Order Number 9216233

Factor-matching as the key to global competition: The case of computer firms in Korea and Taiwan

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The George Washington University, 1991

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FACTOR-MATCHING AS THE KEY TO GLOBAL COMPETITION

The Case of Computer Firms in Korea and Taiwan

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for the Degree of

DOCTOR OF PHILOSOPHY

The School of Business and Public Management

George Washington University

William G. Wells, *Advocate*

MAY 1991

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CHAPTER I

INTRODUCTION

This study explores the relationship between business strategy and market performance among indigenous computer firms from two newly industrializing economies (NIEs)--South Korea and Taiwan--in their global competition. Specifically, similarities and differences in the global strategies across indigenous computer firms from South Korea and Taiwan are examined; factors dictating the contents of those strategies are identified; performances of those firms in the global market are measured, and relationships among the external competitive context, internal operational capability, strategy content and market performance are explored.

A. Purpose of This Study

As global competition has become one of the most striking features of today's business environment, a firm's success in the marketplace depends largely upon how well the firm is positioned strategically within the global context. This is especially true when the industry in which the firm's key business resides has been substantially globalized. Consequently, for firms operating in globalized industries, an effective global strategy is critical to the firm's success in the marketplace. Such a strategy serves as a systematic drive to achieve long-term competitive advantages that would place and sustain the firm in a profitable position in the global marketplace against the forces shaping the external competitive context (Porter, 1986a, 1990).

One of such forces is the emergence of new players from NIEs. Their success has changed the pattern of international trade and investment. Yet, indigenous firms in NIEs are now facing challenges from both less developed countries (with cheaper but similar productive labor forces) and advanced countries (with wide applications of automation). Thus, firms such as those from South Korea and Taiwan must upgrade their competitive positions by entering high value-added industries or segments to create new competitive advantages in the dynamic global marketplace.

Following the success of their consumer electronics counterparts, indigenous computer firms from such NIEs as South Korea and Taiwan have proved to be able to compete in the global market. Recent evidence suggests that indigenous computer firms from South Korea and Taiwan have already obtained a strong foothold in a number of major segments of the global computer market such as PCs, peripherals and components (Asian Computers '91, 1990; Chang, 1990; Kim et al, 1987).

Serious difficulties remain for indigenous computer firms from NIEs to become major players in the global market. First, a healthy business environment in their home markets is required for indigenous firms in NIEs to enhance their global competitiveness (Porter, 1990). Efficient market structures must be established to encourage innovative start-ups to grow, to force established firms to become more innovative, to attract foreign firms to transfer advanced technologies, and to develop sufficient home markets (Porter, 1990; Liang & Liang, 1987). Secondly, as required by intense competition in high-tech industries, computer firms must remain innovative and flexible in response to dynamic changes in the global marketplace. The strategies should be far-sighted instead of simply reactive to the shifting trends of the global competition (Link, 1987; Muroyama & Stever, 1987; Porter, 1983b).

But how should high-tech firms from NIEs compete in the global market? Should their strategies be different from those firms based in the developed countries? What constitutes their competitive advantages and dictates their competitive behaviors in the global market? How will their emerging competitive strategies affect their performances? What impacts do national characteristics have on the strategic behaviors of indigenous firms in their global operations? Important as they are, these questions have not yet been adequately addressed (Porter, 1990; Ricks et al, 1990).

The issue of global strategy has not received due attention until recently (Summer et al, 1990; Porter, 1986a). In the past, the field of international business engaged itself mainly in explaining why national firms became involved in international operations, as shown by many theoretical works on international trade and foreign direct investment (Dunning, 1988; Robock & Simmonds, 1983). At the same time, the field of strategic management, dominated by the schools of business policy and industrial organization, confined its research to national settings (Summer et al, 1990; Porter, 1986a).

Things have begun to change recently as some attempts have been made to address this challenging issue (Porter, 1986a, 1990). Yet, up to now, the theoretical and empirical results seem to fall short of satisfaction for both academia and practitioners (Summer et al 1990; Ricks et al, 1989). Also, there is little empirical research on the strategic behavior of high-tech firms, especially those indigenous firms from NIEs (Ricks et al, 1989).

The purpose of this study, then, is to examine the relationship between business strategy and market performance among indigenous computer firms from South Korea and Taiwan, given the external context embracing the firms and the internal capabilities available to them. By doing so, this study will amplify the empirical database and extend the theories of global strategic management to NIEs. Findings of this study will also help narrow the gap between the outlooks of International Business and Strategic Management and between academic and business communities.

B. Research Question of This Study

An effort is made in this study to develop a conceptual framework for analyzing the multi-dimensional issue of global strategic management. A <u>competitive strategy</u> is defined in this study as a set of well-planned major actions to achieve specific market performing objectives such as market share, growth rate and profit margin at the corporate level. It is argued in this study that the appropriateness of a firm's global strategy is jointly determined by the <u>competitive context</u> **external** to the firm and the <u>operational capability</u> **internal** to the firm.

The <u>external competitive context</u> is defined as a combination of world generic competitive factors, industry-specific competitive factors and nation-specific competitive factors. Put together, these factors form the competitive environment facing firms that are based in a specific home country but operate in a specific industry for the global market.

The <u>internal operational capability</u> is defined as a profile of tangible and intangible assets or resources available to a specific firm. These assets provide a base for firms to gain competitive advantages in a specified market segment.

It is argued that only those strategies that are compatible with both the external competitive context and the internal operational capability will lead to successful performances in the marketplace. It is further argued that a business strategy is multi-dimensional and, therefore, should be measured from various perspectives in a systematic manner.

To provide a measurement baseline, a sample has been drawn from the population of indigenous computer firms in South Korea and Taiwan. The sample firms are export-oriented firms that are wholly-owned by native Koreans or Taiwanese and have overseas manufacturing/marketing facilities for computer products including components, peripherals and systems.

There are several reasons for selecting indigenous computer firms from South Korea and Taiwan as the research sample. First, the computer industry is one of the most dynamic industries, and it is the core of ongoing "information revolution." Secondly, South Korea and Taiwan are among the most successful NIEs in their overall globalization efforts and they are located in the dynamic Pacific-Rim. Finally, as significant differences exist in the national context between South Korea and Taiwan, it is expected that computer firms from Korea and Taiwan would follow different strategies in global competition, therefore, a comparative study of the two would offer significant insights.

The primary research question of this study is as follows in the next page:

What is the relationship between business strategy and market performance, given the external competitive context and internal operational capability, in the case of indigenous computer firms in South Korea and Taiwan when competing for business in the dynamic global market?

As a comparative study, this research effort potentially offers insights into interplays among various factors related to the issue of global strategic management. For academia, this study provides an analytical research framework and an effective measurement of strategy content for analyzing a firm's strategic behaviors in the global competition, especially those still in the process of becoming multina-tional corporations. For business practitioners, this study provides some managerial implications for effective global strategic management, specifically significant for indigenous high-tech firms from NIEs.

C. Outline of This Study

There are eight chapters in this study. A brief introduction to the topic of this study is given in Chapter I. The literature about international trade, foreign direct investment, international technology transfer, and strategic management of multinational corporations is reviewed and evaluated in Chapter II. At the end of Chapter II, an effort is made to synthesize those theories to provide an analytical framework for this study.

The research methodology is discussed in Chapter III, where an analytical framework for this study and measurements of research variables are presented. In the analytical framework, five key relationships are examined:

(1) the relationship between the external context and strategy content is discussed and external success factors, defined as a set of variables regarding the external context that externally defines the strategy's feasibility for global competition, are identified;

(2) the relationship between internal capability and strategy content is reviewed and internal success factors, defined as a set of variables regarding internal capability that internally dictates the strategy's feasibility for global competition, are identified;

(3) the relationships among strategy components are assessed, and strategy contents are identified;

(4) the relationship between a firm's strategy content and its market performance is explored, and

(5) the strategic groups are identified regarding firm-specific characteristics.

To evaluate the above five relationships effectively, specific variables are identified and their properties measured. Also addressed are the criteria and procedures for sample selection and data collection. Methods of data analysis and decision rules for interpretation of findings are discussed. Limitations of this study are also stated.

The external competitive context is studied in both Chapter IV and Chapter V. In Chapter IV, the global competitive context and its related variables are discussed along with the global economic structure and industry-specific factors at the global level. The discussion is extended to the national setting in Chapter V to include variables of nation-specific social and economic features and industry-specific characteristics at the national level. In these two chapters, the relationship between competitive context and business strategy is explored and external success factors are identified. In Chapter V, national resources in South Korea and Taiwan, which are largely responsible for the similarities and differences in the operational capability among indigenous computer firms from South Korea and Taiwan, are also examined and internal success factors identified.

In Chapter VI, the relationships among firm-specific variables are assessed. First, the relationship between internal capability and business strategy is analyzed. Secondly, strategy contents--the relationships among strategy components--are reviewed. Thirdly, the relationship between business strategy and market performance is measured and strategic groups are identified.

In the last chapter, Chapter VII, conclusions of this study are summarized and areas for further research are recommended. At the end of this study, a sample questionnaire, a bibliography and some appendices are attached.

CHAPTER II

LITERATURE REVIEW

To address the primary research question in this study--the relationship between global strategy and market performance in the case of the indigenous computer firms from South Korea and Taiwan--relevant literature concerning international business and business strategy is reviewed. Three major areas of international business literature are discussed: (1) international trade, (2) foreign direct investment, and (3) international technology transfer. For the literature of business strategy, first, two major schools are reviewed: (a) industrial organization approach, and (b) business policy approach, and secondly, two best-known typologies of generic strategies are addressed: (a) Miles and Snow's typology and (b) Porter's typology.

2.1 THEORIES OF INTERNATIONAL TRADE

International business theories have started from studies of international trade and later included studies of foreign exchanges and foreign direct investment. Modern theories of international business have expanded to embrace the international dimension of all business functions such as production, marketing, finance, R & D, and human resources.

Derived from the general equilibrium model of classical economics, traditional theory of international trade, based on the Heckscher-Ohlin-Samuelson Theorem, assumes that under conditions of free trade a spatial division of labor will lead to a state in which each country (or region) will export and specialize in the goods that use intensively the country's relatively more abundant factors of production, and should import those items whose production uses the country's scarcest resources (Ohlin, 1933; Samuelson, 1947). Highly developed countries or regions would therefore be expected to specialize in the export of capital-intensive goods, while the less developed countries or regions should concentrate on the export of natural goods and labor-intensive products. The theory, however, is based upon several unrealistic assumptions such as zero transportation cost, homogeneity in factors of production, immobility of factors across the borders, absence of technological development, and free trading system (Ohlin, 1933; Samuelson, 1947).

To allow for more realistic assumptions, many efforts have been made (Lindert & Kindleberger, 1982; Robock & Simmonds, 1983). There are two general approaches: (1) to modify the factor endowment model by loosening its assumptions within the static framework, and (2) to introduce dynamics into the theory.

The first approach is represented by such modifications as (a) differentiating qualities of labor (Keesing, 1965; Leontief, 1954); (b) including natural resources (Naya, 1967); (c) including government regulations (Baldwin, 1970), and (d) introducing product differentiation (Grubel & Lloyd, 1975). Yet, this kind of approach is still far from realistic because it fails to address the fatal weakness of the Heckscher-Ohlin Model--using a static approach to deal with dynamic phenomena and using nation instead of firm as the unit of analysis (Buckley & Casson, 1985; Robock & Simmonds, 1983).

The second approach takes on the task of introducing some dynamics into the trade theory. Among the efforts, neo-factor proportion model, product life cycle model, and creative comparative advantage model are the most noteworthy. The neo-factor proportion model tries to analyze the mobility of such factors as basic materials and capital goods in conjunction with immobility of other factors such as natural endowment, labor, infrastructure, and institutions (Maillat, 1982). One of its main findings is that, due to factor mobility, export of material-intensive, labor-intensive and certain capital-intensive goods from the industrialized countries is exposed to growing competition from some developing countries, but competition does not yet affect human capital-intensive and technology-intensive export from the developed countries

(Stucky, 1987). The main drawback of this theory lies in its faulty assumption that the human factor is immobile. Another problem is that it still has not used firm as the unit of analysis.

In another effort to inject dynamics into trade theory, the Product Life Cycle Model emphasizes the role of technology diffusion and transfer in changing trade patterns. The model also suggests partial mobility of human and knowledge factors across borders (Vernon, 1966; Wells, 1972). The International Product Life Cycle Model suggests that the firm--for the first time used as the unit of analysis--that invents a new product (usually in the most technologically advanced country or region) enjoys a monopoly rent in the world market until the technology or product becomes standardized and other firms in foreign countries enter the competition.

The newer locations may gain comparative advantage over the innovator's location due to factor intensities required by standard technology, particularly cheap labor and cheap land. Exports from the innovator's location would fall while its imports from the new location will rise. To compensate for the loss of monopolistic rent, the innovator's firm could invest directly in the place where absolute advantages can be achieved by cost-effective means. This seems to suggest that less developed countries or regions could only have competitive advantages in the low-tech industries characterized by homogenous output and standard technology (Tyson & Zysman, 1983). Such a deterministic note invited serious criticisms (Giddy, 1978), and even the initiator himself admitted that the model no longer worked (Vernon, 1983).

Contrary to the above deterministic views, the theory of created comparative advantage offers something different. According to the model, national governments can use all kinds of policies to turn disadvantages into advantages, as has been evidenced by the historical experience of several countries, most notably Japan (Porter, 1986a, 1990; Zysman, 1983). This theory suggests that competitive advantages and disadvantages are not necessarily predetermined, at least not exclusively, and they can be changed through policies and strategies (Caporaso, 1987). Unfortunately, few scholars have paid enough attention to this significant breakaway from the classical and neo- classical economic theories (Lindert & Kindleberger, 1982; Robock & Simmonds, 1983).

2.2 THEORIES OF FOREIGN DIRECT INVESTMENT

The classical and neo-classical theories of trade, represented by the Heckscher-Ohlin-Samuelson Model, while still providing explanatory powers for much of inter-industrial trade, are far from adequate to address intra-industrial trade. Similarly, all modified versions of the model and even those dynamic trade theories, while offering better explanations for much of intra-industrial trade, cannot explain intra-firm trade. The latter falls into the domain of foreign direct investment (FDI) and multinational corporations (MNCs).

The point at which the Hechscher-Ohlin-Samuelson model fails is precisely where the modern theories of FDI starts (Dunning, 1988). FDI first appeared in the 19th century and many efforts were made to explore the phenomenon, partly by Fayerweather's work in the late 1950s, Aharoni's model of internationalization process, Vernon's product-life-cycle model, and particularly by the Hymer-Kindleberger model of market imperfections in the 1960s.

However, there were no established theories about FDI until the mid-1970s (Buckley, 1983). Until then the study of FDI was essentially divorced from mainstream economics (Casson, 1982). Since then the research approaches, such as various versions of "internalization" and "market imperfections," the eclectic theory of Dunning, and Porter's notion of structure-strategy-performance, have contributed greatly to the understanding of the nature and pattern of FDI by MNCs (Kimura, 1988; UNCTC, 1985, 1988).

A. International Transmission of Resources

The first comprehensive framework for explaining international business patterns was offered by Fayerweather in his works in the 1950s and 1960s (Robock & Simmonds, 1983). Extending from the basic philosophy of resource transfers embodied in trade theory, Fayerweather enlarges the concept of resources to include technological, managerial, and entrepreneurial skills, natural resources, capital, and labor (Fayerweather, 1969). He argues that differentials in supply-demand relationship of resources among countries generate basic pressures for the international flow of resources and create opportunities for MNCs. Governmental actions or policies distort or reshape these resource-differentials into actual patterns of opportunities open to firms. Types of resources transmitted, selection of countries, and choice of transmission methods depend on the characteristics and strategies of MNCs in their responding to the opportunities. In sum, three groups of factors--resource differentials, government policies and strategies of MNCs--determine the way in which MNCs play a role in the international flow of resources (Robock & Simmonds, 1983).

This conceptual framework broadly encompasses economic concepts related to international trade and investment as well as behavioral models of the firm. It is general enough to incorporate most dimensions of international management, but it fails to explain why originally domestic firms ever become MNCs or why FDI is a preferred mechanism to export (Robock & Simmonds, 1983).

B. Market Imperfections Theory

The theory of market imperfections is derived from the theory of the firm, which was originally developed by Coase (1937), and expanded later by Williamson (1975) and others. The theory of the firm tries to answer this question: why does a firm exist? The basic premise of the theory holds that internal intra-firm and external market exchange mechanisms exhibit potentially different levels of efficiency in executing different types of transactions (Davidson & McFetridge, 1985). In essence, the theory of the firm extends itself from the general equilibrium theory of economics. While the latter assumes that all forces in an economy are interdependent, external market mechanism can allocate goods and factors efficiently, and any market imperfections will have welfare costs, the former argues that market imperfections widely exist and firms come into being to overcome those market imperfections (Rugman, 1981). The first application of the theory in an international context was by Hymer in his 1960 dissertation (Hymer, 1976). Kindleberger provided the first comprehensive survey of the various theories of FDI similarly expressed by Hymer (Kindleberger, 1969).

The Hymer-Kindleberger approach begins from the perfectly competitive model of neoclassical economics by asserting that in a world of pure competition FDI could not exist, and the rationale for FDI can only be found out from the model of perfect competition (Kindleberger, 1969). The deviation was first noted by Hymer (1960/1976) as he postulated that local firms have better knowledge about the economic environment in their home country than do foreign firms.

According to Hymer, two conditions have to be fulfilled to explain the existence of FDI: (1) foreign firms must possess a countervailing advantage over the local firms to make such investment viable, and (2) the market for the sale of this advantage must be imperfect, or foreign firms would choose to sell their advantages instead of taking risks in FDI. It was only natural for Kindleberger later to suggest that market imperfections--imperfections in goods and factor markets, scale economies, and government-imposed disruptions--were the reason for FDI (Kindleberger, 1969). This approach is later referred to as "market imperfections theory" (Calvet, 1981; Robock & Simmonds, 1983).

The Hymer-Kindleberger approach's greatest contribution is that it moves the theoretical study of FDI away from the arena of neoclassical economics into the field of industrial organization (Buckley, 1983). Besides, the approach also identifies two key conditions for FDI: firm-specific advantages and market imperfections. This seminal work is responsible for many of the later studies that are just its extensions (Calvet, 1981).

C. Modifications of the Market Imperfections Theory

The main thrust of later research efforts is to identify sources of market imperfections and their relationships with various motives for FDI. Three extensions of the theory of market imperfections are noteworthy: (1) internalization theory, (2) eclectic theory, and (3) diversification theory. The early work of developing the internalization theory was done by Caves (1971) and others in the early 1970s, but the notion of internalization was coined by Buckley and Casson (1976). It has become a central tenet of the theory of the MNCs developed by scholars associated with the University of Reading in Britain (Rugman, 1982). The second extension, namely eclectic theory, was developed by Dunning in the late 1970s, who was also associated with the University of Reading. The third extension, the theory of diversification, originates from the finance field as illustrated by the work of Lessard (1979).

Though the genesis of the concept of internalization can be traced back to Hymer-Kindleberger approach (Rugman, 1981), it was Buckley and Casson (1976) who first explicitly treated the relationship between market imperfections and internalization of markets for intermediate goods as a paradigm for the theory of FDI (Rugman, 1981). This theory is ably summarized in Hood and Young (1979), but the most rigorous treatment of internalization appears in Casson's work (1979).

1. The internalization theory:

This theory is a distinctive shift from research of FDI per se toward study of the institutional aspect of FDI, namely MNCs (Calvet, 1981). The theory "demonstrates that the MNC is an organization that uses its internal market to produce and distribute products in an efficient manner in situations where a regular market fails to operate" (Rugman, 1982). The theory particularly emphasizes the imperfections in the intermediate goods market--mostly in the form of knowledge and expertise (Calvet, 1981), instead of focusing on imperfections in the finished goods market as the Hymer-Kindleberger model.

The starting point of the theory is the idea that modern firms conduct many business activities apart from the routine functions of producing goods and/or services. All these activities, including marketing, R & D, and training, are interdependent and are related through flows of intermediate products. The intermediate product markets are difficult to organize due to their imperfections--which provide incentives to bypass them. This results in the creation of internal markets: bringing the activities that are linked by the market under common ownership and control (Buckley & Casson, 1976). Finally, it is the internalization of markets across national boundaries that gives rise to the MNCs (Rugman, 1981).

Some key market imperfections associated with intermediate products are also identified by researchers along different logical paths. One of the thrusts emphasizing the market imperfections for information and technology involves using the concept of appropriability (Arrow, 1962; Johnson, 1970, Magee, 1976, 1977b). Arrow (1962) and Johnson (1970) argue that the need for a monopoly reward for knowledge arises because knowledge is a public good. As there is no regular external market for the pricing of knowledge, and the generation of such knowledge involves the firm in private cost, it is necessary for the firm to overcome this appropriability problem by creating a monopolistic internal market where the knowledge advantage can be developed and explored in an optimal manner on a worldwide basis (Rugman, 1981). Magee extends the analysis by postulating that MNCs' distinctive nature resides in their capabilities of generating valuable information at five different stages: new product discovery, product development, creation of the production function, market creation and appropriability; because sophisticated technologies are less prone to be imitated, MNCs are more successful in appropriating the returns from these technologies than from simple ones. Further, sophisticated information is transferred more efficiently via internal channels than through market mechanisms (Magee, 1976, 1977b).

Teece goes further to argue that certain types of knowledge are just impossible to transfer because they are unique to some environments without which those types of know-how would not function well, so the existence of such firm specific rent-yielding assets can provide a driving force for horizontal FDI (1983). This can be seen as the transferability problem of knowledge. Casson and others, however, emphasize the notion of transaction cost (Casson, 1982). According to Casson, a distinction between opportunity costs and transaction costs needs to be made; the former is assumed to be exogenous to the firms and is associated with the barriers to business measured by the gains from business foregone, while the latter are incurred in attempting to overcome these barriers (Casson, 1982).

When there is a missing market or when transaction costs of the regular market are excessive, there will be a reason for internalization (Rugman, 1981). It can be argued that non-existence of regular markets for certain transactions--such as knowledge (in the case of Johnson's appropriability problem and Teece's transferability problem)--and the risk of losing potential economic gains because of market imperfections other than the missing market--such as quality uncertainty, contract default, government regulation, buyer uncertainly, and dissipation of special advantage--are the two major reasons for internalization. These are barriers to business and should be treated as opportunity costs, while the efforts to overcome these market imperfections by creating an external market reflect transaction costs, and efforts to overcome these market imperfections through internalization reflect internalization cost.

As creation of an internal market also involves cost, a firm would not internalize transactions unless internalization cost is lower than both opportunity cost and transaction cost. It is obvious that when the three types of cost are equal, there would be no special incentive for business, let alone using either internal or external market mechanisms; only when opportunity costs are higher than either internalization costs or transaction costs, will there be an incentive for business. If, in the case of having an incentive for business, internalization costs are higher than transaction cost, the external market will be used instead of the internal one, and if internalization costs are lower than transaction cost, there will be an incentive for internalization. Opportunity cost are a necessary but not sufficient condition for internalization. This theory mainly explains how to explore existing competitive advantages but it fails to address where the advantages come from.

2. <u>The eclectic theory of international production</u>:

This theory tries to synthesize the previous theories of FDI and MNCs and include both home and host-country features as explanatory factors (Dunning, 1977, 1979, 1981, 1988). According to Dunning, the extent, form, and pattern of FDI is determined by the configuration of three sets of advantages as perceived by firms, i.e., ownership-specific advantages, internalization-specific advantages, and location-specific advantages (Dunning, 1977, 1981, 1983, 1988).

There are two sub-sets of ownership advantages: (1) special assets advantages, and (2) common governance advantages. It is the second subset of ownership advantages that cause some confusions in conceptualization. Dunning seems unable to explicitly address the real distinction between common governance advantages and internalization advantages (Dunning, 1988). The third strand of the eclectic paradigm is concerned with the location of FDI because of some immobile factor endowments and some market imperfections that may influence the location decisions by MNCs (Dunning, 1988). Again a distinction is made between structural market distortions (such as government intervention) and transactional market imperfections (such as exchange risks). Because these market imperfections are country-specific, they are classified as location advantages (Dunning, 1988). Another confusion occurs in conceptualization when Dunning fails to discuss explicitly how to distinguish those advantages that are both location-specific and ownership-specific.

Because of the problems in conceptualization as mentioned above, the eclectic theory is under criticism from various sources. For example, Buckley seriously criticizes the notion of firm-specific advantages on several accounts (1983). His main argument is that the notion is "a static concept applied to a dynamic issue" (1983), mainly because (1) all firm-specific advantages are only temporary monopolies, (2) the creator of knowledge is not necessarily the best to exploit that knowledge commercially, and (3) firm-specific advantage is not always a necessary condition for a firm to engage in FDI, especially when the firm is not a first-time foreign investor.

3. <u>The theory of diversification</u>:

This theory is derived from theories concerning financial market imperfections (Lessard, 1979). In his review of the internal financial transactions, Lessard pointed to sources of gains stemming from exchange control arbitrage, credit market arbitrage and equity market arbitrage (1979). Although the mechanics of diversification are well known, the application of international diversification to the MNCs has not always been properly substantiated (Calvet, 1981). Originally, the argument was put forward by international portfolio theorists that variations in security returns across countries show less correlation than within a single country. An immediate implication is that international diversification can be used as means of reducing the average risk faced by investors, but this argument could not justify the behaviors of MNCs.

In one of the first attempts to deal with this issue, Agmon and Lessard (1977) argued that two conditions must be observed before attributing the diversification motive to MNCs: (1) there must exist greater barriers or costs to portfolio capital flows than to direct investment flows, and (2) investors must recognize that MNCs can provide a diversification vehicle that would otherwise not be available. Later

Errunza and Senbet (1980), took a more general perspective and showed that the existence of barriers per se might not yield price differentials among purely domestic and multinational stocks. Nevertheless, the major limitation of this approach lies in its confinement to financial assets.

In sum, these extensions of market imperfections have demonstrated the power of the market imperfections approach as the core of modern theories of FDI and MNCs. Yet, all these theories fail to address two important issues in the international business from the firm's perspective. The first is the dynamics in the development of MNCs, and the second is the firm-specific strategic management. The two issues are better dealt with by the theories of international technology transfer, and theories of business strategy formulation.

2.3 THEORIES OF INTERNATIONAL TECHNOLOGY TRANSFER

International technology transfer has existed ever since the dawn of civilization--almost as old as international trade and much older than international production--and its importance has been increasing substantially in recent years. Yet, theories of international technology transfer are fragmented since they are mostly developed as by-products of general theories of international trade and production (Robock &

Simmonds, 1983). For example, there is no consensus on what should be included as components of "technology," and how to define "transfer" (Samli, 1985). Furthermore, many studies of international technology transfer focus on the relationship between technology transfer and national economic development (Dahlman & Westphal, 1983; Samli, 1985; Segal, 1986; Teece, 1976), while other studies treat the issue as part of the relationship between MNCs and host government (Baranson, 1978, Germidis, 1977; Konz, 1980; Magee, 1977b; Rugman, 1983; Teece, 1981), but few take on the issue of inter-firm transfers.

Some recent research suggests a tendency toward broadening the definition of "technology" to include all managerial know-how besides manufacturing technique, and stressing the importance of human factor in technology transfer (Stewart & Nihei, 1987; Teece, 1983; Yavas & Cavusgil, 1989). The new developments are more firm-specific and managerial in nature, and they are discussed in detail in the sections to follow.

A. International Technology Transfer Mode

There are two major paths of current research on the subject of international transfer mode. One approach focuses on how inefficiencies in international markets for technology affect transfer patterns for different types of technologies and companies (Contractor, 1982; Davidson, 1980; Leroy, 1976). The second approach examines the impact of receiving country's characteristics on the choice of transfer modes (Davies, 1977; Dunning, 1981; Casson et al, 1979; Contractor, 1981). In an attempt to integrate these two approaches, Davidson and McFeitridge (1985) find that firm-specific technology transfer modes confirm closely to behavior patterns described by the theory of the firm or the theory of market imperfections.

Actual transfer patterns are highly consistent with those derived from this body of theory. According to the theory, when the relative cost of an arms-length transfer is higher than internal transfer, the firm will choose an internal transfer through FDI, otherwise the firm will do it through licensing or other market modes. Other microeconomic factors, such as the presence of an affiliate in a receiving country and the parent's R & D spending, also appear to be important in the choice of transfer modes. Host country's economic conditions, however, exhibit no consistent relationship with technology transfer modes. Market size and sophistication, do not appear to be significant factors in the choice between licensing and FDI, but public policy variables appear to be important (Davidson & McFeitridge, 1984, 1985).

The issue of international technology transfer mode is closely related to the theories of international entry mode (Davidson, 1982; Root, 1987). Such a relationship and its managerial implications will be discussed later in this chapter when the literature of entry strategies is reviewed.

B. Foreign R & D

One interesting school of research focuses on foreign R & D by MNCs (Ghoshal & Bartlett, 1988; Perrino & Tipping, 1989; Pierson, 1978; Teece 1976; Tsurumi, 1979). These studies have attempted to explore the motivation and strategies for conducting R & D abroad. It is found that the major initial corporate motivation is to aid in the foreign production of existing products rather than in the development of new products abroad (Pierson, 1978). A new trend has emerged that emphasizes developing new products for local or even regional or global markets abroad (Teece, 1976). MNCs often conduct R & D abroad because of pressures from their subsidiaries to better serve the local market (Pierson, 1978), and there are both incentives and pressures by the host governments for local R & D by MNCs (Ghoshal & Bartlett, 1988). In addition, there is often a public relation reward in having R & D locally (Perrino & Tipping, 1989). Foreign R & D can also take advantage of the local talents.

A further incentive to establish local R & D is potential cost savings in many countries where scientists and technicians are paid less than those in the home countries, or where the tax systems are more favorable (Tsurumi, 1979). With R & D in more than one country, a greater and more varied flow of new ideas may be possible in more flexible decentralized R & D system worldwide (Tsurumi, 1979; Perrino & Tipping, 1989).

2.4 THEORIES OF BUSINESS STRATEGIES

Generally speaking, all the above theories share one major shortcoming--lack of dynamics to help formulate business strategies for either firms or countries. They fail to explain why some late comers could catch up in the competition (such as Japan and Asian NIEs), and why some countries or firms could turn their disadvantages into strategic assets. One of the reasons for such a serious drawback could be the failure to realize the fact that production factors can be "created" by well-planned industrial policies or firm-specific long-term strategies (Zysman, 1984). Such issues have been well discussed in the modern theories of business strategy.

Two major schools of business strategy, namely, business policy analysts and industrial organization economists, would help remedy the lack of dynamics. Unfortunately, little formal and rigorous attention was paid to how firms interact with each other in an industry-specific competitive context, either from business policy researchers or from industrial organization economists until the late 1970s when the modern theories began to be established (Porter, 1980).

A. Traditional Theories

According to traditional business policy theories, business strategy is defined as a set of goals for the firm, and a series of functional courses of actions necessary for achieving those goals. It is a search for its product/market scope and a quest for its competitive advantages over other firms in the product/market areas. The preferences of the firm with respect to these dimensions shape the strategy. Following the strategy, the firm deploys its resources to build competi-tive advantages that are not easily developed by its rivals (Hofer & Schendel, 1978).

Business strategy can be considered as the firm's choice of a particular set of values with respect to a vector of strategically important decision variables (Porter, 1976). The firm can assign particular values to the vector according to its preferences and sets particular parameters on these interrelated variables for a unique competitive stance in its industry. Business policy theories emphasize that these values should be determined mutually and consistently with respect not only to every variable but also to the goals.

Yet, the traditional industrial organizational theorists disagreed. They argued that though the firm wants to choose its strategic variables according its preference, such a freedom is constrained by the competitive context in the industry. Competitive context in an industry can be fully described by a few structural characteristics that decide the firm's pattern of behavior and profitability. The firm cannot sustain the values of their choice of strategic variables and are forced through market process to accept the values that the general market structure dictates. The firm can merely react to the structural conditions and behave accordingly (Porter, 1976).

It is obvious that traditional business policy theories focus on the uniqueness of an individual firm assumed to be free in choosing whatever it likes as its business strategy, whereas traditional industrial organization theories hold that a firm's choice of viable strategies is mandated by the nature of competition determined by the industrial structure, and the firm actually has no options of its own. Traditional theories emphasized either structural characteristics of the industry--as in the case of traditional industrial organization--e.g., number, size, age, and concentration of firms in an industry, or operational features of the firm--as in the case of traditional business policy theories--e.g., functional focus, product mix, and pricing. These theories have been seriously challenged by modern theories.

B. Modern Theories

Modern approaches to business strategy have seriously criticized the traditional schools of thought and have redefined the structure-competition-performance model originated by traditional industrial organization economists. As Scherre (1970), Caves, Porter and Spence (1980) have shown, a modern view of the structure-competition-performance paradigm is that it has dynamic causal flows in both directions: indistrial structures and firms' conducts influence each other, though certain long-standing structural elements constrain the ranges of viable strategic choice by firms in the industry.

Modern industrial organization theories argue that firms do have the option to adopt their unique strategies, but the economically significant strategies are only those that wield influence on structural elements (Kimura, 1988). They further argue that the range of "pro-active" strategic choice is narrowly constrained by structural elements, and strategic moves involve long lead time, cost and risk (Porter, 1976).

Caves and Porter (1977) develop the concepts of "mobility barrier" (as contrasted to "entry barrier") and "strategic groups" so as to link and extend the traditional schools of thoughts. According to Caves and Porter (1977), an economically significant strategy is based on the structural and behavioral conditions of the industry, and these conditions surrounding the firms in an industry are not necessarily homogenous. They argue that variations in strategy and performance may arise from differences in firm-specific characteristics, but only partly so, because these differences can be easily corrected or copied (Porter, 1979). Only when the asymmetry becomes sustainable barriers between firms in an industry, can it lead to persistent variations in strategy and performance across the firms in the industry. Caves and

Porter (1977) define these intra-industry barriers as "mobility barriers."

These barriers arise when the differences in firm characteristics--firm structures--influence and modify the structural elements of the industry to which these firms belong. The height of these barriers differs across the strategies adopted by firms, and the differences in their heights systematically differentiate a group of firms from others within an industry, which leads to the concept of "strategic groupings." These systematic asymmetries arise when these firms' structures and strategic behaviors (which take advantage of initial firm structure and reinforce or upgrade the firm structure through investment in certain strategy-specific assets, such as popular brands, new products, scales of economy, have changed the industry-wide structural elements. Mobility barriers determine what strategies are viable for certain groups of firm, but they can be changed by exogenous forces and firm's long-term investment (Caves and Porter, 1977; Kimura, 1988; Porter, 1980).

Firms' market performance is greatly affected by the characteristics of both entry barriers and mobility barriers. It may even be influenced by the "structure" within a strategic group (intra-group structure). Consequently, besides the industry-wide structural traits (entry barriers), mobility barriers between and within strategic groups add an extra critical dimension to the industrial structure (Porter, 1980).

Generally speaking, modern theories emphasize the interaction of firms within an industry as well as the close relationship between industry-specific structural characteristics and firm-specific decision-making options in formulating strategies (Porter, 1976). Modern theories of strategic management has paid special attention to identifying various types of generic strategies, among which two are the most prominent--the typology of Miles and Snow and the typology of Porter (Segev, 1989; Zajac & Shortell, 1989).

1. Miles and Snow's Typology:

Miles and Snow's (1978) typology is one of the major contributions in the area of business strategy research. Based on field studies about degree of innovation in product and marketing development, they have identified four generic strategies: (1) defender; (2) prospector; (3) analyzer, and (4) reactor, which can be applied effectively in any industry. According to Miles and Snow, the defenders are those who engage in little or no new product/market development but control relatively secure niches and compete primarily on the basis of price, quality, or service. The prospectors are those who pioneer in new products and market development, tend to offer a broad product line and compete mainly by stimulating and meeting new market opportunities. The analyzers are those who make fewer innovations than the prospectors but are more dynamic than defenders. Finally, the reactors are those who have no long-term strategies (Miles and Snow, 1978).

Over time, firms following these different strategies would develop certain internal consistencies and tend to perpetuate those strategies. Snow and Hrebiniak (1980) empirically examine the relationship among strategy, distinctive competence and performance by using Miles & Snow's framework. They find that a variety of strategies are pursued contemporaneously in the same industrial context; though a wide range of organizational capabilities may be feasible within a particular industry, firms tend to develop only some of them. According to their study, defenders and prospectors pursue different strategies and possess distinctive competencies, but both can be successful financially; only when the industrial environment is somehow protected from active competition can the reactors, without distinctive competence, survive. In addition, the performance of the reactors is significantly lower than that of others. However, they do not find any significant difference in distinctive competence among the four types of strategy-users.

Another major empirical study is done by Hambrick (1983). His findings show that the prospectors usually follow an entrepreneurial orientation, and the defenders adopt an efficiency orientation. He also finds that defenders and prospectors do differ in their performance tendencies, depending on the nature of the environment and the performance measure being used. In his examination of four types of industries, i.e., growth, mature, non-innovative, and innovative, Hambrick finds that defenders outperform prospectors in terms of current profitability and cash flow, and that prospectors outperform defenders (except in innovative industries) in terms of market share gains. Hambrick argues that the choice of strategy should depend on the requirements of the environment and the type of performance measures being sought at the time (1983).

There are some serious critics of Miles & Snow's typology. Hambrick (1983) argues that "on the positive side, this (typology) means that organizations have a tested, well-developed set of response mechanisms for dealing with environmental shifts. On the negative side, it means that organizations have difficulty accepting the need for, or being able to implement, strategic change." Galbraith and Schendel (1983) states that Miles & Snow's typology has been well accepted as one that integrates the range of relationships between organizational structure and strategic process rather than one that focus on the type of strategies. Miller (1986) points out that Miles & Snow's typology focuses mostly on innovation and product line, but fails to address marketing, production, vertical integration and asset management strategies. Furthermore, Miles & Snow's typology fails to explicitly emphasize the interaction between industrial structure and strategic options (Segev, 1989).

2. Porter's Typology:

Based on an analysis of competitive forces affecting an industry and their strategic implications, Porter (1980) identifies three internally consistent generic business strategies for creating a sustainable favorable position in a long run. These three generic strategies are (1) overall cost leadership; (2) differentiation, and (3) focus. They can be used both singly and in various combinations.

The cost leader strategy requires aggressive construction of efficient-scale facilities, vigorous pursuit of cost reduction from experience (learning effect), advanced process technologies, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization in areas of R & D and marketing. This strategy stresses providing product and service of the same quality but lower cost compared with competitors.

The differentiation strategy is applied through new products based on advanced technology, unique product design, brand image, and customer service. This strategy offers certain insulation against competitive rivalry because of special monopolistic advantage.

The focus strategy refers to special emphasis on all kinds of market segmentation. This strategy rests on the premise that a firm can serve its narrowly targeted market segments more effectively than its competitors.

Hambrick (1983) applies Porter's typology to the real world and obtains the following findings. First, all of Porter's strategies can be found among the high profit companies. Secondly, not all three generic strategies are found together in any single business environment. Thirdly, the differentiation strategy has different configurations in different industries. Fourthly, market share leaders in different types of industry differ in their strategies. Finally, the primary strategies pursued by high profit groups of firms in each type of industry differ from the strategies adopted by low profit groups. A study done by Dess and Davis (1984) also confirmed Porter's typology but they found out that a trade-off exists between growth and profitability in the focus group. White (1986) uses Porter's typology to study the business unit's strategy-organization fit relationship and the impact of such a fitness upon the business unit's market performance. He finds that the business units with the hypothesized strategy-organization fitness enjoy high performance.

In an effort to synthesize past studies, Miller (1986) extends Porter's typology into four categories and develops five strategic configurations that can be applied under different organizational contexts. According to Miller, for small or entrepreneurial firms, a "niche marketer" strategy can be adopted in combination with high business focus, differentiation and asset parsimony; for mechanistic or machine bureaucracy structure, the firm could adopt a "cost leader" strategy by combining cost leadership, asset intensity and low business focus; for organic structures, the firm should try to be an "innovator" or "marketer" by taking on differentiation, asset parsimony and low business focus; for divisional structure, the firm should apply "conglomerate" strategy at the corporate level and match the above four strategies to different industrial contexts.

In sum, the empirical studies tend to support Porter's typology though with some reservations. All these studies, however, are based on a single country and their findings may not be applicable to other countries (Dunning, 1988).

3. Comparison and Synthesis:

The above two strategic typologies are systematically evaluated, analyzed and compared by Segev in his study (1989). According to Segev, a combination of Porter's typology with Miles & Snow's typology forms a new typology that is coherent. Further, the synthesized combination can be displayed conveniently against various dimensions of consistency. The outcome of this synthesis, according to Segev, is a typology incorporating the relevant components lacking in Porter's typology, i.e., the environmental components of uncertainty, dynamism, and complexity; level of Risk, and size of strategy-making team; at the same time, some information missing from Miles & Snow's typology on liquidity rate is also provided.

An interesting conclusion emerges from analyzing the differences between paired strategies on each variable. Segev shows that the areas in which the two typologies are matched and the degree of matching (1989). Major differences are related to the following strategic variables: Product/Market Breadth, Market Share, Growth Rate, Size, and Number of Technologies. Medium and notable differences are also found for other variables. It seems that Porter's typology focuses on more concentrated industries with larger business units, while Miles & Snow's typology focuses on industries with more competitors, but a synthesis of the two may compensate for this difference (Segev, 1989).

Yet, several problems remain. First, typologies of generic strategies tend to oversimplify the multi-dimensional and dynamic nature of business strategies, as they try to classify complex strategies into a few distinctive categories. Secondly, the typologies attempt to offer specific prescriptions for all firms rather than providing a conceptual framework to guide each individual firm through the process of formulating its unique strategy. Thirdly, while the typologies identify strategic orientations, they fail to explain why and how firms adopt such orientations. Fourthly, the typologies tend to assume that the various strategies are equally viable across environmental contexts and across time. Finally, the typologies fail to address the international dimension of generic strategies.

C. Entry Strategies for International Markets

As a functional aspect of business strategy literature, the study of market entry strategy is concerned with how to develop a comprehensive international marketing plan. Such a plan includes the objectives, goals, resources, and policies that will guide a firm's international operations over a future period long enough to achieve sustainable growth in the world markets (Hill et al, 1989; Root, 1987).

Root (1987) defines market entry strategy as a comprehensive plan composed of several product/market plans. The constituent product/market entry strategies require decisions on (1) the choice of a target product/market, (2) the objectives and goals in the target market, (3) the choice of an entry mode to penetrate the target market, (4) the marketing mix to explore the target market, and (5) the control system to monitor performance in the target market (Root, 1987).

Among the above five attributes of a market entry strategy, the market entry mode is the most significant. According to Root, an international market entry mode, defined as an institutional arrangement that makes possible the entry of a firm's products, technology, human skills, management, or other resources into a foreign market, plays a very important role in the entry strategy (1987).

From an economist's perspective, a firm can enter a foreign market in only two ways. First, it can take an arm'slength approach by using existing external market facilities. For example, the firm can export its products or sell its technologies to the targeted market from a base outside that market. Secondly, it can take a direct-control approach by internalizing the market. For example, the firm can transfer its resources in terms of technology, capital, human skills, and enterprise to the foreign country, where they may be sold directly to the end users or combined with local resources to manufacture products for local sale (Root, 1987).

From a management perspective, however, these two forms of entry can be broken down into several distinctive entry modes, which offer different benefits and costs--depending on the situation--to the firm (Root, 1987). The classification of entry modes used in this context is as follows (Root, 1987):

Export Entry Modes:

OEM sub-contracting
Own brand name

Contractual Entry Modes:

Licensing
Technical agreements
Management contracts
Construction/turn-key contracts
Contractual manufacturing
Co-production agreements

Investment Entry Modes:

Sole venture
Joint Venture

It is obvious that a firm's choice of mode to enter a given market is the net result of several, often conflicting, forces. Such a choice is normally determined by variances in corporate objectives, resource commitment, product features, environmental conditions--both the industry-specific and nation-specific context--and time frame. Due to the difficulty in measuring the magnitudes and the need to anticipate the directions of those forces over a future planning period, the decision over entry mode is a complex process; further, as there are numerous trade-offs among alternative entry modes, the choice is even tougher (Davidson, 1982; Root, 1987).

The literature of entry mode suggests three broad groups of variables that affect the choice of entry mode: strategic variables, environmental variables and transactional variables (Hills et al, 1990). Strategic variables influence the entry mode decision primarily through the control requirements that they entail. The environmental variables influence the entry mode decision primarily through their impact on the appropriate level of resource commitments. The transactional variables influence the entry mode decision through their impact on dissemination risk and on the appropriate level of control. The decision of entry mode is based on the trade-off among control requirements, resource commitments and dissemination risks (Hills et al, 1990).

2.5 NEW DEVELOPMENTS

A critical link seems missing between the literature of international business and the literature of business strategies. As Porter (1986a) points out: "As rich as it is, I think it is fair to characterize the literature on international competition as being limited when it comes to the choice of a firm's international strategy. Though the literature provides some guidance for considering incremental investment decisions to enter a new country, it provides at best a partial view of how to characterize a firm's overall international strategy and how such strategy should be selected. Put another way, the literature focuses more on the problem of becoming a multinational than on strategies for established multinationals." To close the gap, recently there have emerged several interesting attempts to build an integrated approach to international business (Dunning, 1988; Porter, 1986a, 1986b, 1990).

First, some researchers are trying to synthesize existing theories for a more general theory for international business. For example, some are trying to combine traditional theories of business strategy with the eclectic theory of international production (Graham, 1986; Johanson & Mattson, 1987), while others are working along the path of merging the theories of international trade and production (Dunning & Norman, 1985;

Dunning & Pearce, 1985).

Secondly, some researchers are busy exploring new trends in global competition. Among the theories being examined are theories of strategic alliances (Harrigan, 1984; Ohmae, 1989), global industrial sourcing and global production sharing (Davidson, 1982; Drucker, 1980); international value-added chain (Kogut, 1984; Porter, 1986a, 1986b), and new global industrial division of labor in knowledge-intensive industries (Ballance, 1984; Mytelka, 1989). Though these approaches have not yet been well established, they appear to offer the best hope for a more comprehensive paradigm of global business.

Among other efforts, Porter's study of value-added chain is noteworthy. According to Porter, every firm is a collection of discrete activities performed to generate value within the scope of the firm. The firm may possess one of two types of competitive advantages in order to stay in business: (1) low relative cost in performing similar value activities, or (2) differentiation by performing different value activities with a premium. These value activities are not independent but are connected through linkages, either within the firm or with its suppliers and buyers. The firm's value chain resides in a larger stream of activities that Porter terms the value system (similar to the concept of vertical integration). The firm normally chooses a competitive scope for its core business, either as segment scope, industry scope, vertical scope or geographic scope. This is important because the competitive scope shapes the configuration of the value chain and decides how activities are performed and whether activities are shared among units (Porter, 1985).

Porter also extends his research to the global arena by addressing the issue of competitive advantages of nations (Porter, 1990). Building upon his earlier works, Porter explores what makes a nation's firms and industries competitive in global markets and proposes a new paradigm of global competition (Porter, 1990). Porter argues that the only meaningful definition of competitiveness at the national level is national productivity, and the basic unit of analysis for competition should be specific industries and industry segments (Porter, 1990).

Based on an extensive study of more than one hundred industries in ten leading countries, Porter identifies <u>four</u> broad attributes of a national environment as fundamental determinants of a nation's internationally competitive advantages in any industry. These four attributes are (1) factor conditions (endowed or created, basic or advanced, and general or special); (2) demand conditions (composition, growth, and globalization); (3) related and supporting industry (effective inputs, complementary relation-ship, and source of new entrants), and (4) firm strategy, structure and rivalry (goal, attitude, and new entrants).

These determinants reinforce each other and proliferate over time in fostering competitive advantage in an industry

(Porter, 1990). A global industry is defined as one in which a firm's strategic position in one country will be significantly affected by its positions in other countries. Put differently, firms in a global industry compete with each other on a worldwide scale. Thus, a global strategy is an issue of geographic scope. A firm that competes globally must decide how to spread various activities in the value chain among different countries. Here, the distinction between the value activities of "downstream" and "upstream" is made. Porter argues that international competitive strategies can be boiled down to two key terms: (1) "configuration" of a firm's value activities worldwide from concentrated format to dispersed format, and (2) "coordination" of a firm's value activities across the globe from none to high (Porter, 1990). Consequently, a global strategy can be defined as one in which a firm seeks to gain competitive advantage from its global presence through appropriate configuration and coordination among value-added activities (Porter, 1986a, 1990).

Research on strategic alliance is also very important in capturing the current pattern of global competition. Several significant forces give rise to the importance of global importance. In a rapid changing world, the facts of a global economy of converging consumer needs, fast spreading technologies, escalating fixed costs, and growing protectionism, mandate various forms of strategic alliance (Ohmae, 1989).

Complexity in competition caused by advance of technology and globalization is driving firms to ad-hoc cooperative relationships in the form of strategic alliances. Because of much shorter life cycle of new products and new technologies, higher costs of R & D, more difficult market penetrations, firms have to share their limited resources with their partners to survive the intensified global competition. By forming strategic alliances, much needed complementary advantages can be acquired; available resources can be increased, and marketing and R & D costs and risks can be spread (Contractor, 1988; Furino, 1988; Harrigan, 1988; Weimer et al, 1989). By forming strategic alliances, small firms can play a significant role in international markets. In the real world, where global competition and foreign markets are the rule rather than the exception, strategic alliances are found necessary (Weimer et al, 1989).

2.6 SUMMARY AND SYNTHESIS

Review of the literature concerning global business management reveals a common theme that is presented in a fragmented fashion by various theories and none of them alone is sufficient to explain the multi-dimensional issue of global business management. Yet, the common theme shared by those theories can be used as a clue to synthesize the existing literature into a coherent framework with the help of a few new concepts.

A business activity can be perceived as being made up of a compatible set of **value-generating factors.** These factors can be generally termed as "human" and "non-human" factors, and each pair of them forms a basic operational unit in the business practice. These units, when linked together, form a **matrix of value-added chains**, where the X axis reflects the width of a firm's value-added activities in terms of functional areas and product lines; the Y axis reflects the depth of a firm's value-added activities in terms of technology level and market segmentation, and the Z axis reflects the geographical location of those value-added activities.

As a comprehensive measurement of business practice, the matrix of value-added chains can be used as an effective tool for the analysis of competitive strategy. As a competitive strategy is the firm's search for competitive advantages in the marketplace, the firm's potential for success can be measured by the level of compatibility between the firm's position along the matrix of value-added chains and the industry's key success factors dictated by both the external context--the competitive environment--and the internal capability--the operational resources.

This approach can be termed as **"factor-matching,"** because a firm can achieves competitive advantages by positioning itself strategically along the matrix of value-added chains through a process of matching value-generating factors internally available to them to the competitive environment externally imposed on them (Porter, 1985, 1990). This is the hard core of the strategy formulation process (Miles & Snow, 1978; Porter, 1980; Pearce et al, 1988; Quinn et al, 1988).

Pivotal to the factor-matching approach is the issue of how to enhance the availability of resources strategically critical to the firm according to the external competitive environment. With respect to this problem, the factor-matching approach can take place within three **domains** where value-generating factors can be obtained: national; international, and global. Since factor-matching in the national domain does not fall into the scope of this study, only the latter two domains are discussed here.

Factor-matching in either international or global domain is directly linked with the issue of factor mobility beyond national boundaries. This mobility issue is partly touched upon by theories of dynamic factor endowment such as the neo-factor proportion model (Maillat, 1982), and the creative comparative advantage model (Zysman, 1981) when they try to explain what the static trade theories fail to do. Not discussed by the dynamic theories are the magnitude and direction of both inter-industrial and intra-industrial trade flows, in which some factors, such as basic materials and capital goods, are considered as mobile to certain extent.

