from its Japanese partners since 1993. Nevertheless, its product technology in this product line was not mature until its OEM cooperation with Olivetti in 1995. Because of its enhanced technological capabilities, Kinpo was also chosen by Canon, a leading firm in the Japanese plain-paper fax market, to be its ODM supplier in late 1995. With a long-term supply contract worth more than NT\$3 billion, Kinpo is aiming at upgrading its production lines from manufacturing thermal-type models to producing mainly plain-paper models using ink-jet printing. Such a move will help Kinpo distinguish itself from many of the low-cost Taiwanese and Korean fax manufacturers.

To grasp the great opportunity in the fast-growing PC industry, Hsu and some of his friends and employees from Kinpo set up Compal Electronics Inc. in 1984. The new company's products range from PC peripherals to notebook computers. After upgrading its manufacturing facilities in 1987, Compal was able firstly to attract some

minor international OEMs, then it gradually upgraded to provide manufacturing services to a wider range of global players.

Thanks to its OEM/ODM strategy, Compal's sales grew rapidly from NT\$600 million in 1986 to NT\$3.2 billion in 1990, with more than 80% of its sales coming from monitors. After the gross margin of monitors decreased because of fierce competition, Compal was forced to develop another new product line. Compal's R&D team has started to focus on notebook computers since 1989. In 1990 the company announced the first 386SX notebook PC in the world, following by the first Pentium notebook PC in 1994, which gave Compal an image of technological superiority. After it won a large ODM order (21% of its 1991 annual sales) from Tandon in 1991, Compal's notebook PC sales exceeded NT\$2 billion, pushing it into the ranks of Taiwan's top ten PC exporters. The subsequent ODM orders from AST accounted for 31% of Compal's NT\$8.8 billion sales in 1993, while Dell placed another NT\$1 billion order for 486-based notebook PCs.

The risks of OEM/ODM business emerged when Tandon's operation ran into difficulty. Within two years Compal wrote off almost NT\$100 million of accounts receivable - a significant loss for a low-margin contractor. Because of the strong local competition, particularly from another local firm Quanta, which was founded by a group of Kinpo and Compal's ex-employees, the ODM business was very competitive, and Compal had to invest heavily both in R&D and manufacturing capacity in order to remain competitive. Thanks to its relationship with Kinpo, Compal could secure the supply of Japanese key components and get access to the low-cost manufacturing capability of Kinpo's Thai factories. This young company is still run under a sense of crisis, although it has been listed on the TSE. As Frank Yu, vice president in charge of Compal's sales, concluded: *"In this competitive business, nothing can be anticipated within three years..."*

Learning from Tandon's lesson, Compal is now diversifying its customer base further, into Europe and Japan. Although Compal's sales growth slowed down a little in 1994 (sales of NT\$9.7 billion), it plans to reach NT\$13.2 billion in 1995, with most of its

sales depending on ODM business. Compal has started to establish its own service channels in Europe and the U.S. since 1991, a necessary investment to support OEM/ODM business. Although Compal has planned to use M&A to control marketing channels and even promote its own brandname, it is very cautious in approaching this goal as Yu concedes that these marketing efforts may have negative impacts on its existing ODM business. However, this seems to be an unavoidable risk for a sizable company like Compal to take, if it intends to strengthen further its competitiveness. Like many other Taiwanese manufacturers of similar size, Compal needs strategic wisdom and determination to solve this dilemma between existing contract manufacturing business and independent global marketing.

## **Mitac International Co.**

In order to compete with other American PC makers more effectively, ITT decided to outsource its new 8088-based models from Taiwan in 1984. Through the introduction of David Lee, the legendary venture capitalist and founder of Qume which was then a subsidiary of ITT, ITT finally contracted out its 8088-based PCs to two Taiwanese companies: Acer (then called Multitech) and Mitac.

For both Taiwanese PC companies, ITT's OEM order was very important not only because of its volume, but also because it was the first OEM order from an international company. For ITT, this OEM order simply functioned as a trial order since ITT, like other American firms, knew little about the capabilities of Taiwanese companies at that time.

In an OEM order, before the product goes into mass-production, a pilot production phase is essential to smooth out all possible production problems. Mitac's pilot run revealed so many bugs with the final product that their delivery time had to be postponed for almost two months. This gave ITT a first impression that Mitac's manufacturing capabilities were insufficient and ITT had to send engineers to Mitac. However, ITT soon found that the unsatisfactory result was caused by Mitac's strict quality control and Mitac was candid and capable enough even to point out some design bugs such as the mis-specification of the product's floppy disk drive. During these a few months, ITT sent their product and process engineers to Mitac for trouble shooting and provided all kinds of technical manuals to support Mitac's operation. Through these intimate interactions, Mitac not only got the opportunity to absorb a complete range of valuable know-how, but also developed a certain degree of mutual trust with ITT.

After the success of ITT's first overseas outsourcing strategy, with its 8088 models, the new wave of 80286-based PCs followed in 1985. Again, ITT was looking for an offshore supplier - this time for a firm qualified to complete an ODM project because ITT's in-house product R&D was too expensive. With its existing R&D capability

and the previous working relationship with ITT, Mitac beat a group of other competitors including Korean firms, Japanese firms, and other Taiwanese suppliers such as Acer and Ta Tung. For Mitac this was a great opportunity to learn, and they did their best too. Mitac first assembled an engineering team consisting of three hardware engineers and three software engineers. The head of this team, Y. T. Lee, was first sent to ITT in the U.S. to discuss the specifications and schedules for a few weeks. Together with another sales representative (from Mitac's U.S. office), he worked days and nights in ITT's offices. Lee recalled later: "*The Americans are very honest and open people. No doubt they contribute a great deal to Taiwan's high-tech industry. Out of my 100 questions, they gave me detailed answers for 99, with only one considered confidential; but the percentage (of confidential questions) is very very low.*"

After coming back to Taiwan, Lee and his team members started to engage in the new product design task. Half way through their design process, ITT sent a team of product engineers, which consisted of the head of their PC R&D department, David Johnson, and two other hardware and software engineers, to supervise and push ahead to meet the schedule. They brought in other complementary experience which the relatively inexperienced local design team needed. Every two or three days, both teams worked together to review the project. The review meetings covered all the details of circuit layout, logic, and timing. Sometimes the ITT engineers challenged the basic methodologies; sometimes they accepted the methodology but warned against possible bugs. With the local engineers as interpreters, ITT's engineers even visited local component suppliers and provided technical advice. Lee and his team were very impressed by the systematic methods and the detailed minds of their counterparts. Through all these tedious but intimate interactions, over a period of three months, Mitac's R&D team learned solid design know-how as well as working methodologies.

For example, ITT required the local team to document all the details of each version of the product design, and in great detail. The local engineers were used to the "apprenticeship style" of know-how transfer and didn't have the working habit of

documentation, but they were obliged to comply. This documentation formed the basis of Mitac's design procedure and design guide, which helped Mitac pass the ISO 9001 standard with ease in 1993. The certification of Mitac's global fabrication and assembly plants opened the way for its global contract manufacturing business. Another example is the diffusion of product testing practice - the Alpha test and Beta test. The former is basically a functionality test on the first three to five prototypes, while the latter is a reliability test on a much larger samples. Mitac didn't go through the procedures in the first OEM project because ITT had done all these R&D work before they contracted Mitac. However, they had solid hands-on experience under the supervision of ITT's technical team in the second ODM project. Later on, such practices were diffused to other local firms when these engineers worked for other companies.

After the product R&D task came to an end, ITT sent another team of process engineers to Mitac to make sure their production met ITT's quality standard. Upon ITT's requirement, Mitac even set up a new plant in HsinChu Science-Based Industrial Park for ITT's orders. With the assistance of ITT, Mitac then had the most advanced and efficient PC assembly factory in Taiwan, and it attracted a number of other international ODM buyers, such as Memorex in the following years. In addition to its successful ODM business, Mitac was able to design and produce a full line of award-winning products after the ODM cooperation with ITT - its streamline series PCs. Mitac's image and competitiveness were greatly enhanced through the ODM cooperation with ITT. Once again, Mitac was regarded as one of the strongest PC manufacturers in Taiwan and it finally went public in 1990 with annual sales over NT\$5 billion.

In Chairman Matthew Miao's strategic plan, successful OEM/ODM business is only the stepping stone to the establishment of a global brand. Mitac's internationalization efforts in the late 1980s reflected this strategic intent. Firstly, Mitac spared no effort in maintaining more than 100 R&D engineers, focusing on the improvement of product functionality. Miao wanted to distinguished Mitac from the other local PC makers through superior products. On the other hand, Mitac aggressively established

international marketing channels through cooperation with local distributors in foreign markets and even invested heavily in establishing subsidiaries in the U.S., U.K., Germany, Belgium, New Zealand, Australia, Japan, Mexico, and Hong Kong. All these preparations are to upgrade Mitac from a local PC maker to an international player.

However, the price cutting competition since 1991, initiated by Compaq and followed by IBM and other first-tier players, seriously squeezed the market niche for a second-tier brand such as Mitac. To protect its market, Mitac had to reduce price even more aggressively. The result was three successive years of heavy losses and declining sales. In 1993, Mitac's sales were merely NT\$3.97 billion, less than some of the unlisted local makers. To face the crisis, Miau made two strategy changes: one change is to establish three assembly factories, in the U.S., U.K., and Australia. The manufacturing bases of Taiwan and China only ship basic barebones systems, or SKDs, to these assembly centers. In other words, the final assembly is completed near the market. This strategy not only increases the flexibility to meet changing market demand, but also reduces the cost and risk of carrying stocks of key components such as CPU, DRAM, and hard disks. The other change is to re-emphasize ODM business. The only difference this time is that Mitac decides to attract the first-tier international player, and tries to develop a longer-term cooperation.

After tedious negotiation, Mitac signed a complex ODM contract with the world's premier PC firm, Compaq, in April 1995. Mitac's attractions to Compaq include manufacturing quality and cost, existing global production and marketing sites, and sufficient financial backup. Although Acer may be even more qualified, its direct competition with Compaq actually rules out the possibility of such a close cooperation. From Mitac's point of view, although this ODM order is to supply 486-based desk-top PCs at a very competitive price, leaving a slim margin of 1 to 2% only through the realization of efficient mass-production, this NT\$10 billion order is important to boost Mitac's lagging sales. More importantly, Mitac has explicitly

revealed its expectation to upgrade its global operation through cooperation with a world-class partner.

It is estimated that such an ODM deal not only saves Compaq 15 to 20% of its total cost - a significant competitive advantage in the lower-end desk-top market, but also greatly reduces Compaq's inventory risks. To reward its suppliers, Compaq signed a relatively long contract with Mitac, involving three to five years of cooperation subject to annual revision. Such a strategic alliance contract is similar to Compaq's alliances with other Taiwanese suppliers such as its alliance with ADI for monitors and its alliance with Hon Hai for connectors. In return, Mitac has to take care of product design and manufacturing, and it has to deliver the product to designated markets and provide after-sales services and support as well. Mitac even greatly expanded its Telford plant in the U.K., from a capacity of 6,000 PCs/month to almost 40,000 PCs/month to accommodate this large order. Such an intimate cooperation not only requires Mitac to share more responsibilities, but also requires it to mobilize its global production and marketing resources, and even to establish a global computer system and to link up this system with Compaq's global computer system. Although this holistic ODM project is demanding, Mitac believes it can learn a great deal about running and developing its global operational network, a precious experience it would never have had were it not for cooperation with a partner such as Compaq.

If Mitac can successfully develop its global operational network through ODM cooperation with the most competitive global players, it certainly has a much better chance to establish itself as one of them - a goal for which it has paid dearly, but of necessity as it has found it difficult to succeed on its own. For Mitac, the alliance with Compaq signifies the materialization of its yearly efforts in internationalization. However, Mitac still has a long way to go before it can establish itself as one of the global players.

