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Marketing and Technology Adaptations for International Success

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Despite the globalization of markets, necessary adaptations are still considered a factor critical to a firm's success in international markets. The authors use the PIMS database to examine factors that affect the success of a firm's market expansion in different national markets. The results suggest that a firm should focus on different marketing and technological factors to achieve success in different national markets.

I. INTRODUCTION

The trend toward homogenization of international needs has encouraged multinationals to standardize products and capitalize on the competitive advantage of scale economies [30]. However, the converging trend of diverse consumer preferences in the global market should not lead to standardized international marketing activities. According to Porter [41], international marketing activities are the downstream value chain activities that need to be performed close to the market. Adaptive marketing is, therefore, necessary for multinationals in most industries in order to enhance their competitive positions for global business expansion [11, 15, 20, 26, 44]. Adaptive marketing, then, poses a challenge: How can marketing managers effectively adapt a firm's marketing activities to different national markets?

A previous study suggests a framework for multinationals to improve their adaptive abilities in developing appropriate marketing strategies for global expansion [11]. According to Chang [11], the formulating of a firm's adaptive marketing strategy starts with adaptive generalization, which allows a firm to enhance its adaptive ability to design an appropriate strategy for global expansion. A firm's success in international markets results from the competitive edge it develops. Such a competitive edge can be created by a firm's adaptive specialization--the right choice among competing expansion strategies, guided by the nature of the market opportunity, a firm's resources, and its adaptive ability. A firm that develops a competitive edge by formulating

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a relevant adaptive marketing strategy will be able to create customer value and generate high profits globally.

Marketing managers can create customer value by generating four kinds of utility--form, time, place, and ownership [4]. Such kinds of utility constitute the want-satisfying power of a product, which is crucial for developing a firm's competitive position. A firm can generate these four kinds of utility by performing adequate production and marketing activities. Marketing managers, however, should not limit their vision to the marketing function but should try to unlock possibilities for gaining competitive advantage in other upstream activities such as manufacturing, product design, and R & D [41]. In order to obtain a better market position and satisfy target consumers in foreign countries, a firm needs constantly to develop new products, to redesign existing products, and to adjust production processes and scheduling for current markets. Since technology is a key determinant of a firm's adaptive ability [9] for new product development, marketing managers should focus both on marketing and on technology adaptive ability for generating proper utility of their products with good customer value. In this research, the authors use the PIMS database to study what factors would affect a firm's business success in different countries.

II. RESEARCH BACKGROUND

International business literature has long suggested that multinationals conduct global expansion to leverage the value of their assets [2, 7, 17, 24, 43, 50, 51]. However, such expansion does not always result in favorable outcomes. The management of a firm may find difficulties in implementing organizational changes or in coordinating business operations across national borders. Organizational rigidity [32], organizational inertia [21], organizational resistance [14, 49], and national differences [23, 29] are the main reasons for such difficulties. A firm can benefit from its global expansion if the management overcomes these problems and effectively coordinates a firm's global business operations. Previous studies have shown that Japanese follower firms may surpass leaders in foreign markets [25] and that nondominant firms sometimes pursue an international expansion strategy in order to avoid direct competition with leading firms in the home markets [33]. Recent studies suggest that firms that possess extensive stocks of intangible capabilities tend to succeed in their international business expansion if the global market is not saturated with global players [37, 38].

A firm's global expansion is driven by environmental forces such as economic, social/cultural, legal/political, technological, and competitive. Prahalad and Doz [43] claim that multinationals may capitalize either on

efficiency benefits through global integration or on differentiation benefits through national responsiveness. Bartlett and Ghoshal [2] state that multinational corporations differ in their global expansion strategies by focusing on different environmental forces. According to Bartlett and Ghoshal [2], there are three basic strategies for global expansion--globalization, localization, and innovation, all of which reflect a firm's strategic mentalities differently. Multinationals focusing on integrated economic trends tend to use globalization to capture global efficiency. Japanese multinationals, such as Toyota, Canon, and Mitsushita, are good examples of firms that pursue such a global expansion strategy. The second type of multinationals stresses social/cultural and legal/political differences and develops a localization approach to improve local responsiveness. European multinationals such as Fiat, Philips, and Nestle fall within this category. The third kind of multinationals, such as Procter & Gamble, General Electric, and Pfizer, concentrate on technological and competitive environment and leverage innovation as much as possible to enhance their competitive position in the global marketplace. However, in order to assure their future successes, multinationals should continuously develop experience-curve advantage and manage globalization (i.e., efficiency), localization (i.e., flexibility), and innovation (i.e., learning) simultaneously.

Experience-curve advantage results from a company's learning to improve the management of its business. As accumulated production grows, a company learns to improve the management of its business operations and to reduce overhead as well as average unit cost with each doubling of accumulated volume of production. Christenson [12] suggests that a firm use organizational slack to expand its organizational capacity. Organizational slack is the surplus of a firm's revenues over the costs of production that can be invested in managerial or technical capabilities [13, 36]. Since a firm's strategic adaptations are meant to create customer value, strategic managers should focus on investing the firm's slack in different functional areas. In the long-run, firms that develop more slack will have more resources to create better customer value with a satisfactory return.