This shortfall is partly corrected by the theories of foreign direct investment, such as the market imperfections theory (Hymer, 1976), internalization theory (Buckley & Casson, 1976; Rugman, 1981), and eclectic theory (Caves, 1979; Dunning, 1976, 1980, 1981b, 1988). According to these theories, many factors, including intangible assets, are highly mobile internationally; thus, a factor-matching process can take place beyond national borders at a big scale. But these theories fail to provide managerial guidance for global business operations.

Not until recently has the issue of factor-matching in the global domain begun to receive the attention long over due, and some aspects of factor-matching in the global domain have become the hottest topics in the business world, such as the global value-added chain (Kogut, 1984, 1985; Porter, 1986a), global industrial sourcing (Kotabe & Omura, 1986, 1989), global production sharing (Kim, 1986), global strategic alliance (Berg et al, 1982; Borys & Jemeson, 1989; Harrigan, 1984a, 1985, 1988; Hladik, 1985; Killing, 1983; Ohmae, 1989), and global strategic management (Davidson, 1982; Doz, 1985; Hood & Vahlne, 1988; Link, 1987; Porter, 1986, 1990; Prahalad & Doz, 1987).

In these studies, almost all value-generating factors are seen as increasingly mobile in the global domain as the world economies are becoming so closely integrated that many traditional industries have evolved into global industries and new industries are born global. As global competition has become the rule of the game, a sound global strategy is no longer an option but a must for firms operating in that environment (Davidson, 1982; Porter, 1986a).

Factor-matching also involves another key attribute of business strategy, i.e., strategic mode, which is concerned with two related issues. The first issue is how to get access to factors of production owned by other firms through the most appropriate business mechanisms. The purpose of doing that is to expand the availability of factors needed for the best possible configuration and overall orientation of the business operation. Some aspects of this issue are dealt with in theories of technology diffusion and transfer (Baranson, 1978, 1988; Contractor, 1981b, 1985, 1988; Davidson, 1985; Frame, 1983; Teece, 1981b, 1983), international transmission of resources (Fayerweather, 1969), geo-business model (Robock & Simmonds, 1983), and multinational management (Davidson, 1982; Rugman, 1981; Porter, 1986a, 1986b).

The second issue associated with the strategic mode is how to enter a new market through various business channels. This question is dealt with by theories of marketing entry strategies (Root, 1987). As an essential part of a business strategy, entry mode is an institutional arrangement that makes possible the entry of a company's products, technology, human skills, management, or other resources into a specific market. Entry modes can be classified into three major groups, i.e., export entry modes, contractual entry modes, and investment entry modes (Root, 1987).

Related to the strategic mode is the concept of factor-sharing, which refers to access to hard-to-find factors of productions through special strategic modes such as joint venture and service agreements. Sometimes factor-sharing is the only way to turn competitive disadvantages into comparative advantages, as it allows firms to share complementary factors with each other for mutual benefits. It is very important to realize that factor-sharing in both international and global domains is becoming increasingly crucial for any long-term success in the keen competition of today, especially from the perspective of developing countries, as high-quality factors are harder to find than before, the life cycles of those factors become shorter, and the costs for generating new factors more prohibitive. This is particularly true in the high-technology sector such as the computer industry.

Forces propelling factor-sharing to central consideration include all the major features of a shifting competitive context, including advances in technology (**technology-push**), shifts in the pattern of consumers' preference (**demand-pull**), change in competition structure with the advance of globalization (**competition-driven**). In fact, factor-sharing is the primary purpose of forming global alliances.

In sum, this new approach is able to capture all major aspects of global strategic management in a concise and coherent manner, and offers a sound guidance for formulating a firm's global strategy. Based on this new approach, an analytical framework is presented in Chapter III to address the primary research question of this study.

CHAPTER III

RESEARCH METHODOLOGY

The research design for this study is set forth in this chapter, including research questions, analytical framework, research variables, sample design and data collection. The primary research question is broken down into six subordinate questions to be specifically addressed. To answer the research questions, an analytical framework is derived from the literature review. Based upon the framework, key research variables are defined and their measurement identified. Further, a sampling design is specified. Finally, limitations of this study are discussed so that findings of this research are interpreted appropriately.

3.1 RESEARCH QUESTIONS

It can be seen from the literature review in Chapter II that there is a need for a comprehensive approach to the issue of global strategy, especially from the perspective of NIEs. To serve such a purpose, this study has been designed to explore the relationship between business strategy and market performance, given the condition of external competitive context and profile of internal operational capability. A sample has been drawn from the indigenous computer firms from South Korea and Taiwan for this study.

The following is the primary question this study:

> **What is the relationship between business strategy and market performance, given the external competitive context and internal operational capability in the case of indigenous computer firms in South Korea and Taiwan when competing for business in the dynamic global market?**

This complex question is divided into a few subordinate questions for detailed study. First, to examine the relationship between business strategy and market performance, it is crucial to understand the key characteristics of the competitive context that externally defines the content of the global strategies adopted by the indigenous computer firms from South Korea and Taiwan. The external context should be examined from both global and national perspectives. Thus, the first and second subordinate research questions are as follows:

SQ-1: **What are the major characteristics of the external competitive context at the global level in which the indigenous computer firms from South Korea and Taiwan operate?**

SQ-2: **What are the major characteristics of the external competitive context at the national level in which the indigenous computer firms from South Korea and Taiwan are based?**

Secondly, related to the above question, it is important to identify the profiles of internal operational resources and capabilities available to the indigenous computer firms from South Korea and Taiwan, which internally defines the content of their global strategies. The third subordinate research question is as follows:

SQ-3: **What are the profiles of internal capabilities available to the indigenous computer firms from South Korea and Taiwan?**

Thirdly, before the relationship between strategy and performance is explored, specific content of the strategies adopted by the indigenous computer from South Korea and Taiwan in their global competition must be identified and measured. The fourth subordinate research question is as follows:

SQ-4: **What are the specific contents of those strategies adopted by the indigenous computer firms from South Korea and Taiwan when they compete for business in the dynamic global marketplace?**

Fourthly, as the core of the primary research question, the relationship between firm-specific business strategy and actual market performance needs to be specifically addressed. The fifth subordinate research question is as follows:

SQ-5: **How are the competitive strategies of the indigenous computer firms in South Korea and Taiwan related to their actual market performances?**

Finally, to provide managerial implications, it is desirable to classify the indigenous computer firms from South Korea and Taiwan into different strategic groups according to their firm-specific characteristics. Hopefully, certain patterns can be identified regarding their strategic practices shared by successful or unsuccessful firms. Such findings can be used to provide a guideline for constructing effective global strategies. Thus, the last subordinate research question is as follows:

SQ-6: **How can those indigenous computer firms from South Korea and Taiwan be classified into various groups according to the differences in the firm-specific characteristics?**

To address the above questions, a sound conceptual framework is needed. From the literature review in Chapter II, it is clear that no single theory alone is sufficient to provide a general conceptual framework for analyzing global strategy to its full extent. As a multi-disciplinary issue, global strategic management requires an integrated approach. Consequently, the synthesis presented at the end of Chapter II is a logical point to start with in the development of an analytical framework for this study.

3.2 ANALYTICAL FRAMEWORK

The difficulty in studying global strategic management lies not only in the lack of an integrated framework but also in the unresolved controversies within different academic fields. For instance, in the field of Strategic Management, there is no consensus on what makes up the contents of a strategy or how to identify them (Miles & Snow, 1978; Porter, 1980, 1985; Pearce et al, 1988; Quinn et al, 1988; Schendel & Cool, 1988). An effort is required to synthesize and extend theories within and beyond traditional academic domains to include new developments in both theory and practice.

A. Factor-Matching as the Key to Business Strategy

In essence, a business strategy constitutes a firm's long-term commitment in terms of matching the operational resources available to the firm with the competitive context it faces so as to create a set of competitive advantages in reaching its business goals (Porter, 1980; Quinn et al., 1988). The process of formulating and implementing a global strategy can be described as one of matching the internal capability to the external context on a global scale, according to key factors that dictate success in the market. This process can be termed as the "Factor-Matching Process."

1. Two critical issues of the Factor-Matching Process:

Generally speaking, there are <u>two</u> distinctive yet interrelated issues in formulating a sound business strategy. First, a business strategy should take into consideration the **external opportunities and threats** posed by <u>the competitive context embracing the firm operating in that environment</u>. A strategy should best exploit the opportunities available and avoid the threats. Secondly, a business strategy should account for the firm's **internal strengths and weaknesses** defined by <u>the operational capability available to the firm</u>. A sound strategy should maximize the firm's strengths and minimize its weaknesses in light of the external competitive context.

The external competitive context dictates the general features of a strategy as it defines the <u>external success factors</u> in a given business. External success factors refer to those activities and areas in which firms must be proficient as required by the external context to beat the industry-specific competition (Leidecker & Brano, 1984; Thompson & Strickland, 1990). For example, a firm operating in a high-tech industry is required to invest in R & D to remain competitive in the marketplace. High investment in R & D is a key external success factor for competition in a high-tech industry. On the other hand, heavy investment in R & D may not be necessary for firms operating in a low-tech industry, where R & D is not a key external success factor.

Due to their role in determining a strategy's compatibility with the external context in terms of opportunities and threats posed by the environment, key external success factors address a strategy's **external compatibility.**

Though all the key external success factors are critical, a firm does not have to be equally proficient in all of them. Further, due to the limited internal resources available to a firm, it is also impossible for a firm to be equally proficient in all the key factors. In fact, how the key external success factors are addressed specifically is determined by the availability of firms' internal capabilities. Differences in the availability of firms' internal capabilities lead to the uniqueness of each firm's strategy. For example, a firm operating in a high-tech industry has a strong but not state-of-the-art R & D capability cannot be an industry leaders and set the industry standard, but the firm is able to compete by serving market niches or offering cheaper products. Even among the firms that have similar internal capabilities, different aspects of these similar capabilities may be emphasized. Thus, there exist many viable ways of configuring internal capabilities as long as they are compatible with the key external success factors. These compatible internal capabilities can be termed as key internal success factors. Due to their role in directly determining a strategy's compatibility with the internal capability in terms of strengths and weaknesses defined by the resources available to the firm, the key internal success factors define a strategy's **internal compatibility.**

In sum, a competitive success requires an ability to mobilize the operational resources available to the firm to take advantage of the opportunities and to combat the threats imposed by the external competitive context. As a strategy is meant to create and strengthen such an ability, a firm's success in the marketplace depends on how well the external and internal factors--as given conditions--are matched through the firm's activities--as reactions or initiatives--stipulated by a strategy compatible with both the external and internal factors. Only when these issues are addressed appropriately through the factor-matching process can a strategy serves its purpose of achieving superior market performance.

2. Two phases of the factor-matching process:

Corresponding to the two issues of factor-matching process, there are two phases of the factor-matching process. First, choice of business strategies viable for a firm in a particular business is conditioned, to a large extent, by the competitive context in which the firm operates. The factor-matching process in the first phase is aimed at identifying the key external success factors by analyzing the competitive context.

From a firm's perspective, the global competitive context is composed of three key elements: (1) the overall competitive context in the world; (2) the industry-specific context, and (3) the nation-specific context. The overall global competitive context is defined as the generic business environment in the global markets. Major indicators of the overall global competitive context are the features of the world economic structure (Morgan, 1985; Porter, 1986a, 1990; Robock & Simmonds, 1983);

The industry-specific context is defined as the competitive situation in a specific industry, as characterized by (a) market characteristics, (b) nature of the core technologies underlying the industry, (c) production pattern, (d) marketing channel, (e) industrial structure, (f) strategic groups, (g) degree of globalization of the industry, and (h) condition of supporting industries (Porter, 1980, 1986a, 1990); and

The nation-specific general context is the national business setting that serves as a base for the indigenous firms to grow, which is characterized by (a) national economic structure, (b) conditions of national resources, (c) government policy, and (d) social and cultural tradition (Dunning, 1988; Porter, 1990). Among these variables, conditions of national resources are closely related to the internal capabilities of the indigenous firms (Porter, 1990).

In the second phase, attempts are to be made to evaluate the operational capability internally available to the firm against the key external success factors and identify a set of key internal success factors for strategy formulation. From the firm's perspective, operational capability available to the firm can be classified into two broad categories--tangible and intangible assets or resources. The best way to evaluate the internal capability is to examine the profiles of their combined posture along the value-added matrix with respect to the external context. This is discussed in further detail in the next section when strategy content is addressed.

The finished strategy formulated through the factor-matching process should be compatible with both the external and internal success factors with respect to the external opportunities and threats as well as the internal strengths and weaknesses. A strategy's potential success depends on the degree of its external and internal compatibilities. If the compatibility issue is addressed properly, a strategy should lead to desirable market performance if it is also properly implemented.

It is important to note that external compatibility, which is directly related with the competitive context and external factors, dictates the general structure of the strategy, while internal compatibility, directly linked to the operational capability and internal factors, determines the specific features of the strategy. It is also critical to remember that the market is so dynamic that a chosen strategy has to be constantly adjusted whenever any changes occur in the underlying factors that affect the strategy's external and internal compatibilities.

B. Value-Added Matrix as the Key to Strategy Content

One problem remains after the above issues and phases in formulating business strategy have been addressed: the lack of a well-defined analytical tool to measure the strategy content (Miles & Snow, 1978; Pearce et al, 1988; Porter, 1980; Qiunn et al, 1988). One way to remedy is to approach the multi-dimensional phenomenon from various perspectives, each addressing one of its many dimensions, and to define the interrelationships between these dimensions within a given strategy as the strategy content.

As business activities are applications of human **knowledge** in achieving market goals, it is natural to use "knowledge" as the starting point to address business strategy. It can be argued that business knowledge, as other types of knowledge, exists not only in the form of **human factor**, i.e., any direct human involvement (such as labor and management), but also in the form of **non-human factor**, i.e., any non-human assets with knowledge embodied in them (such as materials, tools and blue-prints). Each business activity requires a specific combination of both human and non-human factors; how the two factors are combined determines the uniqueness of the activity.

Each factor has two major dimensions: (1) **knowledge-intensity**, and (2) **knowledge-orientation.** Knowledge-intensity is defined as **sophistication** of the technology and/or know-how embodied in a human factor--as reflected by the level of education and/or training--and a non-human factor--as reflected by the level of human factor required to make/operate it--for the purpose of offering products/services of different quality. Knowledge-intensity can be divided into three broad categories: (1) **high**, (2) **medium**, and (3) **low**, and within each category there can be many sub-groups.

Knowledge-orientation is defined as **specialization** of the technology and/or know-how embodied in a human factor--as reflected by type of education and/or training--and a non-human factor--as reflected by type of human factor required to make and/or run it--for the purpose of offering products/services of various functions. Knowledge-orientation can be classified into four generic areas of business operation: (1) **R & D**, (2) **manufacturing**, (3) **marketing /servicing**, (4) **finance/investment**, and (5) **human resource**, while within each area there may be many sub-groups.

A compatible pair of a human factor and a non-human factor can form a **value-added activity** as the basic operational unit in the business practices. A network of such activities can be represented by a multi-dimensional **value-added matrix** (Porter, 1985). In the matrix, the X axis measures the **breadth in coverage** of the firm's business activities; the Y axis reflects the **depth in sophistication** of those activities, and the Z axis represents the **geographical dimension** of those activities. Besides these three obvious dimensions, there are two hidden dimensions. One is the firm's **business goal for market performance** and the other is the firm's **operational thrust for overall orientation.** The last two dimensions are critical because they serve to coordinate all the business activities along the matrix.

These five dimensions construct a value-added matrix:

Figure 3-1

Value-Added Matrix

```
            R & D  Marketing  Manufacturing  Finance   Human
           Niche  -------------- Thrust --------------- Cost

                               Growth
                                 |
            _____________________|______________________
            /        /           |/          /         /|
           /        /            |/         /         / |
Low       * ------ * ----------- * ------- * -------* / |    /
          |        |           Goal        |        |/  |   /
Med.      * ------ * ----------- * ------- * -------* /   Z
          |        |             |         |        |/  /
High      * ------ * ----------- * ------- * -------*  /
                                 |
                                 |              Geographical
                               Profit             Dimensions
```

As a comprehensive reflection of business practices, the value-added matrix is an effective tool for analyzing strategy content. A business strategy can be defined as a scheme to achieve competitive advantages by positioning the firm along the value-added matrix according to the internal capabilities available to the firm and the external context surrounding the firm. By applying the concept of value-added matrix to the factor-matching process, four elements of a strategy and four steps of matching the elements are identified (Pearce et al, 1988; Porter, 1980, 1985, 1990; Quinn et al,1988; Root, 1987):

(1) when a firm's corporate mission is matched by a compatible business goal for the firm to achieve in the marketplace, an operational direction is established as the **"strategic goal;"**

(2) when the strategic goal is matched by a compatible operational thrust for the firm to adopt in the competition, an operational focus is selected as the **"strategic thrust;"**

(3) when the strategic thrust is matched by a compatible operational capability internal to the firm, a configuration of activities in the value-added matrix along the horizontal, vertical and diagonal axes is constructed as the **"strategic posture;"** and

(4) when the strategic posture is matched by a compatible operational mechanisms available to the firm, a means of implementing the strategic posture in the competition is designed as the **"strategic mode."**

The content of a business strategy can be measured by the above four elements, and a business strategy can be formulated through the above four steps. As the four elements are closely interrelated and indispensable, they support and condition each other. It is also worth noting that the interrelationships among the four elements are directly linked to both the external and internal compatibilities of a strategy. A strategy's compatibility can be measured by examining the appropriateness of interrelations among the four elements.

C. Analytical Framework

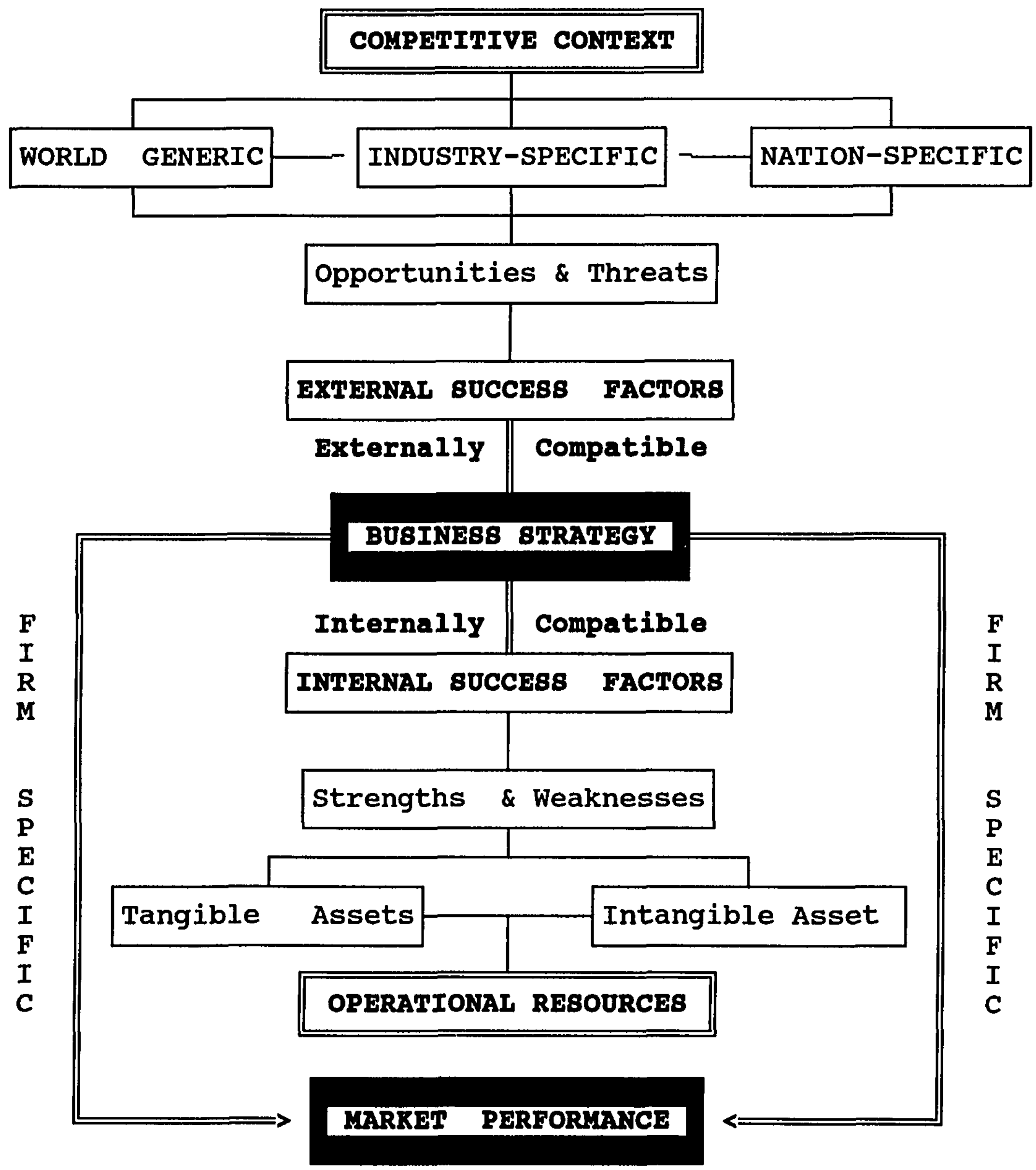
The above discussions lead to a conceptual framework. In this theoretical framework, <u>two types of research variable</u> are distinguished: some variables are firm-specific, internal to and controllable by firms to varying extent, while others are context-specific, external to and uncontrollable by firms. Since the purpose of this study is to explore the relationship between a firm's strategy and performance, the firm-specific variables are the focus of the analysis and serve as <u>dependent</u> and <u>independent</u> variables in various statistical tests, while the context-specific variables are mainly used as <u>control variables</u> (Emory, 1985).

The framework is constructed upon <u>four key concepts</u> and <u>five major relationships</u>. The key concepts are "external factor," "external compatibility," "internal factor," and "internal compatibility" that have been discussed in Part A of this section. The five major relationships correspond to the six subordinate research questions presented in Section 3.1 of this chapter.

The analytical framework is presented in Figure 3-2 in the following page:

Figure 3-2

ANALYTICAL FRAMEWORK



The four key concepts have already been discussed in Part A of this section. The following is a review of the five major relationships corresponding to the six subordinate research questions.

First, the relationship between competitive context and strategy content--the external compatibility--is explored to identify the external success factors by examining the world-generic, nation-specific and industry-specific variables. The external success factors are associated with opportunities and threats posed by the external competitive context at both the global and national levels.

Secondly, the relationship between operational capability and strategy content--the internal compatibility--is explored to identify the internal success factors by examining the resources internally available to the firm, with the external success factors as control variables. The internal success factors are associated with the strengths and weaknesses unique to a particular firm.

Thirdly, the relationship between strategic components--consistency and congruity--is tested to identify the strategy content in light of both external and internal success factors. Fourthly, the relationship between strategy and performance--strategy's impact on performance--is tested with the external factors being controlled for. Finally, the relationship between groups of firms--strategic groupings--is tested to confirm all the relationships mentioned above.

D. Time Frame

For the purpose of this study, the appropriate time period is the late 1980s. This period is the most recent and therefore is regarded as the most relevant to the future. Dramatic changes in the political, social and economic systems in Korea and Taiwan were witnessed in this period as the two NIEs started to move toward political democratization and economic liberalization. Further, this period marked one of the most dynamic periods in the evolution of the computer industry with the introduction of 32-bit microchips and with the emergence of competitors from NIEs in the global market.

3.3 MEASUREMENT OF RESEARCH VARIABLES

After the research variables have been identified, a way must be found to measure them. This research is meant not only to identify qualitatively but also to specify quantitatively the relationship between business strategy and market performance of indigenous computer firms from South Korea and Taiwan as they compete in the global marketplace. It will yield some important insights into the global strategy issue. The following section covers the issues associated with variable definition and measurement.

A. Method of Measurement

A major research measurement problem is that measuring tools are often crude, while variables to be measured are complex and abstract. If variables are abstract and measurement tools are not standardized, it is very likely that the measured results will not accurately reflect the true values. As most of the variables in this study are abstract and complex in nature, a procedure that can help measure the abstract variables more accurately must be carefully developed.

Questionnaire is an effective method for measuring essentially qualitative variables, especially when it is reinforced by bipolar rating scales used for respondents to judge variances in the major facets of a variable (Emory, 1985). Rating scales are now widely used in business research and generally deserve their popularity (Emory, 1985). The results obtained with careful use of rating scales compares favorably with alternative methods. They typically require less time, are interesting to use, and have a wider range of application than most other methods. In addition, they may be used with a large number of variables (Emory, 1985). For these reasons, questionnaire with bipolar rating scales has been chosen, along with personal interviews, as the data collecting tool for this study.

B. Measurement of Variables

Besides measurement method, variables must be defined in an operational manner so that they can be measured by using the questionnaire with bipolar rating scales. Discussed in the following section are the variables concerning the external competitive context, the internal capability, strategy content and market performance.

1. Variables Concerning Competitive Context:

Since the variables concerning competitive context are qualitative in nature, they should be dealt with in qualitative discussions and used only as controlling variables. The variables of the external competitive context are divided into three broad categories: (a) the generic world competitive environment; (b) the industry-specific competitive context, and (c) the nation-specific competitive context.

1a. The world competitive environment:

The content of a global strategy is conditioned by the world overall competitive situation though the impact may be remote or indirect. It is important to identify the key factors that shape the overall competitive context in the global market, especially those structural changes in the world economic system that bear significant implications for firm-specific strategies (Porter, 1990).

For that purpose, several broadly-defined variables are selected. Included among them are "globalization of the world economies," "shift of balance in the world economic power," "implications of technological development," and "role and behavior of MNCs."

1b. The industry-specific context:

It is obvious that the choice of competitive strategy depends largely on the characteristics of competition among firms within the same industry both at home and abroad, i.e., industry-specific competitive context. Since direct competition takes place within each individual industry, the industry-specific competitive context is much more important from the perspective of management.

In the course of the literature review, six broadly defined variables were identified as major factors in determining the industry-specific competitive context. These variables include (1) market segmentation and pattern of consumer demand; (2) nature of technological change; (3) production pattern; (4) distribution channel; (5) degree of globalization, and (6) industrial structure with respect to industrial concentration, barriers to entry and mobility, strategic groupings, and relationship with supporting industries (Casson, 1987; Caves, 1982; Davidson, 1982; Dunning, 1988; Porter, 1980, 1985, 1990; Root, 1987). Together these six variables determine the general level of rivalry and pattern of competition within an industry both at home and abroad, while each of them measures a unique aspect of the overall competition.

First, <u>market segmentation</u> and pattern of consumer demand measure the level and pattern of competition within each specified market segments. Also measured is the level of competition with respect to impact of growth and composition of market demand on firms with different product mix, where intense competition is expected to concentrate in the segments with higher growth and profit potentials. Finally, domestic demand pattern is expected to have certain impact on firms' choice of product mix for foreign markets (Porter, 1980, 1990);

Secondly, <u>pace or stage of technological development</u> measures the level and pattern of competition with respect to the impact of key technological innovations on the competitive behaviors of the firms with different technological capabilities. This can be quantified by applying the product life cycle model (Vernon, 1966) to classify the firms' key products into various categories according to the specific life cycles;

Thirdly, <u>production pattern</u> measures the level and pattern of competition with respect to manufacturing arrangement and cost structure. This variable can be further discussed, first, in terms of level of **vertical integration** and, secondly, in terms of percentage of revenues derived from **offshore production** including offshore sourcing, offshore joint venture and offshore wholly-owned subsidiaries (Dunning, 1988; Porter, 1990);

Fourthly, distribution channel measures the level and pattern of competition with respect to way and method of product marketing. This variable can be further discussed in terms of functions served by different channels so as to pinpoint their appropriateness for different products (Root, 1987);

Fifthly, degree of globalization measures the level of competition with respect to globalization of the industry, which can be further discussed in terms of the world market share controlled by MNCs that have high ratios of foreign sales over total sales (Davidson, 1982; Porter, 1986a); and

Finally, and the most important, the variables of industrial structure best measure the level and pattern of competition by somewhat embracing all the above-discussed variables to varying extent. Industrial structure refers to the relationships among institutions within an industry such as industrial concentration, firm number and size, barriers to entry, barriers to mobility and strategic groups, and interaction with supporting industries.

Industrial concentration can be discussed in terms of 4-firm, 10-firm and 20-firm sale concentration ratios (Scherer, 1980). Firm number and size can be measured by using total number of firms and average firm size in the industry. Barriers to entry can be measured by capital and technical requirement for a start-up to enter the business and number of new entrants compared with existing firms (Kono, 1984; Porter, 1980, 1990). Barriers to mobility can be measured by strategic groupings according to their product/market mix, brand name, R & D capability, scale of economies, pattern of production, marketing channel, and global presence (Porter, 1980, 1990).

Interaction with supporting industries measures the competition with respect to the industry's working relationship with those industries that supply key inputs or complementary products. For the computer industry, supporting industries include the semiconductor industry, the electronics industry, and the telecommunications industry. This variable can be discussed in terms of level of forward integration by semiconductor makers into the computer industry; the level of backward integration of computer makers into the semiconductor industry; the width of related diversification into the electronics and the telecommunications industries, and the international competitive position of these national industries (Porter, 1990).

To offer more information, the above six secondary variables are measured separately in each of the **three major product segments** of the microcomputer industry under this study, i.e., PCs, peripherals and components. Additionally, within each segment **three product segments** are identified: (1) state-of-the-art products as the "high-end," (2) mature and standardized products as the "low-end," and (3) those that fall in between as "middle-end," according to the technological sophistication of these products. [1]

1c. The nation-specific competitive context:

The following variables are meant to measure the nation-specific factors that would affect the formulation of competitive strategy by indigenous computer firms from South Korea and Taiwan. Based on the literature review, several variables are critical to a nation's competitive context--structural characteristics of the national economy, structural characteristics of the society, and availability of national resources for economic development (Dunning, 1988; Porter, 1986a, 1990; Root, 1987).

Structural characteristics of the national economy describe the level of economic development and market structure, both having a key bearing on the competitive context of a nation. The level of economic development can be measured by GNP per capita, economic structure, and technology-content of the exported products. Market structure can be measured by the levels of vertical integration, market concentration, and barriers to entry (Dunning, 1988; Porter, 1980, 1990).

Structural characteristics of the society describe the

[1] Most of the criteria discussed in this chapter are based upon U.S. Industrial Outlook 1990, U.S. Department of Commerce, 1990; Datamation 100, July 1990; Electronic Market Data Book, Electronic Industrial Association, 1990.

role of government in the society, the relationship between public and private sectors, the relationship between labor and management, and the cultural atmosphere toward commercial business. The role of government in the society can be measured by the level of political and economic control by the government. The relationship between business and government can be measured by evaluating public policy toward the industry. The relationship between labor and management can be measured by examining the bargaining power of labor unions. The cultural tradition toward business can be measured by the status of businessmen in the society (Dunning, 1988; Porter, 1980, 1990).

Availability of national resources for economic development describes the sources of international competitive advantages in terms of human and non-human factors, including cost of labor, quality of workforce, commitment to education, commitment to science and technology, cost of capital, and level of capital spending. The cost of labor can be measured by average hourly wages. The quality of workforce can be measured by the level of adult literacy; education level of blue-collar workers, and percentage of professionals with college degrees among the workforce. The commitment to education can be measured in terms of share of GNP spent on education. The commitment to science and technology can be measured by the share of GNP spent on R & D. The cost of Capital can be measured by the interest rate. The capital spending can be measured by the share of GNP spent on capital formation (Dunning, 1988; Porter, 1990). These variables are directly related to firms' internal capability as the availability of national resources offer the basis for the development of internal capabilities of the indigenous computer firms from South Korea and Taiwan.

2. Variables Concerning Internal Capability:

The term "internal capability" refers to the operating resources available to the firm for its global competition. Other terms such as "strategic asset" and "strategic expertise," "competitive capability," "management competence," or "competitive strength" all refer to the same thing (Quinn et al, 1988; Pearce et al, 1989).

Although many attempts have been made to identify and measure what is called "internal capability," a review of the literature shows that no consensus has ever been reached. Stevenson (1976) suggests that a firm's competitive capability should include organizational structure, managerial attitudes, technical capability, adequacy of the product line, and the organization's pattern of growth. Snow and Hrebiniak (1980) propose using ten broad functional measures to decide a firm's competitive capability. Dunning (1988) identifies a list of key firm-specific competitive variables, and Porter (1980, 1985, 1986a) extends that from a strategic perspective. Based on the literature reviewed, the following have been chosen as "internal capability" variables (as shown in Table 3-1) and have been measured in internal scales:

Table 3-1

Internal Capability
Expertise in marketing (Brand & channel);
Expertise in manufacturing (cost & quality);
Expertise in R & D (product & process);
Expertise in Financial Management (cost & source)
Expertise in human capital (training and loyalty)
Expertise in general management
Number of years in the related business
Firm size
Sales per employee
Capital per employee
R & D staff as percentage of total employees
R & D expense as percentage of total revenue

3. Variables Concerning Strategy Content:

As discussed in the conceptual framework, a factor-matching strategy has four interrelated components: (a) strategic posture, (b) strategic mode, (c) strategic thrust, and (d) strategic goal. The above variables have been measured in ordinal scales.

3a. Strategic Posture:

A firm's strategic posture in the global competition is reflected by the configuration of its major activities in terms of product/market mix along the matrix of value-added chains. This is measured by the firm's competitive activities within the scope of product lines (e.g., variety of products with shared technological features, diversification in terms of offering products with different technological features, vertical integration of components and end products), targeted market segments (e.g., type of customers in terms of their purchase power and preference), width of business operational coverage (e.g., functional coverage and scope of horizontal diversification), and geographical span (e.g., single foreign market, regional focus, and worldwide operation). Such a posture with a global dimension is vital to a firm competing in a global industry like the computer industry. Competitive advantages can only derive from a well-planned configuration of strategic actions along the matrix of value-added chains on the worldwide basis (Porter, 1986a, 1990). The strategic posture is measured by the variables listed in Table 3-2:

Table 3-2

Strategic Posture
Product mix
Market-segment mix
Operational coverage.
Geographic span

Here the coding systems of Standard Industry Classification and Standard Product Classification are applied to identify the product-mix, vertical integration and diversification according to their different technological features (Kono, 1984). Only those products that account for 5% or more of the firm's total annual sales are included as candidates for the product-mix analysis. Also used are the classification methods commonly applied by market research institutions to identify various market segments in the market-mix such as high-end, medium-end and low-end according to the level of product sophistication and sale prices. Only those segments that account for 5% or more of the firm's total annual sales are included as candidates for the market-mix analysis.

3b. Strategic Mode:

Global competition involves not only competitive assets and competitive posture but also methods or mechanisms by which those assets and posture are applied in the marketplace. The major mechanisms for a firm to choose for the global competition include international trade, foreign direct investment and global alliance. Some mechanisms are used to retain competitive advantages internally within the firm; some are used to get the best return of the assets despite possible benefits spilled over to others, while the others are aimed at sharing the complementary assets and/or posture with other firms while achieving certain common goals in the global competition. In this regard, the mechanisms can be classified into three broad groups (Davidson & McFeteridge, 1984; Root, 1987), as shown in Table 3-3:

Table 3-3

Strategic Mode

(1) Internalization:

Wholly-owned marketing facilities
Wholly-owned manufacturing facilities
Wholly-owned R & D facilities
New establishment
Acquisition;

(2) External market:

Export with own brand name
Licensing and other agreements
OEM sub-contracting

(3) Hybrid arrangement:

Joint venture in marketing
Joint venture in manufacturing
Joint venture in R & D

3c. Strategic Thrust:

All the above-discussed attributes of a competitive strategy need to work together for a common emphasis, or overriding thrust, in order for the strategy to function effectively and efficiently. Such a thrust is directly interrelated with the choice of the "strategic posture" and, through which, is closely linked to other choices such as those of "strategic mode" and "strategic goal."

Broadly defined, there are two general groups of options for firms to select from as its strategic thrust: (1) cost-efficiency, and (2) product-differentiation. It is selfevident that any competitive advantages, in the final analysis, can only derive from either providing similar products at lower cost--cost efficiency--or providing novel products at comparable cost--product differentiation--(Porter, 1986a). Yet, these two approaches are not mutually exclusive so that various combinations may be possible. For this study, the following variables have been selected:

Table 3-4

Strategic Thrust

(1) Different Product Offering:

New product development
Specialty product
Quality control
Customer service
Brand identification
Global coverage

(2) Cost efficiency:

Competitive pricing
Low cost of material
Cheap labor
Cheap financing
Process innovation
Employee productivity

3d. Strategic Goal:

The generic goals for firms' foreign operations fall into two related categories: (1) growth of sales, and (2) return on investment. Within the first category, there are such features as growth of export and increase in global market share, both bearing a relatively longer perspective. Within the second category there are also possible items, such as quarterly earnings, stock price, profit margins, etc., all aiming at short-term gains. Though the goals in the first category may bear bigger strategic implications, those in the second category are also very important for at least one reason: high profit margin is needed to support huge investment in R & D and advertising. To most firms, the question is not how to make a choice between the two goals but how to strike a balance between them. It has been decided to select "export growth" from the first category and "profit margin" from the second as the strategic goals.

4. Variables Concerning Market Performance:

Closely related to the strategic goal is the firm's market performance. As a strategy is meant to create certain advantages for better market performance, any evaluation of such a strategy must be done against the resultant performance in the marketplace. As a multi-faceted phenomenon, market performance cannot be properly measured by any single dimension, so multiple measurements in ratio scales are needed (Galbraith & Schendel, 1983; Hambrick, 1983a).

Since this study is concerned with the relationship between global strategy and market performance among the indigenous computer firms from South Korea and Taiwan, those performance variables related to the firms foreign operations should be measured. For that reason, the following two variables have been selected as the primary measurement of performances in the global marketplace (Dess & Davis, 1984; Hambrick, 1983a; Porter, 1986b, 1990; White, 1986):

(a) Export Growth: A firm's export growth, and

(b) Return on Foreign Sales: A firm's annual return on its sales overseas.

Two secondary variables have also been selected to help evaluate firms' market performances (Porter, 1990):

(c) Export ratio: share of export in a firm's total sales, and

(d) OEM ratio: share of export through OEM in a firm's total export.

3.4 SAMPLING DESIGN AND DATA COLLECTION

A. Sampling Design

1. Identifying population for the study:

For this study, the population includes the indigenous computer firms from South Korea and Taiwan (the term of firm refers to legal entities regardless of being parent or subsidiary) that meet the following three criteria: (1) producing microcomputer systems and/or peripherals; (2) being wholly owned by the native Koreans and Taiwanese, and (3) engaging in international operations through either export or foreign direct investment or both. Since this study is a comparative research, a sample must be drawn from two groups of firms based upon their national origin of ownership: (1) computer firms from South Korea, and (2) computer firms from Taiwan. For the purpose of this study, a "computer firm" is defined as one that has manufacturing facilities for computer products which account for over half of its total annual revenues.

2. Choosing the sample:

A sample has been drawn from two groups of firms, i.e., the indigenous computer firms from South Korea and the indigenous computer firms from Taiwan. As firms' size may have an impact on their strategic behaviors, it is deemed necessary to divide the computer firms into three categories: (1) "LARGE," (2) "MEDIUM" and (3) "SMALL," and, then, apply a stratified sampling method evenly to the three categories. Finally, a sample has been drawn according to the follows two decisions:

(1) 50 firms have been randomly sampled from each of the three stratified categories among the Taiwanese computer firms;

(2) 15 firms have been chosen from each of the three stratified categories among the Korean computer firms due to a smaller number of computer firms in South Korea.

B. Data Collection

In this study, both primary and secondary data have been collected. The primary data have been collected through mail questionnaires and personal interviews. The secondary data have been collected from two major resources: (1) annual reports and other publications from the sample firms, and (2) books, research papers, reports and other documents from government agencies and private associations. The secondary data have been mainly used for the study of nation-specific external context as well as the industry-specific context at the national level in both South Korea and Taiwan.

Some secondary data regarding firm-specific characteristics have also been collected to assist in exploring the relationship between strategy and performance. These data have been collected from trade journals, statistics reports, corporate newsletters, corporate annual reports and survey reports. The representative publications include <u>Analysis of Information Industry</u>; <u>Asian Business</u>; <u>Business Korea</u>; <u>Computer Guide Book of Korea</u>; <u>CompuTrade</u>; <u>Daewoo Newsletter</u>; <u>Information Industry Yearbook</u>; <u>Korea Electronics</u>; <u>Korea Electronics Directory and Catalog</u>; <u>Sumsung Newsletter</u>, and <u>Taiwan Computer</u> (for a detailed list of these publications, please refer to the bibliography attached at the end of this study).

A survey by mail questionnaires and personal interviews has been the main vehicle of collecting the primary data. A pre-test of the questionnaire was done to ensure its effectiveness and practicality. The formal questionnaires were mailed and faxed to both the sample firms' headquarters at home--in South Korea and Taiwan--and their subsidiaries in the U.S. After two rounds of mailing, about 400 questionnaires were sent to the same 200 sample firms, followed by phone calls to their U.S. subsidiaries, but no more than 20 questionnaires were returned, with a rate of 10%. Though faxes were followed to their headquarters at home and phone calls to their U.S. subsidiaries, more questionnaires came back, but the return rate was still below 15%. To solve the problem, the author went to the Fall 1990 Comdex Show at Las Vegas in November 1990, where he was able to interview the representatives of a number of sample firms. Fortunately, most of the sample firms came to the show, where the author was able to fill in many questionnaires through personal interviews and distributed more questionnaires. Some of them were mailed back after the show. As the result, the final sample size was 69 firms, with an overall return rate of about 35 percent.

Data have been collected in forms of interval and ratio scales respectively. Interval scales are appropriate for variables that are half judgmental and half factual (for example, many attitude scales are presumed to be interval), and they can be applied to all types of statistical methods (Emory, 1985). In this study, interval scales have been used to measure primarily those variables concerning the external competitive context and firm-specific business strategies. Ratio scales are appropriate for measuring factual variables (Emory, 1985). In this study, they have been primarily used to measure the market performances of those sample firms.

3.5 LIMITATIONS

Though many efforts are made to improve the reliability and validity of this study, some limitations remain. First, the relatively small sample of firms included in this study may lead to some reliability problems in the statistical analysis. Secondly, the instrument used in this study--questionnaire--may obtain biased data due to the respondents' subjectivity and their willingness to present accurate information. Thirdly, measurement of some variables appear to be still crude. Finally, generalization of the findings of this study may be limited due to the one-industry, two-country research design of this study and the relationship between strategy and performance may vary across different industries and beyond South Korea and Taiwan.

CHAPTER IV

GLOBAL COMPETITIVE CONTEXT

In the previous chapters, the literature concerning global strategic management was reviewed and the research methodology discussed. The following several chapters will explore and test the relationships between the external context, internal capability, strategy content and market performance, as presented by the conceptual framework. This chapter and the following chapter examine the relationship between the external context and strategy content and identify key external success factors for firms operating in the global computer market in general and indigenous computer firms from South Korea and Taiwan in particular.

4.1 The World Overall Competitive Context

As discussed previously, global strategies of computer firms are conditioned to a large extent by the world general environment in which they operate. At the broadest level, a set of economic, institutional and technological factors can be identified that have influenced the world overall competitive context in the 1980s and may continue to do so in the early 1990s.

Dramatic changes have taken place in the world economic structure in the past two decades. These changes are both complex and diverse, but most analyses would include the following: explosive advances of technology; rapid integration of the world economies, and the new balance of world economic power (Morgan, 1985; Ohmae, 1985; Simon, 1989; Enderwick, 1990). With these changes, the nature of global operations by computer firms has been dramatically transformed, especially for the MNCs from NIEs.

A. Technology and Global Economic Structure

Technological advances have resulted in major changes in the world economic structure and in the way businesses are conducted. In the modern era, advanced information technologies permit instantaneous communications across the globe; improved transportation accelerates worldwide flow of people and goods; new materials revolutionize sectors as diverse as agriculture and medicine, and new manufacturing techniques alter the long-standing patterns of production and employment (Muroyama & Stever, 1987). Due to these technological developments, the world economy has undergone dramatic structural changes. In response, MNCs are adjusting their strategies and governments are revising their policies to remain competitive in the global marketplace.

The world is in the throes of a technological revolution that differs from the periodic waves of technical change that have marked the progress of industrial society since its origin about 200 years ago. A shift is occurring in the socio-technological paradigm that underlies the current world economic structure (Colombo, 1987). The old paradigm favors mass production of essentially standardized products in ever-larger units; it emphasizes quantitative goals and asks for ever higher inputs of capital, energy, and raw materials to produce more without considering environmental impacts and conservation issues.

In contrast, the new paradigm emphasizes quality and diversification of customized products and processes. It also emphasizes the diffusion of small but highly productive units that rely on new technologies and are linked to a process of decentralization of production. Also emphasized is the adoption of process and product choices requiring far less energy and materials input and a greater awareness of the need to preserve natural environment (Colombo, 1987).

The present era of change is being brought about by a whole cluster of technologies, some of which have an exceptional capacity for horizontal diffusion in all sectors of the economy and an equally exceptional capacity for cross-fertilization. Key technologies in this category include microelectronics technologies, new material science, and biotechnologies (Colombo,1987).

Among these new technologies, information technology has the most important impact on the structural changes in the world economy. With the advance of information technology has come the information age and an industrial revolution. Studies show that the most prominent developments in production technology are derived from application of electronic miniaturization to the information processing (Ernst, 1983, 1985; Forestor, 1981; Henderson, 1989; Hoffman & Rush, 1983; Kaplinsky, 1984a). Advances in the information technologies have increased the power and range of applications of integrated circuits while simultaneously reducing their costs; with declining costs, more applications have come within the reach of a greater range of applications (Dorfman, 1987).

Due to the generic character of microelectronics regarding information processing, it can be introduced into almost all business operations (Henderson, 1989). With this flexibility, a widening array of industrial applications had emerged by the late 1970s (UNCTC, 1988). Computer-aided design (CAD) has become the principal automation technology for product design. In manufacturing, four key technologies have emerged: computer-numerical control (CNC) for machinery tools, industrial robots, automated transfer systems, and process-control systems for instantaneous monitoring and control of production (UNCTC, 1988). Further, many management functions have been affected by the development of office technologies (Ernst, 1985; Dorfman, 1987).

Like microprocessor, those automation technologies are also generic and highly flexible. They have found widespread applications in practically all economic sectors. More importantly, they exhibit significant technical and economic advantages over other technologies, and consistently yield declines in unit costs. Yet the most important feature of these technologies is that they are building blocks that can be combined to allow higher levels of integrated, systematic automation. System-level integration involves not only the automation of manufacturing sphere, but also integration of manufacturing with product design under the coordination of management. Studies show that the greatest benefit of integration in terms of high productivity is realized when CAD and manufacturing technologies are used to integrate all functions and divisions in a corporation than being applied to separate tasks or within a single department (Wheelwright, 1987). This ultimate merging of design, manufacturing and management functions has been termed as the "factory of the future."

Because of these changes, patterns of international business activities have been restructured to reflect greater specialization within an industry rather than among industries (Webster & Dunning, 1989). International intra-industry and intra-firm transactions tend to concentrate in high-tech sectors and in those complex manufactures such as automobiles and consumer electronics (UNCTC, 1988; Webster & Dunning, 1989). Most complex and technologically sophisticated goods, which normally require after-sale services, are marketed through wholesale subsidiaries of the exporting firms. In addition, much of intra-industry and intra-firm transaction is in parts and components of complex products (Casson, 1986; Webster & Dunning, 1989).

B. Globalization and Business Strategy

Technological advances have both created and mandated much greater interdependence among firms and nations as well. First, improved worldwide communication has linked different national markets into one, gigantic world market, where customers located in all countries may enjoy products and services from different regions of the world. Also, firms can obtain factors of production from a worldwide market to optimize their factor mix with respect to cost or productivity. Secondly, technological advances make it possible for firms to integrate their worldwide operations and maximize economic benefits by entering the most profitable markets, minimizing operating cost and risks through appropriate business arrangements, and responding timely to the changes in the market and moves of their competitors (Stein & Das, 1988). As a result, many traditionally domestic industries have been transformed into global ones, and all new industries are inherently as such (Colombo, 1987; Gray, 1983; Henderson, 1984).

Globalization of world economies has a big impact on the management of international operations. First, national governments act as promoters and players in the development of new industries and in the transformation of traditional ones. Second, trade frictions are becoming increasingly serious. Third, it is possible today for relatively small firms to operate globally through strategic alliances with partners with complementary assets. Fourth, even large firms are finding it hard to operate without appropriate business alliances due to higher business risks, a faster pace of innovations, and a more competitive marketplace. Fifth, firms traditionally only interested in domestic markets have now arrived on the global scene with financial and technological clout as well as governmental support to stake out their claim. Sixth, customers have become more knowledgeable and demanding, and with the geographic choices of suppliers widening, customers' bargaining power has increased. Seventh, the competitive environment has become more complex; management has to worry about the world events, government policies, trade barriers, and foreign cultures.

C. New Balance of Power and Global Economic Structure

A shift in the balance of economic power in the world has also been witnessed in the last two decades. These changes are so significant that MNCs have to rearrange their global operations accordingly. Among the changes, three broad trends are worth noting. The first is the shift of economic power from the United States to Japan and, to a lesser extent, to Western Europe, so "the triad power" has emerged (Ohmae, 1985). Along with the emergence of the triad power, three major trading blocs are emerging--North America, European Community and East Asia. These developments have a direct bearing on MNCs' global operations. MNCs are forced to be present directly in all three regions by various means. The main thrust of the entry modes is to form strategic alliances with local partners in the three regions (Berg et al, 1989).

The second trend is the boom in the Pacific Rim, especially in the Far East. It is even claimed that the gravity of world economy has been moving eastward from the Atlantic to the Pacific. This is illustrated by the rise of Japan as an economic superpower, the emergence of "four dragons" as export powerhouses and higher growth of trade across the Pacific than the Atlantic (Morgan, 1985; UNCTC, 1988). In 1988, 27.8% of the U.S. exports went to Asia, compared with 23.7% to Europe; while 40.9% of the U.S. imports came from Asia, only 19.3% came from Europe (U.S. Industrial Outlook, 1990).

The third trend is the emergence of NIEs as major players in the global marketplace. NIEs have been catching up very rapidly and many of them have become serious challengers in selected markets. By applying outward-oriented development policies, the "four dragons"--Hong Kong, Singapore, South Korea, and Taiwan--have achieved dramatic successes measured by their superior performances in economic development and global competitiveness (Balassa, 1981). MNCs based in the developing countries have also emerged as important competitors though they face numerous hurdles in the race for global supremacy (Sagafi-nejad, 1986; Wells, 1983; UNCTC, 1988).

D. Strategic Implications for MNCs

In response to the world economic environment featured by slow growth, increasing uncertainty, rapid technological change and rising protectionism in major markets, MNCs have to emphasize strategies for reducing costs of output rather than expanding output. This is related to the growing application of new production technologies based on microelectronics and organizational changes in production management. The shift from a "demand-driven" strategy to a "cost-driven" strategy helps explain much of the corporate restructuring that has characterized many industries in recent years (UNCTC, 1988). High technological requirements and growing uncertainty facing MNCs have led to a significant increase in various strategic alliances between firms that frequently unite competitors in joint ventures, licensing and other agreements.

Recently, many MNCs have begun pouring huge investments into flexible, automated manufacturing facilities at home to meet intensified competition with higher productivity, reliability and quality at lower costs (Colombo, 1987; O'Neill, 1985; UNCTC, 1988). This development makes low-wage countries less attractive as location for new investments and less favorable in the global competition (Drucker, 1989; Junne, 1987). This trend has become a serious problem for the developing countries, including NIEs.