## **Nan Ya Corp.**

Winston Wang is the son of Taiwan's "god of management" - Y. C. Wang, chairman of Nan Ya Corp. and head of the Formosa Plastics Group. Sent to the U.K. in his teens, Winston worked hard through boarding school and university until he earned his master degree in optical physics. Then he switched to take an MBA programme and finally studied the root of his family business - chemistry. His student life in the U.K. continued until he graduated with a PhD in chemistry.

To add the final polish to his capabilities, the young Wang moved to the U.S. and worked as a chemical engineer for five years, until he was finally linked with his family business through the Formosa Plastics Group's expansion projects in Texas, in the late 1970s.

Winston returned to Taiwan in 1980, working on the shop floor of Nan Ya, Taiwan's largest industrial firm, with annual sales of NT\$77.3 billion in 1994 (EBIT NT\$7.9 billion). The "boss's son" worked as a line supervisor at the very beginning, a career tradition of the Wangs. After four years of first-line working experience, Winston was assigned to be in charge of Nan Ya's Fourth Business Unit in 1983. This was the smallest business unit in Nan Ya (1985 annual sales: NT\$2.3 billion) having no prominent profitable product line.

Winston knew very well that this was his chance to prove himself to the whole business group. He soon designed a two-pronged strategy: To start with, he identified the most promising product from the existing product lines - the PU artificial leather. Through licensing and technology transfer from some Japanese sources, he managed to acquire some critical technology and upgrade the PU line of products. However, more importantly, he was waiting for other opportunities, to expand his own business into other new territory.

The new business opportunity came when his staff overestimated the market demand for glass non-woven fabrics - a major material for printed circuit board (PCB)

manufacture. In order to better utilize the newly installed glass-fabrics production machinery, Wang conducted a thorough study of the markets of the PCB industry. The result was encouraging: the PCB output in Taiwan had grown 700% in the previous 10 years, and this trend was projected to continue for the next 10 years.

In 1984, as Winston was considering crossing the boundary of petro-chemicals into the fast-growing electronics industry, Hewlett Packard (HP) was searching for a manufacturing partner to complement its insufficient in-house capacity for PCBs. As the ex-CEO of HP Taiwan, Wen Ko, explained HP's reasoning: *"Because of the quality requirement, HP used to rely on internal PCB sources. As the market demand increases, the three captive U.S. PCB plants cannot meet the increasing demand. As labor-intensive PCB production is not desirable for a high-margin U.S. computer company like HP, and production in Taiwan is 30% cheaper than that in Japan, it's therefore a sound business decision to find a Taiwanese manufacturing partner who can supply the PCBs we need."* When asked about concern for the future competition, Ko continued *"We are not in the PCB business. Our PCB production is only for internal use and we do not intend to sell our PCBs into the market, so Nan Ya will not be a competitor of HP in the market. Besides, this turn-key factory will be the first fully automatic PCB plant in Southeast Asia. After we transfer all the technology, Nan Ya can be a showcase to demonstrate HP's powerful computer integrated manufacturing systems."*

Through the introduction of ITRI (Industrial Technology Research Institute, a semi-governmental R&D center), Nan Ya and HP met and negotiated the details. As it was such a perfect match, the deal was done within a few months. Nan Ya invested NT\$800 million in the new plant and agreed to supply HP's future PCB needs. For Nan Ya, this was a wonderful deal not only because HP brought in all the advanced product and process technology (the 12-layer PCB technology and CIM systems were then new in Taiwan), but also because HP would be a guaranteed buyer. For the whole Formosa Plastics Group, it was a strategic breakthrough, signifying the historical entry of this petro-chemical giant into the fast-growing electronics business.

With HP's help in R&D and marketing, production was the only challenge left for Nan Ya. This latter proved to be an easy task for an industrial company historically renowned for its production efficiency. From February of 1984, Nan Ya organized a task force consisting of 15 young engineers from different business units. They represented a wide range of expertise including mechanical engineering, electronics, chemistry, and chemical engineering. To ensure the successful transfer, Nan Ya even hired two external technical consultants from ITRI. The whole team was then sent to HP's PCB factories in the U.S., where they received thorough training with almost no limitations of technology confidentiality. In the meantime, Nan Ya recruited a new group of engineers for the new PCB plant. They were first trained on the production lines of other business units, a strategy to give the newcomers solid experience on the shop floor and to assimilate them into Nan Ya's organizational culture. In addition to all the preparation, Nan Ya's factory construction engineering team was engaged to evaluate all the necessary equipment, analyzing where they could reduce costs and improve productivity. Based on these solid foundations, Nan Ya soon became one of the largest PCB suppliers in Taiwan, and its product quality is also among the best.

Following the success of its PCB operation, Nan Ya soon entered the production of other related materials. In 1985, Nan Ya expanded into CCL (Copper Clad Laminates), a PCB production material made of glass fabric and epoxy; in 1986, it took one step further to produce the epoxy for electronics products. Until 1991, Nan Ya's CCL had achieved a 60% share of the Taiwanese market, surpassing other MNC competitors such as OAK and Matsushita Taiwan. In 1990, Nan Ya started to integrate the production of the last PCB material for which it still relied on external suppliers - copper foil. This was very much a niche product, supplied mainly by two Japanese Companies Furu Kawa and Nippon Mining. The two Japanese firms firstly formed joint ventures with the American technology sources Gould and Yates, then acquired their American counterparts and dominated the worldwide supply of copper foil.

As far back as 1987, Nan Ya put 30 engineers onto copper-foil production research, and looked for other technical sources worldwide. The research team finally found

one East German firm who was willing and able to provide some basic copper-foil production technology. The R&D team then modified the acquired process technology and conducted tedious experiments in their pilot factory. The quality of the product was improved gradually, until it came into commercial production in 1990.

After all these upward integration efforts, the Fourth Business Unit has become the largest and the most profitable SBU in Nan Ya. Its electronic materials business reached NT\$15 billion in 1994. However, Nan Ya is not satisfied with these achievements. To the Wangs, it is just a starting point for their electronics empire. In their plan, the Fourth Business Unit is to be the powerhouse of Formosa group's electronics empire. With a generous budget and flexible employment policy, this SBU has been able to attract and retain a group of young engineers under Winston's leadership. The new tasks for this group are two key components for IT industries: DRAMs (Dynamic Random Access Memories) and LCDs (Liquid Crystal Displays).

Nan Ya has been interested in DRAM fabrication for more than a decade. However, the plan was postponed for lack of a technology source. In 1994, Nan Ya finally signed a technology cooperation agreement with OKI, a Japanese second-tier player in need of cash to establish an 8" wafer fab, for 16M DRAM production. The technology agreement included the transfer of 16M DRAM design technology, process technology, packaging and testing technology, and a joint R&D program for 64M DRAM. The new 8" wafer fab is under construction and is scheduled to fabricate its first piece of wafer in 1996. As for the LCD business, Nan Ya established its STN LCD lab in 1992. After investing NT\$1.2 billion in its pilot plant, Nan Ya produced its first STN LCD in 1994. With this product as the base, Nan Ya negotiated with Japanese technology sources, aiming at the advanced 10.4-inch TFT LCD. Nan Ya even hired some retired Japanese engineers to negotiate and facilitate the necessary technology transfer to come. Finally, technology transfer deals were struck with Mitsubishi Electric and Seiko-Epson - both latecomers in the TFT LCD area, needing to alleviate the cost and risk of significant manufacturing investment.

Similar to the deal with HP, these Japanese firms also required Nan Ya to supply a certain amount of product at a lower price.

To achieve Winston's vision, Nan Ya Technology Inc. was established in March 1995 for the manufacture of these key components with a budget of NT\$27.1 billion and paid-in capital of NT\$10 billion. Winston Wang was appointed as the CEO, and Nan Ya's R&D team was transferred to the new venture. In addition, the new company is currently recruiting experienced engineers from other local IC firms. Since Nan Ya is the largest electronics materials supplier in Taiwan, its success in these new ventures not only will decide the future development of the Formosa Group, but also will influence the competitiveness of Taiwan's IT industry.

#### **Appendix 4: COMPARATIVE STUDIES ON DIFFERENT PARTNERS**

Another interesting research question in this study is: *From the indigenous firms' perspective, what are the differences in cooperating with partners of the various triad powers, both in terms of the cooperation process and the results? Is there an ideal partner for capability enhancement?* Existing cross-cultural buyer-supplier studies (e.g., Blenkhorn and Noori, 1990; Kenney and Florida, 1993: 126-154; Bensaou, 1994) generally support the argument that Japanese industrial buyers demonstrate different behavioral patterns and cultivate different relationships with suppliers, compared with their western counterparts. Some strategic alliance literature (e.g., Hamel, 1991; Lei, 1993) also show different alliance characteristics and alliance results across firms of different national origins. Because detailed and stylized comparisons among firms of different nationalities are still controversial, and whether OEM buyers of different nationalities have applied their idiosyncratic industrial relations to their alliances with offshore contractors is still unknown, it is hypothesized that in the local partners' perception, cooperating with different partners demonstrates differences in alliance characteristics, and may result in different alliance performance.

**P6: Cooperations with partners of different country origins tend to result in different alliance performance.**

**P7: Local firms cooperating with foreign partners of different country origins exhibit different recipient characteristics.**

**P8: In local firms' perception, partners of different country origins exhibit different partner characteristics.**

**P9: Contract manufacturing projects with partners of different country origins exhibit different project characteristics.**

P10: In local firm's perception, cooperations with partners of different country origins tend to develop into different inter-partner relationships.

In the comparative study of a supplier's cooperation with partners of different country origins, One-Way ANOVA is used to examine whether cooperation with these different partners exhibits different cooperative characteristics and different alliance performance. Using Dunn's multiple comparison method, pairwise comparisons between different partners are also outlined in the following contrast coefficient matrix.

Contrast	American partners	European partners	Japanese partners
1 (A/J)	1	0	-1
2 (A/E)	1	-1	0
3 (E/J)	0	1	-1
4 (A/Non-A)	2	-1	-1
5 (E/Non-E)	-1	2	-1
6 (J/Non-J)	-1	-1	2

The contrasts are:

**Contrast 1:** Cooperation with American partners is compared with cooperation with Japanese partners.

**Contrast 2:** Cooperation with American partners is compared with cooperation with European partners.

**Contrast 3:** Cooperation with European partners is compared with cooperation with Japanese partners.

**Contrast 4:** Cooperation with American partners is compared with cooperation with non-American partners.

**Contrast 5:** Cooperation with European partners is compared with cooperation with non-European partners.

**Contrast 6:** Cooperation with Japanese partners is compared with cooperation with non-Japanese partners.

**Alliance performance and partner's national origins**

*ANOVA between Learning and Partner's National Origins*

Alliance Performance	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
Overall Learning							
<i>R&amp;D Learning</i>							
<i>Process Learning</i>							
v265: flexible manufacturing							-1.703 (.090)
v266: low-cost manufacturing		1.808 (.072)		1.971 (.050)			-2.135 (.034)
<i>Marketing learning</i>							

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

*H3-1: Cooperations with partners of different country origins tend to exhibit:*

- a. different levels of learning in different capabilities,*
- b. different levels of satisfaction,*
- c. different levels of sales growth after projects,*
- d. different levels of change of cooperative strength.*

Although no significant differences in overall learning results have been found between cooperating with different partners, there are still some differences on the level of capability indicators.

Cooperation with Japanese partners seems to result in the lowest level of learning in flexible manufacturing and in low-cost manufacturing. These counterintuitive findings may be explained by the business practice of Japanese industrial buyers in that (compared with their Western counterparts) they usually concern more about quality than price, and they usually have a long trial period to cultivate intimate partnerships before they place important orders. This may also reflect Japanese IT buyers' relatively novelty in their offshore sourcing from Taiwanese IT suppliers. Talking about contract manufacturing for Japanese buyers, one CEO of a Taiwanese handy scanner manufacturer expressed his personal experience: *"It is only in the past two or three years have we started to have major Japanese orders. It took a long time to develop Japanese business and they are very demanding about quality - even our product packaging has to be redesigned upon their request. But once they are satisfied, you can expect steadily increasing sales volume and relatively more stable price [compared with doing OEM business with American buyers]."* However, within such a relatively stable supply relationship, suppliers may not improve their manufacturing flexibility or cost competitiveness.

*ANOVA between Other Performance and Partner's National Origins*

	ANOVA Result of Partner's Country of Origin						
Alliance Performance	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
Satisfaction							
Sales Growth							
Change of co. strength							

(Numbers in columns represent F or T values, while numbers in parentheses denote probability.

Only variables with  $p < .10$  are shown.)

The results show, by the absence of significant value in the above table, that the alliance performance does not vary significantly with the country origins of different partners. Therefore, Hypotheses 3-1 cannot be confirmed from this research. In general, cooperation with partners of different nationalities do not results in significant performance difference.

*The results of cooperating with partners of different competitive status*

Another interesting question about partner-selection is whether cooperating with partners of different ranks exhibits different alliance performance. Because of the measure of partner's competitive status is an ordinal scale, bivariate correlation can be employed to establish the effects of partner's competitive status on alliance performance.

Performance Indicator	v4: Partner's competitive status
<i>Overall Learning</i>	
<i>Satisfaction</i>	
<i>Sales Growth</i>	.1595*
<i>Change of cooperative strength</i>	
<i>R&amp;D Learning</i>	
v261: Product Technology	.1283 (p = .08)
<i>Process Learning</i>	.1330 (p = .07)
v264: Manufacturing Quality	.1453*
<i>Marketing Learning</i>	

*Correlation coefficients (r) \* p < .05, \*\* p < .01, \*\*\* p < .001*

*Only significant variables are listed.*

It is obvious that cooperating with partners of higher global market share is helpful to a supplier's sales growth, because of the larger transaction volume and the reputation effect which come naturally with a first-tier buyer. As for the learning

effects, partner's competitive status has a weak influence, but only in the areas of product technology and manufacturing quality. Because the first-tier buyers usually possess strong technical capabilities and require high quality standard from offshore suppliers, it is also not surprising to see the positive correlations between partner's competitive status and the supplier's technical learning.

However, just as partner's national origin does not significantly affects a supplier's capability enhancement, nor does partner's competitive status has strong impact on supplier's learning. In order to trace further the determinants of the ideal partner for inter-partner learning, OEM client's contributions in different areas were correlated with supplier's capability enhancement, and meaningful findings have been derived from these correlations.

*The impacts of partner's capability contribution to alliance performance*

Performance Indicator	Partner's Capability Contribution		
	R&D Contribution	Process Contribution	Marketing Contribution
<i>Overall Learning</i>	<b>.1708*</b>	<b>.1698*</b>	<b>.2302**</b>
<i>Satisfaction</i>		.1271√	
<i>Sales Growth</i>	<b>.1538*</b>	.1450√	.1281√
<i>Change of cooperative strength</i>	<b>.1867*</b>	<b>.1541*</b>	<b>.2193**</b>

*Correlation coefficients (r)*

√  $p < .1$    \*  $p < .05$    \*\*  $p < .01$    \*\*\*  $p < .001$

Partner's capability contribution (in all three functional areas) is significantly correlated with supplier's overall learning and change of cooperative strength. To a lesser degree, it is also correlated with supplier's sales growth. The findings underline the importance of a partner's capability contribution to a supplier's long-term competitiveness and short-term business development.

Interestingly, supplier's satisfaction is only weakly correlated with partner's process contribution. Partner's capability contribution does not significantly affect suppliers' satisfaction. But partner's marketing contribution seems to be a strong "motivator" for both learning and strengthening cooperation in an OEM alliance.

Because partner's capability contribution significantly affects the supplier's overall learning, further investigation of its impacts on the specific learning dimensions and indicators is necessary to understand such a correlation in depth.

*The impacts of partner's capability contribution to learning*

Learning	Partner's Capability Contribution		
	R&D Contribution	Process Contribution	Marketing Contribution
<b><i>R&amp;D Learning</i></b>	<b>.1535*</b>	<b>.1631*</b>	<b>.2762***</b>
v261: Product Technology	.2147**	.1951**	.1688*
v262: R&D Speed			.2664***
v263: End-customer intimacy		.1571*	.2600***
<b><i>Process Learning</i></b>	<b>.2021**</b>	<b>.1546*</b>	<b>.1674*</b>
v264: Manufacturing Quality	.1629*	.2332**	
v265: Manufacturing Flexibility			
v266: Low Cost Manufacturing	.1984**		.2092**
<b><i>Marketing Learning</i></b>		<b>.1227√</b>	<b>.1537*</b>
v267: Marketing Experience			.1407√
v268: Brandname Management	.1479*	.1724*	.1620*
v269: Channel Management			.1228√

*Correlation coefficients (r)*

√  $p < .1$  \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

In the functional learning areas, R&D learning and process learning are significantly correlated with partner's contribution in all three functional activities.

Apparently, partner's R&D contribution affects supplier's R&D learning, and partner's process contribution affects supplier's process learning. It is also understandable that partner's R&D contribution affects supplier's process learning and partner's process contribution affects supplier's R&D learning, since R&D and process are interrelated activities in the IT industry. However, the reasons for correlations between partner's marketing contribution and supplier's technical learning are not so self-evident. Further investigation into the third-level capability indicators reveals that partner's marketing contribution strongly affects supplier's R&D speed, end-customer intimacy, and low cost manufacturing. Because new product know-how and market information are embedded in the partner's marketing capabilities, a contract manufacturer can understand the customer-driven technology trajectory and anticipate the speed of technology progress through sharing with the OEM buyer's marketing capabilities. Another possible explanation lies in the stronger bargaining power of stronger marketing partners in OEM business. When an OEM buyer's marketing contribution is recognized by its supplier, the buyer tend to have stronger bargaining power, therefore it can push the supplier for faster new product development or even lower manufacturing costs.

As for supplier's marketing learning, partner's marketing contribution appears to be the only significant factor among the three types of contribution. This once again confirms the uniqueness of marketing capability and the difficulty of enhancing it through cross-border contract manufacturing alliances. The explanation for the significant correlations between partner's capability contribution and supplier's brandname-management enhancement is that all three partner's capability contributions are strongly correlated with partner's competitive status ( $p < .001$  in R&D,  $p < .001$  in process, and  $p = .013$  in marketing). It is therefore clear that a partner's capability contribution is almost a surrogate for its global competitiveness (in terms of global market share) in respondents' perception. Because firms with higher global market shares naturally have stronger brands and tend to be more experienced in brandname-management, partnering with these name-brand players thus contributes to a supplier's brandname-management enhancement.

### Alliance characteristics and partner's national origin

Although Taiwanese IT suppliers' alliance performance does not vary significantly with partners of different country origins, different partners do exhibit some differences in the various alliance characteristics. These findings are helpful to our understanding of the perceived behavior of different MNCs, in the eyes of their suppliers. These findings are useful to suppliers for understanding their MNC buyers, and they can be even more useful to MNCs for self-evaluation, through which their supplier management can be enhanced.

### *ANOVA of recipient characteristics and partner's national origin*

In order to understand better the comparative results of cross-border alliances with different partners, ANOVA was first executed with extracted factors then with individual variables. The results of significant findings are summarized as follow.

### ANOVA between Recipient Factors and Partner's National Origin

Recipient Factors	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>Recip1: Learning Intent</i>							
<i>Recip2: EMS supplier</i>	2.8495 (.0606)	-2.300 (.023)		-1.866 (.064)			2.327 (.021)
<i>Recip3: Supplier's Receptivity</i>		1.996 (.048)			1.912 (.057)		

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

There are significantly more EMS suppliers serving Japanese partners than serving either American or European partners. The Japanese firms seem to have applied their *keiretsu* system to their cross-border alliances with Taiwanese suppliers.

However, local suppliers seem to have more OEM experience with American partners, and have higher levels of familiarity with American language and business practices, particularly when compared with Japanese partners.

**ANOVA between Recipient Variables and Partner's National Origin**

Recipient Variables	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>Sales</i>							1.667 (.097)
<i>Supplier's Intent</i>							
v95: marketing exploitation	3.1438 (.0456)		-2.488 (.014)		-1.877 (.062)	2.303 (.022)	
v97: process learning				-2.115 (.036)		-1.986 (.049)	1.804 (.073)
v98: MNCs approval							
<i>Receptivity</i>							
v14: language/practices familiarity	3.8483 (.0231)	2.763 (.006)			2.446 (.015)		-2.295 (.023)

(Numbers in columns represent F or T values, while numbers in parentheses denote probability.

Only variables with  $p < .10$  are shown.)

*H6-1: Suppliers cooperating with partners of different country origins tend to exhibit different intents.*

Only in the area of marketing utilization do suppliers tend to cooperate with different partners. Pairwise comparison reveals that suppliers cooperating with European partners exhibit stronger intent to utilize partners' marketing capability

than those cooperating with American partners. It is also supported by the finding that suppliers cooperating with European partners demonstrate stronger marketing-utilization intent than those cooperating with non-European partners.

Although not significant as a whole, pairwise comparison shows that suppliers cooperating with Japanese partners tend to exhibit stronger process-learning intent than those cooperating with European partners. Suppliers cooperating with European partners, on the other hand, tend to demonstrate less process-learning intent than those cooperating with non-European partners.

Generally speaking, there isn't enough evidence to prove that suppliers cooperating with different partners exhibit different intents. However, there is some weak evidence for the claim that suppliers tend to cooperate with European partners more for the purpose of marketing utilization, while cooperating with Japanese partners more for process learning.

*H6-2: Suppliers cooperating with partners of different country origins tend to exhibit different receptivity.*

Again, only one indicator shows a significant difference. Suppliers cooperating with different partners exhibit different levels of familiarity with partners' languages or business practices. Compared with those cooperating with Japanese partners, suppliers cooperating with American partners tend to feel more familiar with partners' language and business practices. While local suppliers are most familiar with American partners' language and business practices, they are least familiar with those of Japanese partners. The finding may be credited to the prevalence of English in Taiwan, and Taiwan's pro-American educational and business background.

*H6-3: Suppliers cooperating with partners of different country origins tend to be different in size.*

These is insufficient support for this hypothesis.

*ANOVA of partner characteristics and partner's national origin*

ANOVA between Partner Factors and Partner's National Origin

Partner Factors	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>Partner1: Partner's Transparency</i>							
<i>Partner2: Partner's Protectiveness</i>							
<i>Partner3: Partner's Competitive Status</i>	4.6713 (.0106)		3.030 (.003)	-1.963 (.051)	2.273 (.024)	-2.809 (.006)	

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

Different partners are only significantly different in their global competitive status. The American partners seem to be perceived as more globally competitive, closely followed by Japanese partners, while European partners seem to be perceived as the least competitive in term of their global market shares.

Interestingly, the “melting-pot type” American partners (Hamel, 1991) do not seem to be more transparent than their “clan-type” Japanese counterparts, nor are the Japanese partners more protective than the American partners, in the view of the Taiwanese IT suppliers.