E. Challenge to and Options for NIEs

Due to advances of technology, the whole world has been undergoing important structural changes. Mature sectors are being rejuvenated by grafting new technologies onto their processes and products, while new high-tech industries are being created. This pattern challenges the long-standing concepts of comparative advantage and ensuing division of international labor. In the new economic environment, availability of abundant, low-cost raw materials and a pool of cheap labor is no longer enough to ensure advantages to firms based in the developing countries; quality human capital plays a decisive role in the new global competition (Dahlman & Westphal, 1983; Drucker, 1988; Dunk & Beinhorn,1984;Mytelka,1987).

Faced with the rapid change in the world economy, NIEs such as South Korea and Taiwan are currently at a crossroads of a significant transition. Unlike the transition in the 1960s and 1970s that was characterized by industrialization, the current one is from an economy based upon labor-intensive industries to one backed-up by technology-intensive sectors.

Structural changes in the world economy pose serious challenges to firms worldwide, particularly those from developing countries, as much of the technological progress has a bias toward labor-saving processes and value-added products (Blanco, 1988). Whereas it was once possible for places like South Korea and Taiwan to successfully compete in the international market by entering low-level assembly-operations on the basis of low wages, it is no longer favorable to do so now (Drucker, 1989; Simon, 1989).

Technological advances, once largely responsible for the movement of American industry overseas, now enable some of those same industries (in whole or in part) to move back onshore (Simon, 1989). Increasing complexity and precision of new technologies make it necessary once again to fully integrate design, production, and testing in one location (Ballance & Sinclair, 1983; Junne, 1987; Mytelka, 1987). Advantages of production automation outweigh the disadvantages associated with operating in low-wage locations such as poor quality, coordination handicaps, country risk, and low productivity (Altshuler et al, 1984).

Aside from restructuring traditional industries, the developed countries are busy strengthening their leading position in high-tech areas upon which much of the future economic growth will depend (Henderson, 1989; Link, 1987;

Simon, 1989). The gap between the developed and developing economies are likely to widen unless the developing countries quickly establish their own high-tech industries. As high-tech products require not only sophisticated expertise to manufacture, but also expertise to design, to market and to service, the developing countries are put at further disadvantage.

To add to the complexity, it is no longer proper for firms to operate simply as domestic entities. Rather, they should be global in scope and orientation. Firms based in the developing countries have to speed up their efforts in the globalization process. It is at this stage that progress along the learning curve in the past will begin to pay off for NIEs if they have achieved substantial level of technological progress and have become important partners in the global networks of large MNCs (Rushing & Brown, 1983).

Some other factors also add to the necessity of structural transition for NIEs. As NIEs mature, problems of higher labor cost, slower economic growth, and lower profit begin eroding their traditional competitiveness in the world market (Liang & Liang, 1987; Harris, 1986). Further, capital-intensive industries in NIEs also face growing protectionism in the advanced countries that are compelled to preserve their traditional sectors (Harris, 1986). Environmental concerns and poor public services cannot be ignored any more. The governments of NIEs are forced to reconsider their policies to give priority to environmental preservation, consumer protection, and social welfare improvement (Bennett, 1987; Liang & Liang, 1987).

Because of these fundamental changes, both private sectors and governments in NIEs like South Korea and Taiwan have begun looking for new business strategies and public policies to recast their focus to move up into high-tech areas (Bennett, 1987; Liang & Liang, 1987). The development of high-tech and high value-added industries through private initiative and accelerated technology transfers from abroad has become the cornerstone of their hopes for a sustained growth.

One promising area for NIEs to upgrade to is the computer industry, a higher-end of microelectronics sector that some NIEs have proved capable of competing in the world market. There are some evidences favorable to the firms from NIEs. First, production of high-tech capital goods is found relatively labor-intensive (Clair, 1986); secondly, production flexibility in manufacturing processes implies that high production volumes are no longer needed for high productivity, so relatively small-sized firms in NIEs can enter global competition on a smaller scale (Blanco, 1988). Success of NIEs largely depends on whether they are able to formulate and implement effective public policies and business strategies.

4.2 Industry-Specific Context at the Global Level

An information age has come thanks to technological developments in computers and telecommunications to process and transmit information by microelectronics. Not only do information industries have a significant impact on everyday life but also serve as locomotive of growth in today's world economies. With increasingly universal conviction of their importance to a nation's economic future, information industries are always among the top priorities among the national economic endeavors. The focus of this study rests on the core of information industries--the computer industry.

A. Industry Overview

Since the world first computing machine came in the mid-1940s, the computer industry has been undergoing constant changes, from electron tubes in the 1950s to transistors in the 1960s, to integrated circuits (IC) in the 1970s and to very large system integration (VLSI) in the 1980s. Once the exclusive domain of the United States, the computer industry, especially its microcomputer segment, is rapidly evolving into a battleground of worldwide competition with an increasing number of non-U.S. global players, including some from NIEs like South Korea and Taiwan (Datamation 100, 1990).

Throughout the computer industry, the most dynamic and significant segment is microcomputers. Since its inception in the 1970s, the microcomputer industry has quickly become the largest segment of the overall computer industry. It is the driving force behind the development of several related industries, such as computer software, computer peripherals and computer chips; the influence of microcomputers has extended into industries such as telecommunications, factory and office automation and general information systems (Ferguson, 1990; Grove, 1990).

Microcomputers represent a critical step in the evolution of the overall computer industry--a shift of computing power from back-room mainframes and somewhat smaller minicomputers run by highly trained professional to personal boxes that almost anybody is able to use (Lewis, 1989). Microcomputers have reshaped the way professionals work and they have already become as an important and ubiquitous business tool as the telephone (Hillkirk, 1989; Lewis, 1989). Yet, their greatest potential to enhance productivity of individual users and organizations is just beginning to be realized (Grove, 1990; Hillkirk, 1989).

B. Overview of the Microcomputer Industry

Microcomputers are primarily single-user systems that are based on a single integrated circuit called a microprocessor as the central processing unit (CPU). The microcomputer industry consists of hardware and software suppliers of general-purpose machines that are often called "personal computers" (PCs) and professional high-performance machines that are called "workstation." Besides commercial applications, microcomputers can be used for home, educational and scientific applications.

In this study the microcomputer is defined as a system that:

--is designed primarily for use by only one person at any given time;

--may offer single or multi-tasking capabilities;

--is based on microprocessor and can be programmed in a high-level language;

--can be attached to peripheral devices.

The microcomputer industry has evolved from a single-product and single-application business into an industry of three major system configurations--workstation, desktop PC and laptop PC--and four major applications segments--business, science, home, education (US Department of Commerce, 1986). Throughout the evolution, developments in hardware and software have affected systems all across the technological spectrum and have resulted in increasing capabilities and enhanced utility (Grove, 1990).

The microcomputer industry has enjoyed a healthy growth over an extended period of time notwithstanding temporary cutbacks. The technology-driven industry can resort to R & D to roll out new products and, along with them, new markets. The most visible effect of this continued process of technological change has been the dramatic drop in unit cost, leading to falling prices on most of the products within the computer industry. Coupled with reduction in unit costs, there has been a vast improvement in technical performance of the products in terms of speed, capability and reliability (Grove, 1990).

Yet the industry does not stand out as a particularly profitable one, a disappointing outcome that, up to a point, is of the industry's own making. The intense inter-firm competition consonant with rapid industrial growth has served to reduce profit margins. This rapid growth, in turn, is symptomatic of a key underlying strategic factor besetting the industry--the experience of a rising tempo of technological change and the consequent effects on the life-cycle of products in their evolution process (Todd, 1990). This does not mean that specific firms equally undergo intermittent "renewal." Like firms in any other industries, their chances of weathering those technological and market upheavals depend, for the most part, on their specific strategic positions relative to their rivals within the industry (Porter, 1980).

Until the mid-1980s, competition in the world microcomputer market with the U.S.-based firms had been minimal. Yet, in the past few years a number of emerging trends have resulted in an intensified global competition and erosion of the U.S.'s dominance:

--emergence of a few de facto systems standards and increasing component and sub-system standardization;

--improvements in price/performance resulting in the growing price competition;

--erosion of U.S.'s market share due to intensified global competition resulted from standardized low-priced "clones;"

--involvement of government in the industry development;

--adoption of strategies in component outsourcing and offshore assembly or automation to reduce labor cost; and

--advance of innovation and upgrading despite signs of a maturing industry.

In the following sections, specific aspects of the external context of the microcomputer industry are examined, including market segments, technological advance, production pattern, marketing channel, globalization, and industrial structure.

C. Market Segmentation

The microcomputer industry has maintained the fastest growth and has become the largest segment of the overall computer market. Although its growth has slowed down in recent years, microcomputer industry is still growing more than 10% a year (Lewis, 1989). For instance, the U.S. market for all types of PCs, including imports, grew 14% in 1989, and more than half of Europe's and Japan's computer shipments in 1989 were PCs (U.S. Industrial Outlook, 1990). PCs accounted for 14.6% of the global computer market in 1989, plus 2.7% for workstations and 21.9% for peripherals--mainly for microcomputers--while the shares of mainframes and minicomputers were only 11% and 9% respectively (Datamation 100, 1990).

The market for microcomputers can be segmented by six categories. They are: (1) end-user applications; (2) level of technological sophistication; (3) compatibility among different brands; (4) degree of portability; (5) component devices, and (6) geographical locations (US Department of Commerce, 1986; Pearce et al, 1989).

1. End-user Application:

In terms of end-user, the market can be divided into four major application segments: business segment; home segment; educational segment, and scientific segment (U.S. Department of Commerce, 1986). The business segment represents the commercial applications of microcomputers and accounts for more than two-thirds of the microcomputer market. Besides size, it attracts most computer makers because of high profit potentials and large number of computers sold per institution (Lewis, 1989). Due to high profit and intense competition, most innovations occur in this segment (U.S. Department of

Commerce, 1986). As it is so important to the computer industry, this segment is the focus of this study.

The home segment is comprised of those microcomputers used in the home. With rising computer literacy and wide availability of quality computers at lower price, plus the growing need to work at home, number and sophistication level of computers sold to the home segment is expected to increase (U.S. Department of Commerce, 1986). The educational segment includes all microcomputers sold to educational institutions for classroom use. Even though this segment yields lower margins than the business segment, the early contact with the user is believed to generate long-term brand loyalty. As a result, most manufacturers give this segment special attention (U.S. Department of Commerce, 1986). They charge lower prices, and often donate equipment and software. This marketing strategy also helps stimulate derived demand for use at home. The scientific segment consists of microcomputers used in labs for scientific research. For this segment, powerful workstations are used (U.S. Department of Commerce,1986).

2. Technological sophistication:

Since differentiation between types of microcomputers is usually based on memory capacity, bits per word, input/output speed, price, range of peripherals and other technical specifications, the level of technological sophistication may be used to distinguish major microcomputer market segments. According to the category of spectrum in technical sophistication, which bears critical implications for firm-specific strategies, microcomputers can be divided into three major groups: the state-of-the-art computers, commodity-like computers, and those in-between (U.S. Department of Commerce,1986).

Such a distinction is very critical due to the strategic implications. Though microcomputers span a wide technological spectrum and technology diversification is further segmenting the market, the worldwide microcomputer industry exhibits maturation at the low end and rapid technical advance at the higher end (U.S. Industrial Outlook, 1990). Mature products are based upon standardized components and subsystems utilizing well-accepted interface standards and microprocessor architecture, while start-of-the-art machines employ the most up-to-date microprocessor architecture, customized integrated circuits, high-performance sub-systems and peripherals. Other microcomputers are neither mature nor up-to-date but have added features to reduce the gap between start-of-the-art products and commodity-like products. Microcomputers for business applications are increasingly concentrating on two major groups of products: (a) the state-of-the-art group in the case of the high-end IBM PS/2 family using new Intel 80386 or 80486 microprocessors and Apple's Macintosh family using Motorola 68000-based microprocessor, and (b) the rapidly expanding middle-level group--those improved IBM-PC/AT clones based on the 80286 chip plus added new features.

3. Compatibility:

As for the third category--compatibility--the microcomputer market can be characterized by IBM-compatible and non-IBM-compatible. The compatible include a wide range of products from inexpensive "clones" to sophisticated, high-performing machines that do everything an IBM machine can do and often better. Though a few vendors elect to offer microcomputers that are not compatible with the IBM standard--such as the Apple, IBM-compatible computers are still the most popular for business applications (U.S. Department of Commerce, 1986; Lewis, 1989).

4. Portability:

With respect to the fourth category, namely, portability, microcomputers can be categorized into desktops and laptops according to their basic size/weight. Desktops are those that are designed to be primarily stationary machines, which offer the most storage capacity and the largest screens and, therefore, the heaviest and least portable. They account for the largest portion of microcomputer sales. Laptops, also including the notebook, pen-pad and palm-sized computers, offer convenience of portability by virtue of their small size, light weight and battery-backed power supply. They are designed for frequent travelers to use as on-the-road extensions of their office systems. Recent technological breakthroughs in display and disk storage have made the portable the fastest growing segment in the computer industry.

5. Component device:

The fifth category includes the market from the perspective of key parts with which microcomputer systems are built: (1) internal parts like microprocessor and memory chip, and (2) external parts (often called "peripherals") such as disk drive, keyboard, monitor, printer, modem, scanner, and mice. According to Datamation 100, while PC systems account for 14.6% and workstations, 2.7%, of the worldwide information technology market, the biggest segment is the peripherals, accounting for 21.9% of the market (Datamation 100, 1990). Among all the peripherals, monitors/terminals, disk drives and printers are the most important sub-segments.

6. Geographical location:

The sixth category analyzes the microcomputer market from a perspective of geographical locations. From this perspective, the microcomputer market is classified into the following principal markets: the U.S., Japan, Western Europe, NIEs and other developing countries. North America accounted for 39% of the world's spending on computers last year, Europe, 32%, Asia, 26%, and the rest accounted for 3%; on the supply side, the U.S. makers enjoyed 60% of the world market share, while the Japanese took 20%, the European, 15%, and the Asian NIEs had the rest (Datamation 100, 1990). Among the Asian NIEs, South Korea and Taiwan both spend over $1 billion on computers and export over $1 billion worth of computers worldwide (U.S. Industrial Outlook, 1990).

One striking change in the U.S. microcomputer industry has been the penetration by foreign competitors. Although a substantial portion of OEM systems and subsystems has always been made abroad, the number of foreign label computers sold in the U.S. has grown significantly. According to Dataquest, the unit share of these systems has grown from 2% in 1983 to an estimated 19% in 1989, with most of the growth coming from South Korea and Taiwan (U.S. Industrial Outlook, 1990). As the U.S. market is the largest in the world and the major single export market for South Korea and Taiwan, a focus on the U.S. market is significant for this study.

D. Technological Advance and Product Life Cycle

Until very recently the microcomputer industry had almost been completely technology-driven. Competition had centered around technological innovations and product upgrades. With strong R & D skills and entrepreneurial spirit, U.S. firms had been able to set the technology standards, and thereby led the world in both production and market share. Yet, as the basic technologies for microcomputers become increasingly standard, the U.S. is beginning to lose some of its competitive advantages to foreign rivals, especially in the low-end segments. The shift of emphasis from technological development to market-driven factors--price, quality, compatibility and performance--has opened the market to foreign producers, especially those from the Far East who are well-known as good manufacturers of standard products at greatly reduced costs. In response to this trend, U.S. firms have found that it is profitable to either source parts and components from foreign companies, or, in many cases, to move their entire manufacturing plants offshore (U.S. Industrial Outlook, 1990).

Technological changes in the form of new standards and new products present both opportunities and threats for firms in the microcomputer industry (U.S. Department of Commerce, 1986). New technologies and new product standards would weed out those firms that fail to respond swiftly, but offer a chance to those firms that are better prepared for the change. When IBM introduced its PS/2 line and a new marketing emphasis on connectivity in the corporate arena, those IBM-compatible makers were threatened. New products under development by these firms had to be modified to remain compatible.

The central element in the evolution of microcomputer technology has been the microprocessor (U.S. Department of Commerce, 1986). The evolution from 8-bit to 16-bit, and now to 32-bit microprocessors, has resulted in increased computing power at lower costs. Developments in operation a systems software as well as applications software for spreadsheet, database, graphics, financial analysis and other key application areas are also major factors driving the growth of microcomputer industry (Datamation 100, 1990).

The life-cycle of the microcomputer has been shortening as the result of rapid advance of chip-making technologies. Compared with 1970s, 1980s witnessed a much faster pace in the development of microchips and microcomputer systems, and the rate of change in processing power is going to accelerate in the 1990s (Lyons, 1990). According to Intel, by 1993 a 586 chip is expected to come out with as many as 5 million transistors (about four times the 1.2 million on the 80486 chip), and the 686 chip will have 25 million transistors when it will appear by 1995; by the end of this century, the 786 chip will come into being, containing 100 million transistors running at 250 MHZ and pushing 2,000 million instructions per second (Lyons, 1990). The increase in raw computing power will make possible major improvements in user interfaces. Speech and handwriting recognition, also full-motion video, will become common by the second half of this decade. By 1993 simple PCs will be built with a single chip, compared with 10 chips in 1990, 70 chips in 1987 and 120 in 1984 (Lyons, 1990).

Because of rapid advance in the underlying technologies, the life cycle of microcomputers has been shortening. Currently, the life cycle of PCs is about two years--compared with the five-year cycle a few years ago--and new products are introduced every eight to twelve months (Datamation 100, 1990; Lyons, 1990). This time compression demonstrates how quickly technology at the PC level has been evolving.

Further, diffusion of technology in the microcomputer industry has also been accelerating. The lead-time between the introduction of a new microcomputer product and the appearance of a successful imitation or rival product has decreased from a year in the early 1980s to today's few weeks (Stevens, 1989). Such a rapid diffusion grants no firm a long-standing technology monopoly and thus intensifies the competition. It can be concluded that the microcomputer industry is a highly innovative and dynamic business.

E. Production Pattern

1. Production process:

Microcomputer manufacturers primarily produce two major groups of products: (1) peripherals, and (2) central systems. Major microcomputer peripherals include: (1) data entry device such as keyboard and mouse or scanner; (2) disk drives for storing data and programs, and (3) monitor for data display.

A microcomputer's central system is generally made of a printed circuit board--"motherboard"--that contains a microprocessor, several memory chips, and some auxiliary boards for input/output functions. A microcomputer system consists of a central system and a few major peripherals.

A complete production process for microcomputer systems involves the following five steps: (1) product design; (2) manufacturing of parts; (3) sub-assembly into major components; (4) final assembly into systems, and (5) testing (U.S. Department of Commerce, 1986). In practice, most of the microcomputer makers take on only part of the whole process (Pearce et al, 1989). Many choose to design the system, source nearly all components externally from independent suppliers, and assemble and label the final systems. Others concentrate on manufacturing peripherals or components for system vendors who assemble and test the final systems. Still others vertically integrate part of the process, but very few take on all the jobs by themselves because of cost and risk (Pearce et al, 1989). Even IBM, with its great potential for vertical integration, has chosen to rely on outside vendors for nearly all of the components of its PCs, and approximately 73% of the manufacturing cost of the IBM PC comes from components sourced from Asia (Pearce et al, 1989). Most of the major microcomputer vendors in the U.S. only make motherboards in house and outsource all other parts and peripherals from independent suppliers (Pearce et al, 1989).

Though the NIEs in Asia supply most of the major components, they have to rely on many inputs from Japan, and even highly integrated Japanese vendors have to import microchips and hard disk drives from abroad (Asian Computers' 91, 1990). In sum, the microcomputer industry is not highly integrated, but the level of dependence on off-shore sourcing varies across different vendors.

2. Production arrangement:

Common production arrangements for microcomputer manufacturers include four major ones. They are (1) offshore sourcing and assembly through an OEM sub-contracting agreement or foreign affiliates in low-cost locations for import to the home market or export to a third country; (2) onshore production at home for export or at the host country for its domestic markets--based on cheap labor in developing countries and factory automation in developed countries; (3) vertical integration, and (4) international alliances (Pearce et al, 1989; U.S. Department of Commerce, 1986; UNCTC, 1988).

One increasingly prevalent phenomenon in the microcomputer industry in the 1980s was the overseas movement of manufacturers from the advanced countries, particularly the U.S. (U.S. Department of Commerce, 1986; Datamation 100, 1990). These offshore migrations were primarily searching for lower manufacturing and material costs to improve their competitive positions in both domestic and world markets. The lure of foreign production includes lower wages, highly productive workers, tax and investment incentives provided by the host governments, and easy access to overseas markets and supply sources. Such an offshore operation may take several forms: (1) sourcing foreign parts and components to be assembled back at home; (2) importing finished products through retail chains and OEM for sale at home; (3) offshore assembly for finished products to be shipped back home, sold in the host market, or exported to a third country, and (4) locating complete manufacturing facilities abroad in the form of subsidiaries or joint ventures for either sales in the host market or back at home (U.S. Department of Commerce, 1986).

The most frequent sites for offshore sourcing of both parts and finished products and for export-oriented offshore production are both in the Far East, particularly in Hong Kong, Singapore, Taiwan, South Korea, and Malaysia (U.S. Department of Commerce, 1986). In these places MNCs have been using new forms of contractual arrangements with local suppliers that are far more flexible and complex than the conventional approach of setting up foreign affiliates. Those arrangements have been feasible, however, only because the domestic environment of industrial competition in these countries has created a body of indigenous manufacturers who can be relied upon--just as any directly managed affiliates--to meet quality standards, delivery dates and agreed prices

((UNCTC, 1988). Two types of arrangements are of particular importance: sub-contracting by the large retail chains and by the original equipment manufacturers.

Offshore sourcing and export-oriented offshore production tend to be associated with low-end, commodity-like parts and products rather than the top-end, sophisticated machines. Most of the firms go offshore only to reduce manufacturing cost for standard products whose profit margins are at the razor's edge (U.S. Department of Commerce, 1986). Even in the case of producing for the local market through their foreign subsidiaries to break trade barriers, many firms still prefer to keep most of their R & D functions and the state-of-the-art technologies at home (U.S. Department of Commerce, 1986). On the other hand, the offshore production aimed at selling products in the host country is usually associated with the high-and-medium-end products and the advanced economies, as this type of offshore production is necessitated by the existence of prohibitive trade barriers.

Rather than move offshore, some firms remain competitive by choosing to automate their domestic operations (U.S. Department of Commerce, 1986). Automation allows them to counteract the lower wage rates available overseas by increasing productivity. The benefits of automation--when combined with new production management--also include greater yields in output, faster delivery times, material cost savings, and more effective quality control (UNCTC, 1988).

Another effective production arrangement is vertical integration of components and finished products. Such an integration means a shift of added-value away from the manufacturers of components to the manufacturers of final products themselves, or vice versa. As finished products are often part of a system, suppliers of products are led to integrate backward into the supply of components and forward into becoming suppliers of complete systems (UNCTC, 1988).

System vendors differ in their level of vertical integration according to their degree of dependency on proprietary product and process technologies (Pearce et al, 1989). When the dependency is high, vendors tend to integrate vertically so as to keep whole or major part of their production process in house to protect know-how. As the state-of-the-art microcomputer systems are both technology-intensive and capital-intensive, only a limited number of firms are able to follow that strategy. Integrated firms often make their initial production at home, and then move the production to their offshore subsidiaries when the products mature.

If the dependency is moderate, vendors would focus on product design, final assembly of components sourced from outside suppliers, and testing of the finished products. This practice results in a low level of vertical integration. As these vendors just imitate the industry leaders' innovations and they are usually short of capital, it is feasible and desirable for them to source parts from independent suppliers.

In the case of low dependency, the vendors may choose either of the above two approaches. As less sophisticated microcomputers are technologically mature and standardized, they can be assembled from "off-the-shelf" parts by semi-skilled or even unskilled workers, tested manually, and frequently combined with operating system software purchased from an outside vendor. On the one hand, these standard products lend themselves to mass-production assembly in the low-waged off-shore areas. With many new foreign entrants appearing, competition in this rapidly growing sector is steadily increasing.

Few peripherals suppliers are large and diversified, so they are relatively more vulnerable to market changes (Pearce et al, 1989). As the industry is technology-driven, rapid obsolescence inhibits most of the peripheral vendors from committing large investment in R & D for the long-term technological leadership. To remain flexible, most license their innovations to other suppliers. Though this practice provides them with royalties and helps to assure them that their technology will be the standard, it further weakens the power of a single peripheral supplier to bargain with system vendors. Although suppliers do not hold much power, they can cause problems for system makers if they fail to deliver on time or offer quality goods (Pearce et al, 1990). To solve this problem, some system makers have integrated their manufacturing process to a certain extent.

With rising investment costs and shortening product life cycles, business risks are increasing. An effective way to reduce the risks is to form international alliances with other firms. Many large computer makers have entered a variety of alliances to assimilate rapidly needed technologies, share huge R & D costs, spread risks and gain access to foreign markets (Porter, 1986; UNCTC, 1988).

One form of alliances is the acquisition of an existing firm with certain technological and marketing edges, but various form of cooperations short of outright merger and acquisition involving two or more firms from different countries have become increasingly popular in recent years. They can even involve some equity participation, usually with a specific objective (UNCTC, 1988). Other arrangements such as international joint ventures, OEM contracts, cross-licensing and marketing contracts are common as well. For the indigenous microcomputer makers in developing countries, joint ventures, licensing agreements, and OEM contracts are among the only few possible ways for them to gain access to needed technologies, marketing know-how, management expertise and capital.

3. Cost structure:

Microcomputers generally command lower margins than bigger machines. While the gross margins on mainframes and minicomputers can exceed 60%, gross margins on microcomputers are close to 40% (Lewis, 1989), and the returns on sales for microcomputers normally range from 5% to 10% (Datamation 100, 1990). As the global competition is increasingly intense, pressures are mounting on the already thin profit margins for microcomputer makers.

Currently, the typical cost structure in terms of percentage of sales for a microcomputer vendor is as follows:

Table 4-1

Component & Assembly	50-60%
R & D expenditure	5-10%
Marketing expense	10-20%
Administrative	5-10%

Source: Based on the annual reports of some major microcomputer makers.

The cost of materials (components, subassemblies and parts) is a major factor in the microcomputer business. The material cost for a typical PC, plus its assembly, represents roughly one-third of the final sale price. Advertising, marketing, shipping, overhead and profits account for the remaining portion. Materials cost as the percentage of the sale price increases as the machine moves down its price spectrum, thus leaving less margin for other costs and profits

(U.S. Department of Commerce, 1986).

The cost of components and parts is declining as manufacturing technology improves and economies of scale are realized. Intense competition also forces system vendors to cut prices. In terms of processing one million instructions per second, the cost has fallen from $15,000 in 1981 to around $500 today, and is expected to reach $140 in 1993 (Lewis, 1989).

To keep up with the technological race and to meet the demands of the marketplace, computer firms spend billions of dollars each year on R & D, accounting for around 10% of their annual revenues, among the top of the heaviest spenders in all industrial sectors (Business Week Innovation, 1989, 1990; Datamation 100, 1990). High levels of R & D are necessary for those few top-tier, high-end vendors who continue to seek major evolutionary advances in hardware and software. The vast majority of microcomputer makers still have to either follow the top-tier makers for new products or compete in the commodity-like products.

F. Distribution Channels

As distribution plays an increasingly important role in the highly competitive microcomputer market and constitutes up to one-third of the final sales price of a microcomputer, the choice of distribution channels is one of the most critical decisions facing microcomputer firms today. To take full advantage of promising markets, corporate planners must carefully determine the best mix of distribution methods for their products and define the nature of their product-dealer relationships (Pearce et al, 1989; U.S. Department of Commerce, 1986).

Though the distribution has been termed a major bottleneck in the industry, distribution channels have become more diverse. These channels include a variety of mail order vendors and telemarketers, mass merchant chains, specialty stores, wholesale distributors, OEM and value-added dealers, and direct sales forces (Pearce et al, 1989).

Increased user familiarity with and knowledge of various manufacturers' machines has given rise to a unique channel that would have been considered unacceptable a few years ago--the mail order retail. The emergence of this channel is also indicative of the level of confidence the public has in microcomputers as there is little service or support provided by the mail order merchants. The primary appeal of mail-order buying for the sophisticated buyer is the high-quality "no-brand" product at a bargain price.

Another channel of distribution that has opened up because of growing user sophistication is mass merchandising through such chains as Sears and K-Mart. About 5% of revenues but over 40% of units of microcomputers sales in the U.S. come from large chain departments and discount stores. They are mostly low-cost home computers selling for around $1,000. The mass merchandiser's economic advantage in selling these high volume commodity-like microcomputers is the limited amount of technical support required by the consumers. Mass merchandisers can reach a wide range of the general consumer market because of the breadth of their geographical coverage and sales network and their use of aggressive pricing, advertising and promotion practices to spur sales.

Moving up the price spectrum, most business and high-end home microcomputers are sold through computer specialty stores, including chains, independents and manufacturers' outlets. While constituting around 30% of unit sales, these channels represent almost 50% of the dollar value in the U.S. market. Over the years they have accounted for as much as 60% of IBM's and Compaq's sales (Pearce et al, 1989). Specialty chain retailers are an important arm of the retail system. These stores usually carry brand name microcomputers from several manufacturers, as well as peripherals and software. Businessland, and Computerland are the largest in the U.S. Many of these outlets are independently owned, while others are extensions of the manufacturers, such as Tandy's Radio Shack retail stores. These outlets supplement manufacturer's marketing efforts and offer training. They also offer a broad range of computer machines, add-ons and supplies.

Wholesale distributors take title to a large quantity of products for reselling to smaller distributors, retail outlets, value-added resellers, mail order houses and directly to end-users. In the past, this channel was the one most widely used by microcomputer vendors. Yet, producers and retailers are beginning to question the worth of the middleman markup (U.S. Department of Commerce, 1986).

A variant in the retail channel is the value-added reseller (VAR). These specialized retailers purchase computer components, assemble and enhance the products, and resell the whole package to a specific customer, usually those in market niches such as engineering, financial management, manufacturing and medical services. VARs are problem solvers who often enhance systems with software, technical support, peripherals and maintenance options to fit a customer's unique needs. VARs also offer general purpose manufacturing, business and accounting systems that are applicable to a number of different professions and industries. Most VAR activity is targeted at the high end of the market as resellers try to exploit new applications and previously untapped market niches. They usually carry "no-brand" items. This channel represents one of the fastest-growing marketing channels for microcomputers (Pearce et al, 1989).

Another variant is the original equipment manufacturing (OEM). The OEM market includes firms that take title to microcomputers from the original equipment manufacturers for reselling under their brand names. These firms may add value to a system before reselling by adding or modifying hardware and/or including tailored software packages. Many firms have used this channel extensively to penetrate foreign markets. This channel is also used by many firms seeking to add a low cost system to round out their product line, or those wanting to OEM a part of their system such as printers, monitors or disk drives (Pearce et al, 1989).

Direct sale is a major channel that is used primarily by large manufacturers for sales to volume customers. A direct sales force offers many support services that include training customers and keep them informed of new developments in the product line. Only large firms can afford to maintain and support a direct sales force and to service large customers. The market share of direct sales has increased over the past few years as firms mimic IBM's success in selling PCs to the corporate community (U.S. Department of Commerce, 1986).

G. Globalization of Microcomputer Industry

The microcomputer industry came into being when the world economy was transformed into an integrated global market, so the industry inherited a global nature that has been reinforced with its further development. An illustration of that is the share of foreign sales among the top computer firms:

Table 4-2

Top Computer Vendors' Foreign Revenues

Vendors from North America	Revenues from Other Regions
IBM	57%
Apple	36%
Compaq	46%
Unisys	49%
HP	52%
Digital	54%
Sun	47%
Tandy	10%
Commodore	73%
Intel	35%
Group Average	**46%**
Vendors from Europe	Revenues from Other Regions
Groupe Bull	37%
Olivetti	19%
Amstrad	16%
NV Philips	27%
Nokia	1%
Siemens	10%
Nixdorf	7%
STC	18%
Memorex	67%
Alcatel	18%
Group Average	**22%**
Vendors from Asia	Revenues from Other Regions
NEC	10%
Toshiba	14%
Matsushita	20%
Seiko-Epson	49%
Fujitsu	12%
Hitachi	14%
C. Itoh	40%
Acer	71%
Ricoh	39%
Mitsubishi	21%
Mitac	39%
Group Average	**33%**
GRANT TOTAL AVERAGE	**34%**
SHARE OF THE WORLD MARKET	**72%**

Source: Datamation 100, 1990.

From the above discussion on market segmentation, technological advance, offshore production, and in the upcoming analysis of industrial structure, it can be clearly seen that the microcomputer industry is of a global nature and that any firms in such an industry must take this factor into consideration when formulating their competitive strategy. Key points to be considered for the strategy include which market segment--with respect to product line and geographical location--to penetrate and how to enter it; where to locate the manufacturing facilities and how to source key components and parts; and where to locate the R & D facilities and how to strengthen its technological capability.

H. Industrial structure

Industrial structure is a facet of the competitive context that is responsible for molding the strategic choices by the firms with respect to their individually-perceived technological and marketing opportunities and threats imposed by the competitive context. The underlying structure of the microcomputer industry is characterized by the interplay and rivalry among existing vendors, potential entries, and component suppliers.

Though small, highly innovative domestic firms were critical to the early development of the microcomputer industry and they continue to be important sources of new products and technologies, a few large MNCs now dominate the principal segments of the industry. The 4-firm and the 10-firm concentration ratios among the Datamation 100--that account for about 80% of the world computer market--were 37.8% and 55% respectively in 1989 (Datamation 100, 1990). The technological and commercial decisions of these firms essentially define the current competitive context and the future direction of the technology as well (UNCTC, 1988).

1. Geographical Distribution of Rivalry:

Rivalry among existing competitors in the microcomputer industry is very intense as reflected by the competition's global scale, strategic groupings, and industrial concentration. As all major microcomputer suppliers are global players with a strong commitment to export, overseas direct investment, and offshore sourcing, the competition in the microcomputer industry is characterized by its worldwide scale. Among the Datamation 100 information technology suppliers, 60 are from the United States, 20 from Western Europe, 16 from Japan, 2 from Canada and 2 from Taiwan; among the top 20, 9 are based in the U.S., 6 are based in Japan, and 5 are based in West Europe; among the world top 10 PC producers, 5 are from the U.S., 3 from Japan, and 2 from West Europe; among the world top 10 workstation suppliers, 6 are from the U.S., 3 from Japan, and 1 from West Europe; among the world top 10 peripherals suppliers, 6 are from the U.S., 4 from Japan, and none from West Europe (Datamation 100, 1990). These numbers reflect a general pattern of global competition: the worldwide leading position of the U.S.-based suppliers, the formidable challenge from the Japanese makers, the difficult condition of the European vendors, and the rapid emergence of indigenous players from some NIEs, particularly those from South Korea and Taiwan.

1a. The U.S. computer firms:

The U.S.-based computer makers hold leading positions in all segments of the global market. In the PC market, the Big Three--IBM, Apply and Compaq--rank No.1, No.2 and No.4, respectively, among the world PC makers, jointly accounting for about 40 percent of the world PC market; in the workstation market, the top three are all U.S. firms, Sun Microsystems, Digital Equipment and Hewlett-Packard, jointly accounting for more than half the world market; this is also the case in the segments of minicomputer, the mainframe, software, service, and, to a less extent, the peripheral (Datamation 100, 1990). In the area of microprocessors, Intel and Motorola are clearly the world leaders; in the area of software for microcomputers, the world leader is Microsoft. However, the U.S. leading position is eroded by the foreign competition, especially the challenge from Japan.

1b. Japanese computer firms:

Despite years of effort, Japanese makers have only just begun to crack the U.S. computer market. In 1988, they reaped only $2 billion out of the U.S.'s $49 billion hardware sales (Lewis et al, 1989). Yet, Japan has quietly readied an offensive that will test America's computer might. Since the 1970s, its electronics giants have taken over the markets for key parts such as printers, disk drives, and, more important, the dynamic random access memory (DRAMs) chips that are vital to all computers. The Japanese are already competing head-on with IBM and other leading U.S. makers in the fields of mainframes and supercomputers, and they are grabbing big chunks of market share in PCs, especially in the laptop segment. Japan's share of PC shipments in the U.S. jumped from 5.8% in 1985 to 13% in 1989, while Japan's five largest laptop makers held a combined 43% of the U.S. laptop market (Lewis et al, 1989). Bypassing the minicomputer market, they are preparing an assault in desktop workstations. They are buying into U.S. companies to get new technologies or enter new markets. They are working furiously on software, their biggest weakness remaining (Lewis et al 1990).

More important than these numbers is the technological foundation that a vibrant computer industry has provided, preparing the makers to advance quickly in the upcoming years. While the Japanese have not done well in export markets so far, they are keeping up with all the key technologies, and most would agree that Japan is ahead in such areas as new ceramic materials and gallium arsenide. Japan, with advanced technology for processing non-roman characters, is best positioned to benefit from the demand in Asia. Its other strengths lie in its dominant world positions in such key industries as semiconductors and numerically controlled machine tools, a foundation for opt-electronics and factory automation (Anchordoguy, 1989; Ferguson, 1990).

Japan is not free from problems. Japanese chipmakers have not yet been able to design a ground-breaking microprocessor, and they are also weak in system integration/networking and software (Lewis et al, 1989). Yet, major changes in the microelectronics business favor the existing advantages of the Japanese makers. The convergence of computer and telecommunications broadens the market. Superior manufacturing technology and integration of the above two areas give the Japanese a decided cost and systems design edge. Unlike the U.S. computer industry, which is characterized by specialized vendors, the Japanese are highly-diversified and vertically-integrated firms producing a wide range of electrical and electronic products. Miniaturization and standardization also favor them. Diminishing unit cost and escalating selling cost requires that computer makers turn to mass distribution channels, which is to the Japanese advantage (Anchordoguy, 1989; Ferguson, 1990; Lewis et al, 1989).

1c. European computer firms:

Although the European makers account for 24 percent of the world computer production, they are heavily dependent on the U.S. and Japanese suppliers for many key components (Todd, 1990). It is predicted that EEC's trade deficit in information technology will increase from $12 billion in 1989 to $17 billion by 1995 (Datamation 100, 1990). Compounding the problem is the fact that many big computer makers domiciled in Europe are foreign subsidiaries. Large European computer makers are so-called national champions--native suppliers that sell lots of computers at home but virtually none across the borders. Siemens AG of West Germany, the largest information technology supplier headquartered in Europe, is a classic national champion. About 70% of its $3.2 billion revenue generated last year by Siemens' Data and Information Systems Division came from within West Germany, and another 2% came from the rest of Europe. The U.S.-owned IBM, on the other hand, earned nearly 35% of its 1989 revenues in Europe. Such size makes IBM the biggest information technology supplier in every European country in which it does business (Datamation 100, 1990). As for microcomputers, only Olivetti of Italy, Philips of Netherlands and Amstrad of Britain so far are at all visible as big players out of Europe (Hudson, 1989).

Europe's native information technology suppliers are even further behind when it comes to innovation. Although the region's computer scientists are considered among the best in the world, there have been no commercial breakthroughs in computers from Europe (Datamation 100, 1990). Most technological innovations in microcomputers have come from the Pacific Rim, and that is not expected to change soon (Lewis, 1989).

European computer makers do not have many choices these days. Broad-based suppliers intent on surviving through the 1990s must merge, cooperate and pay attention to opportunities in Eastern Europe. Groupe Bull SA of France, for example, has turned itself into one of the world leading suppliers of personal computers by acquiring Zenith Data Systems Corp. Siemens also acquired its largest West Germany competitor, Nixdorf Computer AG, and created an enterprise that generated more than $9 billion in information systems revenues (Datamation 100, 1990). Most recently Japan's largest computer maker, Fujitsu, purchased an 80% stake in Britain's flagship computer firm, International Computers Ltd.(ICL), and became the world's No. 2 computer giant. More mergers among European information technology suppliers are expected in the next few years. Some analysts even speculate that only three large European groups will exist in 1995--Siemens, Bull and an Olivetti combination (Datamation 100, 1990). With a bigger home base, they will emerge as stronger world-market players. However, they are unlikely to unseat the current American and Japanese leaders.

1d. Computer Firms from NIEs:

Perhaps the most impressive development in the microcomputer industry is the emergence of new stars from the Asian NIEs--Singapore, Hong Kong, South Korea and Taiwan. Suppliers from these four economies have been major sources of peripherals and low-cost PCs marketed in the United States for years through OEM agreements or under their own brand names (U.S. Industrial Outlook, 1989).

Among the four Asian NIEs, South Korea and Taiwan stand out as far as the development of indigenous computer firms is concerned. Although Singapore remains the second principal country-of-origin for U.S. computer imports, it achieves that status only by serving as a major offshore manufacturing base for foreign keyboard, disk and printer firms (U.S. Industrial Outlook, 1989). In South Korea and Taiwan, however, foreign firms do not play a major role in manufacturing and exporting computer products there. With the emergence of indigenous players from NIEs in the global marketplace, global competition among the computer firms has intensified and different strategic thinking has been called for to address this new pattern of competition.

2. Strategic distribution of Rivalry:

Based on the competitive position with respect to technological leadership, brand recognition, pricing practice and customer base, three distinctive strategic groups of world competitors in the microcomputer industry can be identified (Pearce et al, 1989; Shao, 1988).

2a. The top-tier players:

Vendors in the top tier are involved in the development of the most advantaged technologies and the introduction of unique new systems. Included in this group are those leading vendors from the United States such as IBM, Compaq, Apple--often called the "Big Three" (Pearce et al, 1989; Shao, 1989) Because IBM, the recognized standard in the industry, is in this tier, others in the top tier are very concerned with what IBM does. Yet, each competitor strives to stay at the forefront of new technologies. They focus on high-end technology and large corporate customers and are ensured shelf space in top distribution chains. They provide extensive support programs for their products and target big businesses as lucrative customers for custom-designed, organization-wide installations that often include supporting communications. Often there is strong brand loyalty among top-tier customers. This group has been gaining market share in recent years. The top-tier players are all large MNCs who specialize in information products. Though currently all the top-tier players are the U.S.-based firms, some Japanese suppliers, such as NEC and Toshiba, are likely to enter this group soon (Shao, 1988).

2b. The middle-tier players:

Typical middle-tier players include AST, Acer, ALR, Everex, NEC, Toshiba, Olivetti, Leading Edge and Commodore. Tandy, Zenith and Dell are special cases in the middle-tier because they have unique distribution channels such as company-owned stores, government ties, and mail-order outlets so they remain insulated from the problems facing other middle-tier suppliers. The middle-tier firms generally take advantage of available technology and spend "just enough" on R & D to add some additional features to create improved products at a lower price than the top-tier leaders. Since most of them are preoccupied with IBM, they are also called IBM-compatible or clone vendors (Pearce et al, 1989; Shao, 1988). The major competitive focus for this group is a combination of price and performance. A major improvement that the middle-tier firms feature is higher operating speed. With middle-end products, they often target small or medium-sized businesses. They provide reasonably good support but not as strong as the top-tier players. There is only moderate brand loyalty among customers (Shao, 1988).

Recently this group has been under pressure from both top-tier and bottom-tier players. High component cost and price competition are squeezing profits. Limited access to retail distribution chains also crimps growth. The middle-tier makers used to be pleased to see the top-tier leaders leap to new technological advances because that would leave more market opportunities for the middle-tier vendors, but it is not so anymore with the emergence of a new generation of microcomputers based on a 32-bit microprocessor. Also, new players from Asia pouring into the market often aggressively mark down their price tags for a foothold in the market, the profit margin of the second-tier players has been seriously eroded (Pearce et al, 1989).

There is a wide variety of players in this group, including large multinational firms, smaller but well-established vendors, and even new start-up ventures. Currently, the majority of players in this group are based in the United States, but more Japanese and other Asian players are going to become important players in this group (Shao, 1988).

2c. The bottom-tier players:

The bottom-tier suppliers include numerous small makers whose spending on innovation is modest. They often use reverse engineering to develop clones of IBM machines already on the market (clones are exactly copies of IBM machines with interchangeable components), so they are also called IBM-clone makers. Hyundai, Samsung, Tatung and many other "no-name" vendors are typical of this group. As they compete strictly on the basis of price and absolute compatibility with other machines, the bottom-tier makers do not attempt to compete in the corporate community (Shao, 1988). Responding to the low-end products they carry, their customers are typically small businesses and home buyers. Further, they offer little or no after-sale support. This group is now in head-on competition with the middle-tier players for what is left over by the Big Three. There is also a variety of players in this group, including large multinational firms, diversified conglomerates, small makers, and new start-ups (Shao, 1988).

2d. Perspectives:

The fortunes of the top-tier Big Three and the middle-tier players have been diverging for a while, but only lately has the trend been brought into sharp focus. While the Big Three enjoy higher growth of sales and profits, many among the middle-tier players report losses. The dim outlook for the middle-tier players marks the end of a free-for-all period and reflects the beginning of a new style of personal computing. Based on the powerful 32-bit microprocessors, the Big Three are slowing the clones with a new generation of microcomputers. These new machines represent a new and dramatic development in microcomputing. More than tools for limited jobs such as writing reports or preparing budgets, the new microcomputers are able to assist "knowledge workers" by automating complicated information-gathering and communications tasks. Because they can do several jobs at once, they have the potential to make office workers far more productive. The switch to more powerful microcomputers will dramatically affect the demand for both bigger machines and less-sophisticated PCs (Grove, 1990; Lewis, 1989).

The problem for the middle-tier players is that even if they come up with competitive 32-bit PCs, they may continue to lose market share because the new PCs are more expensive and complex, designed to work closely with mainframes and other computers on corporate networks, and customers are squeamish about relying on smaller suppliers. Even if the customers were inclined to buy a bargain 32-bit computer from a middle-tier maker, they probably would have trouble finding such machines in computer stores. The Big Three have already locked up the distribution channels. As the industry is more mature, the distribution channels are saturated. That leaves middle-tier players scraping for a role as the low-price option in chains such as Businessland and Computerland. Or they could be the main brand in stores with no Big Three's products. Such outlets mainly serve individuals and small businesses that are likely to buy clones of the older PC/AT, rather than more expensive 32-bit machines.

The middle-tier makers are also under pressure from the bottom-tier suppliers. Several years after the original PC/AT hit the market, its clones are becoming a commodity. While the Big Three have maintained and sometimes boosted prices on top-end machines, middle-tier players have had to cut their prices. Two years ago, the middle-tier companies were confidently predicting that the bottom-tier small clone makers would be squeezed out of the industry as the result of IBM's introduction of the PS/2 as a new standard (designed in part to thwart copycats as a clone-killer) and the price cut by the middle-tier makers (Shao, 1988).

The prediction has not materialized. The small clone makers were able to slash prices even more, the old IBM standard proved firmly entrenched, and companies and individuals had come to feel increasingly comfortable with buying no-name clones. As a result, "no-name" clone makers around the world are expanding instead. Their products, once used almost exclusively by hackers and technical types, are now being bought even by blue-chip corporate giants (Bulkeley, 1988). The dominant reason, of course, is price. Many companies are beginning to feel that they were paying too much for IBM machines or name-brand IBM-compatible. No-name clones are increasingly prevalent as the better models gain respect, and many businesses are more willing to buy them.

One major difference between the middle-tier and the bottom-tier microcomputer vendors is that the former usually have their own designs that differ somewhat from IBM's products while the latter make exact copies of IBM's products and most of their components are interchangeable with IBM's. For most clone buyers, especially corporations, reliability could be a major concern. Yet, there is little difference in reliability and performance between IBM's products and many clones on the market due to the standardized PC technologies (Bulkeley, 1988).

3. Concentration and rivalry:

Producer concentration measures the degree to which a few large firms control the sales or production in an industry and suggests the potential extent to which they can use their market power to influence the market and to elevate the level of prices above the competitive price. High price level suggests the presence of barriers to entry or mobility, providing protection to the incumbent firms from the new competition.

While experiencing both supplier consolidation and new firm formation, the worldwide microcomputer industry exhibits maturity at the low end and rapid technological change at the higher end. The commodity-like nature of lower priced PCs, based on high production volumes, standardized designs, off-the-shelf components, and low support and service requirements, has made the cost of entry relatively small. This has resulted in a significant increase of system makers worldwide and a lowering of market concentration. For instance, though the top two suppliers still hold more than one-fourth of the U.S. market, the share of the top ten makers has dropped from 75% to 50% since 1983 (U.S. Industrial Outlook, 1990). Attracted by the industry's high growth, many firms have entered the IBM clone market, with many coming from the Far East Asia such as South Korea and Taiwan.

Another side of the story is that the high-end microcomputer segment has become more concentrated over time with a few firms accounting for a larger share of output at the national and global levels. Concentration in the high-end segment has been prompted by the need for economies of scale in production, R & D and marketing, and by the benefits from vertical and horizontal integration in related industry segments. The wave of merger and acquisition activities is a good indication of the trend.

Corresponding to the three strategic groups, the microcomputer industry is composed of a triad of giants, a gang of runner-ups, and a mob of small players. The industry is divided into three segments and each of them is unique in its competitive condition: with the top tier being almost monopolistic in nature, the middle tier being oligopolistic, and the bottom tier being perfectly competitive (Lewis, 1989; Pearce et al 1989; Shao, 1988). Consequently, the competitive behavior of firms within each group differs significantly.

4. Barriers to entry and mobility:

As the microcomputer market is inherently global in nature, application of rapidly advancing technologies often seeks high value-added products wherever there is the greatest income elasticity of demand in the world (Gregory, 1986). To compete in this market, differentiation and cost-effectiveness are two key imperatives. The choice between the two factors for a firm to emphasize depends largely on which of the three strategic groups the firm is competing in. For commodity-like products, as low price is the key to success, one has to be more cost-effective, while for the state-of-the-art products where innovation is critical, one has to be more concerned with product differentiation (Lewis, 1989).

Due to the efforts to achieve cost-effectiveness and product differentiation, barriers to both entry and mobility are erected and maintained. Yet, specific sources of those barriers differ along with the distinctive characteristics associated with each of the three strategic groups.

With the rapid advance in microcomputing technologies, the entry barriers to the microcomputer industry are relatively low compared with the mature industries, but the barriers to mobility are higher. For instance, barriers to entry at the bottom-tier are minimal since products can be copied quickly without prohibitive R & D and manufacturing costs, but moving upward to the higher end of the market is not easy. Such a move requires a heavy and risky investment in R & D capability, brand recognition, marketing channel establishment, and sophisticated manufacturing facilities (Grove, 1990).

4a. Operating cost and economies of scale:

As the microcomputer industry is maturing, competition focuses increasingly on price. Some experts expect prices for hardware to decrease at an annual rate of 11% (Pearce et al, 1989). Pressure is being built up for microcomputer makers to reduce costs or emphasize product differentiation. It is obvious that low cost and low price are very critical but fairly easy to achieve for bottom-tier clone makers because the clones are assembled with standard components that are readily available. Though not a primary focus of the top-tier and the middle-tier players, costs are becoming more important as intensified competition reduces market prices and profit margins (Lewis, 1989).

As with most emerging industries, economies of scale are not apparent in the early years of the microcomputer industry. However, as the industry evolves and prices become increasingly important in competition, companies attempt to achieve economies of scale through automation in manufacturing. Additional economies of scale are expected to result as further market concentration is achieved (Lewis, 1989).