**ANOVA between Partner Variables and Partner's National Origins**

Partner Variables	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>v4: competitive status</i>	4.2161 (.0163)		2.889 (.004)	-1.809 (.072)	2.221 (.028)	-2.638 (.009)	
<i>Partner's Intent</i>							
v116: flexibility exploitation intent	2.4522 (.0891)		-2.035 (.043)		-2.173 (.031)		
v118: overall operational learning	3.5161 (.0318)			-2.652 (.009)		-2.384 (.018)	2.365 (.019)
<i>Partner's Transparency</i>							
v18d: technical staff openness			1.978 (.049)			-1.784 (.076)	
v18f: process document provision				-1.827 (.069)			1.660 (.099)

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

*H7-1: Partners of different country origins tend to be perceived differently in terms of their global competitive status.*

The ANOVA results support this argument. In the judgment of local suppliers, American partners are significantly more competitive (in terms of market share) in the global market than their European counterparts. American partners are regarded as the strongest, while European partners are the weakest. The result is in line with the widespread view in the global IT industry, that American firms seem to be leading in global market share, European firms are still mostly regional players, while Japanese firms tend to be ranked in between.

*H7-2: In supplier's perception, partners of different country origins tend to exhibit different cooperative intents.*

Overall, partners of different nationalities do not exhibit significant differences in terms of cooperative intent. However, compared with American counterparts, European partners tend to exhibit stronger intent to utilize local suppliers' R&D speed or manufacturing flexibility; and American firms appear to be less interested in suppliers' R&D and manufacturing flexibility than non-American firms. Although only 12 partners have been perceived to possess the intent of overall operational learning, Japanese firms seem to be most willing to learn suppliers' operational capability, while European firms appear to be the least interested in learning from their suppliers.

*H7-3: Partners of different country origins tend to exhibit different levels of transparency.*

The only significant difference exists in the area of partner's technical staff openness. Compared with their European counterparts, American firms' technical staff are perceived to be more open.

Although not statistically significant, Japanese partners seem to provide more process documentation, especially when compared with their European counterparts. This finding contradicts the traditional view that Japanese firms are more secretive than their Western counterparts.

*ANOVA of project characteristics and partner's national origin*

ANOVA between Project Factors and Partner's National Origin

Project Factors	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>Project1: Inter-partner similarity</i>							
<i>Project2: Partner's Technical Contribution</i>	2.8014 (.0636)			-2.360 (.019)		-2.034 (.044)	2.204 (.029)
<i>Project3: Symbiotic Partnership</i>							
<i>Project4: Project Scale</i>				-1.763 (.080)		-1.656 (.100)	
<i>Project5: Collaborative Competition</i>							
<i>Project6: Businesslike Supplier Selection</i>							

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

As with the previous findings, Japanese partners seem to excel in their technical contribution while European partners contribute the least in R&D or manufacturing. European projects also appear to be smaller and shorter, especially when compared with their Japanese counterparts, but the result is not very significant.

**ANOVA between Project Variables and Partner's National Origin**

Project Variables	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>v31: transaction value</i>			2.045 (.042)	-1.675 (.096)		-2.101 (.037)	
<i>monthly project value</i>	3.1941 (.0435)		2.411 (.017)		2.419 (.017)	-1.698 (.091)	
<i>Technology</i>							
<i>v8Aa: partner's R&amp;D contribution</i>				-1.839 (.068)		-1.781 (.077)	
<i>v8Ba: partner's process contribution</i>	6.4654 (.0020)	-2.311 (.022)	1.689 (.093)	-3.583 (.000)		-3.066 (.003)	3.355 (.001)
<i>Previous Relationship</i>							
<i>v154: frequent transaction</i>	2.8921 (.0581)		-2.283 (.024)		-2.312 (.022)		

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

*H8-1: Contract manufacturing projects with partners of different country origins tend to differ in transaction value.*

Compared with European projects, American contract manufacturing projects are significantly larger in terms of transaction value. Among the three types of partners, European partners seem to place smaller orders - a natural result of the relative fragmentation of the European IT industry.

*H8-2: Contract manufacturing projects with partners of different country origins tend to differ in project duration.*

Although duration is not significant in the ANOVA or any pairwise comparison, the analysis of monthly value does reveal that Japanese projects usually last longer. When total transaction value is compared, American projects are less prominent. However, when monthly value is compared, American projects appear to be significantly larger than both European and Japanese projects. The explanation may be that Japanese projects are higher in total value, but lower in monthly value.

*H8-3: Contract manufacturing projects with partners of different country origins tend to be different in terms of manufactured product contracted.*

No significant result has been found either in product item.

*H8-4: Projects with partners of different country origins tend to receive different technology or capability inputs from partners.*

Partners differ significantly in their manufacturing contribution. Japanese firms' manufacturing contribution seems to be much more highly regarded by the suppliers, while that of European firms is regarded the least.

Although not very significant, European partners seem to be perceived as contributing least in the R&D area, especially when compared with their Japanese counterparts.

*H8-5: Projects with partners of different country origins tend to demonstrate different task natures.*

The interaction requirements of projects are not significantly different with different partners, neither is the division of labor between partners, nor is the supplier's R&D involvement.

*H8-6: Suppliers tend to have had different relationships with partners of different country origins before contract manufacturing alliances.*

American partners seem to have significantly fewer "frequent transaction" relationships with suppliers before the contract manufacturing projects, especially when compared with their European counterparts. The finding may imply that it is more likely for American partners to get into contract manufacturing cooperation without first developing familiarity through trading relationships with suppliers.

*H8-7: Partners of different country origins tend to exhibit different levels of closeness towards their suppliers.*

Which side initiates cooperation does not vary significantly with different partners, and partner's number of alternative suppliers before projects does not seem to be different, either.

*H8-8: Projects with partners of different country origins tend to exhibit different levels of inter-firm diversity.*

Partnership with different partner does not exhibit different degrees of perceived competition, skill complement, culture similarity, or management similarity.

Overall, project characteristics do not seem to be different as a result of cooperating with different partners. The finding is not very surprising given the convergence of the global IT industry and the isomorphism of IT firms in different regions.

ANOVA of relationship characteristics and partner's national origin

ANOVA between Relationship Factors and Partner's National Origin

Relationship Factors	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>Rela1: Harmonious Communication</i>							
<i>Rela2: Mutual Trust</i>	3.0357 (.0506)	-2.219 (.028)	-1.833 (.069)		-2.442 (.016)		
<i>Rela3: Mutual Dependency</i>							
<i>Rela4: Technical Interaction</i>			1.822 (.070)	-1.742 (.083)		-2.026 (.044)	
<i>Rela5: Opportunism</i>							
<i>Rela6: Marketing Interaction</i>			-1.861 (.064)		-1.889 (.061)		

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with  $p < .10$  are shown.)

The ANOVA results show that only two factors are significant at the pairwise comparison level. One interesting finding is that local firms cooperating with American partners tend to develop the lowest level of mutual trust, particularly when compared with those cooperating with Japanese counterparts. The other significant difference is in the area of technical interaction. European partners tend to have less technical interaction with their suppliers, compared both with their American and Japanese counterparts. There is also weak evidence to suggest that American partners tend to have the least marketing interaction with suppliers.

**ANOVA between Relationship Variables and Partner's National Origin**

Relationship Variables	ANOVA Result of Partner's Country of Origin						
	One-way ANOVA	Contrast 1	Contrast 2	Contrast 3	Contrast 4	Contrast 5	Contrast 6
<i>Trust</i>							
v20a: partner's credibility	2.8294 (.0617)	-2.228 (.027)			-2.320 (.022)		
v20b: partner's trustworthiness		-1.736 (.084)			-2.006 (.046)		
<i>Interaction</i>							
v20j: process interaction			1.898 (.059)			-1.951 (.053)	
<i>Communication</i>							
v21c: formal meeting	3.4961 (.0325)			-2.639 (.009)		-2.281 (.024)	2.443 (.016)
v21d: partner's technical advice				-1.794 (.075)		-1.769 (.079)	
v21e: partner's technical staff visit	5.8782 (.0034)	-1.701 (.091)	2.109 (.036)	-3.415 (.001)		-3.189 (.002)	2.930 (.004)
v21g: supplier's technical staff visit	5.0362 (.0075)		2.661 (.009)	-2.902 (.004)		-3.170 (.002)	2.039 (.043)
v21h: supplier's non-tech. staff visit			1.828 (.069)	-1.826 (.070)		-2.077 (.039)	
<i>Dependence</i>							
v19i: partner's importance			1.991 (.048)		2.046 (.042)		

(Numbers in columns represent F or T values, while numbers in parentheses denote probability. Only variables with p < .10 are shown.)

*H9-1: Cooperations with partners of different country origins tends to develop into different levels of trust.*

In the perception of local suppliers, American partners appear to have a lower level of credibility concerning their effective and faithful performance of their duties, particularly compared with their Japanese counterparts. A similar result is found in partner's trustworthiness, in that local suppliers perceived American partners to be less trustworthy and more likely to pursue their own interest.

*H9-2: Cooperations with partners of different country origins tend to exhibit different levels of commitment to the partnership.*

There is no significant difference in either partner's commitment or supplier's commitment when cooperating with partners of different country origins.

*H9-3: Cooperations with partners of different country origins tend to exhibit different levels of inter-partner interaction.*

There is no significant difference in different areas of inter-partner interaction when cooperating with different partners.

*H9-4: Cooperations with partners of different country origins tend to exhibit different qualities of communication.*

There is no significant difference in the quality of communication when cooperating with different partners.

*H9-5: Cooperations with partners of different country origins tend to exhibit different media and frequencies of inter-partner exchanges.*

Japanese partnership has the highest frequency in holding formal meetings, while European partnership has the least. The difference is very significant in the area of

technical staff exchanges. Japanese partners had sent more technical staff visiting suppliers, while European partners had sent fewer. A similar result is found in the area of supplier's technical staff visiting partners. Again, percentage-wise more local suppliers had sent their technical staff to their Japanese partners than to their European partners. Even in the area of non-technical staff (sales/marketing or management personnel) exchanges, suppliers had sent fewer non-technical staff to their European partners. All in all, the findings reveal that it is more common to have personnel exchanges with Japanese partners, while it is less common with European partners. The frequencies of personnel exchanges with American partners are in between of those with Japanese and European partners.

*H9-6: Cooperations with partners of different country origins tend to develop different levels of dependency.*

American partners seem to be more important to the suppliers than other partners, in the evaluation of local suppliers, especially when compared with European partners. The finding is somewhat ironic in that it seems to contradict previous findings that American partners enjoy the lowest level of trust in suppliers' perception. The possible explanations are: 1) American partners are more globally competitive in term of their market shares, and 2) deal size with American partners is relatively larger. Although suppliers do have a lower level of trust in dealing with American partners, they have to serve American partners with more care because of the partners' strength and transaction volume. After all, business is business.

*H9-7: Cooperations with partners of different country origins tend to develop different levels of congruence.*

The hypothesis is not confirmed.

*H9-8: Cooperations with partners of different country origins tend to develop different styles of mutual adjustment.*

The hypothesis is not confirmed.

### *Conclusion*

Although many previous comparative studies between Japanese and Western OEM practices (e.g., Blenkhorn and Noori, 1990; Kenney and Florida, 1993: 126-154; Bensaou, 1994) concluded that there were distinct differences between them, such country-of-origin effects are not so significant in this research, and this is especially in the case of alliance performance.

The explanation for this discrepancy in the findings may be that the previous studies were based largely on interviews with executives from different socio-cultural backgrounds, thus the subjective judgments of these respondents tended to be more diverse because of their different conceptual frames of reference (Riordan and Vandenberg, 1994). This research, however, is based on a large sample survey of Taiwanese managers, so the findings from such a group of third party respondents may be different, and the diversity of responses may be reduced because of the respondents' more homogeneous backgrounds. Another possibility may be that in the survey every questionnaire was independent, and the respondent had not been suggested or even forced to make comparisons between different partners. The respondents' subjective impression on the comparison between different partners were thus excluded. This also minimized the diversity of the comparative results.

Although firms in different countries do demonstrate some differences in their vertical relations with up-stream suppliers, they do not seem to have applied such domestic relations to the contract manufacturing alliances with Taiwanese IT suppliers. On the one hand, the relationship between Taiwanese IT suppliers and their western buyers does not appear to be more market-oriented. On the other hand, the relationship between Taiwanese IT suppliers and their Japanese buyers does not seem to be more clan-like. However, such a finding may be resulted from the nature of cross-border contract manufacturing alliances in which the offshore

suppliers usually are treated neither as mere sellers in the market nor as true insiders within the buyers' business boundaries. Another explanatory for such an unexpected result is that, for Taiwanese IT suppliers, contract manufacturing alliances with Japanese buyers are relatively new phenomena, and both the Japanese buyers and the Taiwanese suppliers are still groping for mutual understanding and adjustment. As their cooperations deepen along the time, the emerging relationships between Japanese IT buyers and Taiwanese IT suppliers may be more stable and their characteristics may be more observable in the future.

The comparative studies in this research found that partner's national origin does not significantly affect supplier's alliance performance, neither does partner's competitive status. Instead, it is partner's capability contribution to the partnership that significantly affects supplier's learning. Therefore the answer to the question of the ideal partner does not lie in any simplistic distinction among partners, such as national origin or competitive status, but depends on the partner's capability contribution to the alliance. Suppliers should select partners who not only possess the desired capabilities, but are also willing to contribute these capabilities to the partnership and share or exchange them with the supplier. The effects of benchmarking and isomorphism through operational interaction will then narrow the capability gaps between partners, and the niche-capability partners (in this research, the suppliers) can enhance capabilities through such strategic alliances.

## **BIBLIOGRAPHY**

Aaker, D. A. (1994). 'Building a Brand: The Saturn Story', *California Management Review*, 36(2), pp. 114-133.

Aaker, D. A. (1989). 'Managing Assets and Skills: The Key to a Sustainable Competitive Advantage', *California Management Review*, 31(2), pp. 91-106.

Abernathy, W. J. and J. M. Utterback (1978). 'Patterns of Industrial Innovation', *Technology Review*, 80(7), pp. 40-47.

Abegglen J. C. and Stalk, G. Jr. (1985). *Kaisha, The Japanese Corporation*. Basic Books, New York.

Adler, P. S. and R. E. Cole (1993). 'Designed for Learning: A Tale of Two Auto Plants', *Sloan Management Review*, 34(3), pp. 85-94.

Agarwal S. and S. N. Ramaswami (1992). 'Choice of Foreign Market Entry Mode: Impact of Ownership, Location and Internalization Factors', *Journal of International Business Studies*, 23(1), pp. 1-27.

Aggarwal R. and T. Agmon (1990). 'The International Success of Developing Country Firms: Role of Government-Directed Comparative Advantage', *Management International Review*, 30(2), pp. 163-180.

Agmon, T. and M. von Glinow (1991). 'The Environment of Technology Transfer', in T. Agmon and M. von Glinow (eds.), *Technology Transfer in International Business*, Oxford University Press, New York.

Alic, J. A. (1993). 'Technical Knowledge and Technology Diffusion: New Issues for U.S. Government Policy', *Technology Analysis & Strategic Management*, 5(4), pp. 369-383.

Amit, R. and P. Schoemaker (1993). 'Strategic Assets and Organizational Rent', *Strategic Management Journal*, 14(1), pp. 33-46.

Anderson, E. and B. Weitz (1992). 'The Use of Pledges to Build and Sustain Commitment in Distribution Channel', *Journal of Marketing Research*, 29(1), pp. 18-34.

Anderson, J. C. and J. A. Narus (1990). 'A Model of Distributor Firm and Manufacturer Firm Working Partnerships', *Journal of Marketing*, 54(1), 42-58.

Anderson, J. C. and J. A. Narus (1984). 'A Model of the Distributor's Perspective of Distributor-Manufacturer Working Partnerships', *Journal of Marketing*, 48(4), pp. 62-74.

- Andrews K. R. (1971). *The Concept of Corporate Strategy*. Irwin, Homewood, IL.
- Angle, H. L. and J. L. Perry (1981). 'An Empirical Assessment of Organizational Commitment and Organizational Effectiveness', *Administrative Science Quarterly*, 26(1), pp. 1-14
- Assouline, M. and E. I. Meir (1987). 'Meta-Analysis of the Relationship Between Congruence and Well-Being Measures', *Journal of Vocational Behavior*, 31, 319-332.
- Bacharach, S. B. (1989). 'Organizational Theories: Some Criteria for Evaluation', *Academy of Management Review*, 14(4), pp. 496-515.
- Badaracco, J. L. Jr. (1991a). 'Alliances Speed Knowledge Transfer', *Planning Review*, 19(2), pp. 10-16.
- Badaracco, J. L. Jr. (1991b). *The Knowledge Link: How Firm Compete through strategic Alliances*. Harvard Business School Press, Boston, MA.
- Bain, J. S. (1954). 'Economies of Scale, Concentration, and the Condition of Entry in Twenty Manufacturing Industries', *American Economic Review*, 44, pp. 15-39.
- Baranson, J. (1978). *Technology and the Multinational: Corporate Strategies in a Changing World Economy*. Lexington Books, Lexington, MA.
- Barney, J. B. (1991). 'Special Theory Forum - The Resource-Based Model of the Firm: Origins, Implications, and Prospects', *Journal of Management*, 17(1), pp. 97+
- Barney, J. B. (1986). 'Strategic Factor Markets: Expectation, Luck, and Business Strategy', *Management Science*, 32(10), pp. 1231-1241.
- Bartlett C. A. and S. Ghoshal (1991). 'Global Strategic Management: Impact on the New Frontiers of Strategy Research', *Strategic Management Journal*, 12, Summer Special Issue, pp. 5-16.
- Bartlett, C. A. and S. Ghoshal (1989). *Managing Across Borders - The Transactional Solution*. Harvard Business School Press, Boston, MA.
- Bartmess, A. and K. Cerny (1993). 'Building Competitive Advantage Through a Global Network of Capabilities', *California Management Review*, 35(2), pp. 78-103.
- Belohlav, J. A. (1993). 'Quality, Strategy, and Competitiveness', *California Management Review*, 35(3), pp. 55-67.

Bensaou, B. M. (1994). 'Buyer-Supplier Coordination in the United States and Japanese Automobile Industries', in T. Agmon and R. Drobnick (eds.), *Small Firms in Global Competition*. Oxford University Press, New York.

Benvignati, A. M. (1983). 'International Technology Transfer Patterns in a Traditional Industry', *Journal of International Business Studies*, 14(3), pp. 63-75.

Berggren, C. (1994). 'MUMMI vs. Uddevalla', *Sloan Management Review*, 35(2), pp. 37-49.

Bergstrom, R. P. (1993). 'The Heart of New Reality', *Production*, 105(1), pp. 40-44.

Bettis, R. A., S. P. Bradely, and G. Hamel (1992). 'Outsourcing and Industrial Decline', *Academy of Management Executive*, 6(1), pp. 7-22.

Bleeke, J. and D. Ernst (1991). 'The Way to Win Cross-Border Alliances', *Harvard Business Review*, 69(6), pp. 127-135.

Blenkhorn D. L. and A. H. Noori (1990). 'What It Takes to Supply Japanese OEMs', *Industrial Marketing Management*, 19(1), pp. 21-30.

Borys, B. and D. Jemison (1989). 'Hybrid Arrangement as Strategic Alliances: Theoretical Issues in Organizational Combinations', *Academy of Management Review*, 14(2), pp. 234-249.

Boston Consulting Group (1970). *Perspectives on Experience*. Boston Consulting Group, Boston.

Brown, W. B. and N. Karagozoglou (1993) 'Leading the Way to Faster New Product Development', *Academy of Management Executive*, 7(1), pp. 36-47.

Brown, W. S. (1985). 'A Proposed Mechanism for Commercializing University Technology', *Technovation*, 3(1), pp. 19-25.

Bryman, A. (1989). *Research Methods and Organization Studies*. Unwin Hyman, London.

Buckely, P. J. and M. Casson (1988). 'A Theory of Cooperation in International Business', in Contractor, F. J. and P. Lorange (eds.), *Cooperative Strategies in International Business*. D. C. Heath, Lexington, MA.

Burgers, W. P., C. W. L. Hill, and W. C. Kim (1993). 'A Theory of Global Strategic Alliances: The Case of the Global Auto Industry', *Strategic Management Journal*, 14(6), pp. 419-432.

*Business Week* (1994). 'Good Design Can't Do It All', June 5, p. 49.

- Business Week* (1993a). 'Taiwan: The Arm Dealer of the Computer War', June 28, pp. 36-37.
- Business Week* (1993b). 'The Virtual Corporation', February 8, pp. 37-41.
- Business Week* (1989). 'When U.S. Joint Ventures with Japan Go Sour', July 24, pp. 14-16.
- Business Week* (1986). 'The Hallow Corporation', March 3, pp. 57-59.
- Canadian Electronics* (1993). 'OEMs Saving Money, Time Using Contractors', October, p. 1, 9.
- Carman, J. M. (1993). 'Continuous Quality Improvement as a Survival Strategy: The Southern Pacific Experience', *California Management Review*, 35(3), pp. 118-132.
- Cavinato, J. L. (1989). 'The Logistics of Contract Manufacturing', *International Journal of Physical Distribution & Materials Management*, 19(1), pp. 13-20.
- Chanaron, J. J. and J. Perrin (1987). 'Transfer of Research, Development and Design to Developing Countries: Analysis and Proposal', *Futures*, 19(5), pp. 503-512.
- Chandler, A. D. (1992). 'What Is a Firm? A Historical Perspective", *European Economic Review*, 36(2), pp. 483-492.
- Chandler, A. D. (1962). *Strategy and Structure*. The MIT Press, Cambridge MA.
- Chen, J. C. (1994). 'Taiwan Semiconductor Manufacturing Corporation: Cultivating the Silicon Field', *Common Wealth Magazine*, pp. 66-70 (Written in Chinese).
- Chi, T. (1994). 'Trading in Strategic Resources, Necessary Conditions, Transaction Cost Problems, and Choice of Exchange Structure', *Strategic Management Journal*, 15(4), pp. 271-290.
- Child, J. and L. Markoczy (1993). 'Host-Country Managerial Behaviour and Learning in Chinese and Hungarian Joint Ventures', *Journal of Management Studies*, 30(4), pp. 611-631.
- Chakravarthy B. S. and Y. Doz (1992). 'Strategy Process Research: Focusing on Corporate Self-Renewal', *Strategic Management Journal*, 13, Summer Special Issue, pp. 5-14.

Cho, D. S. and W. Chu (1994). 'Determinants of Bargaining Power in OEM Negotiations', *Industrial Marketing Management*, 23(4), pp. 343-355.

Ciborra, C. (1991). 'Alliances as Learning Experiments: Cooperation, Competition and Change in Hightech Industries, in L. K. Mytelka (ed.) *Strategic Partnerships: States, Firms and International Competition*. Printer Publishers, London.

Cole, G. S. (1988). 'The Changing Relationships Between Original Equipment Manufacturers and Their Suppliers', *International Journal of Technology Management*, 3(3), pp. 299-324.

Collis D, J. and C. A. Montgomery (1995). 'Competing on Resources: Strategy in the 1990s', *Harvard Business Review*, 73(4), pp. 118-128.

Collis D. J. (1991). 'A Resource-based Analysis of Global Competition: The Case of the Bearing Industry', *Strategic Management Journal*, 12, Summer Special Issue, pp. 49-68.

Contractor, F. J. and P. Lorange (eds.) (1988). *Coopeative Strategies in International Business: Joint Ventures and Technology Partnerships between Firms*. D. C. Health, Lexington, MA.

Contractor, F. J. (1986). 'An Alternative View of International Business', *International Marketing Review*, 3(1), pp. 74-85.

Contractor, F. J. and T. Sagafi-Nejad (1981). 'International Technology Transfer: Major Issues and Policy Responses', *Journal of International Business Studies*, 12(2), pp. 113-135.