Large scale is required to assure maximal economies of scale and learning in production or to sustain the heavy R & D outlays necessary for continued innovation. Large scale also makes it possible to sell the output of large production units and manage information flows that enable the first-tuning of innovation and production to catch the full force of market demand on each successive production upswing. Large corporate size and extent of diversification and vertical integration are not only important for funding capital needs, but also important in rapid innovation and diffusion of technology. They may have synergistic effect of priming the process of downstream product innovation, thus providing an immediate in-house market for new devices, new materials, new machinery and new software. New modes of cooperation are also increasingly critical because of interdependence of new technologies and importance of small firms as sub-contractors and market niche vendors (Grove, 1990; Lewis, 1989).

4b. Product differentiation and market niche:

Unlike the bottom-tier makers, the top-tier and middle-tier makers emphasize product differentiation rather than low prices (Shao, 1988). Facing IBM's dominance in the microcomputer industry, the top-tier and middle-tier vendors have to compete vigorously for survival by offering different products from IBM and each other. To compete effectively, these firms try to provide more features, faster operating speeds, or value-added services. These actions create barriers to mobility into the higher tiers. The key element in IBM's competitive strategy is its extensive use of proprietary technology to beat its challengers. In the bottom tier, however, PCs are considered generic products. Although some companies attempt to differentiate their products in terms of shape and logo, low cost is always the key success factor in this tier. Finding effective market niches is critical for small and medium-sized firms to survive the intensified competition (Grove, 1990). One way to do that is to specialize in and be a leader in developing one or more key components for computer systems.

5. Related industries and vertical integration:

Because the microcomputer is at the intersection of several technologies, firms have been attracted to the industry from many directions such as consumer electronics, office products, mainframes, minicomputers, semiconductors, telecommunications, video games, and new start-ups. Besides, the microcomputer industry is closely linked to and supported by the semiconductor, electronics and telecommunications industries, and the general trend is toward the convergence of these supporting industries with the computer industry (Lewis, 1989).

5a. Semiconductor industry:

Developments in the semiconductor industry go hand in hand with those in the computer industry as the computer industry depends heavily on key components provided by the semiconductor industry. The development of the first microprocessor in 1971 opened up new possibilities for the incorporation of semiconductor technology into computers. Microprocessors, which have made possible the incorporation of the entire central processing unit (CPU) of a medium-sized mainframe computer onto one or a few silicon chips, are the central components around which microcomputers are built. They, in effect, created the market for PCs. Apart from microprocessors, memory chips are also major components in microcomputers.

In today's semiconductor industry, rising capital requirements for plant automation and R & D makes economies of scale a key factor in global competition, but the risks associated with such a large capital commitment also increase. As the semiconductor and computer system industries have become technologically more complex, the costs to any single firm of remaining competitive in all aspects of the technology have often become prohibitive. Because of the financial and technical difficulties in doing all phases of IC-chip production from R & D to manufacturing, a certain inter-firm specialization between firms has become a logical outcome. Since such specialization generally involves the development of complementary products in a single system or subsystem, there is a need for close cooperation and integration of technological information among cooperating firms. Inter-firm technical linkages involve extensive sharing of know-how and joint R & D principally intended to avoid duplication, and to capitalize on other's expertise and are becoming popular practices in the industry. There is a strong trend toward greater cooperation between chipmakers and systems vendors if they have not been vertically integrated (Lewis, 1989).

Vertical integration backward into the semiconductor industry by computer system makers and forward into the computer system industry by semiconductor suppliers have also been common in recent years. Strong impetuses to vertical integration include system maker's being increasingly dependent on a reliable supply of IC chips; rapid convergence of components and systems with the rising level of circuit integration as in the case of microprocessor; higher need for close technical co-operation between component supplier and system maker; and tougher profit squeeze because of intensified competition.

5b. Telecommunications industry:

The convergence between the computer and telecommunications industries is reflected by the rapid development of local area networks (LANs) and private branch exchanges (PBXs). LANs are channels based upon a company's own private switching systems that allow interface with workstations, PCs, and mainframes within an organization and without contact with the telephone company's network. As networked computing and system integration are becoming more popular, the convergence between the two industries is picking up speed, and such a convergence is restructuring the computer industry in a profound way. This evolution induces many alliances between computer and telecommunications companies: few combine expertise in both fields, and partners become necessary. Such alliances often have to transcend national boundaries. Only a position on world markets can justify the risks and the development costs. Molded by these alliances, the computer industry evolves toward a three-tiered structure:

(1) At the top, only a few firms will be able to provide the full range of telecommunications and computer products (IBM, AT&T, NEC, etc.); they need alliance, but remain the dominant partner;

(2) Most firms will join forces and assemble various products to offer complete information networks, adapted to specific user needs;

(3) The smallest will specialize in niches, making products that others will integrate in networks (OECD, 1989).

5c. Microelectronics industry:

Computer industry is an offspring from the more general micro-electronics industry that embraces consumer electronics, military electronics, and industrial electronics. As computer industry, the entire electronics industry rests on two basic technologies: the integrated circuits and software. They constitute the essential building blocks of any electronic system. Importantly, the two technologies are intricately related and interdependent. To trans-form a small silicon into an IC, a complex series of extremely precise physical and chemical processes etch micron-width conductor lines on its semiconductor surface. The combined properties of the conductor lines and semiconductor silicon enable the chip to serve as a complete circuit, with transistors and connections, capable of storing and transmitting information or performing logic operations. ICs are useless without the programs and instructions (software) that guide and regulate their operations. Also, without sophisticated software, engineers are unable to design and test today's increasingly complex microchips, and in turn software can only run on powerful chips. In this sense, computer industry, semiconductor industry, and telecommunications industry are but parts of the more generic microelectronics industry (Lewis, 1989).

4.3 Success Factors at the Global Level

A. Success Factors for the Microcomputer Industry

From the above discussions, some important conclusions can be drawn about the key success factors that are to be observed in the process of formulating strategies for the microcomputer business. Key success factors refer to those factors that exert the most leverage on competitive advantages and performance outcomes so as to get the greatest improvement in market performance for the least effort. Some key success factors are generic in nature and applicable to all firms in the industry, while others are only suitable for certain type of firms under their unique conditions.

The generic factors can be viewed from several perspectives: market segmentation, technological level, production pattern and distribution channels. The specific factors can be analyzed in light of the three strategic groups in the microcomputer industry.

1. The generic factors:

In terms of market segmentation, getting a foothold in the business segment and following the industry leaders for new design standard--system compatibility--are two key success factors. The business segment not only proves to be the largest and the fastest growing market but also presents the future direction of the microcomputer industry (U.S. Industry Outlook, 1990; Datamation 100, 1990). As there is no official industry standard for microcomputers, it is extremely critical to follow the right track to assure the products' compatibility with the evolving de facto industry standards (Shao, 1988).

From the perspective of technological advance, adequate investment in the in-house R & D and/or joint R & D efforts are also a key success factor in this high-tech business. Confronted with rapid advance of technologies underlying the microcomputer industry, it is crucial for firms to keep up with that pace in upgrading their own technological capabilities.

In terms of production, offshore production is very important not only because of the intense pressure on cost-cutting but also because of the great significance of being present in at least one of the three major world markets--North America, Europe, and Asia. From the perspective of distribution, an diversified network of channels is another key. Further, some brand is a must for anyone who wants to remain in this business for a long haul. Good service and support are also becoming very significant in the computer business as new products keep coming up and they become more complex and more application-specific.

With the increasing cost and risk involved with the micro-computer business, strategic alliance in different forms for various purposes is another key to success. The industry has evolved to such a stage that no one is able to do everything all well by itself. As a new form of division of labor, strategic alliance can offer many advantages. It can spread cost and risk, and gain access to resources otherwise not available such as know-how, marketing network and financing.

2. The specific success factors:

The specific success factors for the computer industry can be identified with the three strategic groups discussed in the section of industrial structure. Based on that discussion, a series of success factors can be identified for each strategic groups, as shown in Table 4-3.

In light of the nature of these success factors, only three generic strategic choices offer real chances for success:

1. Be a player in the top league with brands well-known for the standards they set and a combined feature of top-notch quality, performance, and service;

2. Be a player in the mid-tier with brands known for either good quality, or good performance, or good service;

3. Be a player in the low-end of the market with either little known or no brands and compete mainly on cheap price.

Table 4-3

Key Success Factors for Strategic Groups

Top-Tier Players:

State-of-the-art product
Heavy R & D to set industry standard
Well-established brand
Heavy advertising
Vertical integration
Worldwide presence
Excellent services
State-the-art software development
High profit margin for reinvestment

Middle-Tier Players:

Heavy R & D for product enhancement
Quick response to the market change
Solid brand
Unique market niche
Good advertising
Balance between price and profit
Presence in at least one of major markets
Good after-sale services

Bottom-Tier Players:

Aggressive pricing
Some R & D to keep up with the trend
Cheap labor
Economies of scale

B. Future Development of the Microcomputer Industry

Though an increasing number of analysts argue that the overall computer industry is facing a fundamental change--it is maturing--the microcomputer segment will still enjoy double-digit growth because its underlying technology is still as vibrant as ever (Lewis, 1989). Rapid advancements in technology keep pushing down the cost of computing power, which results in an ever growing market. Even without any technological breakthroughs, the microcomputer segment may well sustain its high growth into the next century as the demand in Europe and Asia will keep growing rapidly (Grove, 1990; Lewis, 1989).

But, as the industry grows bigger, it is very hard for it to sustain such a high rate of growth, and a slowing trend is expected to take hold in the future. As a result, the players are going to try to grow by grabbing market share, and consolidation will unavoidably spread. Eventually, some observers predict, the industry may be ruled by less than a dozen of huge Japanese and U.S.-based multinational suppliers that will have overwhelming advantages in manufacturing and distribution (Ferguson, 1990; Lewis, 1989). Smaller players won't disappear, but many will survive only as component suppliers (Grove, 1990).

All these changes are likely to require a new style of management. The free-wheeling risk-takers and brilliant engineers who could blow opportunities and still be saved by soaring demand may no longer have the right stuff to succeed. Indeed, marketing savvy, more than entrepreneurial skill, will be increasingly crucial as the industry shifts from selling chunks of hardware to installing networks. Such system integration will require legions of skilled analysts and software specialists to customize systems. In short, the computer business will wind up looking a lot more like a service industry, and some of the biggest names may not even be computer makers.

Much of this hinges on what happens to corporate spending for computers, and these buyers are getting stingier. Now computers are part of well-measured effort to improve design, manufacturing, distribution, and other operations. That means there is less of a tendency to buy technology for technology's sake. Software and services will be pivotal in the future. They reflect how successful computer suppliers can be at understanding customer needs and developing products to meet them. The pressure is on manufacturers to give users whatever they want rather than whatever makers choose to offer.

For many computer makers, this is a new way of doing business. They have to shift the emphasis of R & D out of lab and into customer sites. They have to embark on new distribution strategies--establishing partnerships to open channels that can best deliver distributed computing solutions to users. They have to develop global offerings that can be customized at least region by region.

As for product offerings, some trends are worth close watching. One trend is the need for more powerful desktop machines, reflected by rapid increase in sales of workstations (U.S. Industrial Outlook 1990). Another trend is miniaturization, characterized by the development in laptop, notebook and palm-sized computers.

In terms of services, computer networking and systems integration, the client/server configuration of distributed computing are the new demand patterns. In the client/server configuration, clients are any intelligent desktop systems capable of running a robust application in concert with a server, whether it be a dedicated print or file server or a minicomputer or mainframe acting in such a manner.

The structure of the microcomputer industry is projected to be different by the year 2000. One scenario predicts the consolidation of the global information industry only allow no more than 60 to 70 firms to survive; another scenario suggests only five or six firms would remain (Lewis, 1989). Increased advertising expenditures, services, reduced manufacturing costs and prices, and sophisticated technology used by major companies are expected to force the lower-tier clone makers out (Pearce et al, 1989). To survive in the 1990s and beyond, microcomputer makers have to innovate, differentiate, and further segment the market.

4.4 Summary

This chapter examined the characteristics of the external context embracing the firms operating in the global computer industry and explored the relationship between the external context and strategy content at the global level. Several important conclusions can be drawn from the above discussions.

1. The World Generic Competitive Context:

It was found that the late 1980s was a period of dramatic changes in the world economic structure. Major features of these changes included rising protectionism on the part of developed countries; shifts in the balance of world economic power from the Atlantic to the Pacific; accelerated development of new technologies, and the emergence of NIEs. These features have significant impacts on the strategic behaviors of all firms in the world in general and indigenous computer firms from South Korea and Taiwan in particular.

A shift has been occurring in the socio-technological paradigm that underlies today's world economic structure. The new paradigm taking shape is identified with an emphasis on quality and diversification of customized products and processes. The broad thrust of industrial innovations has shifted toward integrated but flexible manufacturing process, which yields enormous systemic gains in efficiency while reducing average costs. Because of these changes, patterns of international business activities have been restructured to reflect greater specialization within an industry rather than among industries internationally

Globalization of the world economies has a big impact on the management of international operations. First are the roles of national governments have become promoters and even players in the development of new industries as well as in the transformation of traditional ones. Second, trade frictions are becoming increasingly serious. Third, it is possible today for relatively small firms to act in global markets by linking with other partners with complementary assets. Fourth, firms that were traditionally interested in domestic markets have now arrived on the international scene with substantial financial and technological clout, as well as governmental support, to claim their global shares. Fifth, customers have become more knowledgeable and demanding, and their bargaining power has significantly increased. Sixth, management has become increasingly complex, as managers now must consider impact of government policies, trade barriers, foreign competition, protection of proprietary rights, and cultural differences. Seventh, even large firms are finding it hard to operate without appropriate business alliances due to higher business risks, a faster pace of innovations, and a more competitive marketplace.

Such a global context calls for a new set of skills and strategies to deal with a host of competitive elements as discussed above. Yet, the main thrust underlying the new thinking is the emphasis on human capital development and strategic alliances.

Enhanced consumer tastes and industrial automation have made low-wage countries less attractive as locations for new investments and sourcing. To add to the complexity, it is no longer effective for firms to operate simply as domestic entities. Firms based in the developing countries must speed up their efforts in the globalization process. It is at this stage that progress along the learning curve in the past will begin to pay off for NIEs if they have attained substantial levels of technological progress and have become important partners in the global networks of large MNCs.

Several other factors also add to the challenge facing NIEs. As NIEs mature, problems of higher labor costs, slower economic growth, and lower profit margins emerge; these problems have begun eroding their traditional competitiveness in the world market. Faced with rapid changes in the world economy, NIEs such as South Korea and Taiwan are currently at a crossroads for developing a major structural transformation in their own economies.

2. The Industry-Specific Context at the Global Level:

The computer industry is highly globalized. It is dominated by a handful of global giants based in the U.S. and

Japan. The computer industry enjoys healthy growth based on extraordinary technological advances. Being technology-driven and subject to speedy technological changes, the computer industry can resort to R & D to roll out new products at ever falling cost and, along with them, new market segments. The industry does not stand out as particularly profitable because of intense competition brought about by the rapid development of underlying technologies.

There exists a division of labor among the computer firms in the world. A few U.S. firms are still the leaders in the computer industry; they set industry standards and control the key components of computer products. However, the Japanese computer firms are catching up quickly and have become formidable challengers to the U.S. dominance in the computer industry. European firms are lagging behind though some efforts have been made to revitalize their competitive positions. On the other hand, newcomers from the Asian NIEs have gained momentum for competing in the global market. Among the NIEs, South Korea and Taiwan stand out as far as the development of indigenous computer firms are concerned.

Some key features of the industry-specific competitive context are as follows:

--emergence of a few de facto standards and increasing component and sub-system standardization;

--improvement in price/performance resulting in growing price competition;

--erosion of U.S.'s share in the global market due to intensified competition resulting from standardization;

--involvement of government in the industry development;

--adoption of strategies in component outsourcing and offshore assembly or automation to reduce labor cost;

--advance of innovation and upgrading despite signs of a maturing industry.

Based on competitive positions regarding technological leadership, brand recognition, pricing practice and customer base, three distinctive strategic groups of world competitors in the microcomputer industry have been identified: the top-tier, the middle-tier, and the bottom-tier players.

Vendors in the top-tier focus on the development of state -of-the-art technologies and set industry standards. They emphasize high-end products and large corporate customers. They have easy access to shelf space in top distribution chains. They provide extensive support programs for their products and target big businesses as long-standing customers. Often there is strong brand loyalty among top-tier customers. The top-tier players are usually large MNCs who specialize in information products. Currently, all the top-tier players are U.S.-based firms, but a few Japanese firms are likely to join the club soon.

Typical middle-tier players generally take advantage of available technology and spend "just enough" on R & D to add some additional features to create improved products at a lower price than the top-tier leaders. Since most of them are preoccupied with IBM, they are also called IBM-compatible vendors. The major competitive focus for this group is a combination of price and performance. A major improvement that the middle-tier makers feature is higher operating speed. With middle-end products, they often target small or medium-sized businesses. They provide reasonably good support but not as strongly as the top-tier players. There is only moderate brand loyalty among customers. Recently this group has been under pressure from both top-tier and bottom-tier players. High component cost and price competition are squeezing profits. Limited access to retail distribution chains also crimps growth. Among this group are large MNCs and small but well-established vendors, and a few start-ups.

The bottom-tier suppliers include numerous small makers whose spending on innovation is modest. They often use reverse engineering to develop clones of IBM machines already on the market, so they are also called IBM-clone makers. As they compete strictly on the basis of price and absolute compatibility with other machines, the bottom-tier makers do not attempt to compete in the corporate market. Responding to the low-end products they carry, their customers are typically small businesses and home buyers. Further, they offer little or no after-sale support. This group consists of large MNCs, diversified conglomerates, small makers, and new start-ups.

In the following chapter, the external context at the national level will be explored. The similarities and differences between the competitive contexts in South Korea and Taiwan are compared, and the relationship between the external context and strategy content will be further explored at the national level.

CHAPTER V

NATIONAL COMPETITIVE CONTEXT

Following the review of the external context at the global setting for computer firms, this chapter is an overview of the external context at the national setting for indigenous computer firms from South Korea and Taiwan. Specifically, this chapter will examine the overall features of the national environment, including social, cultural, economic and industrial characteristics, that offer the unique basis for indigenous computer firms from South Korea and Taiwan to compete in the global market. A special attention will be given to the examination of similarities and differences between the national contexts in South Korea and Taiwan.

5.1 Nation-Specific Competitive Context

A. Economic and Industrial Structure

1. Overview:

There are differences as well as similarities in the patterns of economic development and the resulting economic structures in South Korea and Taiwan. In terms of development pattern, both countries industrialized their economies after World War II. Taiwan completed its industrial transition one decade after Japan did, around the end of the 1960s, and South Korea followed Taiwan another decade later (Oshima, 1987). The speed of industrialization was exceptionally fast compared with other countries with the similar agricultural base. That was due, in both South Korea and Taiwan, to a highly developed rice economy, a solid infrastructure built during the Japanese colonial period, longer experience in industrialization than most other Asian colonies, the influx of entrepreneurs and technicians from elsewhere after the Communist governments came to power in the mainland China and North Korea, and a series of development policies that emphasized agricultural and labor-intensive industrialization with a strong export orientation in the 1950s and 1960s in both countries.

The following similarities between the two countries have been amply documented in the literature (Bennett, 1987; Harris, 1986; James et al, 1990; Lau, 1986; Liang & Liang, 1987; Oshima, 1987; Woronoff, 1986):

(1) both are poor in natural resources;
(2) both used to be Japanese colonies;
(3) both got the U.S. aid after the World War II;
(4) both experienced a successful land reform;
(5) both have a big defense burden;
(6) both governments have played a key role;
(7) both have adopted an export-oriented policies;
(8) both have a well-educated and hard-working labor force;
(9) both rely basically on private sector;

(10) both have high savings;
(11) both enjoyed relative political and social stability until 1987 when they moved toward democratization and liberalization;
(12) both entered high-tech industries in the late 1970s;
(13) both have limited import of managerial and technical know-how through foreign direct investment;
(14) both are faced with trade frictions with the U.S.;
(15) both have become newly industrialized countries;
(16) both share the Confucian tradition.

Yet the differences between the two economies, which have received little attention, bear more revealing implications for strategic management than the similarities (Oshima, 1987). Among those differences, the most striking is the industrial structure. Korea and Taiwan differ greatly in both industrial concentration and the way firms are organized and linked together. In South Korea there is a very high concentration ratio in most of the industries with a few dominant conglomerates, while in Taiwan the concentration ratio is low and there are no dominant firms in most of the industries (Levy, 1988).

The differences in the industrial structure between South Korea and Taiwan can be traced back to the differences in historical backgrounds and policies for economic development. South Korea used to be more economically backward and its domestic markets for intermediate inputs and export intermediation were less developed than Taiwan, so Korea had to adopt a concentrated approach in its industrialization drive by emphasizing big businesses, in contrast to Taiwan's approach (Lau, 1986; Levy, 1988; The Economist, 1990). Yet, neither economy is free from problems. A heavy dependence on big businesses may stifle the dynamics and flexibility of the economy, whereas a dependence on small businesses may lose the benefits of synergy effects and economies of scale. It seems that a more balanced approach is more desirable.

2. Different Development Paths and Economic Structures:

The differences between the two economies can be traced back to their historical background--their colonial experience under the Japanese and their approaches to economic development after the World War II (Levy, 1988; Oshima, 1987; The Economist, 1990).

2a. Different historical background:

South Korea was historically more backward than Taiwan both in terms of GNP per capita and education level, largely due to their different experiences during the Japanese occupation. Taiwan was colonized for a longer period by the Japanese, who deliberately cultivated Taiwan as the major agricultural base for export to the rest of the Japanese empire (Harris, 1986). The rural infrastructure--roads, railways, electricity supply, irrigation systems--was better developed than that in Korea (Harris, 1986; Oshima, 1987). Besides, there was a fundamental difference in the governance of the two colonies by the Japanese (Oshima, 1987). The occupation of Taiwan was accomplished smoothly, but there were tensions and frequent clashes in Korea, where a large of number of Japanese immigrants took up jobs and farms, becoming employers and landlords. In Korea, major elements of class struggle were added to colonization, and exploitation was added to suppression (Oshima, 1987).

2b. Different agricultural development:

After land reform in both South Korea and Taiwan in the immediate postwar years, the development of agriculture was continued in Taiwan and the peasantry was able to contribute substantially to national development, but that was not so in South Korea. Faced with a less favorable economic background but a higher ambition for rapid industrialization, the government of South Korea chose to emphasize high economic growth through industrial development and relied upon a few industrial entrepreneurs who prepared to undertake major industrial businesses with the government's assistance. This approach resulted in a high capital concentration with a few large-scale conglomerates to lead the Korean economy (Kang, 1988). Further, the resulted industrial structure has been reinforced over time. In 1977, for instance, the top ten conglomerates in Korea were responsible for about half of Korea's GNP; in 1984 it only took the top five to make up the share, and by 1989 the sales of the top four equalled half of GNP in Korea (Kang, 1988; <u>The Economist</u>, 1990).

In Taiwan, with agriculture as the base for export, related industries were rapidly developed and the rural markets were expanded swiftly. This approach led to a more balanced economic structure and dispersed territorial pattern of development, unlike the high concentration in a few industries and in a few large cities in the case of Korea (Harris, 1986). The difference in productivity growth between South Korea and Taiwan, as shown in Table 5-1, was largely due to the higher growth of Total-Factor-Productivity (TFP) in Taiwan's agricultural sector, reflecting the different pattern of economic development in South Korea and Taiwan (Oshima, 1987). The economic structure shown in Table 5-2 further illustrates the different pattern.

Table 5-1

Average Annual Growth of Product, Input, and Productivity

(1952-1980)

	Whole Economy		Agriculture		Non-Agriculture	
	Korea	Taiwan	Korea	Taiwan	Korea	Taiwan
Product	7.4	9.1	3.4	3.6	9.1	12.0
Labor	3.4	3.1	0.6	-0.6	5.8	5.3
Capital	8.8	7.4	8.0	6.2	8.9	11.8
Prod./Labor	4.0	6.0	2.8	4.2	3.3	6.7
Prod./Cap.	-1.6	1.7	-4.6	-2.6	0.2	0.2
TFP	2.3	4.7	0.6	2.2	2.4	4.8

Source: Based on Oshima's Economic Growth in Monsoon Asia: A Comparative Survey, University of Tokyo Press, 1987.
Note: TFP stands for Total Factor Productivity.

Table 5-2

Economic Structure

(As percentage of GDP)

	South Korea		Taiwan	
	1987	1988	1987	1988
Agriculture	11.2	11.4	5.4	5.2
Manufacturing	34.2	33.4	40.2	38.8
Utili. & Construc.	11.1	11.5	7.9	7.7
Service	38.5	38.8	36.5	38.0
Government	4.2	4.2	9.5	9.7

Source: Asia Yearbook, 1989; The Far East and Australasia, 1990.
Note: In 1989 Korea's GNP was $204 b. ($4,968 per capita), while Taiwan's GNP was $150 b. ($7,509 per capita).

2c. Different industrial development:

Besides the different emphasis on agricultural development between South Korea and Taiwan, their strategies for industrial development began to diverge from the mid-1970s (Amsden, 1989). In the mid-1970s, while Taiwan continued to opt for light industries with a laissez-faire attitude and attention to small companies, South Korea began to target those visible, big-ticket items--steel, automobile, shipbuilding and chemicals--and to compete head-on with the Japanese for export markets (Amsden, 1989; Weiss, 1989). Though Taiwan also moved into those capital-intensive industries, it went much more slowly and mainly aimed at serving its domestic market.

From 1975, South Korea embarked on an accelerated heavy industrialization program and invested heavily in huge complexes of plant, equipment, railways, storage facilities, harbors, utilities, housing, and recreational facilities--all long-lasting, low-yielding capital stocks. It can be plausibly conjectured that these costly programs contributed to low capital productivity and failed to help increase the growth of TFP in the manufacturing sector. This unbalanced development pattern had left Korea with a so-called country-side of "rural isolation" (Oshima, 1987). The failure to release enough farm workers through mechanization led labor shortages when its unemployment rate fell below 4% in the late 1970s (Oshima, 1987). Real wages rose faster than labor productivity and consumer prices accelerated, forcing shifts in the foreign exchange rate. Throughout the postwar decade, consumer prices and foreign exchange rates in South Korea have risen faster than in Taiwan (Oshima, 1987).

The pressure to export manufactured goods has been heavier on South Korea than on Taiwan. The less developed agricultural sector in South Korea has been unable to supply large farm exports, savings, and a domestic market for industrial products. Further, the slower growth in TFP and farm family incomes has been responsible for the slower growth in personal savings in South Korea compared with Taiwan (Harris, 1986; Ohima, 1987). Excessive capital spending without sufficient domestic savings has forced South Korea to borrow heavily from abroad, resulting in an external public debt around twice as much as that of Taiwan (Oshima, 1987). Private debt has also been heavy in Korea due to the mentality of striving for the highest possible business growth and expansion by whatever means. For instance, the average debt-to-equity ratio for firms in South Korea in 1989 was 464% (Darlin, 1990).

3. Market Efficiency and Industrial Structure:

Coming with such an approach to economic development, the general industrial structure in South Korea is much more concentrated than that in Taiwan (Amsden, 1989; Levy, 1988). Compatible with their overall strategy for economic development, South Korea chose to concentrate its limited resources and to internalize business transactions by forming large-scale, highly integrated conglomerates to benefit from scales of economy and learning curves while overcoming the lack of intermediate market and independent trading firms (Kang, 1988; Levy, 1987, 1988). On the other hand, small and medium-sized firms are the major forces in the economy in Taiwan (Levy, 1988).

The market conditions for export intermediation and component supply appear to be of particular importance in shaping firm size and degree of vertical integration. South Korea has been weaker than Taiwan in both regards (Lau, 1986; Levy, 1988). Due to the absence of independent export traders, the South Korean government has chosen to promote large-scale general trading companies (GTCs). The GTCs were established as export-import trading houses that would market aggressively and professionally around the world their own products as well as those of smaller, independent Korean companies assigned to a specified GTC by the government (Cho, 1987; Shin, 1984).

By 1984, there were nine GTCs in South Korea: Hyundai Corp., Daewoo Corp., Samsung Co., Ssangyong Corp., Kukje-ICC Corp., Hyosung Corp., Lucky-Goldstar International Corp., Sunkyong Ltd., and Korea Trading International Inc. To be designated as a GTC, a company must satisfy several conditions such as a minimum export amount per commodity, a minimum number of overseas branch offices and a minimum percentage of the nation's annual total exports. On the other hand, GTCs enjoy various preferences such as government support, preferential banking services, and less government control over their overseas operations. The ratio of the top eight GTCs' export to the nation's total exports was around 50% in the 1980s (Shin, 1984). By contrast, in Taiwan there is a large army of small, independent traders who are eager to uncover export opportunities for equally small manufacturers (Levy, 1988). For instance, the number of export traders in Taiwan was more than twice that of Korea in 1973; this number increased to almost four times by 1984; during the same period, the average value of industrial exports per trader in

Taiwan was about half of that in South Korea in 1973, which dropped to about a quarter by 1984 (Levy, 1987, 1988).

No aggregate data are available on the degree of development of markets for intermediate inputs in Korea and Taiwan. Some field studies suggest that Korean firms tend to be vertically integrated while Taiwanese firms tend to specialize and rely more on arms-length suppliers (Amsden, 1985; Levy, 1987, 1988; Levy & Kuo, 1987). The relative ease with which Taiwanese firms across a wide range of industries enter subcontracting relations with one another, and the presence of a large number of Taiwanese traders willing and able to export for small and medium-sized firms, imply that Taiwanese entrepreneurs can initiate production at a somewhat small scale, with little up-front investment required either for production facilities or for specialized market information. By contrast, in south Korea the paucity of subcontracting and the shortfall of indigenous traders with an incentive to explore export market potential for small firms, imply that the initial investment costs and thus the size at entry for Korean firms is likely to be substantially larger (Levy, 1988).

4. Government Policy and Industrial Structure:

The differences in industrial structure have also been a result of the contrasting philosophies behind government policies for economic development in South Korea and Taiwan

(Scitovsky, 1986). Though the two countries have pursued similar economic development strategies, the philosophies guiding the strategies have differed in some important aspects and have produced different outcomes. The fundamental difference in the development philosophies held by the governments of South Korea and Taiwan, according to some researchers, lies in their views on the role government should play (Scitovsky, 1986; The Economist, 1990). Both governments see the necessity of a governmental role in economic development but they differ in the degree of intervention and the objectives underlying this intervention, similar to the difference between the U.S. and Japan.

Specifically, government's effort to control private sector has been much more intrusive in South Korea than in Taiwan. The Korean government has often had more direct control over the economy, with planning structures larger, more centralized, and more elaborate than that in Taiwan. Though the Taiwanese government has also implemented a variety of economic controls, they have been more selective and less intrusive than those in South Korea. While Korea has often enforced vigorously an elaborate roster of economic "do's and don'ts," the Taiwanese government has aimed instead at creating an economic environment conducive to growth. In other words, Korean government has taken a pro-active role in controlling market forces, while Taiwanese government has tended to rely more on the workings of the free market.

The contrast was most marked in the case of credit and interest policy, which more than anything else determined the present shape of the two economies (The Economist, 1990). From the 1950s Taiwan pursued a policy, almost unique in those days, of letting interest rates rise to high-market levels. This brought one of the world's highest rates of savings and investment, an atomized industrial structure and a relatively equal income distribution.

The purpose of the stance in Taiwan has been to foster the proliferation of small businesses. The open credit market in Taiwan has been relatively easy for a small, untried business to obtain financing to start. Moreover, more realistic interest rates and foreign exchange rates have limited the profits of firms, resulting in slower rates of growth of individual firms and thus helping to keep very large firms from crowding out small ones (Lau, 1986). The presence of many small firms has also been encouraged by factors such as Taiwan's public ownership of monopoly-prone industries and the establishment of the "Forty-eight Industrial Parks and Districts," which provide a variety of advantages for start-up firms.

South Korea's story has been very different in this regard. From 1961--the year General Park came into power through a coup and started Korea's serious drive for industrialization--to 1979, Korea's credit policy was just the opposite of Taiwan's (The Economist, 1990). The planners kept the interest rates low, using their control over banks to direct cheap money to those borrowers whom they believed should be favored. Credit was "rationed" by the government to a few targeted firms. This was also the case for tax incentives. The origins of those giant "chaebol" in Korea--highly integrated and diversified, family-owned and family-operated conglomerates--can be traced back to the efforts by the Korean government to spur its economic development after the Korean War (Steers et al, 1989).

These basic choices about credit and tax were at the root of the two countries contrasting models of development. Taiwan's companies were small and equity-based. Along with tight money, Taiwan also had a tight fiscal policy with a budget surplus every year but one from 1964 to 1988. Korea's companies were big and debt-based. Korea's microeconomic policies were both looser and more erratic (The Economist, 1990). What resulted was higher savings and more tightly controlled, therefore more efficient, investment in Taiwan; more foreign borrowing and far higher inflation in Korea; and a pair of industrial structures that differ substantially (The Economist, 1990).

Taiwan is dominated by small, lightly-indebted firms: by one reckoning, more than four-fifths of its firms in 1981 had fewer than 20 employees; looming over Korea's economy are the huge, heavily-indebted chaebols (The Economist, 1990). For many years, the chaebol have been Korea's main instrument of economic development, have been given the most favorable treatment by the government, and have been allowed to move unfettered into a panoply of businesses. The Korean government has always felt that it can best achieve its goal of rapid economic development by providing selected firms in the targeted industries with the assistance they need for quick expansion (Steers et al, 1989).

Through a series of five-year plans, the Korean government has selected companies that have been given free reign to produce and export. The government has argued that concentrating economic power in the hands of a few big family-held enterprises represents the most efficient and expeditious path to development (Steer et al, 1989). Chairmen of the companies have been held personally accountable to the government for task accomplishment, and the cost of failure has been very high. The government cleared roadblocks to corporate growth and often provided monopolistic conditions that are conducive to success (Steers et al, 1989).

On the other hand, small start-ups find it very hard to survive due to the lack of credit and other resources. The smaller number of firms in Korea, in turn, has made government control much easier, so the process reinforces itself (Lau, 1986). For instance, the combined sales of the top four and the top ten "chaebol" were 10.3% and 15.1% of South Korea's GNP in 1974 respectively; by 1984 the figures went up to 44.3% and 67.4% (Amsden, 1989); by 1989, revenues of the top five chaebols equaled 61% of Korea's GNP (Darlin, 1990).

As the close ties between the government and business have been the main force behind the rapid growth of the chaebols, the industrial policies and the growth of chaebols were directly related. Chaebols can be classified into three groups according to the time they became well established: (1) the 1960s, (2) the 1970s, and (3) the 1980s, responding to the three evolutionary stages of the government development policies (Steers et al, 1989).

Chaebols that grew up in the 1960s were established by self-made founders with the government supports in forms of preferential allotment of grants, disposal of government-vested properties, and preference in taxation and credit. That was the take-off period for Korea's economic development after the war, featured with wide-ranging interventions in export promotion, finance and protectionism. Attention was focused on developing a suitable industrial infrastructure (Steer et al, 1989).

Many chaebols grew big in the 1970s because of foreign loans for a series of five-year plans. During this period--the sectoral policy period of the 1970s--a shift of focus from general export promotion to import substitution took place, and large-scale and capital-intensive industries were selected as targets. The policy of selecting and supporting particular individuals and their companies who were considered loyal and reliable led to the formation of large business groups, the chaebols (Steers et al, 1989). Coming into prominence into the 1970s, the chaebols had become Korea's leading agents of the export of capital goods and related services.

Some new chaebols were set up in the 1970s and grew up in the 1980s, a period characterized by the rapid growth of export and domestic demand (Lee & Yoo, 1987). In this period of market liberalization, a more balanced policy toward small and medium-sized companies and the loosening of credit controls was chosen.

In addition, government control of the banking system since the early 1960s has made it possible to steer big enterprises into the industries the government wanted to develop. The "Korea Inc." is considerably different from the "Japan Inc." In Japan, the relationship between government and business is one of partnership in which the policy reflects a consensus between two equals, while in Korea the government dictates the policies single-handedly and business has to follow; unlike Japanese industrial groups gathering around their own banks, Korean groups have to depend on the government-controlled banking system (Lee & Yoo, 1987).

Consequently, the industrial concentration is much higher in South Korea than that in Taiwan. While the five largest Korean companies accounted for more than 22.3% of the value of Korea's manufacturing shipments in 1985, the five largest firms in Taiwan accounted for less than 4.2% of Taiwan's shipments of manufacturers (Levy, 1988). According to other statistics, average three-firm concentration ratios in all manufacturing industries in 1981 were 62% for South Korea, 56.3% for Japan, and 49.2% for Taiwan (Amsden, 1989). At the establishment level, firms with 500 or more workers accounted for 57.3% of gross manufacturing output in Korea in 1976 and 58.4% in 1981, but only 43.5% and 47% respectively in Taiwan (Levy, 1988). A WARNING NOTE: the above data underestimate the difference between the two countries, because it includes both multinational and state-owned operations (invariably large in size in both countries) besides indigenous private firms. Excluding multinational and state-owned companies, firms with 500 or more workers in 1981 accounted for approximately 35-40% of the gross manufacturing output in Korea, compared to Taiwan's 15-20% (Levy, 1988). One result of this high concentration in South Korea is its heavy dependence on the fortunes of the top conglomerates. Because the chaebols do not subcontract (unlike the diversified industrial and trading groups in Japan), the country's small business sector has not been firmly established (Weiss, 1989).

Another evidence of tight government control in South Korea is the role of labor unions. Labor unions have been kept on a tight leash by law that forbids outsiders from intervening in a dispute between employers and employees. This law makes it almost impossible for a union to help workers bargain with their employers, and regulations on arbitration effectively outlaw strikes (Lee & Yoo, 1987).

It is obvious that these factors have contributed to the low labor cost.

5. Industrial Structure and Firm-Specific Strategy:

Because of the substantial difference in industrial structure, firms in South Korea and Taiwan tend to differ in several key features of their competitive strategies. These features include a strategic focus in terms of targeting distinctive market segments, a strategic thrust in terms of cultivating and utilizing distinctive advantages, a strategic mode in terms of organizing internal and external resources for the best market performance, and a strategic goal in terms of ranking priorities among various market performance objectives.

The central ingredients of the Korean strategy have been a readiness to make substantial initial investments, to start production at high volumes, and to push exports, even in the face of unit costs that can exceed prevailing market prices (Amsden, 1989; Kim, 1980; Levy, 1988; Westphal, 1982). The high volumes permit a new entrant to move rapidly down the learning curve, thereby increasing productivity and reducing unit costs as experience accumulates. Over time, as simpler tasks are mastered, the successful assembly firms can increase its capability to undertake in-house complex tasks of product design and component fabrication.

Taiwanese firms, smaller in size and thus less able to reap the benefits of large-volume production, have emphasized development capabilities more so than their Korean counterparts (Levy, 1987, 1988). Whereas Korean firms have consistently sought a competitive edge through price, the Taiwanese have increasingly sought to earn profits by cultivating flexibility; whereas the Koreans have competed head-on with existing market leaders in an effort to win a significant share of markets for standardized products, the Taiwanese with their readier access to marketing expertise have sought out market niches for non-standardized products; whereas the Koreans have focused their efforts overwhelmingly on mature products, the Taiwanese have increasingly been oriented toward innovation, endeavoring to compete in the global markets somewhat early in the life cycle of individual products; whereas the Koreans have highly integrated their business operations internally, the Taiwanese have relied greatly upon their external business relations with various subcontractors, independent exporters, and even independent bankers (Levy, 1987, 1988; Steer et al, 1989).

In sum, the Taiwanese firms tend to focus on product differentiation, market niches, and inter-firm networking, while the Korean firms tend to rely more on cost-effective measures, mass market, and intra-firm integration (Levy, 1988). Such differences in strategic formulation, plus South Korea's "export or die" policy (in contrast to Taiwan's balanced policy of stimulating domestic consumption as well as export), is largely responsible for Korea's far more volatile economic performance than Taiwan's (Harris, 1986; Lau, 1986).

6. Cultural Characteristics and Management Style:

One of key similarities between South Korea and Taiwan with respect to national competitive context is the widespread family ownership of various companies (Montagu-Pollock, 1989). In both South Korea and Taiwan, not only most of the small and medium-sized firms are owned by families, but also many large firms are owned and run by families. In Taiwan, big firms like Formosa Plastics, Tatung, Evergreen, and Far Eastern Textile are family controlled; in South Korea, giants like Daewoo, Samsung, Hyundai, Lucky-Goldstar are also largely family business (Montagu-Pollock, 1989; Steers et al, 1989). These family businesses are usually managed by one central paternalistic figure as the CEO, often the founder. He typically assumes personal responsibility for the performance of every aspect of the corporation and feels a need to centralize decision-making and authority to ensure tight controls.

Successful for many years, these family-owned firms are now facing serious problems. On the one hand, there has emerged a series of tough challenges such as stronger currency, rising protectionism, higher wages, more rapid technological advance, greater environmental concerns, bigger demand for social welfare, greater political uncertainty, etc.

On the other hand, the second generation of management among the family members are often considered weak for lack of drive, skill and authority as compared with the founders. Consequently, many firms cannot manage strategically.

The fundamental question here is how to manage these family-owned firms in a professional manner, or to be more specific, how to delegate operational control from family owners to outside professional managers. It is still possible for family control to work in some large-scale firms if they stick to a single product such as property, repetitive retailing, banking, or shipping, where decision-making can be centralized. In today's competitive context, the manage-ment style of running a firm like a big family is no longer adequate. The problem with family control is that an organization can be built only to the point where the founder is still in a position to know personally and trust those he is working with. When a firm grows to a certain scale both in terms of size and diversification, it can no longer be run under the charismatic leadership of the top man. At certain stage it has to be depersonalized.

The positive side of the story is that family-controlled firms are extremely flexible and adaptable to change; they have a highly dedicated management; they can take decisions fast; and they tend to enjoy good labor relations. Due to their entrepreneurial nature, Chinese are undoubtedly best at managing small business (Montagu-Pollock, 1989).

Although the family-owned firms in both South Korea and Taiwan suffer those problems, they are much more serious in Taiwan than in South Korea, partly due to such cultural factors as lack of trust in anyone outside of the family circle (Montagu-Pollock, 1989). While the Taiwanese family businesses enjoy a superior edge in small-scale operations, it is a different story when it comes to long-term large-scale manufacturing. For one thing, the Taiwanese are finding it hard to invest in new technologies and new market necessary for their business up-stream. Many of these problems come from the family control. Since the Chinese seem particularly reluctant to take the step of trusting non-family members, those family-owned firms in Taiwan have great difficulty managing large firms successfully for the long term.

By contrast, chaebols in South Korea--the Korean equivalent of the Taiwan's family businesses--have managed to combine family management with professionalism (Wontagu-Pollock, 1989). Though family-controlled, they have built up a small but effective layer of professionals who have real power in the organizations. For instance, Samsung has an office called the Office of the President, which acts as the banker and consultant to the group. According to a survey in 1984, 31% of the executive officers of the top 20 business groups in South Korea consisted of family members, but 40% of the officers were recruited from outside and 29% were promoted from within as non-family members (Lee & Yoo,1987).

Two major factors have contributed to the high percentage of non-family members as top executives in South Korea. Both inside promotion and outside recruitment have been necessitated by the aggressive expansion of corporations and limited number of family members. A large proportion of recruited executives have been high-ranking public officials and retired military generals, who are scouted not because of their managerial expertise but because of personal or political influence as the relationship between government and business is one of the most critical factors for being successful in South Korea. Consequently, though two-thirds of executives have no family ties, not all of them can be considered as professional managers (Lee & Yoo, 1987).

7. New Challenges and Responses:

Faced with rapid changes in the world economy, South Korea and Taiwan, like other NIEs, are currently at a crossroads and are confronted with the challenges of significantly restructuring their economies. Unlike the previous economic transition characterized by industrialization in the 1960s and 1970s, the current structural change is from an economy based on the traditional labor-intensive industries to one based on technology-intensive industries.

Such a transition is mandated by several key factors. These structural factors include the rapid advance of new technologies; globalization of the world economies; higher labor costs, slower economic growth and smaller profit margins in the NIEs; growing protectionism in the advanced countries; rising costs of environmental degradation and increasing demand for public services, and problems associated with the traditional government interventions.

Because of these fundamental changes, both private and public sectors in South Korea and Taiwan have begun looking for effective business strategies and public policies to recast their business focus and economic structure to meet the challenges (Bennett, 1987; Liang & Liang, 1987). The development of high-tech and high value-added industries, through private initiative and accelerated technology transfers from abroad, has become the cornerstone of their hopes for sustained high growth.

There is no question that these changes are fundamental, and are rooted in the need to complete a structural transformation comparable to that taking place in all advanced countries. Nevertheless, due to many differences in the economic structures, South Korea and Taiwan are expected to follow somewhat different strategies to achieve similar goals; some differences, however, may well disappear down the road.

For South Korea, economies of scale and scope will continue to play the major role in improving firms' profit margin and reduce business risk, and their heavy investment in R & D and state-of-the-art equipment will certainly improve their operational capability. Korea's future success also hinges heavily on its ability to encourage entrepreneurship and make firms flexible and adaptable to changes. South Korea needs to build a dynamic sector of small and medium-sized firms to complement the chaebols. Also due to the significant change in the social and political situation, the favorable relationship between big businesses and government is in doubt. A vigorous debate has been going on in South Korea in recent years about how to curb the power of the country's conglomerates and public animosity toward Korea's chaebols has been mounting. Thus, Korea has begun to adopt a more balanced policy to promote a healthy small-and-medium business sector.

At the same time, Taiwan's main concern is to encourage small and medium firms to grow bigger, as small size hinders the exploitation of scale economies in both manufacturing and R & D, though they seem more adaptable, less risky, more able to keep market competitive and entrepreneurial spirit alive, and conducive to income equality (Lau, 1986). Other problems Taiwan faces include falling investment, low R & D spending (around 1% of its GNP, as against Korea's 2%), and the trend to move offshore instead of upgrading production.

For Taiwan, both the governments and business communities have realized that venturing into high-tech and high-value-added industries requires large firm size and business diversification for a critical mass of scarce resources and spread of business risks. They have begun emphasizing economies of scale and scope and trying to expand through various means, particularly by forming strategic alliances, and mergers and acquisitions have become increasingly popular in Taiwan. For example, knowing that small size is their major weakness, the indigenous computer firms in Taiwan are exploring two ways to solve the problem. One is to form collaborative alliances, which are commonly adopted by many small firms, and the other is concluding mergers and acquisitions, which are mostly adopted by the medium-sized and large firms (Flannery, 1990). By doing so, the industrial structure in Taiwan will change in favor of more large firms. Eager young entrepreneurs and well-educated engineers are still instrumental in Taiwan's transition to high-tech areas if the government takes adequate measures to assist financially and administratively in developing R & D and marketing capability (Bennett, 1987).

B. Profiles of Economic Resources

1. Education and Human Resources:

The only source of international competitive advantages of Korea and Taiwan has been their highly educated and highly motivated human resources; if Korea and Taiwan are to become technology-intensive industrial nations in the near future, they need to reinforce their human resources and develop a large, sophisticated R & D workforce.

Korea spends proportionally more money on education than any country in Asia outside of Japan. It allocates more than 20% of its national budget to education, or 3.3% of the country's GNP (Hoon, 1990). This is much more than what Taiwan does, which is less than 13% of the national budget (Hoon, 1990). Even so, more talent is always needed for the high-tech drive. According to an estimate by the Korean government, Korea will need 150,000 specialists for R & D and engineering by 2001, a ratio of 30 per 10,000 in the total population. Currently about 40,000 or so are engaged in various types of R & D projects in Korea, namely, 10 out of each 10,000 in the total population (Korea Newsreview, 1990a). To meet the future demand, the government is taking various steps to elevate educational quality in Korean graduate schools, to drastically increase the training functions of KAIST, to expand training overseas, to induce scientific specialists from abroad, and to establish new technological institutes (Korea Newsreview, 1990a). The main problem is that few are willing to pursue basic science as their career.

About one-fifth of students in Korea's colleges and universities were studying engineering in 1989 (Hoon, 1990). Among the future engineers, the majority were studying heavy engineering; many others were studying mechanical engineering, and only a small proportion were studying electrical engineering while the number of students of computer science was seen as minuscule (Hoon, 1990).

Though Taiwan spends about 12-15% of its national budget on education--much less than that of Korea--it has been successful in developing its human resources. Taiwan has a large pool of talent in engineering, financing, and computer science, particularly in export-related industries such as banking, shipping and manufacturing (CETRA, 1989). In 1988-89 nearly a third of Taiwan's students in higher education were studying engineering, 165,000 of them, a remarkable figure in relation to Taiwan's population by world standards (Economist, 1990).

Still, Taiwan is weak in the areas of marketing. Further, senior R & D personnel in electronics are lacking (CETRA, 1989). The total number of scientists and engineers who are engaged in R & D were 25,000 in 1986, only 12 per 10,000 of the population, but the ratio is expected to increase to 20 per 10,000 by 1996 (Yearbook of Information Industry, 1990).

Public education is the main source of education in Korea and Taiwan. Since the late 1960s, nine-year free schooling has been adopted. A large proportion of the workforce in the labor market, therefore, has been educated up to that level; with this background they are amendable to further education and training through professional seminars and night schools. In recent years more emphasis has been put on vocational and occupational training rather than on academic studies to meet the growing industrial needs. Further, a large number of talented Koreans and Taiwanese live and work in the U.S. This resource offers unique access to new technologies developed in the U.S. (Tanzer, 1989).

A comparison of human resources is as follows:

Table 5-3

Human Resources

(As of 1987 unless indicated otherwise)

	South Korea	Taiwan
Population (1989)	42.79 M	20.00 M
Workforce (1989)	18.35 M	8.46 M
Life Expectancy for Male	64.20	71.00
Life Expectancy for Female	70.60	75.90
As % of the Total Population:		
Urban Residents	65.0%	67.0%
Youth under 15	30.0%	29.0%
Workforce (1989)	39.7%	41.5%
As % of workforce:		
Service	22.1%	42.0%
Manufacturing	27.0%	35.0%
Agriculture	21.9%	20.5%
Construction	5.6%	6.9%
Government	23.4%	2.6%
School Enrollment as Percentage of the Total Population:		
Primary	12.1%	11.3%
Secondary	8.6%	11.3%
Higher education	2.3%	2.6%
Education as % of The Budget:	21.0%	12.8%
Literacy Rate	96.0%	92.2%

Source: Asia Yearbook, 1990; World Development Report, 1990; Asian Business, June & December, 1990.

2. Labor and Management:

Just a few years ago the social environment in South Korea and Taiwan was sweet for business, especially so for the chaebol in South Korea. In those old days the authoritarian government kept the social life under a tight grip; the docile workforce acquiesced in low wages and long hours; the home market was protected from overseas competition, foreign markets were relatively open, and exchange rates were favorable. Now, the world has dramatically changed, and everything seems in disorder. The authoritarian regimes have started the process of democratization since 1987, and the long stifled social grievances have been released, unions have become active, wages have shot up, the domestic currency has appreciated drastically, and domestic markets have been forced to open up to foreign competitors while protectionism in the West has been on the rise. In a word, the firms in both South Korea and Taiwan have entered an unfamiliar world of uncertainty and risk.

The apparently friendly relationship between labor and management has been uncovered to reveal a deep bitterness. The grievances among the workers whose wages had been kept low for a long time and whose unions had been forbidden to operate have finally burst out in an abnormal manner. Supposedly docile and disciplined Korean workers have been increasingly aggressive in their pursuit of a larger slice of South Korea's economic pie. Their feelings of being less than full beneficiaries of Korea's economic success have been compounded by skyrocketing inflation. With the process of democratization, the popular elected civilian government has tolerated those strikes organized by the newly-permitted unions (McClenahen, 1989). Wages have risen sharply in Korea, as shown in Table 5-4.