Cooper, R. B. and R. W. Zmud (1990). 'Information Technology Implementation Research: A Technological Diffusion Approach', *Management Science*, 36(2), pp. 123-139.

Cummings, T. G. (1984). 'Transorganizational Development', *Research in Organizational Behavior*, 6, pp. 367-422.

Cunningham, C. and C. Tynan (1992). 'Electronic Trading, Inter-Organizational Systems and the Nature of Buyer-Seller Relationships: The Need for a Network Perspective', *International Journal of Information Management*, 26(2), pp. 27-46.

Cusumano, M. A. and D. Elenkov (1994). 'Linking International Transfer with Strategy and Management: A Literature Commentary', *Research Policy*, 23(2), pp. 195-215.

Cutler, W. G. (1991). 'Acquiring Technology from Outside', *Research-Technology Management*, 34(3), pp. 11-18.

- Cutts, R. L. (1992). 'Capitalism in Japan: Cartels and *Keiretsu*', *Harvard Business Review*, 70(4), pp. 48-55.
- Daft, R. L. and R. H. Lengel (1986). 'Organizational Informational Requirements, Media Richness and Structural Design', *Management Science*, 32(5), pp. 554-571.
- Davidow, W. H. and M. S. Malone (1993). *The Virtual Corporation: Structuring and Revitalizing the Corporation for the 21st Century*. Harper-Collins, New York.
- Davidson, W. H. and D. G. McFetridge (1985). 'Key Characteristics in the Choice of International Technology Transfer Mode', *Journal of International Business Studies*, 16(2), pp. 5-21.
- Davidson, W. (1983). 'Structure and Performance in International Technology Transfer', *Journal of Management Studies*, 20(4), pp. 453-465.
- Devlin, G. and M. Bleackley (1988). 'Strategic Alliances - Guidelines for Success', *Long Range Planning*, 21(5), pp. 18-23.
- Dierickx, I. and K. Cool (1989). 'Asset Stock Accumulation and Sustainability of Competitive Advantage', *Management Science*, 35(12), pp. 1504-1511.
- Dodgson, M. (1993). 'Organizational Learning: A Review of Some Literatures', *Organization Studies*, 14(3), pp. 375-394.
- Dosi, G. (1982). 'Technological Paradigms and Technological Trajectories', *Research Policy*, 11, pp. 147-162.
- Doz, I., G. Hamel, and C. K. Prahalad (1986). 'Strategic Partnership: Success or Surrender? The Challenge of Competitive Collaboration', Paper presented in the AIB Annual Meeting, London, Nov. 22-23, 1986.
- Dunning, J. H. (1993). *Multinational Enterprises and the Global Economy*. Addison-Wesley, Workingham, England.
- Dwyer, F. R., P. H. Schurr, and S. Oh (1987). 'Developing Buyer-Supplier Relationships', *Journal of Marketing*, 51(2), pp. 11-27.
- Dyer J. H. and W. G. Ouchi (1993). 'Japanese-Style Partnerships: Giving Companies a Competitive Edge', *Sloan Management Review*, 35(1), pp. 51-63.
- Edwards, J. R. (1994). 'The Study of Congruence in Organizational Behavior Research: Critique and a Proposed Alternative', *Organizational Behavior and Human Decision Processes*, 58(1), pp. 51-100.
- E.I.U. Country Report (1995) 'Taiwan - 3rd Quarter 1995', The Economist Intelligence Unit.

Egelhoff, W. G. (1988). *Organizing the Multinational Enterprise*, Ballinger, Cambridge, MA.

*Electronic Business* (1985). 'The Strategy Behind IBM's Strategic Alliances', October 1, p. 126, comment attributed to Peter Olson III, IBM's director of business development.

*Electronic Business Buyer* (1994). 'Contract Manufacturing: Outsourcers Become Part of the Team', 20(8), p. 48-56.

*Electronic Business Buyer* (1993). 'Outsourcing Grows at OEMs', 19(11), p. 95.

Epple, D., L. Argote, and R. Devadas (1991). 'Organizational Learning Curve: A Method for Investigating Intra-plant Transfer of Knowledge Acquired through Learning by Doing', *Organization Science* 2(1), pp. 58-70.

Ettlie, J. E. and E. M. Reza (1992). 'Organizational Integration and Process Innovation', *Academy of Management Journal*, 35(4), pp. 795-827.

Felsenstein, D. and R. Bar-El (1989). 'Measuring the Technology Intensity of the Industrial Sector: A Methodological and Empirical Approach', *Research Policy*, 18(4), pp. 239-252.

Findlay, R. (1980). 'The Terms of Trade and Equilibrium Growth in the World Economy', *American Economic Review*, 70(3), pp. 291-299.

*Fortune* (1994). 'Your Next PC Could Be Made in Taiwan', August 8, pp. 50-55.

*Fortune* (1993). 'The Modular Corporation', February 8, pp. 52-55.

Frazier, G. L., R. E. Spekman, and C. R. O'Neal (1988). 'Just-In-Time Exchange Relationships in Industrial Markets', *Journal of Marketing*, 52(4), pp. 52-67.

Frey, S. C. Jr. and M. M. Schlosser (1993). 'ABB and Ford: Creating Value through Cooperation', *Sloan Management Review*, 35(1), pp. 65-72.

Fuller, J. B., J. O'Connor, and R. Rawlinson (1993). 'Tailored Logistics: The Next Advantage', *Harvard Business Review*, 71(3), pp. 87-93.

Ganesan, S. (1994). 'Determinants of Long-Term Orientation in Buyer-Seller Relationships', *Journal of Marketing*, 58(2), pp. 1-19.

Garud, R. and P. R. Nayyar (1994). 'Transformative Capacity: Continual Structuring by Intertemporal Technology Transfer', *Strategic Management Journal*, 15(5), pp. 365-385.

- Gee, R. E. (1993). 'Technology Transfer Effectiveness in University-Industry Cooperative Research', *International Journal of Technology Management*, 8(7), pp. 652-668.
- Geringer, J. M. (1991). 'Strategic Determinants of Partner Selection Criteria in International Joint Ventures', *Journal of International Business Studies*, 22(1), pp. 41-62.
- Gibson, D. V. and E. M. Rogers (1994). *R&D Collaboration on Trial: The Microelectronics and Computer Technology Corporation*. Harvard Business School Press, Boston, MA.
- Godkin, L. (1988). 'Problems and Practicalities of Technology Transfer: A Survey of the Literature', *International Journal of Technology Management*, 3(5), pp. 587-603.
- Goldhor, R. S. and R. T. Lund (1983). 'University to Industry Advanced Technology Transfer: A Case Study', *Research Policy*, 12(3), pp. 121-152.
- Gordon, G. L., R. J. Calantone, and C. A. di Benedetto (1991). 'Mature Markets and Revitalization Strategies: An American Fable', *Business Horizons*, 34(3), pp. 39-50.
- Grant, R. M. (1991). 'The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation', *California Management Review*, 33(3), pp. 114-135.
- Gugler, P. (1992). 'Building Transnational Alliances to Create Competitive Advantage', *Long Range Planning*, 25(1), pp. 90-99.
- Hagedoorn, J. (1993). 'Understanding the Rationale of Strategic Technology Partnering: Interorganizational Modes of Cooperation and Sectoral Differences', *Strategic Management Journal*, 14(5), pp. 371-385.
- Hall, R. (1991). 'The Contribution of Intangible Resources to Business Success', *Journal of General Management*, 16(4), pp. 41-52.
- Hamel, G. and C. K. Prahalad (1994). *Competing for the Future*. Harvard Business School Press, Boston, MA.
- Hamel, G. and C. K. Prahalad (1993). 'Strategy as Stretch and Leverage', *Harvard Business Review*, 72(2), pp. 75-84.
- Hamel, G. (1991). 'Competition for Competence and Inter-Partner Learning Within International Strategic Alliances', *Strategic Management Journal*, 12, Summer Special Issue, pp. 83-103.

- Hamel, G., Y. Doz, and C. K. Prahalad (1989). 'Collaborate with Your Competitors - and Win', *Harvard Business Review*, 67(1), pp. 133-139.
- Han, S. L., D. T. Wilson, and S. P. Dant (1993). 'Buyer-Supplier Relationships Today', *Industrial Marketing Management*, 22(4), pp. 331-338.
- Harrigan, K. R. (1988a). 'Joint Ventures and Competitive Strategy', *Strategic Management Journal*, 9(2), pp. 141-158.
- Harrigan, K. R. (1988b). 'Strategic Alliances and Partner Asymmetries', *Management International Review*, Special Issue, pp. 53-72.
- Harrigan, K. R. (1986). *Managing for Joint Venture Success*. Lexington Books, Lexington, MA.
- Hasegawa, Y. (1991). 'The Keiretsu System in a Different Perspective', *Tokyo Business Today*, 59(11), pp. 58-60.
- Hays, R. H. and S. C. Wheelwright (1979). 'Link Manufacturing Process and Product Life Cycle', *Harvard Business Review*, 57(1), pp. 133-140.
- Heide, J. B. and G. John (1992). 'Do Norms Matter in Marketing Relationships?' *Journal of Marketing*, 56(2), pp. 32-44.
- Heide, J. B. and G. John (1990). 'Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships', *Journal of Marketing Research*, 27(1), pp. 24-36.
- Helper, S. and M. Sako (1995). 'Supplier Relations in Japan and the United States: Are They Converging?', *Sloan Management Review*, 36(3), pp. 77-84.
- Helper, S. (1991). 'How Much Has Really Changed between U.S. Automakers and Their Suppliers?', *Sloan Management Review*, 32(3), pp. 15-28.
- Hennart, J. F. (1988). 'A Transaction Costs Theory of Equity Joint Ventures', *Strategic Management Journal*, 9(4), pp. 361-374.
- Hill, C., M. A. Hitt, and R. E. Hoskisson (1992). 'Cooperative Versus Competitive Structures in Related and Unrelated Diversified Firms', *Organization Science*, 3(4), pp. 501-521.
- Hobday, M. (1990). *Telecommunications in Developing Countries: The Challenge from Brazil*. Routledge, London.
- Hofer, C. W. and D. Schendel (1978). *Strategy Formulation: Analytical Concepts*. West Publishing, St. Paul.

- Hofer, C. (1975). 'Towards a Contingency Theory of Business Strategy', *Academy of Management Journal*, 18(4), pp. 784-810.
- Hyun, J. H. (1994). 'Buyer-Supplier Relations in the European Automobile Component Industry', *Long Range Planning*, 27(2), pp. 66-75.
- IMP Group (1982). *International Marketing and Purchasing of Industrial Goods*, Hakansson, H. (ed.), John Wiley & Sons, New York.
- Itami, H. with T. W. Roehl (1987). *Mobilizing Invisible Assets*. Harvard University Press, Cambridge, MA.
- Jancsurak, J. (1992). 'Supplier Certification Gaining Ground', *Appliance Manufacturer*, 40(5), pp. 32-40.
- Johnson, N. (1994). 'Horses for Courses - The "Make or Buy" Dilemma', *Purchasing & Supply Management*, pp. 28-30.
- Kast, F. E. and J. E. Rosenzweig (1979). *Organization and Management: A System and Contingency Approach*. 3rd ed., McGraw-Hill, New York.
- Kedia, B. L. and R. S. Bhagat (1988). 'Cultural Constraints on Transfer of Technology Across Nations: Implications for Research in International and Comparative Management', *Academy of Management Review*, 13(4), pp. 559-571.
- Kenney, M. and R. Florida (1993). *Beyond Mass Production: The Japanese System and Its Transfer to the U.S.* Oxford University Press, New York.
- Kim, L. (1991). 'Pros and Cons of International Technology Transfer: A Developing Country's View', In T. Agmon and M. von Glinow (eds.), *Technology Transfer in International Business*, Oxford University Press, New York.
- Klein, J. A.; G. M. Edge and T. Kass (1991). 'Skill-based Competition', *Journal of General Management*, 16(4), pp. 1-15.
- Kleiner, B. M. (1994). 'Benchmarking for Continuous Performance Improvement: Tactics for Success', *Total Quality Environmental Management*, 3(3), pp. 283-295.
- Kogut, B. and N. Kulatilaka (1994). 'Options Thinking and Platform Investments: Investing in Opportunity', *California Management Review*, 36(2), pp. 52-71.
- Kogut, B. (1988). 'Joint Ventures: Theoretical and Empirical Perspectives', *Strategic Management Journal*, 9(4), pp. 319-332.
- Kojima, K. (1978). *Direct Foreign Investment: A Japanese Model of Multinational Business Operations*. Croom Helm, London.