Table 5-4

The Explosion in Labor Cost in Asia

	Average Industrial Monthly Wage		Change	Average Hourly Wage Manufacturing Sector	
	1984	**1988**	**1984-88**	**1987**	**1988**
Korea	$302	$633	110%	$1.79	$2.46
Taiwan	$325	$598	84%	$2.19	$2.71
Hong Kong	$363	$544	50%	$2.12	$2.43
Singapore	$416	$547	32%	$2.31	$2.67
Japan				$11.14	$13.14
U.S.				$13.46	$13.90

Source: Business Week, May 15, 1989; Bureau of Labor Statistics, San Diego Economic Development Corp., 1989.

In Taiwan, though the average industrial monthly wage also went up sharply to $598 in 1988, the main factor has been labor shortage rather than threat of strikes from strong unions, as rapid economic growth has increased demands for workers far faster than the population can supply (Yang et al, 1989).

3. Technological Capability:

Both Korea and Taiwan have emphasized national technological development as the key to their future success. They have been trying to switch from being copycats to innovators. South Korea and Taiwan have been pouring money into R & D to find ways to lower costs and increase performance in existing products from shoes to computers--and to climb the ladder to more sophisticated technologies (Business Week Innovation, 1990). Both have a good chance of getting to the top among the NIEs as they have leap-frogged into mass production of advanced semiconductors and microcomputers.

In the high-tech fields where South Korea and Taiwan have been successful, heavy government R & D funding is often the key. In the mid-1970s, the government in Taiwan set up the Industrial Technology Research Institute (ITRI), and a high-tech industrial park in Hsinchu was established in 1980. As of mid-1988, the government had spent more than $300 million in the park, providing complete public utilities and services as well as industrial, research and executive districts. Among the country's investment in R & D, which was just 1.1% of its GNP in 1987 as compared with Japan's almost 3%, the government contributed 60% of the total (Johnstone, 1988).

Now, private companies have leapt in: By 1989 only about 12% of the $1.8 billion Taiwan spent on R & D came from ITRI (Business Week Innovation, 1990). Private investment in R & D remains low in Taiwan, with an average of 0.5% of corporate sales being spent on R & D, less than half the level in South Korea (Lee et al, 1990). To remedy that, the Taiwanese government has planned to increase its investment in R & D at an annual rate of 30% in the next five years, and by 2000, its national investment in R & D will be 2.5% of its GNP (Yearbook of Information of industry, 1990). For an average firm in Taiwan, 10% of the R & D funding is from internal sources, 7% from the government, 8% from licensing, and 10% from local alliances, 26% from domestic universities, and 35% from foreign sources (Cohen, 1990).

The Hsinchu Science-based Industrial Park is a good case of the Taiwan's commitment to entry into high-tech fields. Since its birth in 1980, the Park has played a central role in Taiwan's transition to technology-intensive economy. Besides investment from the government, private investment in the Park has come 30% from abroad and 70% from local sources. Areas of enterprise include semiconductors, computers, computer peripherals, telecommunications equipment, opto-electronics, automation, biotechnology, environmental, and energy. Some research facilities and institutes of higher learning are located within the Park, such as the Industrial Technology Research Institute, National Tsing Hua University, National Chiao Tung University, and the Food Research Institute. Companies in the Park on the average spend 6% of their annual sales in R & D. Among those firms, 62 are local, 30 from the United States, 7 from the rest of Asia, and 4 from Europe

(Science-based Industrial Park, 1990).

The Korean government has drawn up a new seven-year science and industrial technology development program aimed at sharply cutting its reliance on foreign technology. The plan, announced in July 1989, calls for raising its annual expenditures on R & D to the level of 3-4% of its GNP by 1996 (5% by 2001) from 2.1% in 1989--Korea's annual R & D outlays of $3.5 billion rank it 13th in the world. If the goal is met, Korea's investment in technology development in 1996 is expected to reach 7 to 8 trillion won, up from 3.6 trillion won in 1989 when the nation's GNP amounted to 141 trillion won (Business Week Innovation, 1990; Korea Newsreview, 1990a).

The program is aimed at restoring Korea's international competitiveness and countering rising protectionism concerning advanced industrial technology. When Korea buys aircraft, nuclear power generation facilities, super-speed railway systems and other high-priced foreign systems in the future, according to the program, priority will be given to foreign firms or countries that offer to provide sensitive core production technology. Korea also will increase participation in multinational joint technology development projects, especially with the East-bloc nations to reduce its reliance on the West. The number of freshmen enrolled in science and engineering departments at college will rise from the present 95,000 to 117,000 by 1996. Still, Korea's private investment in R & D is low when compared with advanced countries: the manufacturers in 1989 spent just 1.8% of sales on R & D, and the comparable figure for Japan is about 2.6% (Business Week Innovation, 1990). For an average firm in Korea, 5% of its R & D funding is from the internal source, 10% from licensing, 15% from local alliances, 15% from domestic universities, and 49% from foreign sources (Cohen, 1990).

To improve the situation, the government has been cooperating with the private sector on some large-scale R & D projects. One project is the semiconductor technology development project, in which two government-supported research institutions, seven universities, and several private corporations such as Gold Star Semiconductor, Samsung Semiconductor, Korea Electronics, and Hyundai Electronics, are participating. Projects developing new technologies for computers are also undertaken (Weiss, 1989).

Besides investment in local R & D, a good strategy to get new technology is to attract foreign investment. However, there is still a risk of being technologically colonized by foreigners. For instance, many U.S. and European MNCs set up R & D centers abroad to adapt their products to local markets, while real innovations stay at home. There are exceptions, however, especially at places where local R & D capability has reached a certain level. Some American MNCs have begun tapping the talents in Taiwan by funding R & D there (Liu, 1989).

The acid test is for local innovations to make it in the world markets. Taiwan may have the lead, although most of its R & D spending goes into design and development work to make existing products better (Business Week Innovation, 1990). Its engineers are trying to close the gap in microcomputers, pharmaceutical, aircraft components, pollution-abatement equipment, computer-aided design and manufacturing software, and satellite launching. Meanwhile, Taiwan is developing its own technology in industries where it already has strong sales such as shoes, bicycles, low-end machinery, electronic components, etc. Korea is working hard in the same direction.

4. Financial Resources:

Both South Korea and Taiwan has been aggressive in their capital spending. Both usually spend 20-30% of their GNP on capital investment every year. Such a capital-spending ratio is high, even compared with most of the developed countries (International Financial Statistics, 1988, 1989, 1990; The Economist, 1990). Korea has been keeping up its high investment since the early 1980s, but Taiwan's investment has been dropping from around 30% of its GNP in the late 1970s to about 20-25% since mid-1980s due to the rocketing price of properties and stocks (The Economist, 1990). The cost of capital in terms of interest rate, differs in South Korea and Taiwan. Though there is no substantial gap between the prime rates in Korea and Taiwan--both at around 10%--this rate is only available for big corporations. Other interest rates, which are the real cost for the small and mid-sized firms, are lower in Taiwan than in Korea (Lau, 1986; The Economist, 1990).

5.2 Industry-Specific Context in Korea and Taiwan

A. Overview:

One promising area for NIEs to move up in the market is the computer industry. This is a higher-end of the micro-electronics sector where some NIEs have proved capable of competing in the world market. There is some evidence that the production of some high-tech capital goods is somewhat labor-intensive (Clair, 1986), and the added production flexibility in manufacturing processes implies that high production volumes are no longer needed for high productivity, so the typical small-sized firms in developing countries can enter international competition on a smaller scale of production (Blanco, 1988). Their success, however, largely depends on whether they are able to formulate and implement effective public policies and business strategies.

Both Korea and Taiwan have had good opportunities to move up into the computer market. First, both South Korea and Taiwan are among the most successful in export-led economic development. Secondly, they are ready to move up to the high-tech market with solid foundations in manufacturing capability, especially in the area of consumer electronics.

In fact, both South Korea and Taiwan have been successful in developing their indigenous computer industries. Korea and Taiwan formally included information technology in their national economic plans in the late 1970s (Crawford, 1987). In the early 1980s they adopted sweeping policies with two interrelated targets: (1) expanding the manufacture of computer products and services, and (2) extending the use of computer systems into every sphere of the national economies (Crawford, 1987). A decade later, the indigenous computer firms from Korea and Taiwan have become key suppliers of computer parts to the global market and have begun marketing final products of their own design and brand.

To reach the goal, South Korea and Taiwan relied heavily on advanced nations for almost everything, from technology to marketing channels. Their abilities to obtain access to those technologies and channels enabled them to inaugurate a new industry in a short period of time. This dependence has been waning, however, as the indigenous firms have been rapidly becoming sophisticated competitors in the global marketplace.

B. The profile of Taiwan's Computer Industry

With production and exports reaching $5.5 billion and $5.24 billion respectively in 1989, Taiwan was ranked the sixth largest computer producing country in the world. Taiwan occupies approximately 3% of the total global market and 14% of the world's IBM PC clone market; it supplies over half of the world's motherboards and disk drive controllers and over one-third of the world's monitors, terminals, keyboards, and video cards (Asian Computers '91, 1990; Yang, 1989). PCs have become the No.1 export item in Taiwan and undeniably sets forth the important role of the industry in the Taiwan's economic development.

The influence of the Taiwanese computer industry is far greater than its world ranking would suggest. Whatever line of business Taiwanese manufacturers plunge into, drastic price drops are bound to occur worldwide (Target Electronics Industry Computer, 1989). Not only do the Taiwanese firms have competitive advantage in cheap labor but they also have been increasingly capable of competing on the basis of new technology. When Apple introduced the Apple II personal computer in 1978, it took Taiwan four years to clone it; when Compaq introduced the first 32-bit PC in 1986, Acer Inc., Taiwan's leading computer maker, introduced a similar machine only a few weeks behind, and, within seven months 58 Taiwanese firms showed 32-bit machines to their customers (Johnstone, 1988; Yang, 1989). Taiwan's computer industry is being recognized as a key global powerhouse (Yang, 1989).

Taiwan has been experiencing a transition from low-priced computer products toward high-end items, accompanied by an improving local supply of key components. Taiwanese firms also have stepped up their globalization efforts. Recently, they have purchased several U.S.-based computer firms such as Mouse Systems Corp., Maxi-Switch, Censtor Corp., Microcosm, Altos, and Wyse. The Taiwan-based Scanner Program Interface Association (SPIA) is joining efforts in proposing standards for a program interface for hand-held scanners for the rest of the world to follow (Asian Computers '91, 1990).

1. Industrial Structure:

Taiwan has been in the computer business since the 1960s, and the computer industry took off in the mid-1980s. In the early 1980s, many Taiwanese firms entered the computer business by making fake Apple computers, and then later IBM clones. These companies went through many hardships in their early efforts to break into the global market with their own brand names, especially when several copyright suits were brought against them by Apple and IBM in the period from 1982 to 1984 (Business Week, 1984). Due to legal and marketing problems, most Taiwanese firms had to focus on manufacturing computer products for foreign OEM customers until the mid-1980s. Since then, Taiwanese computer makers have been making impressive progress in the world marketplace (Johnstone, 1988; Yang, 1989).

By the end of 1989, there were about 5,450 firms engaging in computer-related business in Taiwan, mostly small and medium-sized firms, with a total capital of over $300 million, a total employment of 88,000, and a total production of $5.5 billion. Though 14% of these firms, around 750, were manufacturers--large companies in Taiwan--and accounted for 70% of the total exports, their average size was still small by world standards. The average number of employees per manufacturer was just over 100; the average amount of capital was less than $380,000, and the average volume of sales was less than $7 million (Table 5-5 & 5-6).

Table 5-5

Taiwan Information Industry

	1986	1987	1988	1989
Number of Exporters	2,788	3,720	4,090	4,650
Number of Manufacturers	480	630	700	750
Total Employees (1,000)	38	50	66	88
Total Capital ($ Million)	214	248	266	300
Total Sales ($ Million)	2,134	3,839	5,168	5,484
Total Exports ($ Million)	2,063	3,701	4,999	5,244

Source: Yearbook of Information Industry, 1989, 1990, III; Asian Computers '91, 1990.

Table 5-6

Scale and Structure of Operation of Computer Firms in Taiwan

NT$ Billion	PC	Monitor	Disk	Printer	Component	All*
Over NT$5	0	1	0	0	0	4
NT$1-NT$5	5	8	1	0	6	17
NT$0.5-NT$1	5	11	0	1	10	18
NT$0.1-NT$0.5	13	23	6	2	70	90
NT$0.05-NT$0.1	22	13	3	1	156	190
NT$0.01-NT$0.05	62	43	13	4	345	401
Below	813	894	219	140	2866	3000
Total	920	993	242	148	3453	3720

Source: Yearbook of Information Industry, 1989.
Note: *, all computer-related products.

Additionally, the export concentration ratio of the top twenty computer makers dropped from 82.4% in 1984 to 53.7% in 1987 and then became stabilized around that ratio (Yearbook of Information Industry, 1990). There also was quite a number of foreign-invested firms operating in Taiwan, which occupied 10-15 positions of the top 30 computer firms, but their dominating status has declined as their export contribution fell from 57% in 1984 to 44% in 1986, 39% in 1987, 36% in 1988 and 35% in 1989 (Asian Computers '91, 1990; Yearbook of Information Industry, 1990). Some of the foreign firms have been acquired by local investors, such as Wyse Taiwan, Qume Taiwan, and Microscience Taiwan.

2. Product Mix:

The computer industry can be broken down into several major product categories, and their relative shares in the industry's total production represent the product mix, as indicated in Table 5-7.

Table 5-7

Composition of Taiwan's Computer Products
(In Percentage)

	1987	1988	1989
Microcomputer	21	23	25
Color Monitor	14	15	18
Motherboard	15	14	15
Terminal	11	10	8
Monochrome Monitor	9	7	6
Power Supplies	6	6	7
Keyboard	4	4	4
Video Card	6	5	4
Control Card	2	2	3
Disk Drive	3	2	2
Printer	1	1	1
Others	8	11	7
Total	100	100	100

Source: Asian Computers '91, 1990; Yearbook of Information Industry, 1989, 1990.

Among these product categories, two are important for the computer industries in both countries: PC and monitor. PCs play a leading role in Taiwan's computer industry, overtaking monitor in 1988 and now accounting for over 25% of the total production in Taiwan's computer industry. In 1989, Taiwan produced a total of 2.23 million PCs and exported 1.98 million of them to the world.

The PC industry in Taiwan has been undergoing a big change in the product mix: with low-end PCs such as XT-compatible being phasing out and high-end PCs such as 386- and 486-based systems coming in. The average unit price has kept rising, from $388.7 in 1987, $579.3 in 1988 to $627.3 in 1989 (Asian Computers '91, 1990). In 1989, both production and export of 386-based systems exceeded that of 286-based systems; in the first half of 1990, Taiwan exported 1 million 386-based systems worth $748 million, more than the total volume and value for the whole year of 1989 (Analysis of Information Industry, 1990.8.C.).

Table 5-8 shows the export composition of Taiwan's computer products:

Table 5-8

Taiwan's Microcomputer Export Composition
($ Million)

	1986	1987	1988	1989	1989 (%)
8088/86	189	303	392	197	15.8
80286	94	258	552	444	35.7
80386	0	45	121	517	41.6
Others	110	153	86	86	6.9
Total	393	759	1,151	1,244	100.0

Source: Asian Computers '91, 1990;
Yearbook of Information Industry, 1989.

Taiwan's PCs account for 10.5% of the world market in terms of unit, and in some world's major markets such as U.K., Germany and France, Taiwan's market shares exceed 15% (Asian

Computers '91, 1990). Taiwan also supplies more than 10% of the world market for laptop and notebook computers (Analysis of Information Industry, 1989.10., 1990.10).

Another key computer product in Taiwan is the monitor. Taiwan has traditionally been the world's largest monitor manufacturer. In 1989, Taiwan produced 7.31 million monitors worth $1.32 billion-- color and mono monitors accounting for 58% and 74% respectively--and exported 6.95 million monitors worth $1.25 billion--color and mono monitors accounting for 55% and 75% respectively, supplying 34.7% of the world market for color monitors and 29.4% of the world market for monochrome monitors (Asian Computers '91, 1990).

Taiwan is also strong in many other computer peripherals. For example, Taiwanese firms now supply about 70% of the mice, more than 60% of the motherboards, 52% of the control cards, 33% of the video cards and terminals, 29% of the keyboards, and 18% of the power supply devices in the world (Asian Computers '91, 1990). The key components for these products are primarily produced by the small- to mid-scaled firms in Taiwan.

Taiwan enjoys an extensive component industry to support monitor production and it has been trying to upgrade its monitor production. These efforts have resulted in several trends: (1) 12-inch monitors are rapidly giving way to 14-inch models; (2) low- to mid-resolution monochrome monitors dropped from 54% of Taiwan's total number of monitors exported in 1988 to 39% in 1989, and color monitors overtook monochrome as the leader even in terms of volume (by mid-1990, the ratio of color monitors to total monitor production exceeded 60% in volume terms); (3) the share of VGA monitor production rose from 12.6% in 1988 to 27.2% in 1989, and (4) because of the above changes, the unit price of monitors has kept going up. In the first half of 1990, Taiwan's total monitor production reached 3.6 million units worth $685 million, with the unit price reaching $190.3, compared to that of $152 in 1988 and $180 in 1989 (Asian Computers' 91, 1990). These trends help make monitors one of Taiwan's strongest information products. If the local availability of high-resolution CRTs and LCDs can be improved, Taiwan could possibly become the world's most important production base for color monitors (Asian Computers '91, 1990).

3. Export Market Mix:

Taiwan's computer industry is highly export-oriented, with an export ratio of over 95% (Asian Computers '91, 1990). The export of information products accounts for 9.4% of Taiwan's total exports, and it ranks as the No.3 largest exporting industry in Taiwan. As the No.1 exporting item in the electronics sector, the share of computer products in the electronics export was 25% in 1985, and by 1988 the share increased to 38% (Yearbook of Information Industry, 1990). The locally-owned firms are responsible for over two-thirds of the total exports from Taiwan (Analysis of Information industry, 1990.8.C.).

The export market for Taiwan's information products has been more diversified. The export to North America has decreased in recent years while the export to Europe has been increasing at more than 20% a year. In 1989, 39.5% of Taiwan's information products were exported to Europe, compared to the 42.8% to North America (Asian Computers '91, 1990). Europe was the largest market for Taiwan's PCs in 1989, taking 52% of its total export, compared to 1988's 48.2%; the U.S. market accounted only for 31% of Taiwan's PC export in 1989. Taiwan's monitor markets are also gradually shifting from the U.S. to other parts of the world. Shipments to the U.S. decreased from 45% of the total exports in 1988 to 40% in 1989, while those to Europe increased to 42% in 1989 (Asian Computers '91, 1990).

4. Marketing Channels:

Of the various marketing channels available to Taiwan makers, OEM is still the most important. Of the two key characteristics of OEM sales--large quantity and marketing channel, marketing channel is more important to Taiwan companies, as most of them do not have their own marketing channels. In 1989, 43% of all Taiwan information products were exported through OEM orders, as compared to 44% in 1988, 41% in 1987, and 39% in 1986 (Asian Computers '91, 1990).

To earn higher profits, most Taiwan firms are trying to upgrade their sales from OEM to ODM (original design manufacturers) or OBM (original brand manufacturers) and to develop their own overseas marketing channels. Such efforts have paid off, and sales of products with manufacturers' own brands have increased in recent years. Taiwanese firms exported 41% of their PCs under their own brand names in 1989, while OEM orders fell to 27%, and foreign subsidiaries in Taiwan took the rest, compared to 1988's 40%, 22% and 38% respectively (Analysis of Information Industry, 1990.5.C). As for monitors, about 36% of Taiwan's 1989 exports were to OEM customers, compared to 40% in 1988, while brand sales rose from 21% to 24% (Analysis of Information Industry, 1990.5.C). Overall exports through Taiwanese brand names went up from 3% in 1984 to 17% in 1986, 20% in 1987 and 1988, and 22% in 1989 (Asian Computers '91, 1990; Yearbook of Information Industry, 1990).

5. Major Players:

Indigenous computer manufacturers in Taiwan may be divided into four groups according to their historical background, technical capability, marketing expertise, financial strength, and level of internationalization.

The first group includes those companies that gained their computer experience by serving as distributing agents for foreign vendors, including such well-established PC manufacturers as Acer and Mitac, which now ranks among the world top 100 computer firms (Datamation 100, 1990). These firms usually have rich experience in computer design and marketing gained through close cooperation with well-established foreign vendors.

The second group includes those spin-offs of existing computer firms, either foreign or locally-owned, such as Microtek and UMAX, both scanner makers; Elitegroup, a motherboard maker, and DFI, an add-on card maker. Founded by visionary entrepreneurs, these fast-growing firms usually have strong R & D capabilities but their manufacturing experience and finance strength are in doubt.

The third group includes those firms that are subsidiaries of diversified large corporations such as CAF from the Yuen Foong Yu Group, FIC from the Formosa Plastics Group, Arche from the Kunnan Group, Chaplet from the Chinese Automobile, etc., all being PC makers. These firms can get access to strong financial and marketing support from their parent companies.

The fourth group includes those traditional electronics makers that have diversified into the computer industry such as Tatung, Sampo, Teco, etc. These firms normally have both strong manufacturing and marketing expertise plus technological and financial capabilities. Though these companies are complex in organizational structure, they are not usually well equipped with innovative capabilities in the computer area.

6. Government Policy:

The Taiwanese government has been very active in promoting the information industry through various kinds of policies to support typically small-scale Taiwanese firms. As early as 1980, the Taiwanese government proposed a "Ten-Year Development Plan for the Information Industry in Taiwan," in which the government formulated a series of detailed objectives, goals, policies to foster the indigenous computer industry and to promote it into an export-oriented endeavor. In this plan, human resource development, technology acquisition, and favorable environment for investment were singled out as key factors for the development of an indigenous computer industry.

To meet the need for scientific and technical manpower, the government established a nation-wide network of educational computer systems, accompanied by the intensive courses and the modern facilities in the educational institutions. The government also set up training centers for computer technology to expedite on-the-job training for skilled manpower. A qualification examination system was also established to raise the level of computer expertise.

To enhance Taiwan's technological capability, the government funded various R & D programs through educational and research institutions. The most obvious examples include the Hsinchu Science-based Industrial Park (HSIP) and the Electronics Research and Service Organization (ERSO). HISP was set up in 1979 to induce investment in knowledge-intensive industries. The incentives for investment in HSIP include favorable financing, cheap land rent, tax exemption and tax credit.

ERSO, a division of the Industrial Technology Research Institute (ITRI), was founded in 1974, with the mission of promoting the technological advancement of the electronics industry. ERSO performs two major functions: (1) to develop new generic technologies to be transferred to the private firms for commercialization, and (2) to provide needed technical services for the private firms. In recent years, ERSO has been concentrating on the development of semiconductors, computers, telecommunications, and industrial automation. ERSO has successfully developed many products that have been commercialized by the private companies, including BIOS and chip sets for 386- and 486-based systems and workstations. ERSO also offers a broad range of services to foster the effective diffusion of new technologies for specific needs of the electronics industry. The government has used procurement and tariffs to encourage targeted strategic products, especially in the information industry. To accelerate the development of local industries, the government also has spared no effort to attract foreign capital into Taiwan to help counter such problems as appreciation of Taiwan currency as well as to introduce into Taiwan the latest technical know-how to strengthen international competitiveness. Besides the establishment of Industrial Development and Investment Center (IDIC) at the Ministry of Economic Affairs for promotion purposes, other government agencies such as the Hsinchu Science-based Industrial Park and agencies stationed abroad have engaged in trade promotion, taking that promotion as one of their major tasks.

As part of its effort to meet needs for future economic growth, the government has accelerated the transition of the industrial structure by promoting the development of venture capital companies, especially those that invest in high-tech industries. By mid-1989 there were 11 venture-capital companies in Taiwan, with a total paid-in capital of NT$4.5 billion; these firms were involved in 96 cases with a total amount of NT$1.62 billion, 86% of which went to information and electronic firms (Yearbook of Information Industry, 1990).

The government also offers subsidies and loans and forms joint-ventures to finance private R & D projects to cultivate information technology. Assisting local manufacturers to get loans has become an important element of the government's promotion of strategic industries including the computer industry in Taiwan. Those manufacturers engaging in the computer business are entitled to apply for loans from selected financial institutions. The government also provided a special fund totaling NT$27.3 million for manufacturers to develop computer systems, electronic parts and materials. The funds also were used for technical assistance as well as improving the management and daily operations of Taiwan computer companies (Yearbook of Information Industry, 1990).

The Taiwanese government has also played a key role in promoting Taiwan's computer products in the global markets. Taiwan's main trade-related agency is China External Trade Development Council (CETRA). Founded in 1970, CETRA provides services to both domestic and foreign firms. Those services include providing business information, sponsoring trade shows, organizing business trips, and product design and packaging. These services has greatly helped the indigenous computer firms to enter foreign markets.

C. Profile of Korea's Computer Industry

Korea produced $3.26 and exported $2.45 billion of computer products--including $1 billion of PCs and $0.5 billion of color monitors in 1989. This performance continued a boom that began in 1986, and led Korea to become one of the top ten computer producing countries in the world, from No. 13 in 1986 (Asian Computers '91, 1990; Analysis of Information Industry, 1990.8.C.; U.S. Department of Commerce, 1990a). Korea is working aggressively to reach the goal of exporting $5.9 billion of computer products by 1992 (U.S. Department of Commerce, 1990a).

Korea has been enjoying rapid growth in its computer industry in recent years, reducing the gap with its major rival, Taiwan. Korea's production of computer-related products rose from $9 million in 1980--with local firms accounting for 98% of the total--to $519.3 million in 1985--with local firm accounting for 66% of the total (Kim et al, 1987); by 1989, the total computer-related production in Korea reached $3.26 billion, a 26% increase over 1988 (much higher than Taiwan's growth of 6%), accounting for 1.3% of its GNP (Asian Computers '91, 1990).

1. Industrial Structure:

Since the early 1980s, the number of firms in Korea's computer industry has gradually increased. For instance, there were only 4 computer producers in 1980; by 1985, the number increased to 50, including 39 locally-owned firms, 7 joint ventures, and 4 foreign subsidiaries (Kim et al, 1987); by 1986, Korea had 57 registered manufacturers of computers, peripherals and related products--including 20 medium-to-small PC makers--and around 45 unregistered manufacturers, employing approximately 84,500 people (U.S. Department of Commerce, 1986); by 1990, there were about 93 makers of computer hardware in Korea (Computer Guide Book of Korea, 1990-91). Among them about 60 were major computer-related firms, including 20 manufacturers of PC systems (U.S. Department of Commerce, 1990a). Korea's computer industry centers on six major makers, which together account for 3/4 of the country's total production and export: TriGem, Hyundai, Samsung, Daewoo and Goldstar, each being close to others in volume of computer sales (Crane, 1990).

2. Product Mix:

Korea's computer products consist mainly of microcomputers and peripherals, accounting for more than 90% of the total production and exports (Kim et al, 1987; Analysis of Information Industry, 1989.7.C). Among them, PCs and monitors stand out as two of the most important items. In 1987, PCs accounted for 38% of the total value of Korea's export of computer products, while monitors had another 35%; in 1988, the respective percentages were 41% and 34%, and in 1989, the respective numbers became 45% and 30% (Analysis of Information Industry, 1989.7.C. and 1990.8.C.).

South Korea's export composition of PCs are shown in Table 5-9:

Table 5-9

Korea's Microcomputer Export Composition
($ Million)

	1986	1987	1988	1989	1989 (%)
8088/86	218	358	418	333	35.4
80286	36	90	316	369	39.1
80386	0	0	48	140	14.9
Home PC	150	79	124	100	10.6
Total	404	527	906	942	100.0

Source: Analysis of Information Industry, MIC, III, 1989.7.C.

From 1983 to 1988, Korea's IBM-compatible PC exports soared an average of more than 50% annually, reaching $935 million in 1988. But in 1989 the value of PC exports grew only 4% and the number of units shipped dropped by 3.7% (Crane, 1990). Even so, Korea is still the fifth largest PC exporter in the world with 2 million shipped in 1989 (Business Korea, 1990a).

The next largest computer product is the monitor. Korea exported $481 million worth of monitors, both color and mono, in 1987, and $750 million, including $480 million of color monitors, in 1988; in 1989, Korea exported $561 million of color monitors (Analysis of Information Industry, 1989.7.C. & 1990.8.C.). Unlike Taiwan, where TV exports have all but dried up, Korean firms are major TV suppliers to the world market. Therefore, Korea's monitors, backed up by a solid TV industry and based upon mass production and a low price strategy, are very competitive in the world market. For instance, Korean monitor makers have a local supply of picture tubes. Samsung, Goldstar, and Orion can supply much of the local demand, while Taiwan must depend on imports from Japan or foreign subsidiaries in Taiwan. However, Korean makers still rely on lower-end color monitors such as EGA and CGA models (Asian Computers '91, 1990).

Korea is also a major supplier of keyboards to the world market. Korean firms have been wrestling with their Taiwanese counterparts to grab a bigger global market share. Like PC makers, Korean keyboard makers also rely mainly on economies of scale. With the price of keyboards falling, most of the Korean manufacturers are prepared to cut prices to the most competitive level with the help of volume economy, but many show more interest in reliable quality rather than price differences. They are also interested in diversifying their products, including various types of keyboards for different purposes. Korean makers believe that they have a competitive edge over Taiwanese in price thanks to the mass production of quality switches of their own.

Korea has been trying hard to develop its hard disk industry in recent years, but with mixed results. Korea started producing hard disk drives in 1986 with only one firm--Oriental Precision, but in 1988 four more firms entered the industry. For several years this industry segment has been growing at a rate of more than 100%. Due to technical difficulties, Korean firms had time and again failed in their attempt to design fast, operational machines. Until recently, these efforts have been focused on OEM contracts, where the marketing restrictions allow sales in limited territories, usually only Korea. They largely produce only disk drives with small capacity. Korea has a highly developed semiconductor industry. Seemingly overnight, Korea has become the world's No.3 chip producer, trailing only Japan and the U.S., with sales amounting to $2 billion in 1990 (Neff et al, 1990). Korea's leading chipmaker, Samsung Electronics Co., is now only a year or so behind Japan in developing DRAMs. It recently started shipping its own 4-megabyte DRAM--the first time a Korean company has designed a state-of-the-art integrated circuit from scratch. To ensure closing the gap with Japan, the Korean government planned a five-year public-private program to catch up to Japan by 1993. Rather than going after small niches, Korea's chipmakers have chosen to attack the high-volume DRAM markets and have been successful. However, their move into microprocessors and other more profitable products is slow. Lack of R & D is often singled out as the key factor (Neff et al, 1990).

Except memory chips, Korea's computer components industry is not well developed due to many factors. According to a comparative study of the computer industries in the "Four Dragons", Korea's local component source is ranked the weakest among the four (Asian Computers '91, 1990).

3. Export Market Mix:

Korea's computer industry is basically export-oriented, with an export ratio of 60-70% (less export-dependent than Taiwan), and with North America and Western Europe as the major markets (U.S. Department of Commerce, 1990a). Its exports increased from $6.2 million in 1980 to around $399.6 million in 1985, and then to $2.45 billion in 1989 (Kim et al, 1987; U.S. Department of Commerce, 1990a). Computer products have become Korea's No.2 exporting item in its electronics industry, just behind semiconductors.

Korea's largest computer export market is the U.S., which takes over 50% of the total export, while Europe takes another 35% and Asia takes 6% (Analysis of Information Industry, 1989.7.C.). Korean computer firms formerly relied mainly on OEM as a way to market their products, but they are aggressively promoting their own brands by establishing their own marketing channels through acquisition of existing U.S. vendors or opening up new marketing branches.

4. Major Players:

The players in the indigenous computer industry in Korea can be divided into four groups according to their historical background, technological capability, marketing expertise and financial strength.

The first group of firms had both manufacturing and R & D capabilities at the time of their entry into the computer industry and soon dominated the local market, such as Samsung, Hyundai, Daewoo. These firms have been leaders in the electronics industry from which they have diversified into the computer industry. Capabilities gained in consumer electronics through implementation, assimilation and improvement of imported technology by indigenous efforts have been applied to a great extent to the production and innovation of computers. These industry leaders, reluctant to copy foreign products, have been investing heavily in acquiring technological capabilities in computer design and manufacturing to supplement previous experiences and capabilities in consumer electronics.

In addition to investment in local technological efforts, they established high-tech outposts in Silicon Valley in the 1980s. These outposts are manned primarily by Korean-American scientists who have worked at American computer firms such as IBM, DEC, Bell Labs and Hewlett-Packard. These California offices also serve as an "antenna" for information on research activities and training posts for scientists and engineers from R & D centers and manufacturing plants in Korea (Kim et al, 1987). These firms have been the major beneficiaries of public R & D support. They usually account for over 90% of the government's support for joint research between public R & D institutes and the private sector. They also depend heavily on foreign technology, accounting for about 60% or 32 of 54 licensing agreements through 1985, for instance (Kim et al, 1987). In short, the industry leaders exhibit four characteristics of dynamic firms: (1) combining external technological inputs with in-house technological efforts to expedite the acquisition of technological capability; (2) boundary spanning activity to monitor technological changes elsewhere; (3) heavy commitment to training and developing human resources, and (4) organizational capability to integrate the above elements and to orchestrate the various functions in the firm to carry out its competitive strategy

(Kim et al, 1987).

The second group, small in number, includes technology-based small spin-offs from universities and public R & D institutes without previous manufacturing experience, such as TriGem, Qnix, EsPert, and Taeil Media. Given the initial capability in innovation, they normally start by developing innovative systems and software for the industry leaders under sub-contracts and gradually accumulate manufacturing capability to make their own systems. They rely less than others on licensing foreign technology and continue to maintain a close relationship with their original institutions (universities and R & D institutes) as a way to sustain their dynamic competitiveness. Some of them have grown to become important exporters (Kim et al, 1987).

The third group of computer firms generally entered the industry with some manufacturing experience in industrial electronics on a small-scale but without innovation capability. These firms include Sejin, Handok, and Jeil Precision. They are primarily engaged in producing computers and peripherals for OEM buyers. They benefit from technological assistance from the OEM buyers but have not aggressively invested to acquire advanced technological capabilities. Some of them have intensified their R & D efforts recently as a strategy to diversify their product lines and markets (Kim et al, 1987).

The fourth group includes those who entered the computer industry without either manufacturing experience or innovation. Some of them are large existing firms which have no previous experience in electronics. They entered the industry by acting as a local sales and service agent for foreign firms, and then shifted into manufacturing under foreign licensing. The rest are small entrants relying on imitating existing products through reverse engineering (Kim et al, 1987). Examples of such firms are Korea Computer Inc., Korea Computer Corp., and Hyung Han Systems.

5. Government Policy:

The government of Korea has played a critical but indirect role in the development of the indigenous computer industry in Korea. The related public policies may be divided into three categories (Kim et al, 1987). The first set of policies is designed to induce the private sector to invest in technological efforts by creating a market for innovative products (the demand side of technology); the second set is designed to help the private sector enhance R & D activities and acquire technological capabilities (the supply side of technology), and the third set is designed to provide an effective linkage between the demand and supply sides, making technological efforts feasible and less risky and costly.

There is a major difference between the policies to promote the computer and other microelectronics-related industries in 1980s and those used to promote more mature industries in the previous decades. The difference is that the government took a much more active role for the former than in the latter in both strengthening R & D capabilities (supply side) and creating markets (demand side).

The first set of policies includes those for import-restrictions and procurement arrangements. For import restrictions, a series of new rules were established in 1982 to ban the import of all mini-, micro- and personal computers, peripherals and related software if the equivalent products were being produced locally. Exceptions were made for educational and research purposes. Further, an import license for any computer and/or related equipment had to be approved by the government. Preference for this approval was given to companies having joint-ventures or technology transfer agreements with Korean firms. These measures did not seriously affect those large companies that were present before 1982. However, it effectively closed the market for new foreign entrants after 1982.

The most influential mechanism that the Korean government has used for the development of the computer industry is the creation of the markets through its procurement activities. The government's first such action, for example, was its announcement in 1982 that it intended to purchase PCs for public schools. This attracted many new entrants to the industry and induced aggressive investments and R & D and production by some existing firms, and became instrumental in setting up technical standards, making a major turning point for the computer industry in Korea (Kim et al, 1987).

The second set of policies includes public funding for basic research at universities and public institutions, and for private firms participating in joint research projects. Here, the government played a more significant role as a developer in high-tech industries in the 1980s than in the traditional industries before, as high-tech industries required more basic and mission-oriented applied research (Kim et al, 1987). First, the government supported basic research at some 30 universities that had graduate programs in high-tech fields. Secondly, several research institutes, such as the Korea Institute of Electronics Technology (KIET), the Korea Advanced Institute of Science and Technology (KAIST), and the Korea Electronics and Telecommunications Research Institute, played pioneering roles in developing high-tech industries. Thirdly, the government initiated a "Special Industrial Technology Research Financing Program" in 1982 to provide seed money to public R & D institutes that undertook R & D projects jointly with the private sector and academe.

The third set of policies includes various tax incentives, preferential financing, and support for education and training. For instance, Korea's fifth Five-Year Plan for the Electronics Industry Targeting Program singled out total 180 projects, including 19 in computer hardware and software, with $300 million investment (Korea Newsreview, 1990b).

D. Comparison of Korean and Taiwanese Computer Industries

Industry-specific similarities and differences between South Korea and Taiwan have a direct bearing on the choice of firm-specific competitive strategies among the indigenous computer firms in Korea and Taiwan. It is important to note the industry-specific features in national settings as a part of the competitive context, against which the computer firms formulate and implement their firm-specific strategies.

1. Major Similarities:

As indicated in the discussion on the national competitive context, major similarities between the computer industries in South Korea and Taiwan include the following:

(1) both have had solid supporting industries such as the consumer electronics industry, semiconductor industry and telecommunications industry;

(2) both have adopted the export orientation, mainly targeting the U.S. market;

(3) both have developed the computer industry through private sector with the help of the government (Brazil and India, in contrast, depend mainly on their public sectors);

(4) both emphasize human capital development through in-house training and education abroad (enjoying "brain drain in reverse" from the United States back home);

(5) both have relied on the developed nations, particularly the United States and Japan for new technologies and key components;

(6) both have heavily depended on OEM deals for export, and

(7) both focus on relatively labor-intensive and low-end products.

Due to these similarities, the computer firms in Korea and Taiwan share many problems associated with today's intensified global competition. These problems--trade frictions, labor cost, social unrest, and exchange rate--were discussed in detail in Chapter IV.

2. Major Differences:

There are also many structural differences between the two industries, and because of those differences, firms in South Korea and Taiwan tend to adopt distinctive strategies (Levy, 1988). Several factors have contributed to the differences, including historical background and public policies.

While Taiwan started making computer components and parts for the U.S. buyers in the 1960s, Korea entered the computer business only in the early 1980s (Yang et al, 1986). Though a few existing electronics firms in Korea began producing OEM products such as dumb terminals in 1979, it was not until 1980 that Korea's computer industry was formally established when a number of small new entrants started making Apple-compatible personal computers (Kim et al, 1987). In Taiwan, those traditional components makers and marketing agents for foreign computer firms in Taiwan were able to launch computer projects with the help of the govern-ment-sponsored research institutes in the late 1970s (Kovar, 1990).

Not only did Korea entered the computer business later than Taiwan but it also has been less aggressive in developing its own indigenous computer technology than Taiwan (Asian Computers '91, 1990). Korea's national policy has been to develop both the consumer electronics industry and the information industry at the same time to share the same resources. Korea also has been less active in attracting foreign investment in the information industry than Taiwan (Kovar, 1990).

While Korea leads Taiwan in the export of consumer electronics products, particularly those products that require large-scale investment and mass production, Taiwan leads Korea in the export of industrial electronics, especially computer-related products that are more suited to the production abilities of small- and medium-sized firms. While 20% of Taiwan electronics export is consumer electronics and 40% is industrial electronics, 40% of Korea's export of electronics is consumer electronics and 20% as industrial electronics (Kovar, 1990). While Taiwan has a 7.4% share in the OECD industrial electronics market and 4.1% in the OECD consumer electronics market, Korea has 2.6% and 11.3% respectively (Bae, 1990).

Due to the above and other reasons, there are significant differences in the structure of the two industries. First, the computer industry in Korea is highly concentrated in a few conglomerates, especially the four chaebols--Samsung, Goldstar, Hyundai and Daewoo, while Taiwan's computer industry is composed of a large number of small and mid-scaled firms. By 1990, Taiwan had 173 PC makers, compared to only 44 in Korea; in Taiwan there were 159 monitor makers, seven times the number in Korea (Kovar, 1990). The average member firm of the Taiwan Electric Appliance Manufactures Association (TEAMA) had 96 employees; the average Electronics Industries Association of Korea (EIAK) member company had 450 employees, and the average capital of a Taiwan company was US$600,000, which was only one-fourth of the Korean average of US$2.4 million (Kovar, 1990). If foreign-invested firms and joint ventures--more prevailing in Taiwan than in Korea--were excluded, the average size of local Taiwanese firms would be even smaller, with only 64 employees and US$400,000 in capital (Kovar, 1990). The concentration ratio of the top 20 computer manufacturers in Taiwan was 53.7%, while the same ratio in Korea was 95.5%, with the top four controlling over 60% of the total production and the top five accounting for 75% of the total (Analysis of Information Industry, 1990.8. C.; Crane, 1990; Kovar, 1990; Yearbook of information Industry, 1990).

Though both Korean and Taiwan computer firms have realized the fact that the traditional "screwdriver assembly" approach that depends heavily on cheap labor, imported components and OEM deals is no longer practical for them, Korea's transition to higher-tech and more value-added products has not been, in general, as quick and smooth as Taiwan (Business Korea, 1990a). Taiwanese firms have generally been successful in staying close to the starting phase of a product life cycle of many computer products such as i486-based PCs, color scanners, and super VGA monitors, while Korean firms tend to lag 6 to 12 months behind Taiwanese firms in introducing new products so they generally depend on lower-end, standard products such as XT/AT PCs and CGA/EGA color monitors (Analysis of Information Industry, 1989.7.C.).

One way to measure the differences is to examine the average unit price of major computer products exported from Korea and Taiwan. The average unit prices of major export products such as PCs and monitors are much higher in Taiwan than in Korea, suggesting Taiwan's general focus on higher-end products as compared with Korean firms (Table 5-10).

Table 5-10

Exports of Computer Products from Korea and Taiwan in 1988

	Korea			Taiwan		
	Value	Volume	Unit-Price	Value	Volume	Unit-Price
PC	906	2,490	363.85	1,151	1,987	579.27
Color Monitor	481	3,496	137.59	723	2,746	263.29
Mono Monitor	269	4,110	65.43	365	3,693	98.84
Terminal	141	582	242.27	505	2,585	195.36
Hard Disk	34	58	586.21	111	421	263.58
Printer	9	50	180.00	43	96	447.91
Other periph.	100	-	-	81	-	-
Components	271	-	-	2,016	-	-
Total	2,211	-	-	4,999	-	-

Source: Information Industry Analysis, Taiwan, 1989.7.C.
Note: "Value" in $ million, "Volume" in thousand, and "Unit-Price" in $.

A closer look at the structure of PC exports leads to the same conclusion. Taiwanese PC makers are moving toward higher-end products more quickly than Korean firms, as indicated by the share of each model in their product lines in Table 5-11.

Table 5-11

Composition of PC Export in Korea and Taiwan
(% in terms of value)

	Korea				Taiwan			
	1986	1987	1988	1989	1986	1987	1988	1989
8088/86	54	68	46	35	48	40	34	16
80286	9	17	35	39	24	34	48	35
80386	0	0	5	15	0	6	10	42
Home	37	15	14	11	28	20	8	7
Total	100	100	100	100	100	100	100	100

Source: Analysis of Information Industry , MIC, III, Taiwan, 1989.7.C; Asian Computers' 91, ARCO Publishing,1990.
Note: Korea's 80386 figure includes laptop computers.

Korea is also not generally as strong as Taiwan in computer components. Computer components account for only 10% of Korea's total value of computer production, whereas Taiwan's computer components take a share of around 40% (Asian Computers '91, 1990). Korea shipped 2 million PCs broad in 1989, but only the cabinet was actually produced in Korea and foreign suppliers provided the key parts such as basic input/output system (BIOS), microprocessor, floppy disk drive, hard disk drive, keyboard, chip sets, which made up half of the total production cost. This leads up to lower value-added for local PC makers. Compared to foreign PC makers' value-added rates over 50%, Korea's local makers average below 10% (Business Korea, 1990a).

Due to the lack of local suppliers, Korean firms normally pay more than their Taiwan counterparts for many items. For instance, the average material cost for one 16-bit AT personal computer for Korean PC manufacturers was US$956.46 in 1990, compared with Taiwan's US$822.66; Korean firms would pay, on the average, US$25 more per EGA board, US$9 more for keyboard, and US$46.8 more for 36 units of DRAM (100ns) than Taiwan firms (Kovar, 1990). Yet Korea has been very successful in developing its chip industry and it enjoys a better local supply of CTRs for monochrome monitors than Taiwan (Asian Computers '91, 1990). Additionally, for those key components imported from the U.S. and Japan, Korean firms may get the benefit of lower price due to volume discount (Analysis of Information Industry, 1989.7.C.).

Related to their size, Korean computer makers tend to follow the approach of reaping economies of scale by mass producing a few standard items at lower cost. Their marketing strategies tend to emphasize large OEM orders and market share with aggressive pricing even at the expense of profit margin (Analysis of Information Industry, 1989.7.C.). For instance, Korean firms concentrate on PCs and monitors while Taiwan firms generally offer a wide range of computer product lines including power supplies, cases, mice, scanners, and add-on cards. While Taiwan firms sold 56% of their computer products abroad with their own brands and only 44% through OEM arrangement in 1986, about 73% of Korea's total computer products was exported on the OEM basis and only 27% was marketed with their own brands in the same year (Levy, 1988).

One study found out that Korean monitor makers usually require a 4% profit margin, while their Taiwanese counterparts would ask for a margin of over 10%; as a result, the Korean firms sell their monitors at a price 15% below Taiwan's, among which half is due to the low-pricing strategy (Analysis of Information Industry, 1989.7.C.). Due to their large size, Korean manufacturers, in contrast to Taiwanese firms, tend to have difficulty in accepting small orders (Asian Computers '91, 1990).

Korean PC makers usually devote a higher percentage of their total revenues to R & D than Taiwan firms. Korean PC firms often spend 5-8% of sales on R & D, as compared with an average of 3-5% among most of the Taiwan firms (Crane, 1990). However, Taiwanese firms have been stepping up their own R & D efforts to rival their Korean counterparts. According to a survey by Electronic Business Asia of 14 Asian-owned PC makers in the four Asian NIEs, Taiwanese PC makers had the most aggressive growth plans, with spending on R & D programs expected to climb from an average of 3.6% of sales in 1989 to 14% in 1990 and 15.5% in 1992; South Korean vendors, with the highest R & D rate averaging 6% in 1989, planned to spend 7% in 1990 and 9% in 1992 (Cohen, 1990). Rather than spending to strengthen their R & D muscle, much of Korean firms' huge foreign earnings during the boom period of 1986-88 when the strong Yen forced Japan to hand over many orders to Korea poured into land speculation, and that had serious negative impacts on Korean firms (Business Korea, 1989a, 1990a).

To overcome the disadvantage of being small, Taiwanese firms have also been putting their limited resources together in developing new products. R & D consortia have been quite popular among Taiwanese firms for new products such as notebook and hand-held computers, color scanners and X-window terminals (Brown, 1990). Marketing consortia are also planning to establish computer supermarkets in the U.S. to jointly retail their products (China Daily, 11/24/90).

Korean firms' reliance on borrowed capital is also higher than Taiwan firms. Over the past decade, the Korean giants have had to borrow huge amounts from both domestic and foreign financial institutions on their way to becoming industrial powerhouses. For example, the average debt ratio of the 30 Korean chaebols reached 484% in 1988 and that of the top five stood at 464% in 1988 (Business Korea, 1989a, 1990b). Taiwan firms usually have a much lower debt ratio (Analysis of Information Industry, 1989.7.C.; The Economist, 1990).

Korean firms tend to depend less on export and rely more on the domestic market than Taiwanese firms. While Taiwan exports 95% of its total production and imports 70% of its total domestic consumption, Korea only exports 65% of its total production and imports 45% of its total domestic consumption (U.S. Department of Commerce, 1990a, 1990b).

As indicated above, the computer firms from Taiwan and Korea tend to follow different business strategies. The central ingredient of the approach commonly adopted by Korean firms has been the readiness to make substantial initial investment, to start production at high volume, to push exports at low prices which sometimes are even below costs, to move rapidly down the learning curve and move up steadily along the value-added chain from assembly to component fabrication, in-house product design and brand promotion (Levy, 1988).

In contrast, Taiwanese firms, normally smaller in size and thus less able to reap the benefits of large-volume production, have emphasized the development of rather different competitive advantages than their Korean counterparts (Levy, 1988). Whereas Korean firms tend to focus on low-end products with aggressive pricing, Taiwanese firms have increasingly tried to earn profits by upgrading their products and by cultivating flexibility. Whereas Koreans tend to compete head-on with existing market leaders in an effort to win a significant market share for standardized products, the Taiwanese have sought out market niches for non-standardized items (Levy, 1988).

As for the market performances, it can be seen that Korea's export of computer products in general has been generally growing faster than that of Taiwan except for PCs, as indicated in Table 5-12.

Table 5-12

Export Growth of Computer Products from Taiwan and Korea
(Percentage)

	1987	1988	1989	1987-89*
Total				
Korea	63%	60%	11%	63.7%
Taiwan	79%	35%	5%	51.4%
PC				
Korea	30%	72%	4%	44.6%
Taiwan	94%	51%	8%	72.2%

Source: Asian Computers '91, 1990; Analysis of Information Industry, 1989.7.C.; Yearbook of Information Industry, 1989.
Note: *, simple average annual growth rate.

In the first half of 1990, Korea's export of computer products was down by 10% from 1989, while Taiwan's export of information products in the first nine months went up 16.3%; Korea's export of PCs in 1990 declined about 50% from 1989, while Taiwan's export in the first nine months increased by 1% (China Daily, 11/4/90; 1/7/91). For the whole year of 1990, Taiwan's total production amounted to more than $6 billion, up 12% from that of 1989, and exports grew 10% to $5.75 billion

(China Daily, 1/7/91).

As for their performances in the world's largest market-the U.S., Korean firms performed marginally better than Taiwanese firms up to 1989. While Taiwan exported $1.175 billion of computer products to the U.S. in 1986, $1.91 billion in 1987, $2.198 billion in 1988, and $2.374 billion in 1989, with an average annual growth of 34%, Korea's exports to the U.S. was $600 million in 1986, $750 million in 1987, $1.031 billion in 1988, and $1.279 billion in 1989, with a growth of 38% (U.S. Industrial Outlook, 1989, 1990, 1991).

5.3 Key Success Factors at the National Level

From the above discussion, some conclusions can be drawn about the key success factors for the indigenous computer firms from Korea and Taiwan. From the review of the industry-specific context at both the global and national levels as well as the nation-specific context, it can be seen that the indigenous computer firms from Korea and Taiwan cannot adopt the strategies for the top-tier players. Most of the Korean and Taiwanese computer vendors are only capable of competing in the global market as the bottom-tier players but some of them have the potential to become serious middle-tier contenders.

For Korea and Taiwan, the competition to become the world's leading supplier of IBM clones has turned into economic warfare between the two countries. In this warfare, Korean firms enjoy many advantages. They can afford to push the Taiwanese out of the market by cutting prices; they can afford to extend credit to customers and have other resources to help them edge out the Taiwanese (Yang, 1989). Yet Taiwanese firms also have their own advantages. Most Taiwanese firms have worked their way up through the basic stages of computer technology, progressing from printed circuit boards to home computers to IBM-compatible systems. The process has developed a great deal of expertise in Taiwan. Because of that, while Korean suppliers have good economies of scale, the Taiwanese entrepreneurs have the technical skills and flexibility to adapt quickly to changing markets and to serve smaller niches. Taiwanese firms claim that they can cope with a change of technology much faster than Korean counterparts. In short, Taiwanese firms are more dynamic, flexible and innovative, while Korean firms have the advantage of heavy industrial muscle. Fortunately, there is enough room for both to develop in the computer industry (Yang et al, 1986)

Based upon their unique competitive advantages, the indigenous computer firms from Korea and Taiwan tend to follow different strategies for the global competition. Korean firms have comparative advantage in the scale economies of scale, so they are inclined to follow the low-cost strategy. In contrast, being small and flexible, Taiwanese firms often adopt the market-niche strategy.

With their concentration on large OEM orders, most Korean PC makers rely heavily on price as their key competitive advantage, rather than investing in overseas sales networks or new technology to improve their products. The strategy has been undermined during the past three years, as rising wages and a rapid appreciation of their currency have hurt the relative price/performance advantage of their machines. The low-end PCs that were the bread-and-butter of Korean computer makers in the 1980s are now driven more by price than any other factor. Also, because most Korean makers manufacture PCs on an OEM basis, their survival has been at the mercy of their OEM buyers.

With the organizational flexibility and technological sophistication, Taiwanese firms tend to focus on higher-end products for special market niches. They rely much less on OEM deals than their Korean counterparts. Instead they tend to emphasize their own brand names. They join efforts with U.S.-based computer firms established by American-Chinese to develop and market new products in the U.S. and push hard to diversify into European market through joint ventures with local partners.

Both the indigenous computer firms from Korea and Taiwan have the capability to compete in the global marketplace as middle-tier players. They have the resources for an average job in R & D and marketing, and they have good manufacturing facilities and experience for quality electronic products. Most importantly, they have the most valuable asset of all: highly-developed human resources at home. Yet they need to be more global-minded to attract talents from all over the world for their R & D and marketing efforts.

Generally speaking, the greatest strength of the indigenous computer firms from Korea and Taiwan lies in their manufacturing capability. The greatest weakness of those firms is their inability in developing new products and marketing their own brands. It can be argued that Taiwanese firms may have a better chance of moving up to the middle-tier quicker than their Korean counterparts because of their technological expertise, brand recognition, flexible adaptation, and market-niche approach. Korean firms may have the potential to become the top-tier players quicker than their Taiwanese counterparts, because the Korean firms are much more diversified and large in size to benefit from the converging trend of technological advances and the synergic effect of future market development. This is analogous to the contrast between the U.S. and Japanese computer firms (Anchorguy, 1989; Blustein, 1991; Ferguson, 1990; Lewis et al, 1990).

In this chapter and the previous one, the characteristics of the external context for indigenous computer firms from South Korea and Taiwan were reviewed, and the relationship between external context and strategy content was explored. In the following chapter, the relationships between firm-specific variables such as internal capability, strategy content and market performance will be examined in detail.

Chapter VI

FIRM-SPECIFIC STRATEGY AND PERFORMANCE

In the previous two chapters, the relationship between the external context and business strategy among the indigenous computer firms from Korea and Taiwan were discussed. Also briefly evaluated in Chapter V was the internal capability of those firms. This chapter is focused on the relationships among firm-specific variables, including internal capability, strategy content, market performance, and strategic groups.

To analyze the above relationships, various research methods have been used, both qualitative and quantitative. For the quantitative part, several statistical methods have been applied, including descriptive analysis, correlation analysis, discriminate analysis, and regression analysis. For the qualitative part, a number of firms have been studied in detail for illustration. Quantitative and qualitative methods complement each other in addressing the research questions about profiles of internal capability, content of business strategy, actual performance in the marketplace, and strategic groups among computer firms in Korea and Taiwan.

6.1 Data Analysis

A. Model Construction

This chapter is chiefly concerned with the relationship between strategy content and market performance with the given external context and internal capability. Before that relationship can be explored, the impact of external context and internal capability on the choice of strategy content and actual performance in the marketplace must be addressed, and the content of strategy also has to be properly measured. Without an adequate understanding of such issues, the relationship between strategy and performance cannot be fully examined. For that reason, an in-depth analysis of the external context from the perspective of the indigenous computer firms from South Korea and Taiwan has been conducted in Chapter IV and Chapter V. In addition, the issue of internal capability of those firms have been brought up in Chapter V with the review of national resources in South Korea and Taiwan and general features of the indigenous computer firms as a whole.

To augment the discussion in Chapter IV and Chapter V, some statistical tests and case studies are needed to address the research questions of this study. In this chapter, four of the subordinate research questions that are concerned with firm-specific characteristics are addressed. The first to be examined is the impact of internal capability on strategy content, with internal capability as the independent variables and strategy content as the dependent variables. Secondly, the interrelationships among the four key elements of strategy content is measured to ensure that the strategy content is adequately explained by the four elements. Thirdly, the impact of strategy content on the actual market performance is explored in light of the review of external context and internal capability. Finally, strategic groups are identified and their managerial implications are discussed.

B. Method of Analysis

The statistical methods used in this chapter include descriptive analysis, multiple correlation analysis, cluster analysis, discriminant analysis, multivariate analysis, and multivariate regression analysis. Descriptive analysis is largely a study of the distribution of one variable. This method can provide profiles of competitive context, corporate strategy, and market performance in terms of specific features such as level, stage, ratio, condition, composition, size, and mode. Among the descriptive statistics, basic methods involve the presentation of a profile table and ratio analysis.

Causal analysis is concerned with the study of how some variables affect changes in other variables. The stricter interpretation of causation, found in experimentation, is that some external factors produce a change in the dependent variable(s). In much business research, however, the cause-effect relationship is less explicit. In the case of this study, the main interest lies in the understanding of the interrelationships or associations among variables rather than in determining causal effects per se. For this reason, the techniques used involve multiple correlation analysis, discriminant analysis, multivariate analysis, and regression analysis, according to the nature of research questions concerned and the quality of data obtained.

With multiple correlation analysis, the coefficients can be calculated by which the closeness of associations and the net effect of each independent variable on the dependent variable are measured. First to be measured is the closeness of associations among the independent variables measuring the concept of "business strategy" and "internal capability." Secondly, the net effect of each of the variables on the captive term "market performance" is also measured.

In order to classify the computer firms in terms of strategic groups, discriminant analysis is used to confirm the classification obtained from the analysis of firm-specific characteristics. Discriminant analysis is a technique in which a nominally scaled dependent variable is related to one or more independent variables that are usually interval or ratio scaled. Once the discriminant equation is found, it can be used to predict into which class a observation should be placed (Emory, 1985). Multivariate analysis based on various ANOVA methods can be applied to confirm the differences between groups. Multivariate regression analysis can be further used to test the relationships among various types of variables such as the "internal capability," "strategy content," and "market performance."

For all of the statistical tests, the rule for deciding whether the results are significant is at the 5% critical level in a one-tail test. In a few instances the 10% critical level is listed only to offer some reference to the question concerned, but it is not applied as a decision rule.

The underlying statistical assumptions--such as normality, homoscedasticity, and additivity--have been properly addressed. No mathematical transformations are needed in this study as the data meet the necessary requirement. As for the actual calculations, the "SAS" computer program have been utilized on the computer facility in the George Washington University. Additionally, detailed case studies of several representative firms have been conducted for specific insights about the interactive process of global strategic management.

C. Variable Definition:

The firm-specific variables include those concerning internal operational capability, strategy content and market performance. The following specific variables have been defined and measured for the analysis. For their theoretical implications, please refer to the discussion of variable measurement in Chapter III.

Operational Capability

YEAR: Number of years since the firm's involvement in the production of electronics products;

SALE: Total annual sales of computer products;

SALP: Sales per employee;

CAPP: Capital per employee;

RDR: R & D expense as percentage of total revenues;

RDMR: R & D personnel as percentage of total employees;

TECH: Technological capability of the firm;

MANU: Manufacturing capability of the firm;

MARK: Marketing capability of the firm

FINA: Financial capability of the firm

HUMA: Human resource development capability of the firm;

MAGT: Management capability of the firm;

Strategy Content

DIVF: Level of the firm's diversification;

GLOB: Level of the firm's globalization;

PLIN: Width of major computer product lines;

PLEV: Level of technological sophistication and sale prices of the computer products;

MCHA: Channels used to market the products;

MODE: Modes to get access to foreign market and technology;

NICH: Emphasis on competing on product differentiation;

COST: Emphasis on competing on low pricing;

GGRW: Emphasis on growth as the main goal;

GPFT: Emphasis on profit margin as the main goal;

Market Performance

GR: Average actual export growth;

PR: Average net return on overseas sales;

OEMR: Share of OEM sales in the firm's total export;

EXPR: Share of export in the firm's total sales.

6.2 Statistical Findings

A. Survey Sample Profile

The survey sample has been drawn from three stratified groups in terms of firm size from each of the two groups of firms country population. Based on usable data collected about the firms, the final sample is consisted of 69 firms, among which 44 are from Taiwan and 25 from South Korea.

The sample contains large firms with annual sales over $6 billion and small firms with annual revenues below $4 million; some of these firms have been around for about 40 years, while others were just started three years ago; some are diversified conglomerates but others are single-product manufacturers. Given this wide variety, the resulted sample is adequate for this study. The sample is proportional to the distribution of computer firms in each country. Yet, one negative aspect of the sample is its small size.

Table 6-1

Sample Profile

Number of Firms	Korea		Taiwan	
In Terms of Annual Sales:				
Large firms (with sales over $100 million)	13	(52%)	9	(20%)
Mid-sized firms (with sales between $50 and $100 m.)	4	(16%)	13	(30%)
Small firms (with sales below $50 million)	8	(32%)	22	(50%)
Subtotal:	25	(100%)	44	(100%)
In Terms of Product Lines:				
Vendors Majoring in Systems	15	(60%)	22	(50%)
Makers Majoring in Peripherals	10	(40%)	22	(50%)
Subtotal:	25	(100%)	44	(100%)

Note: The parentheses show the ratio of firms in that group over the total number of sample firms from each country.

B. Internal Capability and Strategy Content

The relationship between a firm's internal capability and its strategy content has been explored by applying two statistical tests in this section. Methods used include multiple correlation analysis and multivariate regression analysis.

1. Multiple correlation analysis:

Multiple correlation analysis has been used to test the relationship between internal capability and strategy content. Listed in Table 6-2 are the correlation coefficients of key strategy content variables and internal capability variables.

Table 6-2

Correlation Matrix of Key Variables

	GGRW	GPFT	COST	NICH
YEAR	-	-0.23*	0.21*	-0.25
SALE	-	-	0.28	-0.23*
EXPT	-	-	0.26	-0.25
CAP	-	-	-	-0.24
EMPY	-	-	0.28	-0.28
RDV	-	-	0.27	-0.22*
RDM			0.25	-0.23*
OEM	-	-	0.26	-0.24
RDR	0.30	0.22*	-0.20*	-
RDMR	0.40	0.40	-0.21*	0.37
OEMR	-	-0.42	-0.41	-0.50
CAPP	-	0.39	-	0.35
TECH	-	0.46	-0.28	0.43
MANU	-	0.23*	-	0.27
MARK	-	0.37	-0.22*	0.34
FINA	-	0.45	-0.20*	0.47
HUMA	0.28	0.61	-0.31	0.64
MAGT	0.31	0.47	-0.34	0.47

Note: Statistics listed are significant at the 5% level as one-tail test except for *, which is at the 10% level.

Measured as key strategy content variables are NICH (market-niche thrust), COST (low-cost thrust), GGRW (export-growth goal) and GPFT (profit-margin goal). As these four variables capture the key feature of strategy content, they have been selected to represent the strategy content for the practical purpose of the statistical analysis. For internal capability, all defined variables have been used in the statistical testing but only those whose correlation coefficients with key strategy content variables appear significant are listed in Table 6-2.

From Table 6-2, it can be seen that the variables of internal capability are closely related to the key variables of strategy content. It is worth noting that niche-oriented thrust (NICH) is positively correlated with many internal capability variables, while the low-cost thrust (COST) is negatively correlated with many internal capability variables. It is obvious that profit-oriented goal (GGPT) is strongly correlated with many internal capability variables. Also positively correlated with many internal capability variables is the growth-oriented goal (GGRW), only to a lesser extent than profit-oriented goal (GGPT).

2. Multivariate regression analysis:

Using multivariate regression analysis, the null hypothesis that there is no relationship between internal capability and strategy content has been tested. This hypothesis addresses the issue of whether internal capability will affect the choice of strategic content.

The results are shown in Table 6-3 in the next page.

Table 6-3

Regression Analysis

Criterion Variable	Explanatory Variables	F-test Statistics	Probability of F* > F	Adjusted R-Square
NICH	Capability*	5.510	0.0001	0.4218
COST	Capability*	3.267	0.0017	0.2683
GGRW	Capability*	2.529	0.0114	0.1983
GPFT	Capability*	5.147	0.0001	0.4015
GLOB	Capability*	3.664	0.0006	0.3011
DIVF	Capability*	3.858	0.0008	0.2927
PLIN	Capability*	5.538	0.0001	0.4234
PLEV	Capability*	14.729	0.0001	0.6895
MCHA	Capability*	9.390	0.0001	0.5758
MODE	Capability*	5.956	0.0001	0.4450

Note: *, the explanatory variables include RDR, RDMR CAPP, SALE, TECH, MANU, MARK, FINA, HUMA, MAGT and YEAR.

In all the ten instances, the null hypothesis has been rejected. The statistical results strongly suggest that there is relationship between strategy content and internal capability. The results also support the theoretical framework used in this study, which maintains that internal capability plays a critical role, together with the external context, in defining the content of firm-specific strategies.

C. Strategy Content

According the theoretical framework of this study, strategy content can be best described by measuring four major strategic elements: strategic posture, strategic mode, strategic thrust and strategic goal. The relationships among the four strategic elements are explored in this section.

1. Multiple correlation analysis:

The relationships among the four elements of strategy content has been test by applying the multiple correlation analysis. The statistical results are listed in Table 6-4.

Table 6-4

Correlation Matrix of Key Variables *

	GGRW	GPFT	COST	NICH
GLOB	0.24	-	-	-
DIVF	-	-0.33	-0.53	-0.49
PLIN	-	-	-	-
PLEV	0.27	0.58	-0.49	0.65
MCHA	0.28	0.41	-	0.34
MODE	0.22*	0.55	-0.22*	0.42
GGRW	1.00	-	-	-0.24
GPFT	-	1.00	-0.27	0.60
COST	-	-	1.00	-0.35

Note: Statistics listed are significant at the 5% level with one-tail test except for *, which are at the 10% level.

It can be seen from Table 6-4 that most variables of strategy content are correlated with each other, either positively or negatively. It is interesting to note that DIVF (diversification) is negatively correlated with three of the four key strategy content variables--GPFT (profit-oriented goal), COST (cost-oriented thrust) and NICH (niche-oriented thrust). Further, DIVF is not correlated with GGRW (growth-oriented goal). This suggests that diversification may not be a sound strategic choice for firms engaging in the computer business.

As expected, niche-oriented thrust (NICH) is negatively correlated with cost-oriented thrust (COST), and growth-oriented goal (GGRW) is not correlated with profit-oriented goal (GGPT); high-end product mix (PLEV) is negatively correlated with cost-oriented strategy (COST) but positively correlated with niche-oriented strategy (NICH); marketing channel (MCHS) and entry mode (MODE) are both correlated with niche-oriented strategy and not correlated with cost-oriented strategy. All these findings are significant in suggesting that strategy content variables are closely interrelated to each other in shaping a coherent strategy as it is argued in the theoretical framework used in this study.

2. Multivariate regression analysis:

The null hypothesis of no relationships among strategic elements has been tested by using multiple regression analysis. The statistical results are listed in Table 6-5.

Table 6-5

Regression Analysis

Criterion Variable	Explanatory Variables	F-test Statistics	Probability of F* > F	Adjusted R-Square
NICH	STRATEGY*	13.390	0.0001	0.5931
COST	STRATEGY*	5.238	0.0001	0.3327
GGRW	STRATEGY*	4.227	0.0005	0.2752
GPFT	STRATEGY*	7.074	0.0001	0.4168

Note: *, explanatory variables include DIVF, GLOB, PLIN, PLEV, MCHA, MODE.

As shown in Table 6-5, the statistical results--from the models with NICH, COST, GRRW and GPFT as criterions--support the argument that there exists a coherent relationship among the strategy variables with respect to the niche-oriented thrust (NICH), cost-oriented thrust (COST), growth-oriented goal (GGRW) and profit-oriented goal (GGPT). The statistical results also support the theoretical framework of this study. The results support the argument that strategy content is best measured by strategic posture, strategic mode, strategic goal and strategic thrust.

D. Strategic Groups:

The sample firms from Korea and Taiwan have been classified into strategic groups according to their firm-specific characteristics. The classification is aimed at providing some managerial implications for global strategic management from the perspective of indigenous computer firms from NIEs. Descriptive analysis, discriminant analysis and regression analysis have been applied in this section.

1. Korean and Taiwanese firms as two distinctive groups:

1a. Descriptive Analysis:

With mean and standard deviation as measurement, the following contrasting features between the firms from Korea and Taiwan have been identified (Appendix 6-1):

1. Korean firms, on average, have a longer history in electronics business, compared with the Taiwanese firms;

2. Korean firms, on average, are larger in terms of sales, capital and employee;

3. Korean firms, on average, invest slightly more on R & D than the Taiwanese firms;

4. Taiwanese firms, on the per capita basis, have higher capital, R & D staff, and sales than Korean firms;

5. Taiwanese firms have some comparative advantages over Korean firms in technology, marketing, finance, human resource, and export through their own brand names;

6. Korean firms are more diversified and globalized than Taiwanese firms;

7. Korean firms enjoy comparative advantage over Taiwanese firms in price and product line; and

8. Taiwanese firms perform better in terms of growth, profit margin, brand exports, and exports in general.

1b. Discriminant analysis:

Regarding internal capability, Korean firms and Taiwanese firms have been found as two distinctive groups. Through a discriminant analysis of capability variables, three Korean firms (12% of the group) and six Taiwanese firms (13% of the group) were identified as "misclassified observations" (Appendix 6-2).

Regarding strategy content, Korean firms and Taiwanese firms have been found different again. Three Korean firms (12% of the group) and four Taiwanses firms (9% of the group) were identified as "misclassified observations" (Appendix 6-2).

When the sample was tested using all the variables--including internal capability, strategy content and market performance--in the model, only one out of sixty-nine was identified as a "misclassified observation" (Appendix 6-2). These findings strongly suggest that Korean and Taiwanese firms generally belong to two distinctive groups.

1c. Multivariate Analysis:

The null hypothesis that there is no overall group effect between Korean firms and Taiwanese firms has been tested by using the MANOVA test criteria. The statistical results are listed in Table 6-6.

Table 6-6

Strategic Groups

	Capability	Strategy	Performance
Wilk's criterion	0.5195	0.3862	0.7171
Prob > F	0.0001	0.0001	0.0001
Pillai's Trace	0.4805	0.6138	0.2829
Prob > F	0.0001	0.0001	0.0001
Hotelling-Lawley Trace	0.9248	1.5893	0.3945
Prob > F	0.0001	0.0001	0.0001
Roy's Maximum Root Criterion	0.9248	1.5893	0.3945
Prob > F	0.0001	0.0001	0.0001

Based on these results, the null hypothesis is rejected, which again suggests the differences between the Korean and Taiwanese firms as two groups. All these tests confirm the observation in the context review that Korean and Taiwanese computer firms are so different in many aspects that they should be classified into two distinctive groups.

E. Strategy Content and Market Performance

1. Multiple correlation analysis:

Multiple correlation test has been applied to the sample data, and the statistical results are listed in Table 6-7.

Table 6-7

Correlation Analysis *

	GR	PR	EXPR	OEMR
YEAR	-0.53	-0.28	-0.36	-
SALE	-0.25	-	-	-
EXPT	-0.26	-	-	-
CAP	-0.28	-	-	-0.38
RDV	-0.22*	-	-	-
OEM	-0.24	-	-	-
EMPY	-0.28	-	-	-
RDM	-0.22	-	-	-
TECH	-	0.35	-	-0.25
RDR	-	0.31	-	-
RDMR	0.26	0.39	-	-0.23*
MANU	-	0.26	-	-0.23*
CAPP	-	0.32	-	-0.38
SALP	-	-	-	-
MARK	-	0.37	0.21*	-0.51
FINA	0.21	0.45	-	-0.45
HUMA	0.38	0.50	0.28	-0.40
MAGT	-	0.41		-0.41
DIVF	-0.40	-	-0.49	0.39
GLOB	-	0.22*	-	-
PLIN	-0.23*	-	-	-
PLEV	0.27	0.54	-	-0.39
MCHA	-	0.40	0.28	-0.50
MODE	-	0.42	0.25	-0.44
NICH	0.29	0.36	-	-0.50
COST	-	-0.41	-	-
GGRW	0.21*	-	-	-
GPFT	0.31	0.62	0.24	-0.42
EXPR	-	-	1.00	-
OEMR	-	-0.30	-0.44	1.00

Note: *, all the statistics listed here are significant at the level of 5% in a one-tail test. Others are omitted

The correlation coefficients show strong support for the argument that there exists a relationship between strategy content and market performance. Several interesting observations are noteworthy. First, it can be seen from the above correlation matrix that growth has a lot to do with the firm size (negatively correlated) while the profit level is not related to the firm size.

Second, OEM orientation (OEMR) appears to be negatively related to internal capability and strategy content. It is even negatively correlated to export orientation (EXPR), indicating that the OEM approach is associated with potential problems.

Third, both growth and profit depend heavily on human resource development, R & D effort, financial strength, and sophisticated products. Growth and profit also benefit from the market-niche approach.

Fourth, diversified firms tend to suffer in their export efforts. Diversified firms tend to rely more on OEM deals.

2. Multivariate regression analysis:

Multivariate regression analysis has also been used to test the null hypothesis that there is no relationship between strategy content and market performance. The hypothesis addresses the question whether the content of firm-specific strategies has any impact on firm's actual performances in the marketplace.

The statistical results are listed in Table 6-8:

Table 6-8

Regression Analysis

Criterion Variable	Explanatory Variables	F-test Statistics	Probability of F* > F	Adjusted R-Square
GR	STRATEGY *	2.013	0.0400	0.1516
PR	STRATEGY *	5.816	0.0001	0.4594
EXPR	STRATEGY *	3.730	0.0007	0.2865
OEMR	STRATEGY *	5.346	0.0001	0.3899

Note: *, the explanatory variables include NICH, COST, DIVF, GLOB, PLIN, PLEV, MCHA, MODE, GGRW and GPFT.

The statistical results support the argument that there is a relationship between strategy content and market performance. Four of the performance criterions--GR (export growth), PR (profit margin), EXPR (share of export in the total sales), OEMR (share of OEM sales in the total export) --can be well explained by strategy content variables such as NICH, COST, DIVF, GLOB, PLIN, MCHA, MODE, GGRW and GPFT.

F. Summary

The relationships among firm-specific characteristics have been statistically tested in this section. Four out of the six subordinate research questions of this study have been addressed. The statistical results show strong support for all four firm-specific relationships as argued by the theoretical framework of this study:

(1) The tests show that firms' internal capability does have an impact on their choices of strategy content;

(2) the tests suggest that firms' strategy content can be measured by the four major strategic elements--strategic posture, strategic mode, strategic thrust and strategic goal;

(3) the tests indicate that firms' strategy content does have an impact on their market performance; and

(4) the tests confirm that the indigenous computer firms from Korea and Taiwan belong to two distinctive groups.

6.3 Case Studies

To offer some insights into the complex issue of global strategic management, detailed case studies on representative firms have been conducted. In the following section, six indigenous computer firms from Taiwan and three from South Korea have been studied in detail for illustration. It can be seen from these case studies that the selected firms are typical in their respective countriesnational counterparts, and many subtle aspects of global strategic management can be revealed through the method of case study. Due to the uneven access to the corporate information, the nine case stuidies are not presented in exactly the same format.

A. Computer firms from Taiwan

Six indigenous computer firms from Taiwan have been studied in detail as illustrating cases. The six computer firms represent the typical indigenous computer firms from Taiwan. The six firms are Acer, Arche, Chicony, KYE, Microtek, and TVM.

Case 1: Acer Inc.

Brief History:

Acer was founded in 1976 in Taiwan under the name of Multitech International Corporation, which changed its name into Acer in 1987. Within fourteen years, Acer has become one of the leading personal computer makers in the world with 5,600 employees working around the world generating annual revenues close to $1 billion.

In the beginning it was not easy. When it started from scratch, all the odds seemed against it. In the very first year of its establishment, two of the seven founding members quit. This left the five founders, including Mrs. Shih, the only director with a non-electronics background, struggling to run their operation on a $25,000-equity they had scraped together. Banks refused to lend because they had no track record and the company was unknown. They survived by designing and consulting for others and served as a local agency of microchips for Advanced Micro Devices of the U.S. In the first five years, they developed some 40 different products for customers in Taiwan, Japan, Hong Kong, and the U.S., including telephone sets, TV games and home computers. The agency agreement with AMD also helped them acquire computer technology and experience.

Acer's real breaks came at the turn of a new decade. In 1980, the company introduced the Dragon Chinese-language CRT which won Taiwan's highest product design award. One year later, the company introduced the MicroProcessor I (MFP-I), a learning kit that helped engineers and students to learn microprocessor technology in an easy way. It was nothing spectacular, nor did it open a big market. Because it was innovative and cheap, it became an instant hit, widely noted in technological magazines. Other breaks have followed--the 8-bit home computer in 1983, the 16-bit PC in 1984, and on and on--and with each break came a better recognition in the world market, despite some legal troubles with IBM.

Now, Acer is Taiwan's biggest PC producer and the fourth largest maker of i386-based PCs in the world, and it plans to become a key global player across the microcomputer sector by the mid-1990s. Acer seems to have the potential to achieve the goal because it enjoys strong R & D and manufacturing capabilities, good brand recognition, and strategic alliances with key global players, and it has a sound strategy.

Internal Capability:

R & D

Acer has invested heavily in R & D and has achieved many innovations. Acer has constantly devoted over 5% of its annual sales and 13% of its workforce to its R & D projects. With 850 R & D personnel in the U.S. and Taipei, Acer is striving to staying ahead of the technology curve and introduce new products on time.

By devoting substantial resources to R & D, Acer has accomplished a few innovations. In November 1986 Acer's five-member "tiger team" introduced a 32-bit, 80386-based PC before the Comdex computer show in the U.S., only weeks behind Compaq but ahead of IBM, and shocked the PC world. Acer's another major success came in May 1988 when it became the first non-Japanese supplier of AX English/ Japanese bilingual systems. As a result, Acer is now a well-known computer name in Japan. At the same time, Acer introduced an universal intelligent terminal described as "a daring breakthrough in pricing and features. The machine offers the corporate markets a front-end solution for mainframes and minicomputers. In January 1989, Acer introduced the Acer M5105, a super I/O chip that integrates 8 conventional chips into 1. Though the chip was developed jointly with the U.S.-based National Semiconductor, a team of 10 Acer engineers in the Taipei did most of the work. In March 1988, Acer became the first in the world to crack the secret of IBM's much vaunted PS/2 30 model and came up, to IBM's disbelief, with a compatible system. Acer also developed the world's fastest 80386-based PC, the Acer 1100/33 and shipped its millionth machine in 1989.

Another example of Acer's commitment to R & D is that it set up the Acer Lab in May 1987 with an investment of $2 million, making an entry into ASIC design. Acer-deigned ASIC chips are now being manufactured by leading makers in the U.S., Japan and Taiwan. Also, using its own multi-processor technology, ASIC design, and innovative memory subsystems, Acer has taken advantage of both MCA and EISA architectures.

One of Acer's traditional strengths is in bilingual systems that can process English, Chinese, Japanese, Arabic, Thai and other languages. Keyboards, manuals, software, and promotional materials are translated into several languages. For example, the successful development of a Chinese version of MS-DOS marketed a milestone in Chinese software history.

Acer invested $26.5 million or 5% of its turnover in R & D in 1988, and another $665 million or 95% of its sales in 1989. Acer devotes 850 engineers or 14% of its workforce to R & D in its labs in Silicon Valley and Taipei.

Marketing

Over the years, Acer has had an uphill marketing battle in overcoming Taiwan's poor reputation as a source of primarily low-quality manufactured goods. To solve that problem, Acer has been following a strategy focusing on the middle-and-high-end product segments in selective geographical locations.

First, Acer is devoted to its foothold in the domestic market. It went overseas only after it had dominated the local Taiwan market with a 50% share of brand name PCs there. Secondly, Acer started its international operations by first entering those overseas markets that were less competitive such as Chile, Greece and Scandinavia and established itself before it began to explore other more competitive markets such as the U.S. Acer began penetrating the U.S. market as late as 1985. Thirdly, for many years Acer built computers on an OEM basis for Unisys, Siemens, Canon, Philips, ITT, and Texas Instruments before it started selling under its own brand.

Fourthly, when it had little success selling under the Multitech brand, Acer adopted the current name, Acer, in 1987 at a cost of about $6 million to improve its image. The Latin meanings of Acer--sharp, penetrating, energetic and spirited--are attributes that Acer wanted to convey to the world. In an effort to push Acer as a quality brand, Acer hired the Ogilvy & Mather advertising agency to help Acer shake the cheap image of goods made in Taiwan. For a quite a time, Ogilvy's ads did not hint that Acer computers came from Taiwan. Acer also started to use American firms to produce computers to be sold under Acer brand in the U.S. In late 1987, Acer began manufacturing its high-end models in the U.S. under an agreement with Texas Instruments to give Acer the made-in-the-U.S.A. image.

Fifthly, Acer spends about 6-7% of its sales on worldwide promotion and advertising. Just after the name change, Acer launched a $5 million ad campaign to sell the name to customers and computer distributors worldwide. It spent $20 million to promote its overseas sales in 1988.

Sixthly, Acer picks its distributors with extreme care since it realizes that it is its greatest challenge to get good distributors lined up and build credibility with them. Acer now has an network of 10,000 dealers in over 75 countries, with more than 3,500 in North America. In order to position itself in the global market for the 1990s, Acer has opened new offices around the world. Acer currently has 17 overseas offices in the U.S., Canada, U.K., Germany, France, the Netherlands, Japan, Malaysia and Australia. Acer is considering the location of its first European manufacturing facility in preparation for the unified European market in 1992. Acer is currently working hard to establish itself in the U.S. and Japan. Since 1987, overseas sales have soared to account for about 90% of its total revenues: a third goes to North America, another third to Europe, and the rest in Asia.

Manufacturing

Acer has more than a decade of electronics manufacturing experience and a highly sophisticated manufacturing facility.

In recent years, Acer has expanded its manufacturing facility from 580,000 sq-ft to 1 million sq ft, capable of producing 1 million microcomputer units a year. In 1987, Acer's production capability was 260,000 PCs, which was doubled in 1988 and redoubled in 1990. Acer has factories in Malaysia, Taiwan, the Netherlands, and the Silicon Valley in California.

Finance

There used to be some suggestions that Acer's management was not strong in finance as it was in manufacturing and marketing. During its expansion in mid-1980s, Acer had a fairly high leverage for fast growth--with a debt/equity ratio 1.98:1 in 1986, 1.82:1 in 1987, 1.5:1 in 1988. To solve that problem, Acer started to sell its stocks. First, Acer had a private placement to a local investor, Continental Engineering Co., which had 17% of Acer's stock, and then to six international financial institutions, including Prudential Asia, Boston-based Advent International, and Chase Manhattan Asia in 1987 for another 13%. Later, Acer tested the stock market with its first public offering--about 15% of its equity--in December 1988 to raise $40 million, and second offering in July 1989 for $180 millon. Part of the money raised in the second offering was used to finance the near-doubling of manufacturing space at Acer's Hsinchu plant to 1 million-sq-ft in 1990.

Human Resource

Acer is well-known for its treatment of employees and for its contribution of human resource to Taiwan's information industry. First, Acer has a very effective incentives scheme. Acer offers stock options which means that its relatively low-paid employees own 70% of the company through a share-ownership scheme. Low basic pay for scientists means that each dollar spent on R & D goes twice as far as far as it does in America. With total employees reaching 5,600, Acer spares no efforts to provide a good working environment for them. Acer encourages its employees to view working for Acer as a long-term career. Evidence: 90% of the key staff who were in the company in 1980 are still there. A sense of participation is established with the help of stock options. Acer has a very good labor-management relationship.

Secondly, Acer has trained many professionals for Taiwan's information industry. For example, even within the first two years of its founding, Acer established and operated the Microprocessor Training Center, successfully training more than 3,000 engineers in two years for Taiwan's growing information industry.

Acer has adopted an approach of decentralization and encourages communications at all levels. Acer Inc. was formally reorganized into independent business units in 1989: PCs and bilingual systems, peripherals and ASIC, multiuser and communications systems, and education and publishing.

Business units work independently as profit centers and offer maximum flexibility in operations to meet the needs of global customers.

Top Management

Behind Acer's success is its founder and CEO, Mr. Shih, who wryly describes himself as MIT--"Made-in-Taiwan." The inventive son of an incense maker, who died when young Shih was only three. Shih learned math by helping his mother sell duck eggs and watermelon seeds at a roadside stand. He went on to get a master's degree in electrical engineering in Taiwan. Not long afterward he invented what he claims was the world's first pen-watch and Taiwan's first pocket calculator. In 1976, he started the company with several friends.

Mr. Shih's vision lifted Acer above scores of middle-tech upstarts in Taiwan. Most tend to neglect R & D and marketing, which Shih emphasized from the start. Taiwanese prefer to work for themselves, a social bottleneck that Shih broke through by selling shares to employees and setting an example by working 16 hours a day. He has banned time clocks for employees.

Following what he calls "the principle of being No. 2," Shih capitalizes on markets that IBM creates by devising compatible machines with more features and lower prices. Reversing the normal Taiwan practice of assembling machines for U.S. companies, Shih gets Texas Instruments to build his computers in Austin for the U.S. market.

Being odd in the ocean of small firms in Taiwan, Acer has a big idea of becoming a real world-class corporation like Philips and Sony. Mr. Shih has called for the formation over the next five years of 10 multinational conglomerates spanning all sectors of Taiwanese industry, and a further 50 by 2004. He is also lobbying for the creation of as many as five high-tech industrial complexes throughout the country, to be patterned on the existing Hsinchu science park.

To help a transition to professional management, Mr. Shih turned over daily operations of Acer to Leonard Liu, a 20-year veteran of IBM and an expert in management and technology, who became President of Acer Inc. and Chairman and CEO of Acer America Co. Mr. Shih remains as Chairman of Acer Group, concentrating on long-term planning.

Acer Group consists of Sertek International, a high-tech trading company with worldwide operations; Acer Inc., which serves as a manufacturing arm; Continental Systems, which specializes in contract manufacturing of PCs; Third Wave, a publishing firm in the high-tech field and Multiventure, a venture capital firm. Acer's overseas operations include sales branches in North America, Europe ad Asia. Acer also has overseas manufacturing and R & D subsidiaries such as Acer American (North American headquarters), Acer Counterpoint, and the newly acquired Altos.

Business Strategy:

Strategic posture:

Acer is among the few vendors in the world who have a wide product line embracing computer system, peripheral, component, and networking. Acer makes such computer systems as desktop PC, laptop and notebook PC, high-end file server, multiuser UNIX-based system, such peripherals as monitor and printer, such components as ASIC chip, DRAM, and BIOS chip, and such telecommunications equipment as modem and LAN card. Acer plans to diversify its product line. PC sales will fall from 70% of the total to 50%; there will be more bilingual workstations, and it will design more if its own ASICs. Acer is even moving into military electronics area. Acer positions its products at the high-end in quality and performance but at the mid-level in price to achieve a high performance/price ratio.

By establishing a joint venture with Texas Instruments to manufacture 1- and 4-megabit DRAMs in Taiwan, Acer is assuring itself a supply of these critical components, but this is also one of Acer's riskier investments. In the new venture, Acer owns 74% of a $250 million manufacturing facility, the only one of its kind in Taiwan. Acer has also concluded an agreement with the U.S.-based National Semiconductor Corp., whereby the two will jointly develop VLSI chips and National Semiconductor will make chip sets designed by Acer.

To benefit from the trend to network PCs, Acer has set up a new business unit called Network Computing Business, which will supply integrated network-computing systems. The new unit will report to Mr. Liu, who was once group director of communications and programming at IBM.

Acer has further moved into other areas such as software, publishing and venture capital investment. Acer is positioned as a software supplier, particularly for the Chinese community around East and Southeast Asia. This is one of the reasons why Acer hired Leonard Liu in 1989 as president of Acer. Acer is already the largest software distributor in Taiwan, acting for Microsoft and Ashton-Tate. Acer has participated in the development of a Chinese version of MS-DOS in cooperation with Microsoft and has introduced a Chinese version of Ashton-Tate's dBase III. Acer also added to its software stable in 1989 with the acquisition of Princeton Publishing Labs, a New Jersey-based development of desktop-publishing software.

In terms of geographical coverage, Acer has expanded in all three major computer markets--North America, Europe and East Asia. Acer's new focus is on the Southeast Asian markets. Acer's global strategy is to meet the specific needs of customers in the three major regional markets. This strategy is an example of the "global-localization" approach.

<u>Strategic Mode</u>:

The transition from to a cost-effective manufacturer of computer hardware to multinational information technology giant won't be easy. The fiercest threats to Acer's expansion come from Japan and Korea, but Acer intends to play by its own rules. It does not want head-on competition, and it needs help from those well-established firms through strategic alliances.

Acer is good at forming strategic alliances with foreign partners to gain access to new technology, marketing network, and financial resources. Though it has been shifting steadily from its reliance on OEM deals (as a means of obtaining new technology and marketing channel) to its own brand and own network, Acer still wants to form strategic alliances with major global players to enhance its global competitive position.

The nature of new strategic alliances is changed, from one-sided reliance on others' mercy to mutual reliance. For instance, in recent years Acer has turned to use foreign makers as OEM makers for Acer and market under Acer brand, including Unisys' 3-year licensing agreement for production of Acer 110/20C and Acer 110/16 in the U.S., and Texas Instruments' contract to manufacture chips designed by Acer. Acer has also teamed up with National Semiconductor Corp to co-design and sell devices to build processors for personal computers. Acer has joined Texas Instruments Inc., to build DRAM chips so neither company is at the mercy of the Japanese and Koreans.

To become a global player, Acer is also expanding its presence across the globe. Acer is buying companies in the U.S. and Europe to gain technology, market channel and component and product synergy. Acer paid $4.4 million in summer 1988 to buy Counterpoint Computers, a Silicon Valley company making multi-user UNIX systems, which changed its name to Acer Counterpoint. Since Acer's in-house knowledge of UNIX market was not strong, it needed help for software development in that area. Counterpoint's Japanese distributor, Chiyoda Joho Kiki, which installed the first Acer System 19K UNIX machine in Japan in 1988, later assisted the development of a communications software interface that would link Acer PCs with Counterpoint's UNIX systems.

Acer has concluded its largest acquisition deal ever in the U.S. Founded in 1977, Altos Computer virtually created the UNIX-based multi-user system market niche and remains an industry leader in powerful multi-user systems for networked LANs, WANs, and state-of-the-art client/ server computing. Acer acquired Altos in September 1990. Altos provides Acer with complementary product and sales channels and a team of experienced in delivering and servicing multi-user systems. Together, Acer and Altos offer total solutions for all types of business.

Acer also set up a joint venture with Smith Corona for a new line of PCs specifically designed for the consumer, home office and small business markets. In Europe, Acer envisages a manufacturing joint venture, possibly in Spain or Ireland. Acer also purchased a Dutch computer company, Kangaroo B.V. of Eindhoven and took a 50% stake in its Germany distributor CeTec Data Technology GmbH.

In the Asia/Pacific region, which accounts for one-third of its sales, the group set up a PC monitor plant in Malaysia and a software operation in Malaysia. Acer has also been talking about staring manufacturing or striking licensing deals in Indonesia and Thailand. Acer is cracking the difficult Japanese market through a joint venture with Sumitomo and a subsidiary of Daiwa Securities.

To enhance the "Acer Platform" in 1990s, Acer will seek more cooperation with industry leaders and will offer integrated solutions to add more value to its products. Besides laptop and notebook PCs, Acer is stepping up its effort to offer more sophisticated workstations. Recently Acer is authorized by British ICL to sell ICL's DRS-6000 UNIX minicomputer in the name of Acer System 6000 in Taiwan.

Strategic Thrust:

Acer's focus is to differentiate its products through R & D and service instead of competing on price only. It focuses on high-end computer products, emphasizes the total solution, provides first-rate service, and becomes a global player in the 1990s. Acer has been diversifying in three directions--software, semiconductor and networking. It has established a customer service division to offer better support for its increasingly sophisticated products. Acer is integrating Acer's technologies, cooperating more closely with suppliers of software, and responding to market conditions.

As Mr. Shih points out: "The big limitation is brand recognition and marketing expertise." Acer is stepping up its effort to differentiate its products on quality, function and service.

Strategic Goal:

Acer's long-term goal is to become a world-class corporation as IBM, HP, Compaq and Apple. As Mr. Stan Shih has elaborated: "We need to forge a new strategy based on research and manufacturing in optimum locations around the world. A mesh of regional research and manufacturing operations will help us tap bright local minds and make best use of manpower, capital, and goods around the world." Nurturing a global culture within Acer is another goal. Acer emphasizes long-term results instead of short-term profits. Acer wants to be an inspiration for other Taiwanese firms.

Market Performance:

Acer had been growing rapidly in the late 1980s. By the end of 1989, Acer had installed over 1.6 million PCs worldwide. With a capital of $80 million in 1987, $140 million in 1988, and $320 million in 1989, Acer's global sales was $366.7 million with a net profit of $16.9 million or a return of 4.6% in 1987, $530.8 million with a net profit of $27.4 million or a return of 5.2% in 1988, and $698.1 million with a net profit of $151 million or a return of 21.6% in 1989. Acer's return on sales in 1989 was only second to Microsoft among the top 100 computer firms in the world. Acer's sales growth was 67% in 1987, 45% in 1988, and 32% in 1989.

Since 1987, overseas markets soared to account for about 90% of its sales. A third is to North America, another third goes to Europe, and the rest sells in Asia, making Acer one of the top PC makers in the world, accounting for 2% of the world PC market. Acer's U.S. computer sales was $10 million in 1986, $100 million in 1987, $150 million in 1988, and $170 million in 1989. Acer's sales in the U.S. is expected to reach $250 million by 1991. The share of Acer's overseas brand sales has been steadily--though slowly--going up, from 53% in 1987 to over 60% in 1989.

Acer's information systems' revenues reached $493.7 million in 1989, up 30.1% from 1988's $379.4 million that was up 29% from 1987's $294 million. Acer's information systems' revenues were 70.7% of its total sales. In 1989, $377.8 million came from PCs, $42.8 million from peripherals, and $13.3 million from data-communications.

Acer has earned many industry awards such as PC Magazine's Editor's Choice, PC World's Best Buy, VAR Business's No.1, Germany's IF, "Excellence in Technologies Communications Award" at the Hannover's CEBIT show and Japan's G-Mark awards. Acer was named by the Wall Street Journal's Centennial Edition as "one of the star of the future, who will lead advances in technology, find new ways to make and market products and services, and elevate the science of management to an art."

In a recent survey by PC Magazine of 30 leading PC makers in the U.S., the reliability of Acer's computers was rated "average"; the percentage of people intending to buy Acer products again was "above average"; yet, Acer's technical support and repair service were both rated "below average."

Acer has its own serious problems with its globalization efforts. Acer was barely profitable in 1990 on estimated revenues of $1 billion. After averaging 100% a year from 1976 to 1988, growth has slowed and failed to keep up with the huge overhead due to its aggressive expansion. Acer also suffers from a few bad acquisitions and two years of heavy losses in the U.S. PC market. Recently, Acer announced its plan to cut back its U.S. operations. Acer still has a long way to go to become a major global player in the computer market.

Case 2: Arche Technologies

Brief History:

Arche Technologies Inc. was established only three years ago, but its computer products have gained a reputation. In November of 1987, Arche shipped its first product, the Rival 286-12. By July of 1988 that same machine was awarded the Editor's Choice by the PC Magazine, among 9 AT computers. In November 1988, the same publication equally praised the Arche Rival 386 PC. In April 1990, the Personal Computing published a survey wherein Arche computers placed an overall 7th in terms of PC satisfaction rating among 16 world-known computer vendors, being ranked below Compaq, HP, NEC, IBM, Everex, ALR but above Epson, Apple, AT&T, Toshiba, AST, Hyundai, Leading Edge, Commodore and Atari. In July 1990, the same magazine gave the Editor's Choice Award to the Arche Legacy 486-33 personal computer.

Internal Capability:

Arche Technologies is a wholly-owned subsidiary of the Kunnan Group in Taiwan. At the center of nine independently operating companies on five continents is the Kunnan Enterprise Ltd., which was established in 1969. Kunnan was already operating the world's largest racket-making facility, turning out equipment for most of the leading international sporting goods corporations, when it decided to launch its own brand in the mid-1970s. Kunnan had a lucky break in terms of timing because that was a period of unprecedented change for tennis racket manufacturing. Kunnan invested heavily in perfecting the new technology of using new material for over-sized rackets and was the first to bring out the mid-sized racket that has since achieved an enormous popularity. To make up for the small advertising budget at the start, Kunnan salesmen concentrated on a grass roots approach, developing close relationships with professional players and retailing through shops at tennis clubs. Kunnan has also learned through its own experience that it is best to use the local people who know the market and the culture, so its overseas sales departments are headed by natives.

As the result, its Pro-Kennex brand is the first international brand name of Taiwan, and ranks the third among worldwide famous brands. Kunnan Lo, the founder, has created a vast empire which encompasses three factories producing graphite frames, one factory manufacturing aluminum frames, and one factory making badminton rackets. In addition, Lo recently launched a new division in the U.S. to deal with commercial real estate.

Arche certainly benefits from Kunnan's corporate culture of emphasizing R & D for new products and its expertise in marketing brand products overseas. Besides, Kunnan's financial strength and manufacturing capability boost Arche's competitiveness. With a start-up capital of $12.5 million in 1988, Arche doubled its capital to $25 million in 1989, and the figure reached $50 million in 1990. Arche has more than 500 employees in Taiwan alone, and close to 2,000 including those in its overseas branch offices. It has a 100-strong R & D team, 60 of whom are returnees from the U.S. Arche has the U.S. headquarters, manufacturing and R & D facilities in the Silicon Valley. Arche's U.S. operation employs over 150 people, including 40 engaged in the R & D. It is headed by a well-known computer designer, Joe Kua, who was lured by Arche from a U.S. firm. Mr. Kuo is mainly responsible for the redesign of Arche's whole PC product line.

Highlighting Arche U.S. operation is Arche Lab, the hub of R & D for the entire company. To date, Arche Labs has brought three new technologies to the PC platform: flagged register copy-back microprocessor memory cache, Direct Memory Access (DMA) snooping, and first party DMA that runs transparently in parallel with CPU.

While Arche believe its ability to advance state-of-art PC design is essential for its future success, it also recognizes that its R & D efforts have a significant impact on the design and reliability of the current Arche product line. To support this, Arche has invested in one of the most advanced ASIC design labs in the world. Using Design Express --Arche's VHDL (Hardware Description Language) design tool--

Arche engineers apply logic synthesis to simulate actual operation of custom microchips on Arche computer systems.

Arche has marketing offices in major countries around the world. Its has opened new branches in South Korea, Thailand, Indonesia, and Philippines.

Business Strategy:

Strategic Posture:

Arche's product line includes high-end PCs, workstations, motherboards and assorted add-on cards. Arche Labs specializes in the development of high-performance PC-standard computer systems, incorporating an array of unique performance features that otherwise can only be found in mini and mainframe computers. Now it is focusing on its first full-line of high-end personal computers and workstations--the Legacy Series, which were unveiled in the fall 1990 and won immediate praise from the industry publications, analysts and resellers. With the introduction of the Legacy Series, Arche has shown its commitment to high-end, high-performance products, while maintaining the integrity and quality-conscious reputation it developed during the late 1980s.

Strategic Mode:

Arche products are mostly shipped overseas--about 95% for export, and 90% of them are sold under Arche brand. Arche markets its products through authorized dealers plus its own chain stores in the U.S. and Europe, and it sells in other markets through its branch offices there.

The concept of chain store has proved to be very successful. Arche has 60 chain stores in the U.S. and about 30 in France. The main advantage of owning and using chain stores to market products is that the producer actually gets in tough with the end-users. With chain stores operated by the manufacturing company itself, user specifications, satisfaction ratings, and feedbacks are received and addressed much more promptly, compared to conducting marketing through independent trading companies.

Strategic Thrust:

In the order of importance, Arche emphasizes R & D, quality, technical and support services, and marketing. Arche's products are priced relatively higher than most brands, an indicative of the higher quality. Arche's corporate philosophy is "Quality Above All." Arche also differentiates itself by offering products with higher-performance and more features. Arche is constantly ranked as one of the top computer makers in the world in terms of PC performance ratings.

Arche is also devoted to advertising, especially in promoting its own brand name. Its advertising efforts are at par with the top-tier players in the world. In the October

1988 issue of the Personal Computing, Arche's ad was ranked as one of the five best computer print ads in 1988. Arche has been streamlining its direct channel in the U.S. for further support channel development and for the introduction of Arche Legacy family of high-performance PC standard workstations, servers and multiprocessor systems. Arche has also launched a marketing effort to create awareness of its entry into the high-end PC segment.

Strategic Goal:

Arche wants to maintain a balance of growth and profit, but in recent years it has emphasized market share more than profit margins. Arche's strategy can be summarized as the following: to position Arche computers as high-end product at a middle price range, to be sold through Arche's own branch offices or exclusive agents, and to provide end-users a good service. Arche's main emphasis is on R & D and marketing. Manufacturing is only secondary.

Market Performance:

Arche has been growing more than 100% a year for the past three years. Sales from its Taiwan operations in 1989 reached $50 million, and it was estimated to achieve $100 million in 1990. Its average net profit margin was around 6% for the last three years, higher than most of the PC makers in Taiwan.

Case 3: Microtek International Inc.

Brief History:

In many ways Microtek is typical of the tenants at Taiwan's Hsinchu Science-based Industrial Park. As one of the Park's first occupants, Microtek has achieved what the Park has been designated to accomplish. Microtek is also typical of what Taiwan small firms are best suited to do: exploring market niches and being adept to market changes.

Microtek was founded in 1980 by five friends, three of them engineers from Xerox, the others, MBAs from the University of Southern California, all returnees to Taiwan from the U.S. Two years later, they spent $5 million--equal to a year's turnover--on a lavish new facility. The company has gone from 20 employees and sales of $200,000 in its first year to 392 employees (120 of them R & D staff) and sales of $30 million in 1987. By 1990, sales was expected to reach $65 million, and the workforce increased to 500.

Internal Capability:

The secret of Microtek's success and what makes the company unique in the world is its ability to come up with innovative products for special market niches. Microtek plowed 35% of its first year's sales of $200,000 in revenue into R & D. Since then, the level of R & D investment has never dropped below 10%. Microtek has been very aggressive in hiring top-notch engineers from Taiwan and the U.S. Many of the senior engineers are Chinese-Americans who once work for Xerox.