Kotabe, M. and K. S. Swan (1994). 'Offshore Sourcing: Reaction, Maturation, and Consolidation of U.S. Multinationals', *Journal of International Business Studies*, 25(1), pp. 115-140.

Kumar, B. N. (1995). 'Partner-Selection-Criteria and Success of Technology Transfer: A Model Based on Learning Theory Applied to the Case of Indo-German Technical Collaborations', *Management International Review*, 35(1), pp. 65-78.

Lado, A. A, N. G. Boyd, and P. Wright (1992). 'A Competency-Based Model of Sustainable Competitive Advantage: Towards a Conceptual Integration', *Journal of Management*, 18(1), pp. 77-91.

Lambright, W. H. and A. H. Teich (1976). 'Technology Transfer as a Problem in Interorganizational Relationships', *Administration and Society*, 8(1), pp. 29-54.

Langlois, R. N. and P. L. Robertson (1992). 'Networks and Innovation in a Modular System: Lessons from the Microcomputer and Stereo Component Industries', *Research Policy*, 21(4), pp. 297-313.

Large, D. W. and D. W. Barclay (1992). 'A Marketing Framework for Successful Technology Transfers', *Optimum*, 23(2), pp. 13-24.

Lawrence P. R. and J. W. Lorsch (1967). *Organization and Environment*. Division of Research, Harvard Business School, Boston, MA.

Learned, E. P; R, Christensen; K. R. Andrews, and W. D. Guth (1965). *Business Policy: Text and Cases*. Irwin, Homewood, IL.

Lei, D. (1993). 'Offensive and Defensive Uses of Alliances', *Long Range Planning*, 26(4), pp. 32-41.

Lengel, R. H. and R. L. Daft (1988). 'The Selection of Communication Media as an Executive Skill', *Academy of Management Executive*, 2(3), pp. 225-232.

Leonard-Barton, D. and D. K. Sinha (1993). 'Developer-User Interaction and User Satisfaction in Internal Technology Transfer', *Academy of Management Journal*, 36(5), pp. 1125-1139.

Leonard-Barton, D. (1992). 'Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development', *Strategic Management Journal*, 13, Summer Special Issue, pp. 111-125.

Leonard-Barton, D. (1990). 'A Dual Methodology for Case Studies: Synergetic Use of a Longitudinal Single Site with Replicated Multiple Sites', *Organization Science*, 1(3), pp. 248-266.

- Levin, M. (1993). 'Technology Transfer as a Learning and Developmental Process: An Analysis of Norwegian Programmes on Technology Transfer', *Technovation*, 13(18), pp. 497-518.
- Lingwood, D. A. (1975). 'A Study of Research Utilization in the U.S. Forest Service', in J. A. Jolly and J. W. Creighton (eds.), *Technology Transfer in Research and Development*. Naval Postgraduate School, Monterey, CA.
- Lohtia, R. and R. E. Krapfel (1994). 'The Impact of Transaction-Specific Investments on Buyer-Seller Relationships', *Journal of Business and Industrial Marketing*, 9(1), pp. 6-16.
- Lubatkin, M., H. Merchant, and N. Srinivasan (1993). 'Construct Validity of Some Unweighted Product-Count Diversification Measure', *Strategic Management Journal*, 14(6), pp. 433-449.
- Lyles, M. A. (1988). 'Learning Among Joint Venture Sophisticated Firms', *Management International Review*, 28, pp. 85-98.
- Lyons, T. F., A. R. Krachenberg, and J. W. Henke (1990). 'Mixed Motive Marriages: What's Next for Buyer-Supplier Relations?' *Sloan Management Review*, 31(3), pp. 29-36.
- Madu, C. N. (1989). 'Transferring Technology to Developing Countries - Critical Factors for Success', *Long Range Planning*, 22(4), pp. 115-124.
- Mansfield, E., A. Romeo, M. Schwarts, D. Teece, S. Wagner, and P. Brach. (1982). *Technology Transfer, Productivity, and Economic Policy*. Norton, New York.
- Markides, C. and N. Berg (1988). 'Manufacturing Offshore is Bad Business', *Harvard Business Review*, 66(5), pp. 113-120.
- Matthyssens, P. and C. Van den Bulte (1994). 'Getting Closer and Nicer: Partnership in the Supply Chain', *Long Range Planning*, 27(1), pp. 72-83.
- Matthyssens, P. and W. Faes (1985). 'OEM Buying Process for New Components: Purchasing and Marketing Implication', *Industrial Marketing Management*, 14(3), pp. 145-157.
- McClintock, B. (1988). 'Recent Theories of Direct Foreign Investment: An Institutional Perspective', *Journal of Economic Issues*, 22(2), pp. 477-484.
- McGee, J. and H. Thomas (1989). 'Technology and Strategic Management Progress and Future Directions', *R&D Management*, 19(3), pp. 205-213.

- Meen, D. E. and M. Keough (1992). 'Creating Learning Organization: An Interview with Peter M. Senge', *McKinsey Quarterly*, Vol. 1992, No. 1, pp. 58-86.
- Metcalf, L. E., C. R. Frear, and R. Krishnan (1992). 'Buyer-Seller Relationships: An Application of the IMP Interaction Model', *European Journal of Marketing*, 26(2), pp. 27-46.
- Miles, R. E. and C. C. Snow (1978). *Organizational Strategy, Structure and Process*. McGraw-Hill, New York.
- Miller, J. G. and A. V. Roth (1994). 'A Taxonomy of the Manufacturing Strategies', *Management Science*, 40(3), pp. 285-304.
- Mody (1993). 'Learning Through Alliances', *Journal of Economic Behavior and Organization*, 20(2), pp. 151-170.
- Mohr, J. and R. Spekman (1994). 'Characteristics of Partnership Success: Partnership Attributes, Communication Behavior, and Conflict Resolution Techniques', *Strategic Management Journal*, 15(2), pp. 135-152.
- Mohr, J. and J. R. Nevin (1990). 'Communication Strategies in Marketing Channels: A Theoretical Perspective', *Journal of Marketing*, 54(4), pp. 36-51.
- Moorman, C., R. Deshpande, and G. Zaltman (1993). 'Factors Affecting Trust in Market Research Relationships', *Journal of Marketing*, 57(1), pp. 81-101.
- Morris J. and R. Imrie (1993). 'Japanese Style Subcontracting - Its Impact on European Industries', *Long Range Planning*, 26(4), pp. 53-58.
- Moss-Kanter, R. (1995). *World Class: Thriving Locally in the Global Economy*. Simon & Schuster, New York.
- Nonaka, I and H. Takeuchi (1995). *The Knowledge-Creating Company - How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press, New York.
- Normann, R. and R. Ramirez (1993). 'From Value Chain to Value Constellation: Designing Interactive Strategy', *Harvard Business Review*, 71(4), pp. 65-77.
- Ohmae, K. (1989). "The Global Logic of Strategic Alliance", *Harvard Business Review*, 67(2), pp. 143-154.
- Olesen, D. (1985). 'The Offshore Manufacturing Alternative Can Be Alluring', *Purchasing World*, 29(9), Sep. pp. 42-PW28 - 42-PW29.

Ounjian, M. L. and E. B. Carne (1987) 'A Study of the Factors Which Affect Technology Transfer in a Multilocation Multibusiness Unit Corporation', *IEEE Transactions on Engineering Management*, EM-34(3), Aug., pp. 194-201.

Ozawa, T. (1979). *Multinationalism: Japanese Style*. Princeton, NJ.

Parkhe, A. (1993). 'Messy' Research, Methodological Predispositions, and Theory Development in International Joint Ventures', *Academy of Management Review*, 18(2), pp. 227-268.

Parkhe, A. (1991). 'Interfirm Diversity, Organizational Learning, and Longevity in Global Strategic Alliances', *Journal of International Business Studies*, 22(4), pp. 579-601.

Penrose, E. T. (1959). *The Theory of the Growth of the Firm*. Basil Blackwell, Oxford.

Peters T. J. and R. H. Waterman (1982). *In Search of Excellence: Lessons from America's Best Run Companies*. Harper & Row, New York.

Pfeffer, J. and G. R. Salancik (1978). *The External Control of Organizations - A Resource Dependence Perspective*. Harper & Row, New York.

Pinto, M. B., J. K. Pinto, and J. E. Prescott (1993). 'Antecedents and Consequences of Project Team Cross-functional Cooperation', *Management Science*, 39(10), pp. 1281-1297.

Porter, M. E. (1991). 'Towards a Dynamic Theory of Strategy', *Strategic Management Journal*, 12, Winter Special Issue, pp. 95-118.

Porter, M. E. (1988). *Competition in Global Industry: A Conceptual Framework*. Harvard Business School Press, Boston, MA.

Porter, M. E. and M. B. Fuller (1986). 'Coalitions and Global Strategy', In M. Porter (ed.) *Competition in Global Industries*. Harvard Business School Press, Boston, MA. pp. 315-343.

Porter, M. E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. The Free Press, New York.

Porter, L., R. Steers, R. Mowday, and P. Boulian (1974). 'Organizational Commitment, Job Satisfaction, and Turnover among Psychiatric Technicians', *Journal of Applied Psychology*, 59(5), Oct., pp. 603-609.

Powell, W. (1990). 'Neither Market nor Hierarchy', *Research in Organizational Behavior*, 12, pp. 295-336.

Prahalad, C. K. and G. Hamel. (1994). 'Strategy as a Field of Study: Why Search for a New Paradigm?' *Strategic Management Journal*, 15, Summer Special Issue, pp. 5-16.

Prahalad, C. K. and G. Hamel (1990). 'The Core Competence of Corporation', *Harvard Business Review*, 68(3), pp. 79-91.

Prahalad, C. K. and R. A. Bettis (1986). 'The Dominant Logic: A New Linkage Between Diversity and Performance', *Strategic Management Journal*, 7(6), pp. 485-501.

*Purchasing* (1995). 'Purchasers Use More Contract Manufacturers', May 18, p. 32.

*Purchasing* (1993). 'Contract Manufacturing is Up', November 11, p. 57.

Pucik, V. (1991). 'Technology Transfer in Strategic Alliances: Competitive Collaboration and Organizational Learning', in T. Agmon and M. von Glinow (eds.), *Technology Transfer in International Business*, Oxford University Press, New York.

Quinn, J. B. and F. G. Hilmer (1994). 'Strategic Outsourcing', *Sloan Management Review*, 35(4), pp. 43-55.

Ramstetter E. D. (1991). *Direct Foreign Investment in Asia's Developing Economies and Structural Change in the Asia-Pacific Region*. Westview Press, Boulder, CO.

Rappaport, A. S. and S. Halevi (1991). 'The Computerless Computer Company', *Harvard Business Review*, 69(4), pp. 69-80.

Reddy, N. M. and L. Zhao (1990). 'International Technology Transfer: A Review', *Research Policy*, 19(4), pp. 285-307.

Reed, R. and R. J. DeFillippi (1990). 'Causal Ambiguity, Barriers to Imitation, and Sustainable Competitive Advantage', *Academy of Management Review*, 15(1), pp. 88-102.