Microtek's R & D team accounts for 30% of its total workforce, and 40% of its employees has an engineering degree. Microtek has six in-house R & D labs, including one in Silicon Valley. Microtek markets its products through its branches and independent distributors and dealers. Microtek has a 48,000-sq-ft manufacturing facility in Taiwan. It went public in Taiwan's stock exchange in 1988, and the stock sold well; even during the stock crisis of Taiwan in 1989 its stocks were still able to hold their value. Microtek's total workforce was 390 in 1987, 440 in 1988, 500 in 1989, and 600 in 1990 (500 in Taiwan and 100 abroad).

Though Bobo Wang, a Taiwanese immigrant to the U.S., could have started a company in the U.S., he left his research job at Xerox's El Segundo, CA, electronics division in 1980 to start Microtek with his friends, following the trend of thousands of educated Chinese-Americans. In Hsinchu Science-based industrial Park, they got low-interest financing, tax incentives, and cheap rent. Wang is well-known for his vision and insight for the market trends, which enables Microtek to introduce new products ahead of its competitors and ensure success in the marketplace. Every product Microtek has introduced is an instant winner. Says Mr. Wang, "For success in the 1990s you don't need to be big, but just have vision and move fast."

Business Strategy:

Strategic Posture:

Microtek offers innovative products at a mid-level price range. Its main products include MICE (Microtek In-Circuit Emulator), flatbed scanners, roller feed scanners, laser printers, CNC controllers. There are 7 models of scanner, 2 models of printer, and one model of MICE. Everything the company produces has been a winner. Its first product, for instance, an in-circuit emulator to help engineers design microprocessor applications, was a tenth the price of rival products. Microtek has repeated its success in scanners and printers.

With 30% of the firm's total employees assigned to R & D, Microtek is able to come up with many niche products. It makes computer-controlled machine tools and the software to run them. It makes scanners and fax cards. Next new product is a multi-functional machine that is able to copy, scan, print and fax.

Scanning images and turning them into digital information for processing by computers is a business that appear ready to take off in the 1990s and Microtek is positioning itself to corner a large part of that market. "A key to developing our business is understanding applications, third party software vendors and good strategic alliances," says Hsieh, a senior vice president of Microtek. "To do this right, we have to have excellent channels of communications and support staff."

Strategic Mode:

Microtek exports 90% of its products to over 40 countries, and sells the remaining 10% for home market. Microtek has one subsidiary in the U.S., and four joint ventures overseas. A successful marriage of engineers and entrepreneurs, Microtek is using merge and acquisitions and joint ventures to grow, but within the niche it has successfully carved for itself in the field of image scanning. Bob Hsieh, the senior vice president, says, "We realize that this is such a dynamic business that no one can do a good job unless he forms strategic alliances and marketing agreements." What it is doing is making deals to fill in the gaps in the technology they don't have. For example, they have software, but need to build up their own components. In printers, they are dependent on Japanese technology for motors. Microtek formed a joint venture with the U.S.-based **Photon Imaging Corp.** to develop a new kind of printer called a Photon page printer, which uses light to print. In March it entered into a joint venture with **C-Cube Microsystems** of the U.S. to accelerate the development of technology for use in filmless digital cameras and video-telephones. With two Taiwanese partners, Microtek bought out U.S.-based **Mouse Systems Corp**, a computer mouse and mouse-related products supplier. It also formed a joint venture with **Poly-Ventures**, a U.S.-based venture capital firm, and **Core Corp** of Japan, a system integration company, to develop software for creating and manipulating color images by computer and technology that compresses the data of images into smaller space. Another joint venture will work on an optical mouse for computer control. The firm's foreign activities are usually run by people from those countries. "I think that is the only way to go if you want to localize the product," Hsieh says.

Strategic Thrust:

Microtek's overall strategy is to serve niche markets with innovative products. "If others can do it, then we don't want to," explains Bobo Wang. "We want to be the first." Getting in early: the Microtek MICE--smaller and cheaper than any other debugger--got to the market before the U.S. or Japanese competitors. It proved a hit and the company was profitable within two years. In 1984 Microtek introduced the world first affordable desktop scanner, the product of its early entrance into R & D of image processing. The introduction has resulted in Taiwan's leading position in the world market and has enabled Taiwan makers to direct the development and market trends of these products. Microtek is also the first in the world to introduce a laser printer using the PDL language based on Microsoft's TrueImage software. Robert Hsieh, head of office automation products, spends much time traveling abroad to industry conferences and workshops, where he listens for new-product ideas in the conversations and complaints of computer hobbyists, newsletter editors and office managers. He also encourages his staff to leave Taiwan and find new things. An American-educated image-processing expert, Mr. Hsieh keeps a small staff of technical people in the U.S. to watch trends in research and customer behavior. "We move fast. Japan has committees, committees and committees to decide something. We can jump right on things because all I need is one signature." Consequently, Microtek introduces 3-5 major new products each year.

Strategic Goal:

The strategic goal for Microtek is high profit margin for future R & D and long-term growth. It puts profit margin ahead of sales growth.

Market Performance:

With the help of its innovative products, Microtek is able to grab a large share of the world market. Its first product, MICE, was voted "Product of the Year" in 1981 by the U.S. magazine Electronic Products. It has enjoyed a good market acceptance. The product that really put Microtek's name on the map was the image scanner. It once claimed to have 40% of the total scanner market in the world. It also first introduced fax card for computers. Because of these innovations, Microtek won a $20 million order for scanners and PC-fax cards from the U.S. military, a subcontracting deal it got in conjunction with Zenith and Unisys.

Its new color/grey scanner is another hit for Microtek, commanding a whopping 70% share of the world market. Not only does it get to the market ahead of the Japanese rivals, but also sells for less than half the price of a comparable Japanese product. By the time Sharp scrambled its version onto the market, Microtek was far ahead. The result: in about six months, little Microtek sold 11,000 of the $2,700 scanners--more than Sharp will probably sell in a year.

From the one-bit scanner in 1984 to the new eight-bit color scanner introduced in September 1989, Microtek has sold over 70,000 sets of desktop scanners throughout the world, and its total output accounts for 30% of the world market, and its color scanner enjoy 80% of the world market.

Microtek's revenues were $30 million in 1987, $38.4 million in 1988, $46.4 million in 1989, and about $65 in 1990. The average growth was about 30% a year. Though Microtek's sales growth is not spectacular, the return on sales is truly surprising: gross profit margins have averaged at 70-80%, and net returns are more than 30%.

Case 4: Chicony Electronics Co.

Brief History:

Chicony was founded in 1983 as a specialized keyboard maker. In 1986 it set up a branch in California. In 1987, it expanded its product line to include portable PCs and established a Portable Computer Division. In 1988, it opened its second U.S. branch in New Jersey, and a branch in West Germany. In 1989 it built a plant in Thailand. In 1990, it opened a new manufacturing facility in Taiwan and several branches in the U.S. and Europe.

Internal Capability:

Among Chicony's strategic assets, a clearly-defined long-term strategy, a perceptive top management, a strong R & D team, high employee morale, an international marketing network are the key to Chicony's performance. Over the past six years, Chicony has brought together over than 50 talented engineers in Taiwan to establish its R & D team, 6% of its total workforce, and it plans to expand the team to 100. It spends about 8% of total revenues on R & D activities.

Its network includes a subsidiary in the U.S. with three other branches, a subsidiary in West Germany, a subsidiary in Austria, and a subsidiary in Thailand. Its marketing staff comes from technical background with years of experience in international trading. Its service people devote a lot of time for customers.

It operates two manufacturing facilities, one in Taiwan and one in Thailand. It has a series of automation equipment and a rigorous quality control program. The production area was 16,700 square meters in 1989 and expanded to 52,800 square meters in 1990. Though still a privately-held company, Chicony plans to go public with stock offerings in 1991. Chicony's total employees reached 842 in 1989 and 1,000 in 1990. Chicony has a young and energetic management team with good foresight and clearly-defined long-term strategy.

Business Strategy:

Strategic Posture:

Founded for the purpose of producing computer keyboards, Chicony has matured into the leading keyboard manufacturer in Taiwan, and it has followed up to become Taiwan's preeminent maker of laptop computers as well.

Chicony's main product lines include keyboard, laptops, notebooks, motherboard and add-on card, barebone PC system. Chicony offers high quality, mid-end products at low to mid-range prices. Intensive pre- and post-sales service is also emphasized. The integration of resources and operations at Chicony is the secret of its success.

Chicony did not produce PCs until 1988 and by 1989 its PCs accounted for 42% of its total sales while the rest was keyboard and other peripherals. About 30% of Chicony's PCs go to the U.S. market, 35% to Europe, 10% to the domestic market, and the rest to other areas. About 35% of keyboards go to the U.S., 35% to Europe, 10% to the domestic market, and 20% to other markets.

Strategic Mode:

Though Chicony still relies on OEM contracts for many of its keyboards, it ships 95% of its laptop and portable computers under its own brand.

Strategic Thrust:

Chicony strives to serve market niches such as high-quality keyboard and laptop and notebook computers. It spares no efforts in differentiating itself from others by introducing innovative products. Among its innovations include the first tracking-ball keyboard in Taiwan, an award winning design, and Chicony 286 NEAT and 386SX mainboard with which Chicony's widely acclaimed laptop model are built.

It has tried as much as possible to stay ahead of others, whether in technology and in other areas. With strong commitment to quality and service, Chicony spends at least 5% of its total costs on after-sale service, and their salespeople usually spend 20-30% of their time on the after-sales service. Chicony also has a well-planned new products development program for the long-term prospect.

Chicony also differs from its competitors in as it is willing to take risks on new technology. Though only 25% of the components in a Taiwan-shipped laptop computer are manufactured locally in Taiwan, Chicopy has invested in internal development of products and processes which most firms purchase abroad. Chicony emphasizes that control of technology and components means more than simple esteem: It has played a big role in establishing Chicony as Taiwan's number one brand-name laptop exporter. "To the extent you make your own components and products, you have an advantage over products supplied by companies who only do assembly or who don't have much R & D capability," says vice president Howard Cheng. "We can react better to changes in the marketplace and we can stand behind our products better. I think this has helped us differentiate ourselves in the market and build a name."

Strategic Goal:

Chicony keeps a balance between growth and profit.

Market Performance:

Chicony's sales were $22 million in 1987, $30 million in 1988, and $61 million in 1989. The return to sales has been about 5%. In the third year what the company calls its "Rambo Plan", Chicony is meeting with success. The plan calls for sales of $160 million in 1991, and 1989's sales of $60 million, double the 1988 figure, were right on target. Chicony is already the largest laptop computer maker in Taiwan, and its keyboards command 5% of the world market, with 200,000 keyboards and 5,000 laptops coming out Chicony's product lines every month.

Chicony has won a number of prizes and awards such "the Award of the Ten Outstanding PC of Taiwan," "Award for New Product Development" by the Chinese National Federation of Industries, and "1989 Taiwan Product Design Award" by the China External Trade Development Council. Chicony's approach shows that investment in technology and attention to brand-name development can be profitable for even smaller companies in Taiwan.

Case 5: Kun Ying Enterprise Co., Ltd.

Brief History:

Known for its Genius mouse, Kun Ying Enterprise or KYE was established in 1983 by two Taiwanese entrepreneurs with just US$25,000 capital. Initially as cloners of PCs, they switched to mouse making in 1985 and have never looked back. The sales was expected to reach $45 million in 1990.

Internal Capability:

Outside Europe is the world of American mice, but within its borders, the story is different. "Genius" is the most popular sounding brand name among mouse users in Europe. KYE devotes about 5% of its sales on R & D. Its 20-member R & D staff has been increased to 70. Factory and office automation has helped KYE keep total personnel down at 200, of which only 40% consists of machine operators. KYE has several overseas subsidiaries and branches, including the KYE International Corp. in the U.S., which hires 20 people to handle sales in the North American region. KYE's second plant was scheduled to complete in 1990 and its third one will be established by the end of 1991. KYE currently turns out more than 200,000 mice every month.

Business Strategy:

Strategic Posture:

KYE specializes in mouse, plotter and scanner. It offers low- to mid-end products at low to mid-range prices. The U.S. market takes 20% of its total mouse output and Europe absorbs 70%, while Asia buys the remaining 10%.

Strategic Mode:

KYE has recently shown an ambition to expand its distribution to other regions besides Europe. In April 1990, it participated in buying over a U.S.-based mouse manufacture, Mouse System. Financial and technical support from KYE soon increased Mouse System's sales. Through Mouse System's marketing channel in the U.S., KYE quickly enhanced its presence in this market. Over 90% of KYE's mice is sold with the Genius logo.

<u>Strategic Thrust</u>:

KYE is able to grab a market niche for its Genius mice by going early for Europe. "We started marketing our products in Europe early," noted James Jow, vice-president of KYE. This explains much of KYE's success. Avoiding the U.S., a market monopolized by three large-scaled makers but still ventured into by new and small mouse makers worldwide. By the time other makers decided to withdraw from the U.S. and diversify into Europe, KYE is just about ready to explore new markets.

Well-established sales channels do not only increase sales but also help build product image. "Not too many logos make their way into PC makers' accessories, Genius is one of the few," claimed Jow. Whenever PC makers allow a logo to be part of their computer peripherals, it means the logo is credible enough to increase their overall product value and image. "Product image is our first priority," says Jow. The firm never resorts to price cutting measures and sacrifice the quality of its products and services.

Market Performance:

Efforts at maintaining a high product image has paid off handsomely. KYE has become the largest mouse maker in Taiwan with a monthly output of 200,000 pieces. KYE boasts of taking 90% of the central European market. Its sales totalled $30 million in 1989, an 11 growth over 1988. 1990's sales was expected to grow 50% to $45 million. Its return of sales is about 5%.

Case 6: Taiwan Video and Monitor Corp.

Brief History:

Founded in 1978, TVM first dealt with in several electronics components, but quickly shifted to concentrate on computer monitor. Now it is a specialized manufacturer of high-quality computer monitors, calling itself "the Professional Monitor Company."

Internal Capability:

TVM has a 15-staff R & D team and spends over 5% of its sales on R & D. TVM is also the largest Taiwan monitor brand name. Backed by a 2,743-square-meter plant with a staff of 160, TVM has a marketing network across 72 countries, with the focus on Asia and Europe and most recently shifting to the U.S. It operates the Amsterdam distribution warehouse, and has branch offices in Los Angeles and Vancouver. It plans to expand in the U.S. with a 2.5-million-dollar and 40,000 sq-ft facility in California in 1992. This North American headquarters will also be the home for TVM's global marketing center, graphics division and advanced R & D functions.

Business Strategy:

Strategic Posture:

TVM specializes in offering high-quality and mid-level to high-end monitors at mid-range prices. This single-mindedness has brought the company to its present position as a leading monitor maker in the global market. Its target in mind is Japan's NEC. TVM began producing color monitors in 1982, and currently color monitors account for 60% of its total output. TVM stresses superior design and consistent quality. TVM's products are priced at the middle and high range. TVM uses best components available for its quality monitors. TVM emphasizes global market diversification.

Strategic Mode:

The majority of TVM's monitor are for export, accounting for 90% of its total output. About 90% of TVM's products are sold under its TVM brand. TVM has a special business relationship with Tatung Co., Taiwan's largest electronics maker that also manufacture computer products such as PC systems and monitors. Tatung provides a monitor manufacturing facility for TVM and the two share many resources. It is said that Tatung owns part of TVM.

Strategic Thrust:

TVM has earned its worldwide reputation for monitors of superior quality in construction and design. Its innovative products best show its dedication to design and quality. That has been true since its early days. Back in 1983, for instance, TVM announced the world's first three-in-one multi-display color monitor--the MD-3. At the same time, TVM borough to the market one of the industry's first 14" screens.

The latest products from TVM represent a commitment to R & D. When it came out in the summer of 1990, the MD-14V SuperSync 4A was the first all-analog multiscan monitor available. It was followed by 5A, 6A and 7A monitors.

TVM's strategy can be summarized as emphasis on superior design and reliable quality, efficient distribution channel, and after-sales service and technical support. Quality, service, and innovation are the three catch word for TVM.

Market Performance:

With the above strategy, TVM has been able to rank among the three foremost monitor suppliers in Western Europe, Asia and Australia. Its 1988 sales were $79 million, and that grew 90% to reach over $150 million in 1989. TVM has also won several industrial awards. Its MG-11 monitors won the Editor's Choice in the August 1989 issue of PC Magazine. TVM two awards in Taiwan are "the Original Brand Award" and the "Good Design Award."

B. Computer Firms from South Korea

Three major indigenous computer firms from South Korea have been studied in detail in this section. These firms are Daewoo Telecom, Hyundai Electronics and TriGem Computers.

Case 7: DAEWOO GROUP

Brief History:

Founded by Kim Woo-Chong in 1967 as Korea's first exporter of textiles with an initial investment of $9,000 and with a handful of old Kyonggi High School schoolmates--a club that sill dominates Daewoo's inner circle, Daewoo has become the youngest among the top four conglomerates in Korea, with annual sales of over $22 billion. In just 23 years, Daewoo has branched out from textile into steel & metal, machinery, chemical, construction, shipbuilding, automobile, electronics, and financial services. In 1984, Sweden's King conferred on Mr. Kim, chairman of Daewoo Group, the International Business Award, the top honor given every three years by the International Chamber of Commerce to "an entrepreneur who has contributed to the idea of free enterprise by either creating or developing his own company."

Despite the claimed special favor by the government, hard work, risk-taking, aspiring for export growth, sensitivity to the market trends and innovative management are more critical to Daewoo's success. As a legendary workaholic, Mr. Kim has been leading Daewoo into the rank of top corporations in the world within just two decades by aggressively venturing into new businesses and new markets that have a high potential for Korea's global competitiveness. Daewoo is also well-known for its unique ability to turn around troubled businesses acquired by Daewoo that has used acquisition as its main vehicle for fast expansion.

It was Daewoo that initiated a series of innovative practices to promote Korea's export. Daewoo persuaded the government to establish the general trading companies in Korea. Daewoo led the way to start direct sales to major U.S. retail chains. Daewoo is among the first in Korea to peg product development to market opportunities and stress quality control as means to achieve business success. Daewoo is also widely recognized as being the most sophisticated Korean firm with respect to financial expertise and sourcing. Even

Daewoo's critics praise it for its obsession with innovations. Contrary to Korea's conventional approach of only manufacturing under foreign licenses, Daewoo emphasizes developing new products based upon learned expertise through OEM contracts.

Unlike other conglomerates in Korea where family members typically fill key managerial positions, none of Daewoo's senior managers are related to Chairman Kim. Yet the management team share two characteristics: their young age and their educational background, forming a tightly-knit management group with strong shared values. Though Daewoo has gone much further than any other chaebols in developing professional management, the decision making is still highly centralized as Chairman Kim continues to dominate decision making on important issues.

An emphasis on people is another feature of Daewoo's management. With a belief that each individual has a potential, Daewoo seldom fires employees from acquired companies, and it encourages every employees to be creative. It also emphasizes in-house training and often sends employees to study abroad. Daewoo is among the first to begin recruiting Korean scientists who used to work in the research labs of top U.S. companies and put them in charge of managing R & D programs and high-tech businesses.

Underlying Daewoo Group's operational strategy, a drive to move to higher technology is perhaps the most pervasive in

Daewoo, being implemented in two ways. First is a shift in the mix of businesses, a transformation through diversification. Second is the upgrading of existing businesses, a transformation through value-adding. Another characteristic of the strategy is the emphasis on joint venture and coprosperity. In international arena, Daewoo is keen on joint ventures and strategic alliances with major global players.

Daewoo has relied mainly on acquisition to expand into other industries. Every major new business entry for Daewoo involves a takeover of an existing troubled firm. This approach has enabled Daewoo to take a major position in a new business sector with little or no call on its limited financial reserves, since the purchase price is usually low and often accompanied by bank loans. As a result, Daewoo management has gained considerable experience and confidence in turning troubled company around.

In recent years, Daewoo's growth has been slowing down, its exports declining, and its earnings becoming negative. Daewoo has two major problems: it has not yet achieved a dominant position in any single industry, and it has lagged in establishing its brand.

There are 28 member companies in the Daewoo Group, not including a number of affiliated companies and overseas subsidiaries. Currently Daewoo Group is organized into nine business divisions: trading & construction, machinery, electric & electronics, telecommunications, automotive manufacturing, auto parts & components, shipbuilding, chemicals and financial services. For computer items two subsidiaries are Daewoo's mainforces: Daewoo Telecom and Daewoo Electronics, especially the former. Thus, Daewoo Telecom has been selected as case study as follows.

Daewoo Telecom Co.

Established in 1983, Daewoo Telecom has quickly become one of the leading electronics companies in Korea, specializing in information products. In 1989, its sales reached $323 million, ranked as the 87th largest among all Korean corporations, and 30% of its total revenue coming from export sales.

Internal Capability:

Instrumental in Daewoo's entry into information-related products has been Daewoo's chief advisor on electronics, Park Sung-Kyou, who got his Ph.D. in electrical engineering from the University of Texas (Austin) and used to be a senior researcher with Schlumberger Ltd in the U.S. He was attracted by the management style of Daewoo's founder Mr. Kim and quit his job in the U.S. to join Daewoo in 1978. As a graduate of Seoul's prestigious Kyungki High School, Park also had close social ties to Chairman Kim, himself a Kyungki alumnus.

Park's first mission at Daewoo was to help establish Daewoo Telecom Ltd., a manufacturer of personal computers and telecommunications equipment, and which Park now heads as president and chief operating officer.

Park fortified the company by forging strategic alliances with such foreign partners as Northern Telecom of Canada. Creative contributions of his own included the successful launch of the Leading Edge Model D in 1984, which was an instant success, gaining Daewoo a foothold in the U.S. market and propelling the company into one of Korea's leading PC makers. Since the R & D Center was established in 1982, Daewoo Telecom has invested up to 10% of its sales each year into R & D and the Center is staff by over 600 engineers. The center includes such major divisions as Switching Systems, Transmission Systems, Radio Communications, Computer Systems, and System Integration. Daewoo Telecom has five major, moden production facilities among which the Chuan Plant 1 produces PCs and peripherals while the Sorae Plant is mainly employed in the production of telecom equipment and mini-class computers. Daewoo Telecom benefits from Daewoo Group's global marketing network, and it also has its own offices in many foreign countries. In the U.S., Daewoo Telecom used Leading Edge as a marketing outlet.

Business Strategy:

Strategic Posture:

Daewoo has adopted a corporate philosophy to achieve ideal combination of computers and telecommunications. To this end, Daewoo Telecom has been expanding its territory over the past several years to encompass a diverse range of items: switches, transmission equipment, office automation equipment, optical communications equipment and semiconductors. Another major product line, besides PCs, for Daewoo Telecom is the TDX (timed digital exchange), a digital electronic switching system developed jointly by a consortium of local companies and the Korea Institute of Electronics and Telecommunications.

Daewoo Telecom used to rely on Leading Edge PCs for 90% Of its export in 1986 and its computers accounted for 70% of its total production--30% for telecommunications--in 1987. Daewoo Telecom has been trying to balance that to a 50% share for telecommunications, 35% for computers and 15% for semiconductors. Daewoo mainly targets the low-end PC market within the low price range.

Strategic Mode:

Daewoo emphasizes forming joint ventures and strategic alliances with foreign partners. One of the examples is its a joint manufacturing arrangement with the University of Washington and with Next for graphic cards. Recently, Daewoo

Telecom signed an assembly licensing, technology transfer and OEM agreement with MIPS Computer Systems of the U.S. Under the terms of the OEM portion of the agreement, Daewoo Telecom will resell MIPS's entire product line in Korea under its own brand name; Daewoo will also assemble selected MIPS workstations and servers in Korea. It has just established a 50-50 joint venture, Daewoo ZyMOS Technology Ltd., with ZyMos of the U.S. in CA for semiconductor production. It will also explore its close relationship with Unisys --as the later's local representative in Korea--to develop capability to design and produce large computer systems.

Strategic Thrust:

Daewoo Telecom stresses massively manufacturing standard products and competes on quality and price.

Strategic Goal:

Daewoo Telecom's operational goal is both growth and profit, with a bigger emphasis on the former.

Market Performance:

Daewoo's sales was 130 billion won with an export of $86 million in 1986, among which 90% was due to Leading Edge sales. Daewoo Telecom's revenue grew 23% in 1987, 7% in 1988, 23% in 1989, reaching $323 million. Net Profit/sales ratio was 1.9% in 1987, 3% in 1988, 3.1% in 1989.

Computer Business and Leading Edge

Four years ago, Daewoo Telecom was a big, but visible, name in the IBM PC clone business. Sold in the U.S., by importer Leading Edge Products, Daewoo Telecom's PCs captured a U.S. market share larger than that of Japan's NEC and Toshiba. When Consumer Reports compared IBM clones from Japan, Taiwan, and Korea in 1986, it gave the Leading Edge Model D computer--designed from scratch and built in 4 months by Daewoo Telecom--a "Best Buy" rating and the No.1 rating in quality. In 1989, Daewoo Telecom acquired control of Leading Edge Products after the U.S. importer filed for bankruptcy. The move was made partly in response to the urging of major Leading Edge clients, but it marked a big step in Daewoo's evolution as a marketer as well as a manufacturer of PC systems.

Leading Edge Inc. was founded in Newton, Mass. by Michael Shane, a contentious onetime salesman of wigs, jeans, floppy disks and printers and later a pioneer in the computer clone business. He started importing high-quality, low-priced Asian computers long before it became common in the U.S. By doing so, his business was a great success. Mitsubishi was Leading Edge's first clone supplier starting in 1984, but Mr. Shane stopped buying under the contract after Mitsubishi failed to meet price cuts by the competitors. Subsequently, Mr. Shane sued charging that Mishubishi failed to make computers available to him, and then signed up with Daewoo Telecom in 1985. Daewoo designed and built the Model D from scratch in four months with several enhanced features including a 3.5-inch floppy disk drive it correctly foresaw as IBM's next move.

Leading Edge experienced enormous success as a result of its price-conscious marketing strategy. Leading Edge Model D hit the U.S. shores at a retail price of $1,495, just half of IBM PC XT's price. At its height, Leading Edge shipped 190,000 PCs in 1986, 140,000 in 1987, and 108,000 in 1988 that accounted for 2-3% of the U.S. market in term of unit. By 1988, Leading Edge computers became the fifth most popular brand and accounted for about 6% of the computers sold in the U.S. by independent retailers, and the private-held company had annual sales of more than $200 million.

Before long, Leading Edge began to have financial troubles. Mr. Shane became so obsessed with low-pricing strategy that he kept slashing prices until the list price hit $925. By then Leading Edge was losing money on each sale. Mr. Shane believed that was a necessary response to the competitive conditions.

When Leading Edge failed to make any payments to Daewoo, which had a huge warehouse in Log Angeles to supply Leading Edge, had to refuse further shipments. Then Leading Edge began laying off its staff, and finally filed for bankruptcy in February 1989. Mr. Shane agreed to sell off the name and the major operations of his company, amid an apparent cash crunch and a welter of supplier disputes, layoffs and retailer fears. Though Mr. Shane blamed the pressures and costs of an going legal battle with Japan's Mitsubishi Electronic Co. over a 1984 computer purchase agreement, Leading Edge's problems reflected the growing competition of the low-priced clone business and Mr. Shane's own history of litigious, hard-nosed dealings with customers and suppliers. Industry analysts pointed that it was heightened competition, poor service and a ungainly distribution channel that led Leading Edge to file for protection from its creditors under Chapter 11 of the Federal Bankruptcy Code and left behind installations totalling 800,000 and a loyal user base.

Daewoo never expected their cooperation with Leading Edge would end like this. K.H. Lee, general manager for Daewoo office in Boston said that Daewoo was "a bit confused why this kind of thing can happen." He sags that Mr. Shane was "a very smart businessman. We had hoped him to be a successful businessman for the long term." But Daewoo Telecom got broadsided. For 1989, Daewoo Telecom's PC sales in the U.S. was only $17 million, compared with over $130 million in 1988 and over $200 million in 1987. In November 1989, Daewoo Telecom bought Leading Edge from court-appointed trustees for $16.5 million, for the purpose of direct distribution and sales.

New Strategy for Computer Business:

Daewoo Telecom was back in 1990 with a plan to mount a new drive into the U.S. computer market--and to piggyback again on the Leading Edge brand. It set up a shop in Westborough, Mass., hired new American managers, and expanded the product line. The new strategy is to establish a new management team, set up a effective distributing network, make best use of Daewoo's financial and manufacturing strength, and become a price/performance leader.

New Management Team:

To help stage a comeback, Daewoo reestablish the management. A new team who had computer marketing expertise were borough in from Panasonic and NEC. Albert J. Agbay, a 42-year-old former computer dealer and senior marketing executive at Panasonic, was appointed the president and CEO of Leading Edge in January of 1990. When Mr. Agbay came to Leading Edge, he was stunned when he found out that the company did not have a focus, new products were at a standstill, and marketing programs or sales strategy were virtually nonexistent.

Brand Recognition:

Daewoo management says the "main factor" in its new strategy is the Leading Edge brand name, which still has a substantial recognition. This time, in addition to PCs, Daewoo expects to sell everything from fax machines to engineering workstations under the Leading Edge label. "Our final purpose is not PCs," says Young-Sang Han, general manager of Daewoo Telecom.

A quick return to volume sales remains Daewoo's best hope. With Leading Edge in Chapter 11, most dealers dropped the brand--frequently in favor of Daewoo's Korean rivals, Hyundai and Samsung. Hyundai Electronics America doubled its number of dealers to 1,000, partly by signing up former Leading Edge outlets. There's no doubt that we benefitted from Leading Edge's absence, says F. J. Reid, Hyundai vice president for marketing and sales.

Marketing Channel:

The first thing Mr. Agbay did was to build up a capable sales force and then backfill that with a strong service team. Though price will still remain very competitive, Leading Edge intends to control distribution of its products tightly in order to avoid an oversaturation of dealers in a particular area and ensure good technical support and service. In April 1990, Leading Edge persuaded Softsel/Microamerica to handle its products as its exclusive national distributor. Softsel/Microamerica, one of the largest computer products distributors, will service regional distributors who in turn will service resellers. These resellers will have to be site-and service-authorized.

Agbay believes Leading Edge still has a lot of potentials. He predicts that Leading Edge can sell 200,000 PCs in 1990. The company, he asserts, will have annual revenues of $550 million within five years. The strategy is to set list prices as much as 20% less than other clone makers such as NEC and directing its marketing efforts toward mid-sized growing companies--which it defines as those that need to make a significant investment in quality computer equipment, but where price is still a real consideration. He is also counting on renewed interest from many of the 80,000 Americans who already owned a Leading Edge machine, which are now ripe for replacement. A $5 million advertising campaign is intended to whip up latent name recognition. To win back corporate buyers, Agbay promises better dealer support programs and is emphasizing powerful models such as laptops and file servers.

Yet there are many difficulties for Leading Edge to come back to its glory. The first danger is the low pricing strategy, as reflected by the downfall of Mr. Shane. The second is the risk of relying on distributors. Though it seems to spare the cost of a direct sales force, it may lose other valuable customers. More sophisticated dealers who sell to corporations buy directly from computer makers. When a manufacturer sells through distributors, it does not have any control. Thirdly, though well-known, Leading Edge brand may not be well-loved. The roster of Leading Edge dealers, once as high as 3,000, has dwindled to perhaps 300. Fourthly, customers may also be leery. Some large companies that once bought Leading Edge and other off-brand PCs no longer gamble on clone-makers. Leading Edge may have lost a lot of its corporate following. Finally, Leading Edge is behind in new product development. Its current product line includes 286, 386SX, 386DX/25, 386DX/33, and laptop, missing 486-based power machines and the hot notebooks. Further, it does not have many computer peripherals to offer.

Product Development:

Leading Edge has a 9-man R & D team--out of 105 employees in Leading Edge--working closely with the engineers in Seoul on the design of new products. Daewoo requires Leading Edge to take a more active role on the overall development of their products on a world basis. Daewoo is very interested in becoming involved in peripheral products such as laser printer, dot matrix printer, and monitor. The company is also has an eye on the workstation market but its current focus is to reestablish itself as a leading PC vendor.

Manufacturing:

The quality issue is being taken good care of by Daewoo factories in Korea, where modern facilities are installed and quality control is high. Daewoo has five major manufacturing facilities: The first Chuan plant turns out Leading Edge PCs; the second Chuan plant turns telephones and fax machines; Sotae plant builds switching systems; the fourth focuses on the mass production of optical fiber and cables, and the fifth one is dedicated to the production of semiconductor devices.

Market Performance:

After Daewoo acquired Leading Edge and tried a new strategy, Leading Edge did come back in the PC business. In 1990, Leading Edge's sales recovered to around $80 million and it aims to reach $130 million in 1991. How far it can go still remain an open question.

Case 8. Hyundai Electronics Co.

Brief History:

The establishment of Hyundai Electronics Industries Co., Ltd, in February 1983, representing the Hyundai Business Group's gamble on the fast-growing electronics market and its first major stride toward excelling in electronics and other high-tech sectors. Prior to then, Hyundai had no experience in electronics and other high-tech areas. Yet Hyundai is clearly determined to repeat the come-from-nowhere success in its automobile to its high-tech drive. After a sluggish start in PC business and a near disaster in chips, Hyundai has begun to show signs of success. HEI has been playing a key role as the technological innovator to the Hyundai Group.

Internal Capability:

HEl's Research Institute houses two major divisions for the on-going development of semiconductors and electronic systems. HEI usually invests 10% of its sales to R & D and it has a R & D staff of 930 or 8.5% of its total employees. With the help of a huge manufacturing site and a R & D center, HEI mass-manufactures telecommunications equipment, semiconductors, industrial and automotive electronics, and advanced information systems.

Most of Korea's PC exporters depend on OEM contracts for the majority of their export sales. The one notable exception is Hyundai, which was launched in 1983 with an investment of $1.7 billion so as to create its own brand and marketing channels. In the past several years, HEI has developed a strong marketing network of its own around the world. With the help of such a network and the brand extension from Hyundai's successful cars, HEI had been able to export more than 90% of its PCs under Hyundai brand in 1989. Since HEI's first ad campaign made its debut in the Wall Street Journal in the U.S. in 1987, HEI has built up a network of 350 dealers for its PCs, gaining a foothold in more than 1,000 U.S.

computer shops. The fact that Hyundai was the only Korean PC makers to record growth in the first half of 1990 strongly suggests that a lack of direct sales networks has become the Archilles heel of other Korean PC makers.

Because of the authoritarian nature of Mr. Chung, founder and former chairman of Hyundai Group, Hyundai had long depended entirely on him for expertise, dynamism and decision making. This makes a smooth succession difficult. The successor should not only be as tough and strong-willed as he is, but also flexible enough to lead the group into a new business generation where professionalism counts. The transition means more than a change in command at the companies that the aging entrepreneur founded; it means a change to a generation which is highly educated and which has less emotional attachment to the enterprise; it could also mean a change in the management style--away from the top-down, highly centralized system to one more decentralized and professionally managed. The biggest and perhaps stickiest question will emerge over the ownership of a business group with a net worth that nobody knows. Most companies are in a private domain made up mostly of Chung and to a small extent his family members. Even those companies which are listed on the Seoul Stock Exchange are majority-owned by Chung and his family.

HEI's top management still lack a complete understanding of the electronics industry. In charge of HEI is Chung's son, Chung Mong Hum. Before assuming the top post at HEI, the then 35-year-old Chung had virtually no experience in high tech.

Business Strategy:

Strategic Posture:

HEI's product mix covers only industrial electronics such as telecommunication equipment, semiconductors, computer products and automotive electronics. As computer products are concerned, HEI's Information System Division focuses on quality low-end standard computer items at low to mid-level prices. HEI offers a wide range of computer products such as PCs, monitors, terminals, modems, hard disk drives and floppy disk drives.

U.S. is HEI's major market. HEI entered the U.S. computer market in 1986 when it signed a $180 million contract to build low-cost IBM clones for Blue Chip Electronics that sold through chain stores instead of through computer specialty retailers. Blue Chip listed the machines below $1,000, leaving no profit for HEI. HEI's mission was not to make money at that moment but to gain a foothold in the U.S. market. When the effort failed to materialize, HEI changed its marketing approach.

Strategic Mode:

HEI started to export its computer products in 1986 when it signed a contract with the U.S. distributor Blue Chip to sell through mass merchandise stores. After 25,000 units landed on retail shelves, the product had virtually no sale. HEI then decided to test two-step distribution. It signed agreements with four regional distributors, but the arrangement failed because the distributors crossed over into each other's territories, causing destructive competition. Then HEI created a dealer channel that would bypass distributors, offer higher discounts to dealers and improve HEI's return.

HEI has been heavily dependent on foreign technologies and it has got them through licensing such as PC technology from U.S.-based Tolerant Systems, floppy disk drive technology from Japan's Fujitsu, and printer know-how from Canon. In semiconductors, HEI bought the EEPLD technology from a startup it helped finance: International CMOS Technology at San Jose. SRAM designs are from MOS Electronics; ASIC design software from LSI Logic, and HEI's DRAM technology are thanks to three companies: Inmos, Texas Instrument, and Vitelic.

Strategic Thrust:

The success of HEI has so far been a result of the company's emphasis on low-priced standard computer products made possible by the economies of scale from mass production and relatively cheap labor.

Strategic Goal:

HEI's major goal is growth and market share even at the expense of profit margin.

Market Performance:

HEI used to rely heavily on OEM contracts for such companies as Commodore, Digital, IBM, Sun Microsystems and Xerox. Starting from 1987, HEI began to develop its own marketing channels and sell computer products under its own brand name. Unlike other Korean firms that sell through distributors, HEI's approach of selling directly to dealers has accelerated market acceptance for its products. Two years later, Hyundai was ranked sixth in the U.S. with a 2.5% of the U.S. IBM-clone market share according to a report by Computer Software. Hyundai's sixth place in the U.S. put it just behind the Japanese vendor Epson but ahead of Leading Edge. HEI's sales were $200 million in 1986, $320 million in 1987, $700 million in 1988 and $790 million in 1989, with an average growth of 64%. HEI's profit margins averaged 4% in the same period.

Case 9: TriGem Computer, Inc.

Brief History:

If the name of TriGem does not ring a bell, try Computerland, Blue Chip or Epson. Those are the nameplates under which American shops sell TriGem PCs and that have helped fuel TriGem's average annual sales growth of over 60%. Founded in July 1980 by a group of young entrepreneurs and computer engineers headed by Kim Jong-Kil, the company has become Korea's leading computer maker with annual sales of $300 million.

Behind TriGem's success is Kim Jong-Kil, who masterminded the company after a 15-year career in Goldstar, where he managed a cash-register factory. While still at Goldstar, he persuaded his wealthy brother-in-law to found TriGem and install him at its helm. Like many other PC entrepreneurs in the world, Mr. Kim began in 1981 in a postage-stamp Seoul office where five employees wielded soldering irons.

Mr. Kim's first year was a disaster. TriGem cloned a computer made by Japan's Sharp Corp. and produced 30 of them using electronics parts that Mr. Kim bought in Seoul's electronics bazaar. Peddling the machines around Korea, he sold only ten.

The turning point came a year later when Mr. Kim learned of Apple Computer's wild success from Korean who started bringing the machines back from the U.S. TriGem quickly cloned the Apple II personal computers, the first Korean company to do so, and began to export them immediately. In late 1982, the Korean government ordered Korean institutions to buy domestically made machines and named five official suppliers: four chaebols and tiny TriGem.

That helped boost TriGem's sales to 3,000 machines in 1983 from 1982 sales of 300. TriGem continued its cloning success when it became the first Korean company to introduce the IBM-compatible machines in 1984, a feat that made TriGem "the Compaq of Korea."

In 1990, TriGem is named "Korea's Best Company" by the Korea Managers' Association in recognition of TriGem's "quality-oriented corporate policy, outstanding labor relations and superior commitment to research and development."

Internal Capability:

R & D:

As always TriGem has dedicated to R & D with a R & D staff of 300 or 18% of the total employees and a R & D budget as 8% of the total revenue. Over two-thirds have advanced or Ph.D. degrees in electronic engineering. TriGem has an R & D subsidiary located in Santa Clara, California, where a small team of American engineers complements the R & D activities in Korea in system and logic design. Several local subsidiaries are involved in related R & D of new system software, LAN and other communications products.

Human Resource:

TriGem literally means "three assets"--technology, service and people. TriGem's 1,700 staff are more than a "company" in the traditional sense. A better description might be "partnership." TriGem employees own 14% of the company's outstanding shares in one of the most generous employee stock option programs. TriGem strives to provide an open, Silicon Valley-style environment in which engineers have freedom to explore new areas. A good example is local subsidiaries like Human Computer that are acquired by TriGem but still run by the original engineers.

Finance:

TriGem's success attracted financing from two government venture capital funds, which now own 22% of the company. The first financing of $200,000 came from Korea Development Investment Corp in September 1983, whose additional investments have brought the total to $1,162,000. Epson subsequently granted TriGem a contract to make Epson's Equity line of computers and bought a 20% of stake in TriGem in 1987. TriGem went public and listed its stocks in the Korea Stock Market in

December 1989.

Marketing:

TriGem has five overseas subsidiaries in the U.S., Germany, the U.K., Japan and Hong Kong. It used to rely solely on OEM and now it has started to cooperate with selected distributors to establish own marketing channels.

Business Strategy:

Strategic Posture:

TriGem offers a wide range of computer and telecommunications products as the company terms as "the total solution and single sourcing." TriGem's corporate objective for the 1990s is to secure a leading reputation as a one-stop shop for total solutions. TriGem starts with a complete line of computer systems, and it expands to computer peripherals such as video card, monitor, keyboard, printer, and then it extends to networking and communications. It also emphasizes software development and ASIC chip designs.

TriGem positions its products at the low- to medium-end of the market but with such special features of medium-performance, low-cost, and high-quality. TriGem ships its computer products to over 40 countries around the world, but its major market is the U.S., where it has won several big OEM contracts for the U.S. vendors.

Strategic Mode:

TriGem relies heavily on OEM deals. In 1989, 90% of TriGem's export were sold to OEM buyers like Japan's Seiko Epson--it resells TriGem PCs in the U.S. under Equity brand name--and the U.S.'s chain Computerland. Since 1986 TriGem has been the exclusive OEM maker for Computerland and Epson, and in 1989 3Com and Solbourne Computer in the U.S. joined their names to TriGem's list of OEM partnership. TriGem emphasizes strategic alliances with capable foreign partners for technology, market access, and sometimes financial assistance. TriGem's partnership with Seiko Epson has helped TriGem learn dot matrix and laser printer technologies and has helped Epson win a place among the well-known PC brands in the U.S. In 1987, Epson invested directly in TriGem and now holds a 12.6% equity interest in TriGem. Partnerships with 3Com and Solbourne Computer of the U.S. has enhanced TriGem's capabilities in LAN and RISC workstations, while expanding the market for the U.S. firms through TriGem's network in Asia, Europe and North America. Partnerships with distributors have also benefitted both sides. Bestagro Computer of Thailand, a major TriGem customer, now commands a 35% share of the Thai PC market.

Strategic Thrust:

TriGem's main strategic thrust is to offer a complete line of computer products with high-quality and superior price/performance. TriGem is aimed at enhancing existing product designs. TriGem is competing on mass production of quality standard items at low cost.

Strategic Goal:

TriGem stresses both growth and profit.

Market Performance:

TriGem has achieved many successes since its establishment. Historically, TriGem claims to be the first Korean firm to make PCs and export them to the U.S., Canada and Europe and has been a leader in many new product development in Korean computer industry. TriGem's sales were $36.4 million in 1986, $78.4 million in 1987, $199.3 million in 1988, and $291 million in 1989, while its export was $12.7 million in 1986, $43.6 million in 1987, $128.9 million in 1988, and $192.2 million in 1989, growing at an annual rate of 105% and 163% respectively. Despite of its heavy investment in R & D, TriGem recorded a healthy operating profit of 8% of sales and a net after-tax profit of 4% in 1989.

TriGem's growth has greatly attributed to the sudden surge of OEM orders, which may disappear as sudden as they show up. TriGem chairman Lee Yong Teh concedes Korean makers may have erred by treating PCs as commodity manufacturing items instead of trying to develop niches at the high end of the market for their own brands.

That strategy cost TriGem dearly during the first half of 1990 as Epson, which accounts for about 85% of TriGem's OEM business and almost all its U.S. sales, had poor sales in its low-end products supplied by TriGem, and Epson is now turning to its own U.S. manufacturing subsidiary to build its next generation of more powerful 32-bit PCs. To augment Epson's business, TriGem has begun a crash effort to develop its own network of dealers and distributors in major overseas markets. TriGem recently surprised the computer industry with its new laptop workstation, which uses the newest-generation chips. The workstations will be available just as similar models from Japan come to market--rare timing for a Korean company. It is estimated that TriGem's sales in the U.S. will climb 50% in 1991 because of the new, $10,000 laptop workstation.

C. Summary

Several observations can be concluded from the nine case studies. First, the external competitive context has a direct impact on the characteristics of firm-specific strategies, and firms tend to formulate their competitive strategies according to their internal capability which is partly defined by the external context. As illustrated in the case studies, the structural differences between South Korea and Taiwan have a clear bearing on the strategic behaviors of their respective indigenous firms.

Because of their structural characteristics, Korean computer makers tend to adopt the approach of reaping the economies of scale by mass producing a few standard items at lower cost (as in the cases of Daewoo, Hyundai, and until recently TriGem). Their marketing strategies tend to emphasize large OEM orders and market share with aggressive pricing even at the expense of profit margin. Due to their concentration on large OEM orders, many Korean PC makers rely on price as their key competitive advantage, rather than investing in overseas sales networks or new technology to improve their products. This approach has been undermined recently, as rising wages and a rapid appreciation of their currency have hurt the relative price/performance advantage of Korean firms, especially when the low-end PCs, which are the bread-and-butter of Korean computer makers, are now driven more by price than any other factors. Also, because most Korean makers manufacture PCs on an OEM basis rather than through their own marketing channels in their brands, they are at the mercy of their OEM buyers, as illustrated by the cases of Daewoo and TriGem. However, Korean PC makers appear to devote a higher percentage of their revenues to R & D than the Taiwanese counterparts, but the practical results have not been impressive (as in the cases of Daewoo and Hyundai).

Thanks to their organizational flexibility and technological sophistication, Taiwanese firms tend to focus on higher-end or niche market segment and emphasizes their own brands. All Taiwanese firms under this study, Acer, Arche, Chicony, KEY, Microtek and TVM, share those characteristics. They seem to rely much less than OEM deals than their Korean counterparts; instead, they tend to emphasize their own brand names (as in the cases of Acer, Arche, Chicony, KEY, Microtek and TVM). They also tend to join in efforts with U.S.-based computer firms established by American-Chinese to develop and market new products in the U.S. and other regions (as in the cases of Microtek and Arche).

In general, those firms that are strong in R & D tend to focus on high profit margin by serving higher-end market segments and by offering innovative products. They also tend to emphasize their own brand names and marketing channels. That is exactly the case with Acer, Arche, Microtek and TVM. This is also true, to a lesser extent, with KYE, Chicony and TriGem.

Secondly, in light of the global competitive context, the indigenous computer firms from South Korea and Taiwan appear only capable of competing as bottom-tier or middle-tier firms in the global marketplace. Most Korean and Taiwanese vendors can only operate as bottom-tier players though some of them have the potential to become middle-tier contenders such as KEY, Hyundai and TriGem, and some of them are already qualified such as Acer, Arche, Microtek, and TVM. They have the financial and human resources for an average job in R & D and marketing, they enjoy good manufacturing facilities and experience for quality electronic products, and, most critically, they have the highly-developed human resources at home. Yet, to sustain and improve their market positions, they need to be more global-minded to attract talents from all over the world for R & D and marketing functions.

Currently, the greatest strength of indigenous computer firms from Korea and Taiwan lies in their manufacturing capability, and their greatest weakness is their limited capability in R & D for new products and marketing their own brands. It can be argued that Taiwanese firms may have a better chance of moving up to or along the middle-tier quicker than their Korean counterparts thanks to their technological expertise, brand recognition, flexible adaptation, and market-niche approach, but Korean firms may have greater potential to become top-tier players than their Taiwanese counterparts because Korean firms are much more diversified and large in size so as to benefit from the converging trend of technological advances and synergy effects of market developments.

Thirdly, differences in market performance are chiefly determined by two strategic elements: (1) strategic posture along the value-added matrix, and (2) strategic thrust based on low-cost and market-niche. Firms that position at the high-end of the value-added matrix (emphasizing sophisticated products with a strong R & D capability) tend to enjoy either high growth rates or high profit margins or both according to firms' choice of strategic goals. In the high-end group, those firms that adopt a market-niche thrust tend to have the highest growth rates and profit margins--in the cases of Acer, Arche, Chicony, KEY and TVM--or at least highest profit margin --in the case of Microtek. Other high-end firms that emphasize a low-cost thrust usually may have high growth but not high profit margin (in the case of TriGem). This suggests one of the pitfalls of the low-cost approach.

Firms that position at the low-end of the value-added matrix (focusing on commodity-like products with a strong manufacturing capability) tend to suffer from low profit margin and unstable growth. In the low-end group, firms that adopt a low-cost thrust suffer the most in both growth and profit (in the case of Daewoo) while others that choose to serve market niches may even get high growth and average profit (in the case of Hyundai). The pitfalls of the low-cost approach are revealed again.

In all these cases, the emphasis on marketing products with one's own brand is critical to the firm's success in market performance. No matter what strategic posture or strategic thrust a firm adopts, marketing with its own brand makes a difference in market performance. This point has been well illustrated in all the case studies, especially the cases of Daewoo and TriGem.

One of the major differences in strategic choice between Korean and Taiwanese computer firms is their attitude toward their own brand names. Generally speaking, Taiwanese firms emphasize promoting their brands, while Korean firms tend to rely on OEM arrangements. This difference has added to the variances in market performance between Korean and Taiwanese firms as two distinctive groups.

Finally, no matter where a firm is based, it must cultivate at least one or two internal capabilities and find a position in the competitive context for itself to maximize its capability and minimize the weakness in the global marketplace. According to both external and internal success factors, only three generic strategies offer real chances for success:

1. Be a player in the top league with brands well-known for the standards they set and a combined feature of top-notch quality, performance, and service;
2. Be a player in the mid-tier with brands known for either good quality, or good performance, or good service;
3. Be a player in the low-end of the market with either little known or no brands and compete mainly on low price.

For the indigenous computer firms from South Korean and Taiwan, the best chance of success in the global market seems to be the middle road.

Chapter VII

SUMMARY, CONCLUSION AND AREAS FOR FURTHER STUDY

7.1 SUMMARY

Explored in this study has been the relationship between business strategy and market performance among indigenous computer firms from two newly industrializing economies (NIEs)--South Korea and Taiwan--in global competition. Specifically, similarities and differences in the global strategies across indigenous computer firms from South Korea and Taiwan have been examined; forces dictating the strategy contents have been identified, and performances of those firms in the global market have been measured. More importantly, the relationships among external context, internal capability, strategy content and market performance have been explored.

A. Significance of This Study:

As global competition has become one of the most striking features of today's business environment, a firm's success in the global marketplace has come to depend largely upon how well the firm is positioned strategically in the global competition. This is especially true when the industry in which the firm's key business resides has been substantially globalized. Consequently, for firms operating in globalized industries, an effective global strategy is critical to the firm's success in the marketplace. Such a strategy serves as a systematic drive to achieve long-term competitive advantages that would place and sustain the firm in a profitable position in the global market in coping with the forces shaping the external competitive context.

One of these forces is the emergence of new players from NIEs. Their success has changed the pattern of international trade and investment. Yet, indigenous firms in NIEs are now facing challenges from both less developed countries--with cheaper but similar productive labor forces--and advanced countries--with wider applications of automation and other advanced technologies. Thus, firms such as those from South Korea and Taiwan must upgrade their strategies by such measures as entering either high-tech industries or high-end market segments so as to create new competitive advantages in the dynamic global marketplace.

The issue of global strategy has not received adequate attention until recently. In the past, the field of international business engaged itself mainly in the task of explaining why national firms became involved in international operations. At the same time, the field of strategic management, dominated by the schools of business policy and industrial organization, confined its research to national settings. Though many efforts have been made to address the challenging issue of global strategic management, the theoretical and empirical results up to now seem to fall short of satisfaction for both academia and practitioners. Also, there is little empirical research on the strategic behavior of high-tech firms, especially those indigenous firms from NIEs.

The purpose of this study, then, is to amplify the empirical database and extend the theories of global management to global strategies of indigenous computer firms from NIEs. The following primary question has been extensively explored as the focus of this study:

> **What is the relationship between business strategy and market performance, given the external competitive context and internal operational capability in the case of indigenous computer firms in South Korea and Taiwan when competing for business in the dynamic global market?**

The findings of this study help narrow the gap between the outlooks of International Business and Strategic Management as well as between academic and business communities. The findings seem to offer practitioners and academia better understanding about how to construct successful competitive strategies with the given external competitive context and internal operational capability. This is especially so from the perspective of NIEs since the sample in this study has been drawn from the population of indigenous computer firms from South Korea and Taiwan.

For academia, this study suggests the basis for an analytical framework and a set of measurements for strategy content in analyzing firms' strategic behavior in global competition, especially those that are still in the process of becoming multinational corporations. For practitioners, this study offers some managerial implications for effective global strategic management, these are especially significant for indigenous high-tech firms from NIEs.

Though there remain some limitations such as small sample size, the use of subjective questionnaires as the main data-collecting instrument, and external validity due to one-industry analysis, this study seems to make several contributions to the field of global strategic management. First, it offers some insights into a critical issue through a combination of background review, statistical testing and case studies within a conceptual framework developed in this study. Second, both primary and secondary data, objective and subjective measures, statistical tests and case studies have been applied in this study, which have enhanced the validity of this research effort. Third, as a comparative study of two NIEs that have as many similarities as differences, this study delineates the interplays between various factors related to the issue of global strategic management. Finally, since the indigenous computer firms from South Korea and Taiwan have been relatively successful in the global market, any conclusions drawn from their experiences are potentially helpful to both researchers and practitioners.

B. Literature Review

Review of the literature concerning global strategic management has revealed that no single theory is able to explain the complexity and multiple dimensions of global strategic management. The literature review covers a range from theories of international trade, foreign direct investment, international technology transfer to business strategy.

International business theories started from studies of international trade and later included studies of foreign exchange and foreign direct investment. Modern theories of international business have expanded to embrace the international dimension of all business functions: production, marketing, finance, R & D, and human resources.

The classical and neo-classical theories of trade, represented by the Heckscher-Ohlin-Samuelson Model, while still providing explanatory powers for much of inter-industrial trade, are far from adequate to address intra-industrial trade. Similarly, all modified versions of the static model and even those dynamic trade theories, while offering better explanations for much of intra-industrial trade, cannot explain intra-firm trade. The latter falls into the domain of foreign direct investment (FDI) and multinational corporations (MNCs). The main thrust of research efforts on FDI and MNC is on attempting to identify sources of market imperfections and their relationships with various motives for FDI and consequently becoming MNCs. Three extensions of the theory of market imperfections are noteworthy: (1) internalization theory, (2) eclectic theory, and (3) diversification theory.

Generally speaking, all the above theories share one major shortcoming--lack of dynamics to help formulate business strategies for either firms or countries. They only achieve explanations of why and, at most, how the status quo comes into being, but fail to suggest how we can change the status quo and take advantage of the opportunities brought about by such changes. Such an issue has been well analyzed in the modern theories of business strategy.

Yet, a critical link seems missing between the literature of international business and the literature of business strategies. As Porter (1986a) points out: "As rich as it is, I think it is fair to characterize the literature on international competition as being limited when it comes to the choice of a firm's international strategy. Though the literature provides some guidance for considering incremental investment decisions to enter a new country, it provides at best a partial view of how to characterize a firm's overall international strategy and how such strategy should be selected."

Review of the literature concerning global business management reveals a common theme that is presented in a fragmented fashion by various theories but none of them alone is sufficient to explain the multi-dimensional issue of global business management. Still, the common theme shared by those theories can be used as a clue to synthesize the existing literature into a coherent framework with the help of a few new concepts for this study.

C. Research Framework:

The primary research question of this study has been divided into six subordinate questions for close examination. First, to explore the relationship between business strategy and market performance, it is crucial to understand the key features of competitive context that externally define the content of global strategies adopted by indigenous computer firms in South Korea and Taiwan. The external context should be examined from both global and national perspectives. The following subordinate research questions have been studied:

SQ-1: **What are the major characteristics of the external competitive context at the global level in which indigenous computer firms in South Korea and Taiwan operate?**

SQ-2: **What are the major characteristics of the external competitive context at the national level in which indigenous computer firms in South Korea and Taiwan are based?**

Secondly, related to the above two questions, it is important to identify the profiles of internal operational resources/capabilities available to the indigenous computer firms from South Korea and Taiwan, which internally define the content of their global strategies. The following subordinate question has been examined:

SQ-3: **What are the profiles of internal capabilities available to indigenous computer firms in South Korea and Taiwan?**

Thirdly, before the relationship between strategy and performance is explored, the specific content of strategies adopted by indigenous computer firms in South Korea and Taiwan in their global competition must be identified and measured. The following subordinate question has been addressed:

SQ-4: **What are the specific contents of those strategies adopted by indigenous computer firms in South Korea and Taiwan when they compete for business in the dynamic global marketplace?**

Fourthly, as the core of the primary research question, the relationship between firm-specific business strategy and actual market performance needs to be treated separately. The following subordinate question has been explored:

SQ-5: **How are the competitive strategies of indigenous computer firms in South Korea and Taiwan related to their actual market performances?**

Finally, to reveal managerial implications, it is desirable to classify the indigenous computer firms from South

Korea and Taiwan into different strategic groups according to their firm-specific characteristics to identify patterns of practice shared by successful or unsuccessful firms. The following subordinate question has been assessed:

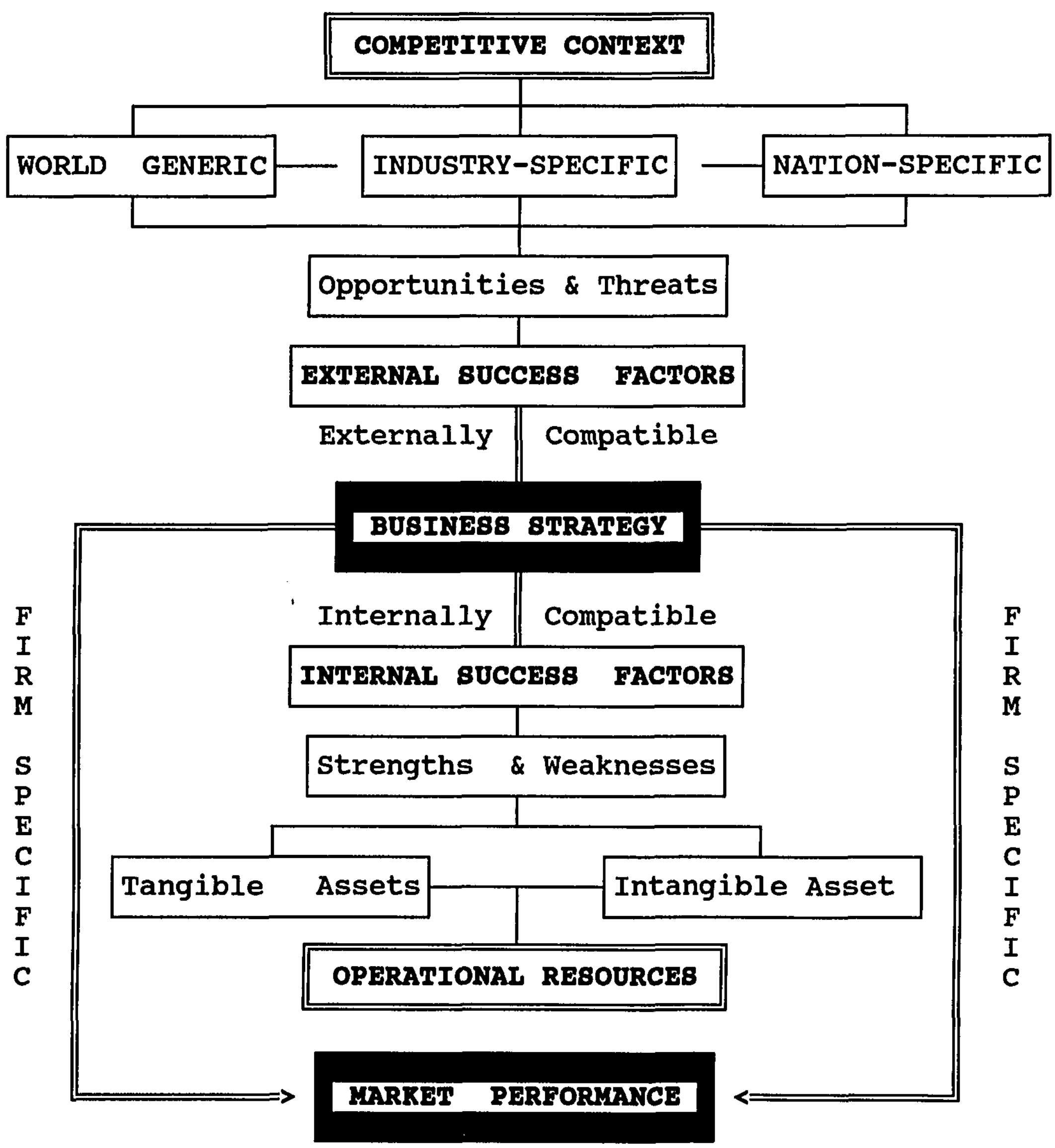
SQ-6: **How can indigenous computer firms in South Korea and Taiwan be classified into strategic groups according to the differences in the firm-specific characteristics?**

To answer the above research questions, a conceptual framework for analyzing the multi-dimensional issue of global strategic management has been developed in this study (Figure 7-1). In this conceptual framework, a competitive strategy is defined as a set of well-planned major actions to achieve specific market performing objectives such as market share, growth rate and profit margin at the corporate level. It is argued in this framework that a firm's market performance is jointly determined by the appropriateness of the firm's global strategy in light of the competitive context **external** to the firm and the operational capability **internal** to the firm.

The external context is defined by a combination of world-generic competitive factors, industry-specific competitive factors and nation-specific competitive factors. These factors characterize the competitive context for firms that are based in a specific home country but operate in a specific industry to serve the global market. The internal capability is defined by the profile of tangible and intangible assets or resources available to a specific firm. The assets determine the firm's internal strengths and weaknesses as compared with its competitors in the same industry.

Figure 7-1

ANALYTICAL FRAMEWORK



It is argued that only those strategies that are compatible with both external context and internal capability will lead to success in market performance. The conceptual framework has been basically constructed upon two key concepts --"external compatibility" and "internal compatibility"--and five major relationships that correspond to the six subordinate research questions.

The five relationships are as follows:

(1) The relationship between competitive context and strategy content--the external compatibility--is explored to identify the external success factors by examining the world-generic, nation-specific and industry-specific variables. The external success factors are associated with opportunities and threats posed by the external business environment at both the global and national levels. This corresponds to the first and second subordinate questions of this study (**SQ-1** and **SQ-2**).

(2) The relationship between operational capability and strategy content--the internal compatibility--is explored to identify the internal success factors by examining the resources internally available to the firm, with the external success factors as control variables. The internal success factors are associated with the strengths and weaknesses unique to each firm. This corresponds to the third subordinate question of this study (**SQ-3**).

(3) The relationships among strategic components are explored to identify the strategy content by controlling for

the external and internal success factors. This corresponds to the fourth subordinate question of this study (**SQ-4**).

(4) The relationship between business strategy and market performance is explored by controlling for the external and internal success factors. This corresponds to the fifth subordinate question of this study (**SQ-5**).

(5) The strategic groups are identified in terms of strategy content and market performance for managerial implications. This corresponds to the sixth subordinate question of this study (**SQ-6**).

D. Research Variables:

Still referring to the analytical framework in Figure 7-1, the following variables concerning competitive context have been included in the analysis: (1) the world generic competitive context, as measured by "globalization of the world economies"; "shift of balance in the world economic power"; "implications of technological development," and "role and behavior of MNCs;" (2) the industry-specific context, as measured by "market segmentation and pattern of consumer demand"; "nature of technological change"; "production pattern"; "distribution channel"; "degree of globalization," and "industrial structure" with respect to industrial concentration, barriers to entry and mobility, strategic groups, and association with supporting industries;

(3) <u>the nation-specific competitive context</u> as measured by "structural characteristics of the national economy"; "level of economic development"; "market structure"; "structural characteristics of the society"; "role of government"; "relation between business and government"; "relation between labor and manage-ment"; "cultural tradition"; "cost of labor"; "quality of workforce" in terms of adult literacy, education level and commitment to education; "commitment to science and technology"; "cost of capital," and "capital spending."

The following variables concerning internal capability have been measured: "expertise in marketing"; "expertise in manufacturing"; "expertise in R & D"; "expertise in financial management"; "expertise in human resources management"; "expertise in general management"; "number of years in the related business," and "firm size."

The following variables concerning strategy content have been used in the analysis: (1) strategic posture, as measured by "scope of product lines"; "width of operational coverage," and "geographical span"; (2) strategic mode, as measured by "internalization"; "external market", and "hybrid arrangement"; (3) strategic thrust, as measured by "cost-efficiency" and "product-differentiation"; and (4) strategic goal, as measured by "export growth" and "profit margin."

The following variables concerning market performance have been used in the analysis: (1) export growth; (b) profit margin on overseas sales; (3) export ratio, and (d) OEM ratio.

E. Data Collection:

A sample has been drawn from the general population of indigenous computer firms based in South Korea and Taiwan for data analysis. The sample firms are export-oriented computer corporations that are wholly-owned by native Koreans or Taiwanese and have overseas manufacturing and marketing facilities for computer products including components, peripherals, and systems.

Both primary and secondary data have been collected. The primary data have been collected through mail questionnaires and personal interviews. The secondary data have been obtained from reports and journals. The secondary data have been mainly used to explore the external competitive context. The primary data have been mainly used to address the firm-specific characteristics.

The sample firms have been drawn from three stratified groups: "LARGE," "MEDIUM" and "SMALL." About 50 firms have been randomly sampled from each stratified group among the Taiwanese firms, while 15 from each stratified group among the Korean firms have been sampled. A return rate of 35 percent has been achieved in the data-collecting process. Among the 69 sample firms, 44 are from Taiwan and 25 from South Korea, with return rates of 29 percent and 55 percent respectively.

7.2 Conclusions

Due to the complexity of this study, a summary chart of how the primary research question has been treated in this study is helpful. Conclusions are presented corresponding to each subordinate research question listed in the following section.

A. Summary Chart

As noted earlier, the primary research question is the cornerstone of this study and it has been divided into six subordinate questions to examine each aspect of the primary question separately. The six subordinate research questions have been discussed in three chapters of this study.

A chart to map their whereabouts is as follows in the next page (Figure 7-2):

Figure 7-2

SUMMARY CHART

Primary Research Question:

Relationship Between Strategy and Performance

Question	**Content**	**Nature**	**Location**
Subordinate Question 1	Global Context	Context in General Industry-Specific	Chapter IV
Subordinate Question 2	National Context	Context in General Industry-Specific	Chapter V
Subordinate Question 3	Internal Capability	National Resources Firm-Specific Assets	Chapters V & VI
Subordinate Question 4	Strategy Content	Firm-Specific	Chapter VI
Subordinate Question 5	Market Performance	Firm-Specific	Chapter VI
Subordinate Question 6	Strategic Groups	Firm-Specific	Chapter VI

B. Subordinate Research Question No. 1

What are the major characteristics of the external competitive context at the global level in which indigenous computer firms in South Korea and Taiwan operate?

The external context at the global level has been found to be closely related to firm-specific strategic choices. The external context at the global level includes the world generic competitive environment and industry-specific features at the global level.

1. The World Generic Competitive Context:

The 1980s, the time frame for this study, was a period of dramatic changes in the world economic structure. Major features of these changes included rising protectionism on the part of developed countries; some shifts in the balance of world economic power from the Atlantic to the Pacific; accelerated development of new technologies, and the emergence of NIEs. These characteristics have significant impacts on the strategic behaviors of the indigenous computer firms from South Korea and Taiwan.

A shift has been occurring in the socio-technological paradigm that underlies today's world economic structure. The new paradigm taking shape is identified with an emphasis on quality and diversification of customized products and processes. The broad thrust of industrial innovations has shifted toward integrated but flexible manufacturing process, which yields enormous systemic gains in efficiency while reducing average costs. Because of these changes, patterns of international business activities have been restructured to reflect greater international specialization within an industry rather than among various industries.

Globalization of the world economies has a big impact on the management of international operations. First are the roles of national governments, who have become promoters and even players in the development of new industries as well as in the transformation of traditional ones. Second, trade frictions are becoming increasingly serious. Third, it is possible today for relatively small firms to act in global markets by linking with other partners with complementary assets. Fourth, firms that were traditionally interested in domestic markets have now arrived on the international scene with substantial financial and technological clout, as well as governmental support, to claim their global shares. Fifth, customers have become more knowledgeable and demanding, and their bargaining power has significantly increased. Sixth, management has become increasingly complex, as managers now must consider the impact of such items as government policies, trade barriers, foreign competition, protection of proprietary rights, and cultural differences. Seventh, even large firms are finding it hard to operate without appropriate business alliances due to higher business risks, a faster pace of innovations, and a more competitive marketplace.

Such a global context calls for a new set of skills and strategies to deal with a host of competitive elements as discussed above. And the main thrust underlying the new thinking is the emphasis on human capital development and strategic alliances.

Enhanced consumer tastes and industrial automation have made low-wage countries less attractive as locations for new investments and sourcing. To add to the complexity, it is no longer effective for firms to operate simply as domestic entities. Firms based in the developing countries must speed up their efforts in the globalization process. It is at this stage that progress along the learning curve in the past will begin to pay off for NIEs if they have attained substantial levels of technological progress and have become important partners in the global networks of large MNCs.

Several other factors also add to the challenge facing NIEs. As NIEs mature, problems of higher labor costs, slower economic growth, and lower profit margins emerge; these problems have begun eroding their traditional competitiveness in the world market. Faced with rapid changes in the world economy, NIEs such as South Korea and Taiwan are currently at a crossroads for developing a major structural transformation in their own economies.

2. The Industry-Specific Context at the Global Level:

The computer industry is highly globalized. It is dominated by a handful of global giants based in the U.S. and Japan. The computer industry enjoys healthy growth based on extraordinary technological advances. Being technology-driven and subject to speedy technological changes, the computer industry can resort to R & D to roll out new products at ever falling costs and, along with them, new market segments. The industry does not stand out as particularly profitable because of intense competition brought about by the rapid development of underlying technologies.

There exists a division of labor among the computer firms in the world. A few U.S. firms are still the leaders in the computer industry; they set industry standards and control the key components of computer products. However, ~~the~~ Japanese computer firms are catching up quickly and have become formidable challengers to the U.S. dominance in the computer industry. European firms are lagging behind though some efforts have been made to revitalize their competitive positions. On the other hand, newcomers from the Asian NIEs have gained momentum for competing in the global market. Among the NIEs, South Korea and Taiwan stand out as far as the development of indigenous computer firms are concerned.

Some key features of the industry-specific competitive context are as follows:

--emergence of a few de facto standards and increasing component and sub-system standardization;

--improvement in price/performance resulting in growing price competition;

--erosion of U.S.'s share in the global market due to intensified competition resulting from standardization;

--involvement of government in the industry development;

--adoption of strategies in component outsourcing and offshore assembly or automation to reduce labor cost;

--advance of innovation and upgrading despite signs of a maturing industry.

Based on competitive positions regarding technological leadership, brand recognition, pricing practice and customer base, three distinctive strategic groups of world competitors in the microcomputer industry have been identified: the top-tier, the middle-tier, and the bottom-tier players.

Vendors in the top-tier focus on the development of state-of-the-art technologies and set industry standards. They emphasize high-end products and large corporate customers. They have easy access to shelf space in top distribution chains. They provide extensive support programs for their products and target big businesses as long-standing customers. Often there is strong brand loyalty among top-tier customers. The top-tier players are usually large MNCs who specialize in information products. Currently, all the top-tier players are U.S.-based firms, but a few Japanese firms are likely to join the club soon.

Typical middle-tier players generally take advantage of available technology and spend "just enough" on R & D to add some additional features to create improved products at a lower price than the top-tier leaders. Since most of them are preoccupied with IBM, they are also called IBM-compatible vendors. The major competitive focus for this group is a combination of price and performance. A major improvement that the middle-tier makers feature is higher operating speed. With middle-end products, they often target small or medium-sized businesses. They provide reasonably good support but not as strongly as the top-tier players. There is only moderate brand loyalty among customers. Recently this group has been under pressure from both top-tier and bottom-tier players. High component cost and price competition are squeezing profits. Limited access to retail distribution chains also crimps growth. Among this group are large MNCs and small but well-established vendors, and a few start-ups.

The bottom-tier suppliers include numerous small makers whose spending on innovation is modest. They often use reverse engineering to develop clones of IBM machines already on the market, so they are also called IBM-clone makers. As they compete strictly on the basis of price and absolute compatibility with other machines, the bottom-tier makers do not attempt to compete in the corporate market. Responding to the low-end products they carry, their customers are typically small businesses and home buyers. Further, they offer little or no after-sale support. This group consists of large MNCs, diversified conglomerates, small makers, and new start-ups.

Based on the analysis in Chapter IV, the following key success factors (those activities or areas in which a firm must be especially proficient to succeed in a specific business) have been identified:

Key Success Factors for All Computer Firms

Emphasis on R & D

Strategic Alliances

Marketing network

System Compatibility

Business Segment

Offshore Sourcing

Key Success Factors for Strategic Groups

For The Top-Tier Players

State-of-the-art products
Heavy R & D to set industry standard
Well-established brand
Heavy advertising
Vertical integration
Worldwide presence
Excellent services
State-the-art software development
High profit margin for reinvestment

For The Middle-Tier Players

Heavy R & D for product enhancement
Quick response to the market change
Solid brand
Unique market niches
Good advertising
Balance between price and profit
Presence in at least one of major markets
Good after-sale services

For The Bottom-Tier Players:

Aggressive pricing
Some R & D to keep up with the trend
Cheap labor
Economies of scale

In light of the nature of these success factors, only three generic strategic choices offer real chances of success:

1. Be a player in the top league with brands well-known for the standards they set and with combined features of top-notch quality, performance, and service;

2. Be a player in the mid-tier with brands known for either good quality, or good performance, or good service;

3. Be a player in the low-end of the market with either little known or no brands and compete mainly on cheap price.

C. Subordinate Research Question No. 2

What are the major characteristics of the external competitive context at the national level in which indigenous computer firms in South Korea and Taiwan are based?

1. The Nation-Specific Competitive Context:

Both similarities and differences in the nation-specific context between South Korea and Taiwan have been identified. The similarities between the two countries are summarized as follows:

(1) poor in natural resources;
(2) used to be Japanese colonies;
(3) with the U.S. aid after the World War II;
(4) successful land reforms;
(5) big defense burdens;
(6) key role of governments;
(7) export-oriented policies;
(8) well-educated and hard-working labor force;
(9) well-developed private sectors;
(10) high savings;
(11) relative political and social stability until 1987 when they moved toward democratization and liberalization;
(12) entry into high-tech industries in the late 1970s;
(13) limited import of managerial and technical know-how through foreign direct investment;
(14) faced with trade frictions with the U.S.;
(15) status of newly industrialized countries;
(16) the Confucian tradition.

Major differences have also been found between South Korea and Taiwan regarding their national context in which indigenous computer firms originate and grow. South Korea and Taiwan differ in their industrial structure, national economic policies and strategic orientations, as summarized below:

(1) the industrial structure in South Korea is characterized by a high concentration with a few diversified conglomerates dominating all the major industries; in Taiwan the concentration ratio is low and there are virtually no dominant firms in any industries;

(2) South Korea's national economic policies are in favor of big business; the government policies in Taiwan are in favor of a more competitive and flexible industrial structure; and

(3) the strategic emphasis of Korean firms is on mass production of standard items at low costs and marketing them through OEM agreements at low prices; in contrast, the strategic focus of Taiwanese firms is on market niches.

Because of the substantial differences in their national context, firms in South Korea and Taiwan tend to differ in several key features of their competitive strategies. These features include: (1) strategic posture in terms of targeting distinctive market segments, (2) strategic thrust in terms of cultivating and utilizing distinctive competitive advantages, (3) strategic mode in terms of organizing internal and external resources for the best market performance, and (4) strategic goal in terms of ranking priorities among various market performance objectives.

The central ingredients of the Korean strategy have been a readiness to make substantial initial investments, to start production at high volumes, and to push exports, even in the face of unit costs that can exceed prevailing market prices. The high volumes permit a new entrant to move rapidly down the learning curve, thereby increasing productivity and reducing unit costs as experience accumulates. Taiwanese firms, smaller in size and less able to reap the benefits of large-volume production, have emphasized development capabilities more so than their Korean counterparts.

Consequently, whereas Korean firms have consistently sought a competitive edge through price, Taiwanese firms have increasingly sought to earn profits by cultivating flexibility. Whereas the Koreans have competed head-on with existing market leaders in an effort to win a significant share of markets for standardized products, the Taiwanese firms with their easy access to marketing expertise have explored out market niches for non-standardized products. Whereas the Koreans have focused their efforts overwhelmingly on mature products, the Taiwanese have increasingly been oriented toward innovation, endeavoring to compete in the global markets somewhat early in the life cycle of individual products. Whereas the Koreans have highly integrated their business operations internally, the Taiwanese have relied greatly upon their external business relations with various business partners.

2 The Industry-Specific Context at the National Level: Major similarities between the computer industries in

South Korea and Taiwan have been identified as follows:

(1) both have had solid supporting industries such as the consumer electronics industry, semiconductor industry and telecommunications industry;

(2) both have adopted the export orientation, mainly targeting the U.S. market;

(3) both have developed the computer industry through private sector with the help of the government (Brazil and India, in contrast, depend mainly on their public sectors);

(4) both emphasize human capital development through in-house training and education abroad;

(5) both enjoy "brain drain in reverse" from the United States back home;

(6) both have relied on the developed nations, particularly the United States and Japan for new technologies and key components;

(7) both have heavily depended on OEM arrangements for marketing, and

(8) both mainly offer relatively labor-intensive low-end products.

On the other hand, many structural differences between the two have also been found. Because of those differences, firms in South Korea and Taiwan tend to adopt distinctive strategies: (1) The computer industry in Korea is highly concentrated in a few conglomerates, especially the four chaebols--Samsung, Goldstar, Hyundai and Daewoo, while Taiwan's computer industry is composed of a large number of small and mid-scaled firms, and (2) Korea's transition to higher-end and more value-added products has not been as quick and smooth as Taiwan's. Korea's major computer products are not as technologically advanced as those from Taiwan. Nor is Korea as strong as Taiwan in computer components.

Related to their size, Korean computer makers often follow the approach of reaping the economies of scale by mass producing a few standard items at lower cost. Their marketing strategies tend to emphasize large OEM orders and market share with aggressive pricing even at the expense of profit margin. Korean PC makers usually devote a higher percentage of their total revenues to R & D than the Taiwanese firms. To overcome the disadvantage of being small, Taiwanese firms should put their limited resources together in the form of R & D consortia. Korean firms depend less on export and rely more on their domestic market than Taiwanese firms do.

D. Subordinate Research Question No. 3

What are the profiles of internal capabilities available to the indigenous computer firms from South Korea and Taiwan?

It can be seen from the statistical analyses in Chapter VI that the variables of internal capability are closely related to the key variables of strategy content. It is worth noting that niche-oriented thrust (NICH) is positively related to many internal capability variables while the low-cost thrust (COST) is negatively related to many internal capability variables. It is obvious that profit-oriented goal (GGPT) is strongly and positively related to many internal capability variables. Also positively related to many internal capability variables is the growth-oriented goal (GGRW), only to a lesser extent than profit-oriented goal (GGPT). It has been concluded that firms tend to formulate their strategies according to their profiles of internal capability.

The availability of nation-specific resources in South Korea and Taiwan defines both the similarities and differences in the internal capabilities across the indigenous computer firms in South Korea and Taiwan. This has been discussed in Chapter V and Chapter VI.

Compared with the advanced economies, NIES such as South Korea and Taiwan are still at disadvantage in the global high-tech competition due to the lack of R & D infrastructure and experience. The best hope for South Korea and Taiwan lies in the joint efforts by both public and private sectors in transforming their economic structures from labor-intensive to being technology-intensive. They must encourage investment in R & D and pay more attention to higher education. They must give priority to the development of indigenous R & D capability. They should better utilize their greatest assets--human resources.

In light of the global competitive context and internal limitations, indigenous computer firms in South Korea and Taiwan are only capable of competing as bottom-tier or middle-tier players in the global marketplace. Most of the Korean and Taiwanese vendors can only operate as bottom-tier players though some of them have the potential to become middle-tier contenders, such as TriGem.

More specifically, as Korean firms have comparative advantages in scale economies, they are able to compete on the basis of low prices. Due to their concentration on large OEM orders, most Korean PC makers rely on price as their key competitive advantage, rather than investing in overseas sales networks or new technology to improve their products. However, such an approach has been undermined recently, as rising wages and a rapid appreciation of their currency have hurt the relative price/performance advantage of Korean firms, especially when the low-end PCs that have been the bread-and-butter of Korean computer makers are now driven more by price than any other factor. Also, because most Korean makers manufacture PCs on an OEM basis rather than through their own marketing channel in their brands, they have been at the mercy of their OEM buyers, as illustrated by the cases of Daewoo and TriGem.

Thanks to their organizational flexibility and technological sophistication, Taiwanese firms are capable of focusing on higher-end products for special market niches. They rely much less on OEM deals than their Korean counterparts. Instead, they emphasize their own brand names. They also join in efforts with U.S.-based computer firms established by American-Chinese to develop and market new products in the U.S. and other regions, as shown by the cases of Microtek and Arche. They have been working hard to diversify into European markets through joint ventures with local partners.

Indigenous computer firms from Korea and Taiwan have the potential to compete in the global marketplace as middle-tier players such as KEY, Hyundai and TriGem, and some of them are already competing as such (Acer, Arche, Microtek, and TVM). They have the financial and human resources for an average job in R & D and marketing, and they enjoy good manufacturing facilities and experience for quality electronic products. Most importantly, they have the most valuable asset--highly-developed human resources at home, but they need to be more global-minded to attract talents from all over the world for R & D and marketing functions. Generally speaking, the greatest strength of the indigenous computer firms from Korea and Taiwan lies in their manufacturing capability. The greatest weakness of such firms is their limited capability in R & D for new products and marketing their own brands. It can be argued that Taiwanese firms may have a better chance of moving up to the middle-tier quicker than their Korean counterparts because of their technological expertise, brand recognition, flexible adaptation, and market-niche approach. Korean firms may have the potential to become top-tier players quicker than their Taiwanese counterparts because Korean firms are much more diversified and large in size to benefit from the converging trend of technological advances and synergy of market developments.

As revealed by the background review in Chapter IV and statistical tests and case studies in Chapter VI, three observations are noteworthy: First, Taiwanese firms tend to enjoy higher technologies if compared with their Korean counterparts. This is partly because of the development of Hsinchu Scientific and Industrial Park and the easy access to new technologies with the help of the ethnic Chinese who run successful computer firms in the U.S. Secondly, Taiwanese firms enjoy more flexibility in adapting to the rapidly changing competitive context than their Korean counterparts due to the size and structure of these firms and thirdly, Taiwanese firms are more used to tough competition abroad since they have had the experience in their competitive home market.

E. Subordinate Research Question No. 4

What are the specific contents of those strategies adopted by indigenous computer firms in South Korea and Taiwan when they compete for business in the dynamic global marketplace?

A new approach is introduced in this study to identify and analyze strategy content. According to this new approach, strategy content is treated as a multi-faceted phenomenon and is approached from various points of view. Strategy content has been analyzed by identifying the four key aspects of strategy--strategic posture, strategic mode, strategic thrust and strategic goal--and their interrelation-ships. The merit of this approach has been strongly supported by the statistical analyses and case studies in Chapter VI.

Most variables concerning strategy content are correlated with each other, either positively or negatively. It is interesting to note that DIVF (diversification) is negatively correlated with three of the four key strategy content variables--GPFT (profit-oriented goal), COST (cost-oriented thrust) and NICH (niche-oriented thrust). Besides, DIVF is not correlated with GGRW (growth-oriented goal). This is an indication that diversification may not be a sound strategic choice for firms in the computer industry. Further, niche-oriented thrust is negatively correlated with cost-oriented thrust; growth-oriented goal is not correlated with profit-oriented goal. Other statistical tests have also confirmed that strategy content variables are interrelated and jointly define the content of strategy, as argued in the analytical framework of this study.

As revealed in the case studies, Taiwan firms tend to focus on higher-end or niche market segments and emphasizes their own brands with their strong internal R & D and marketing capabilities, operational flexibility, and competition experience. All Taiwanese firms examined in the case studies, Acer, Arche, Chicony, KEY, Microtek and TVM, share those characteristics.

In contrast, Korean firms are normally large in size, diversified in product mix, slow in adapting to the market changes, and accustomed to the protected environment at home. They tend to rely more on OEM arrangements and their domestic market; they focus on mass production of low- to mid-end standard products and compete on low price more than anything else. The case studies of Daewoo Telecom, Hyundai Electronics and TriGem Computer have revealed the typical features of strategies adopted by Korean firms.

F. Subordinate Research Question No. 5:

How are the competitive strategies of indigenous computer firms in South Korea and Taiwan related to their actual market performance?

Based on various statistical analyses, market performance is closely related to the firm-specific strategies. First, export growth is negatively related to firm size while the profit level is not. Second, OEM orientation appears to be negatively related to internal capability and strategy content, and it is even negatively related to export orientation, suggesting a problem of the OEM approach. Third, both growth and profit depend heavily on human resource development, R & D effort, financial strength, and sophisticated products, and benefit from the market-niche approach. Fourth, diversified firms tend to be weak in export and have to rely more on OEM deals. Other statistical tests have also confirmed that strategy content does affect firms' market performances, as shown in Chapter VI.

It has been established in the case studies that differences in market performance are chiefly determined by two strategic elements: (1) strategic posture along the value-added matrix, and (2) strategic thrust based on low-cost and market-niche, as discussed in Chapter III. Firms that position at the high-end of the value-added matrix (emphasizing sophisticated products with a strong R & D capability) tend to enjoy either high growth rates or high profit margins or both, according to firms' choice of strategic goals. In the high-end group, those firms that adopt a market-niche thrust tend to have the highest growth rates and profit margins--in the cases of Acer, Arche, Chicony, KEY and TVM--or at least highest profit margin --in the case of Microtek. Other high-end firms that emphasize a low-cost thrust usually have high growth but not high profit margin (in the case of TriGem). This suggests one of the pitfalls of the low-cost approach.

Firms that position at the low-end of the value-added matrix (focusing on commodity-like products with a strong manufacturing capability) tend to suffer from low profit margin and unstable growth. In the low-end group, firms that adopt a low-cost thrust suffer the most in both growth and profit (in the case of Daewoo) while others that choose to serve market niches may even get high growth and average profit (in the case of Hyundai). The pitfalls of the low-cost approach is revealed again.

In all these cases, the emphasis on marketing products with one's own brand is critical to a firm's success in market performance. No matter what strategic posture or strategic thrust a firm adopts, marketing with its own brand makes a difference in market performance. This point has been well illustrated by all of the case studies, especially the case of Daewoo.

Finally, one of the major differences in strategic choice between Korean and Taiwanese computer firms is their attitude toward their own brand names. Generally speaking, Taiwanese firms emphasize promoting their brands, while Korean firms tend to rely on OEM arrangements. This difference has added to the variances in market performance between Korean and Taiwanese firms as two distinctive groups.

G. Subordinate Research Question No. 6

How can indigenous computer firms in South Korea and Taiwan be classified into several groups according to the variance in the firm-specific characteristics?

The sample firms from South Korea and Taiwan have been classified into two distinctive groups according to their firm-specific characteristics by the statistical tests conducted in Chapter VI. When the computer firms from South

Korea and Taiwan are compared as two groups, the following observations concerning internal capability have been obtained in Chapter VI:

1. Korean firms, on average, have a longer history in electronics business, compared with Taiwanese firms;

2. Korean firms, on average, are larger in terms of sales, capital and employees;

3. Korean firms, on average, invest slightly more on R & D than the Taiwanese firms;

4. Taiwanese firms, on a per capita basis, have higher capital, R & D staff, and sales than Korean firms;

5. Taiwanese firms have some comparative advantages over Korean firms in technology, marketing, finance, human resources, and export through their own brand names;

6. Korean firms are more diversified and globalized than Taiwanese firms; and

7. Korean firms enjoy comparative advantage over Taiwanese firms in price and wide product lines.

As for market performance, it has been found through the descriptive analysis and case studies that Korean firms as a group underperform their Taiwanese counterparts both in export growth and profit margins due to their dependence on OEM deals and low-end, standard products which are bound to have thin profit margins. As Taiwanese firms focus on higher-ends of the market and market niches, they enjoy higher growth and profit margins. Further, since Taiwanese firms are small and nimble, higher growth and profits are also easier to obtain for them. Unlike Korean firms that have the economies of scale, some small Taiwanese firms, without R & D capability to enjoy or market niches to serve, are forced to follow the low-cost approach, but their market performance is by far inferior to that of their Korean counterparts because they lack cost-effective advantages.

No matter where a firm is based, it must cultivate at least one or two internal capabilities and find a position in the competitive context for itself to maximize its capability and minimize its weakness in the global marketplace. As noted earlier, according to the nature of both external and internal success factors, only three generic strategies offer real chances for success:

1. Be a player in the top league with brands well-known for the standards they set and a combined feature of top-notch quality, performance, and service;
2. Be a player in the mid-tier with brands known for either good quality, or good performance, or good service;
3. Be a player in the low-end of the market with either little known or no brands and compete mainly on low price.

To be a player in any of the three groups, a firm must possess certain capabilities or assets to meet the requirements of that group. If it fails to comply, there is no way for the firm to succeed in the marketplace. For instance, no firm can adopt the low-cost strategy unless it has certain advantages in that area, such as low financing, low wages, large volume, or efficient operations. Also, no firm should follow the top-notch approach if it does not have the capability to set industry standards or to stay ahead of the competition by having state-of-the-art technologies accompanied by well-known brands.

For Korean and Taiwanese computer firms, the best chance of success seems to be the middle road. Indigenous computer firms from Korea and Taiwan have the potential to compete in the global market as middle-tier players. They have the financial and human resources to do a fair job in R & D and marketing areas, in addition to their already good manufacturing expertise. Though currently the key advantage for Korea and Taiwan firms is their manufacturing capability, they can move upward by investing more in R & D and brand recognition. If they can succeed in upgrading their R & D and marketing efforts, Korean and Taiwanese firms are capable of becoming major players in the global computer marketplace.

As is established in this study, more focus on higher-end products in niche markets offers the best chance of success in the global computer market. Microtek is an excellent example. In this regard, Korean firms should learn from their Taiwanese partners. Yet, both Korean and Taiwan firms can learn from each other to enhance their competitiveness. Imagine what might happen if Taiwanese firms grow as large as Korean firms and Korean firms become as flexible as Taiwan firms, while both maintaining their original competitive advantages. In the mean time, however, both Korean and Taiwan firms must stress the importance of forming strategic alliances for technological, marketing or financial assistance.

7.3 Recommendations for Further Study

The relationship between business strategy and market performance in the case of indigenous computer firms from South Korea and Taiwan has been explored in this study. The findings are significant for both practitioners and academia. Any generalization of these findings to other industries and other countries may well require more research efforts, especially those across-industry, across-country studies along the line of the theoretical framework developed in this study. Further studies will help refine the theoretical framework and obtain more interesting findings.

Follow-up case studies seem to be important for better understanding of the complex strategy issue. It is quite possible that new findings can be obtained through such efforts. Other longitudinal research will also help in this regard.

More robust statistical analysis with a larger sample is another alternative for further study. Such an analysis may generate more generalizable conclusions leading to important theoretical developments.

More and/or different variables might well be used in future studies to examine the relationships postulated in this study. By doing so, the validity of the theoretical framework presented in this study can be examined.

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Appendix 6 - 1.

Average

South Korea

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
GGRW	25	3.2000000	0.408248	3.00000000	4.000000	0.081650
GPFT	25	2.6800000	0.556776	2.00000000	4.000000	0.111355
NICH	25	2.2400000	1.200000	1.00000000	5.000000	0.240000
COST	25	3.9600000	0.611010	3.00000000	5.000000	0.122202
DIVF	25	4.1600000	1.143095	2.00000000	5.000000	0.228619
GLOB	25	3.6800000	1.345362	1.00000000	5.000000	0.269072
PLIN	25	3.2000000	1.224745	2.00000000	5.000000	0.244949
PLEV	25	2.7600000	0.663325	2.00000000	4.000000	0.132665
MCHA	25	2.5600000	1.003328	1.00000000	5.000000	0.200666
MODE	25	2.3200000	0.945163	1.00000000	5.000000	0.189033
OEMR	25	0.7129339	0.391964	0.02727273	2.142857	0.078393
EXPR	25	0.5658260	0.294231	0.00413223	1.000000	0.058846
SALE	25	656.4000000	1382.559583	16.00000000	5980.000000	276.511917
HUMA	25	3.0800000	0.812404	2.00000000	4.000000	0.162481
MAGT	25	3.2800000	1.061446	2.00000000	5.000000	0.212289
RDR	25	0.0538861	0.019940	0.02040816	0.099256	0.003988
YEAR	25	13.7600000	7.833050	3.00000000	36.000000	1.566610
RDMR	25	0.0921110	0.041648	0.01666667	0.200000	0.008330
CAPP	25	0.0131108	0.009817	0.00259740	0.033667	0.001963
TECH	25	2.8400000	0.898146	1.00000000	4.000000	0.179629
MANU	25	4.0000000	0.912871	2.00000000	5.000000	0.182574
MARK	25	2.6000000	0.912871	1.00000000	5.000000	0.182574
FINA	25	2.4800000	0.714143	2.00000000	5.000000	0.142829
SALP	25	0.1427397	0.177450	0.03555556	0.770000	0.035490
GR	25	31.4000000	23.711811	-2.00000000	100.000000	4.742362
PR	25	2.9400000	1.679037	-2.00000000	6.000000	0.335807

Appendix 6 — 1

Average

Taiwan.

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
GGRW	44	3.2500000	0.4380188	3.00000000	4.000000	0.0660338
GPFT	44	3.2954545	0.6675030	2.00000000	5.000000	0.1006299
NICH	44	3.7045455	0.9042418	2.00000000	5.000000	0.1363196
COST	44	3.6590909	0.6078242	2.00000000	5.000000	0.0916330
DIVF	44	2.7045455	0.9296047	2.00000000	5.000000	0.1401432
GLOB	44	3.1818182	1.0404097	1.00000000	5.000000	0.1568477
PLIN	44	3.0227273	0.9019007	2.00000000	5.000000	0.1359667
PLEV	44	3.3636364	0.8651095	2.00000000	5.000000	0.1304202
MCHA	44	3.3181818	0.9344250	1.00000000	5.000000	0.1408699
MODE	44	3.3863636	0.9696777	1.00000000	5.000000	0.1461844
OEMR	44	0.3350721	0.1963882	0.03703704	0.800000	0.0296066
EXPR	44	0.7173136	0.2074013	0.22123894	0.947368	0.0312669
SALE	44	116.7954545	215.4906332	4.00000000	1156.000000	32.4864353
HUMA	44	3.6590909	0.7758920	3.00000000	5.000000	0.1169701
MAGT	44	3.6363636	0.7499119	3.00000000	5.000000	0.1130535
RDR	44	0.0471542	0.0333623	0.01333333	0.214286	0.0050296
YEAR	44	9.0227273	4.9813076	2.00000000	28.000000	0.7509604
RDMR	44	0.1517939	0.1114385	0.03125000	0.583333	0.0168000
CAPP	44	0.0329402	0.0273540	0.00333333	0.140000	0.0041238
TECH	44	3.3863636	1.2978678	1.00000000	5.000000	0.1956609
MANU	44	4.1363636	0.5536731	3.00000000	5.000000	0.0834694
MARK	44	3.7045455	1.1926041	1.00000000	5.000000	0.1797918
FINA	44	3.6136364	0.9696777	2.00000000	5.000000	0.1461844
SALP	44	0.1965582	0.1953938	0.02666667	1.000000	0.0294567
GR	44	70.3409091	42.7866221	15.00000000	200.000000	6.4503260
PR	44	4.9318182	2.8966519	3.00000000	20.000000	0.4366867

Survey of Global Strategies of Indigenous Computer Firms in South Korea and Taiwan

This survey is designed to explore the relationship between business strategy and market performance among the indigenous computer firms from South Korea and Taiwan in their international operations, and it contains **31** questions in **3** sections.

GENERAL INSTRUCTIONS

1. This survey seeks for information concerning the strategy your firm had actually implemented in the period of 1987-89.

2. The variables are measured on a scale from 0 to 4. Please follow the specific instructions at the beginning of each question.

3. All individual responses will be kept strictly confidential. Please be completely candid.

4. If for any reason you cannot complete the entire questionnaire, please return it anyway. Even partial information can help.

SECTION I: BASIC INFORMATION (Please fill in the blanks)

1. Your company was **incorporated** in 1 9 ___ ___

Question 2-6 ask for the data as of 1989

2. Total **fixed assets** US$ ______________
3. Total number of **employees** ______________
4. Number of employees with **engineering degrees** ______________
5. Number of employees working in the functional areas of

   R & D _____ **Manufacturing** _____ **Marketing** _____

6. Share of major products in the total sales of computer products

   PC ____ **Workstation** ____ **Peripheral** ____ **Components** ____

Questions 7-15 ask for average annual figures in 1987-89

7. **Domestic sales** US$ ______ and **foreign salesa** US$ ______
8. Before-tax **profits** US$ _______
9. **R & D** expenses US$ _______
10. Number of **new products** introduced _______
11. **Marketing** expenses US$ _______

12. Expenditure for **advertisement** abroad US$ ________

13. Sales in the **U.S.** US$ ________ **Europe** US$ ________

East Asia US$ ________ **Others** US$ ________

14. Your <u>foreign direct investment</u> for the facilities of

R & D US$ ________ **Production** US$ ________ **Marketing** US$ ________

15. Number of your wholly-owned **foreign subsidiaries** in

U.S. ____ **Europe** ____ **Asia** ____ **Other regions** ____

16. Number of <u>joint ventures</u> at home and/or abroad with <u>foreign partners</u> from the **U.S.** ____ **Europe** ____ **Japan** ____ **Others** ____

17. Most of your <u>products</u> are **standardized** ____ or **customized** ____

18. You serve a wide range of **market segments** ____________________

or only focus on certain **special market niches** ______________

19. You focus on your **own innovation** ____________________________

or on improvement upon **other's innovation** ____________________

20. Besides computers, you also carry <u>other products</u> such as **Semi-conductors** ____ **Telecommunications** ____ **Other electronics** ____

SECTION II: STRATEGY CONTENT

Hereafter **"high-end"** refers to <u>state-of-the-art</u> products, **"low-end"** refers to <u>standardized, commodity-like</u> products, and **"middle-end"** refers to those fall between the two poles. Please check at the spot corresponding to your specific case.

<u>Example</u>:

Suppose your firm has certain level of competitive advantages in manufacturing low-priced standard PCs, you first look for the heading for **"Manufacturing"** and **"PC"**, and then check at the spot which corresponds to your case:

	Manufacturing				
	0	1	2	3	4
PC					
-high-end					
-middle-end					
-low-end	_	_	X	_	_

21. **Strategic Asset:**

Here are listed major advantages you might have had compared with your major global competitors for the period of 1987-89. The scale ranges from 0 (**NONE**) to 4 (**STRONG**).

Competitive Advantages in the Areas of

	R & D					Manufacturing					Marketing					Finance				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Peripheral																				
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
PC																				
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Component																				
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

22. **Strategic Posture and Strategic Mode:**

Here are listed areas and modes of your foreign operations in the period of 1987-89. The scale ranges from 0 (**NEVER**) to 4 (**EXTENSIVE**).

In the Form of Export Using

	Others' Brandname					Own Brandname					Own Channel				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Peripheral															
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
PC															
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Component															
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

Mode of Acquiring Foreign Technologies

	Licensing					Acquisition					Joint Venture				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Peripheral															
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
PC															
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Component															
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

In the Form of Wholly-Owned Venture for the Purpose of

	Assembly					Manufacturing					Marketing					R & D				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Peripheral																				
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
PC																				
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Component																				
-high end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-medium	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
-low end	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

In the Form of Joint Venture for the Purpose of

	Assembly	Manufacturing	Marketing	R & D
	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
Peripheral				
-high end	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
-medium	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
-low end	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
PC				
-high end	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
-medium	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
-low end	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
Component				
-high end	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
-medium	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
-low end	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _

23. **Strategic Thrust:**

Here are listed four key strategic approaches you might have adopted in the period of 1987-89. The scale ranges from 0 (**NONE**) to 4 (**STRONG**).

Overall Approaches Characterized by Focusing on

	Minimum Cost/ Low Price	Product Differentiation	Vertical Integration	Global Expansion
	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
Peripheral	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
PC	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _
Component	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _

24. **Strategic Goal:**

Here are listed <u>essential objectives</u> of your foreign operation in the period of <u>1987-89</u>. The scale ranges from 0 (**<u>NONE</u>**) to 4 (**<u>STRONG</u>**).

General Objectives

	Export Growth					Return on Sales				
	0	**1**	**2**	**3**	**4**	**0**	**1**	**2**	**3**	**4**
Peripheral	_	_	_	_	_	_	_	_	_	_
PC	_	_	_	_	_	_	_	_	_	_
Component	_	_	_	_	_	_	_	_	_	_

Free-Form Questions

25. How do you characterize your <u>current</u> competitive strategy?

26. What do you think would be your major <u>opportunities</u> and <u>threats</u> in terms of your <u>strengthens</u> and <u>weaknesses</u> in the global competition in the 1990s?

27. What kind of <u>strategy</u> will you plan to adopt to deal with those opportunities and threats in the 1990s?

SECTION III: MARKET PERFORMANCE

28. **<u>Market Performance</u>:**

Here are listed three key indicators of your performance in the global marketplace in terms of <u>average annual figures</u> in the period of <u>1987-89</u>. Please write down specific numbers.

Market Performance

	Export Growth (%)	U.S. Market Share (%)	Return on Sales (%)
Peripheral	___	___	___
PC	___	___	___
Component	___	___	___

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE!

Please return the finished questionnaire <u>plus</u> your **<u>annual corporate reports</u>** of 1987, 1988 and 1989 to:

Mr. Peter Li c/o Dr. Herbert J. Davis
Department of Strategic Management
School of Business Administration
George Washington University
21st & G street
Washington, D.C. 20052
U.S.A.
(202) 994-6881 (Office)
(703) 242-8387 (Home)
(703) 242-8387 (Fax)

Optional

If you would like to receive a copy of survey results, please fill in the following information and return it with your completed questionnaire.

Name: Last ____________ First ________________ M. ____
Title: ____

Company: ____

Address: ____________________________ State _____ Zip _______