Reich, R. B. and E. D. Mankin (1986). 'Joint Venture with Japan Give Away Our Future', *Harvard Business Review*, 64(2), pp. 78-86.

Richardson, J. (1993). 'Parallel Sourcing and Supplier Performance in the Japanese Automobile Industry', *Strategic Management Journal*, 14(5), pp. 339-350.

Richter F. J. and Y. Wakuta (1993). 'Permeable Networks: A Future Option for the European and Japanese Car Industries', *European Management Journal*, 11(2), pp. 262-267.

- Riordan, C. M. and R. J. Vandenberg (1994). 'A Central Question in Cross-Cultural Research: Do Employees of Different Cultures Interpret Work-related Measures in an Equivalent Manner?' *Journal of Management*, 20(3), pp. 643-671.
- Rumelt, R. P., D. Schendel, and D. J. Teece (1991). 'Strategic Management and Economics', *Strategic Management Journal*, 12, Winter Special Issue, pp. 5-29.
- Saaty, T. L. (1988). *The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation*. University of Pittsburgh, U.S.
- Saaty, T. L. and K. P. Kearns (1985). *Analytical Planning: The Organization of Systems*. Pergamon, New York.
- Sako, M. (1995). 'Suppliers' Associations in the Japanese Automobile Industry: Collective Action for Technology Diffusion', *Centre for Economic Policy Research*, Discussion Paper No. 1147.
- Sako, M. (1992). *Price, Quality and Trust: Inter-Firm Relations in Britain and Japan*. Cambridge University Press, Cambridge.
- Schendel, D. (1994). "Introduction to the Summer 1994 Special Issue - 'Strategy: Search for New Paradigms'", *Strategic Management Journal*, 15, Summer Special Issue, pp. 1-4.
- Schneider, S. C. and A. De Meyer (1991). 'Interpreting and Responding to Strategic Issues: The Impact of National Culture', *Strategic Management Journal*, 12(4), pp. 307-320.
- Schollhammer, H. (1973). 'Strategies and Methodologies in International Business and Comparative Management Research', *Management International Review*, 13(6), pp. 17-32.
- Selznick, P. (1957). *Leadership in Administration: A Sociological Perspective*. Harper & Row, New York.
- Senge, P. M. (1993). 'Transforming the Practice of Management', *Human Resource Development Quarterly*, 4(1), pp. 4-32.
- Sharif, M. N. (1988). 'Technology and Economics: Basis for Techno-Economic Policy Analysis', *Science and Public Policy*, 15(4), pp. 217-229.
- Sharif, M. N. and A. K. M. A. Haq (1980). 'A Time-Level Model of Technology Transfer', *IEEE Transactions of Engineering Management*, EM-27(2), pp. 49-58.
- Sheth, J. N., and A. Parvatiyar (1992). 'Towards a Theory of Business Alliance Formation', *Scandinavian International Business Review*, 1(3), pp. 71-87.

Simerly, R. L. (1992). 'Should U.S. Companies Establish Keiretsu?' *Journal of Business Strategy*, 13(6), pp. 58-61.

Simkoko, E. E. (1992). 'Managing International Construction Projects for Competence Development within Local Firms', *International Journal of Project Management*, 10(1), pp. 12-22.

Simon, D. (1991). 'International Business and the Transborder Movement of Technology: A Dialectic Perspective', in T. Agmon and M. von Glinow (eds.), *Technology Transfer in International Business*, Oxford University Press, New York.

Smilor, R. W. and D. V. Gibson (1991). 'Accelerating Technology Transfer in R&D Consortia', *Research-Technology Management*, 34(1), pp. 44-49.

Spekman, R. E. (1991). 'U.S. Buyers' Relationships with Pacific Rim Sellers', *International Journal of Purchasing and Materials Management*, 27(1), pp. 2-10.

Stalk, G., P. Evans, and L. E. Shulman (1992). 'Competing on Capabilities: The New Rules of Corporate Strategy', *Harvard Business Review*, 70(2), pp. 57-69.

Statistics Department of Taiwan MOE (1995). *The Industry Upgrading Status of Manufacturing Industries in Taiwan*, (In Chinese), Ministry of Economic Affairs, Taiwan.

Stewart, G. H. and D. V. Gibson. (1990). 'University and Industry Linkages: the Austin, Texas, Study', in Williams F. and D. V. Gibson (eds.), *Technology Transfer: A Communication Perspective*. Sage Publications, Newbury Park, C.A.

Stobaugh, R. B. (1976). 'Some Thoughts on Research', Internal Memorandum of Harvard Business School, October 14.

Stonham, P. (1993). 'The Future for Strategy: An Interview with Gary Hamel', *European Management Journal*, 11(2), pp. 150-157.

Stopford J. M and L. T. Wells Jr. (1972). *Managing the Multinational Enterprise*. Longman, London.

Stuart, F. I. (1993). 'Supplier Partnerships: Influencing Factors and Strategic Benefits', *International Journal of Purchasing and Materials Management*, 29(4), pp. 22-28.

Sun Tzu (1963). *The Art of War*. Translated by Samuel B. Griffith, Oxford University Press, New York.

Suzuki, K. (1993). 'R&D Spillovers and Technology Transfer Among and Within Vertical *Keiretsu* Groups - Evidence from the Japanese Electrical Machinery Industry', *International Journal of Industrial Organization*, 11(4), pp. 573-591.

Szulanski, G. (1993). 'Intra-organizational Transfer of Best Practice: Predicting Difficulties', INSEAD Working Paper, No: 93/88/SM.

Tallman, S. B. and O. Shenkar (1990). 'International Cooperative Venture Strategies: Outward Investment and Small Firms from NICs', *Management International Review*, 30(4), pp. 299-315.

Teece, D. J. (1986). 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy', *Research Policy*, 15, pp. 285-305.

Teece, D. (1977). 'Technology Transfer by Multinational Firms: The Resource Cost of Transferring Technological Know-How', *The Economic Journal*, 87, pp. 242-261.

*Time* (1995). 'Desktops of Destiny - With Speed, Agility and Low-cost Engineering, Taiwan Becomes a Computer Giant', September 25, pp. 68-69.

Timm, N. H. (1975). *Multivariate Analysis: with Applications in Education and Psychology*. Brooks and Cole, Monterey, CA.

Towill, D and M. Naim (1993). 'Supply Chain: Partnership Sourcing Smooths Supply Chain Dynamics', *Purchasing & Supply Management*, pp. 38-42.

Towner, S. J. (1994). 'Four Ways to Accelerate New Product Development', *Long Range Planning*, 27 (2), pp. 57-65.

Treacy, M. and F. Wiersema (1993). 'Customer Intimacy and Other Value Disciplines', *Harvard Business Review*, 71(1), pp. 84-93.

Tsang, E. (1994). 'Strategies for Transferring Technology to China', *Long Range Planning*, 27(3), pp. 84-93.

Turnbull, P., N. Oliver, and B. Wilkinson (1992). 'Buyer-Supplier Relations in the UK Automotive Industry: Strategic Implications of the Japanese Manufacturing Model', *Strategic Management Journal*, 13(2), pp. 159-168.

Turner, L. (1994). 'Japan Suffers in the Slump', *International Management*, 49(2), pp. 30-32.

Uchihashi, K. (1994). 'Grass-Roots Rebellion', *Tokyo Business Today*, 62(1), pp. 14-15.

- Upton D. M. (1994). 'The Management of Manufacturing Flexibility', *California Management Review*, 36(2), pp. 72-89.
- Utterback, J. M. (1974). 'Innovation in Industry and the Diffusion of Technology', *Science*, 183, pp. 620-626.
- Varadarajan P. R. and D. Rajaratnam (1986). 'Symbiotic Marketing Revisited', *Journal of Marketing*, 50(1), pp. 7-17.
- Venkatesan, R. (1992). 'Strategic Sourcing: To Make or not To Make', *Harvard Business Review*, 70(6), pp. 98-107.
- Vernon, R. and W. H. Davidson (1979). *Foreign Production of Technology-Intensive Product by U.S.-Based Multinational Enterprises*. National Science Foundation, Washington D.C.
- Vestal, J. E. (1989). 'Evidence on the Determinants and Factor Content Characteristics of Japanese Technology Trade 1977-1981', *Review of Economics and Statistics*, 71(4), pp. 565-571.
- Voll, S. P. (1980). *A Plough in Field Arable: Western Agribusiness in Third World Agriculture*. University Press of New England, Hanover, New Hampshire.
- Von Hippel, E. (1994). "'Sticky Information' and the Locus of Problem Solving: Implications for Innovation", *Management Science*, 40(4), pp. 429-439.
- Von Hippel, E. (1988). *The Sources of Innovation*. Cambridge University Press, Cambridge.
- Welch, L. S. (1992). 'The Use of Alliances by Small Firms in Achieving Internationalization', *Scandinavian International Business Review*, 1(2), pp. 21-37.
- Welch, J. A. and P. R. Nayak (1992). 'Strategic Sourcing: A Progressive Approach to the Make-or-Buy Decision', *Academy of Management Executive*, 6(1), pp. 23-31.
- Weller, D. (1981). 'Contract Manufacturing and Licensing', *International Trade Forum*, 17(4), pp. 18-21.
- Wells, L. T. Jr. (1993). 'Mobile Exporters: New Foreign Investors in East Asia', in Kenneth A. F. (ed.), *Foreign Investment Today*. National Bureau for Economic Research, University of Chicago Press, Chicago.
- Wernerfelt, B. (1984). 'A Resource-Based View of the Firm', *Strategic Management Journal*, 5(2), pp. 171-180.

Westney, D. E. (1988). 'Domestic and Foreign Learning Curves in Managing International Cooperative Strategies', in Contractor, F. J. and P. Lorange (eds.), *Cooperative Strategies in International Business*. D. C. Heath, Lexington, MA.

Westphal, L. E., L. Kim, and C. J. Dahlman (1985). 'Reflections on the Republic of Korea's Acquisition of Technology Capability', In N. Rosenberg and C. Frischtak (eds.), *International Technology Transfer: Concept, Measures, and Comparisons*. Praeger, New York.

Williams, R. G. and M. M. Lilley (1993). 'Partner Selection for Joint-Venture Agreements', *International Journal of Project Management*, 11(4), pp. 233-237.

Williams, F. and D. V. Gibson (1990). *Technology Transfer: A Communication Perspective*. Sage Publications, Newbury Park, CA.

Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. Free Press, New York.

Williamson, O. E. (1975). *Market and Hierarchy: Analysis and Antitrust Implications*. Free Press, New York.

Wilson, I. (1985). 'Restructuring of Competition: The New Strategic Imperative', *Long Range Planning*, 18(1), pp. 19-20.

Winter, S. G. (1987). 'Knowledge and Competence as Strategy Assets', In D. J. Teece (ed.) *The Competitive Challenge: Strategies for Industrial Innovation and Renewal*. Ballinger, Cambridge, MA, pp. 159-184.

Wolff, M. F. (1994). 'Building Trust in Alliances', *Research-Technology Management*, 37(3), pp. 12-15.

Wolff, M. F. (1989). 'Technology Transfer: A GM Manager's Strategy', *Research-Technology Management*, 32(5), pp. 9-10.

Wong, P. K. (1992). 'Technological Development through Subcontracting Linkages: Evidence from Singapore', *Scandinavian International Business Review*, 1(3), pp. 28-40.

World Bank (1993). *The East Asian Miracle*. Oxford University Press, New York.

Wrigley, L. (1970). *Divisional Autonomy and Diversification*, Unpublished D.B.A. Thesis, Harvard University.

Zander, U. (1991). *Exploiting a Technological Edge: Voluntary and Involuntary Dissemination of Technology*. Institute of International Business (IIB), Stockholm, Sweden.