The need for adaptive marketing results primarily from a firm's recognition of the cultural and legal aspects of national differences in consumer preference and perception. According to Porter [41], the main tasks of international marketers are 1) to coordinate marketing activities across countries effectively, and 2) to unlock potent and competitive advantages due to scale and learning in the upstream activities of the value chain if the first task is successful. In order to grasp global market opportunities, firms need to consider where to perform value chain activities (i.e., configuration) and how to perform such activities effectively in different countries (i.e., coordination).

With a global strategy in mind, firms that adapt to the local market conditions can make distinctions and adjustments in different markets and obtain better leverage from their overall global positions. Strategic managers, therefore, need to enhance the firm's adaptive resource capacity for developing good leverage.

Adaptive resource capacity is the extent and nature of material and human resources that affect strategic choices for international expansion. When a firm increases the degree of marketing adaptations, a greater reliance both on professionals and on structure adjustments occurs, which generally shifts a firm's experience curve downward [5]. Such a shift raises the risk of failure relative to the advantages of accumulated business experience [21] if a firm's adaptive abilities remain at the same level. To avoid such a risk, a firm must continue to invest organizational slack in improving technology level, marketing skills, and management competence. The technology level of a firm is an important factor in adapting to changes in the international markets because it is the key to developing new products for creating latent demand at an acceptable price. Multinationals that try to exploit the economies of scope can search for market niches and enter specialized markets unlikely to attract their major competitors. To find a market niche, a firm must develop a relevant marketing mix for international expansion.

A review of the related literature supports such an argument. In the strategic management literature, technology is considered a critical determinant for improving a firm's adaptive ability [9], while the marketing literature suggests marketing adaptations are crucial if firms are to cope efficiently with the market situations [15, 16, 20]. Two manageable factors of a firm's resource capacity--technology level and marketing mix--are suggested for enhancing a firm's adaptive abilities. Once a firm enhances its resource capacity, it also increases the level of its adaptive abilities, which then allows it to develop a suitable adaptive marketing strategy to improve its competitive edge for generating high profits.

III. METHODOLOGY

Hypotheses

International business literature has long suggested that firms develop competitive edges to ensure success in foreign markets (e.g., [42]). Such competitive edges tend to be monopolistic and tangible or intangible assets [7, 17, 24, 27], such as new technology, patented products, product development capability, marketing skills, management competence, and experience-curve advantage. The authors, therefore, propose:

H1a: In a given national market, the market leaders are more likely to have a higher technology adaptive ability than do the market followers.
H1b: In a given national market, the market leaders are more likely to have a higher marketing adaptive ability than do the market followers.

The need for improving a firm's technology and marketing adaptive abilities varies from industry to industry. The contingency theory in the management literature suggests that firms develop appropriate organizational capability to cope with environmental changes [31, 35]. Since the market structures and the need for new technologies are different in the industrial and in the consumer product markets, two hypotheses are proposed:

H2a: Manufacturers of industrial products are more likely to have a higher technology adaptive ability than do manufacturers of consumer products.
H2b: Manufacturers of consumer products are more likely to have higher marketing adaptive ability than do manufacturers of industrial products.

The strategic management literature suggests different generic strategies for firms to conduct business expansion effectively. However, firms using the same generic strategy may have different foci in selecting strategic attributes. Although global marketing is suggested for obtaining a firm's global efficiency, firms still need to tailor their marketing programs to the local market situations [44]. This leads to the following two hypotheses:

H3a: In a given national market, the technology adaptive factors may have different influence in predicting a firm's profitability. To succeed in its target market, a firm's focus on technology adaptive ability should vary according to different market situations.
H3b: In a given national market, the marketing adaptive factors may have different influence in predicting a firm's profitability. To succeed in its target market, a firm's focus on marketing adaptive ability should vary according to different market situations.

Database and Variables

In this study, the PIMS database was used to examine the influence of a firm's technology and marketing adaptive abilities upon its profitability in a given national market. The main benefits of using PIMS database are its coverage of several national markets and its consistency of longitudinal and cross-sectional data collection. By selecting the firm's four-year average data from this database, the authors allocated 2,744 firms doing business in different national markets, including the U.S., Canada, the U.K., the European Community (EC), and other regions. In terms of the order of the firm's market entry, 1,429 firms are market leaders; another 1,315 firms are market followers and late entrants. Among them, 766 firms are in the consumer product business, 1,803 firms are industrial product manufacturers, and 175 firms are in the service sector. By controlling national market, business sector, and market entry order, the authors were better able to test the hypotheses presented previously.

This research assigns variables to the constructs of technology and marketing adaptive abilities [9, 11]. In this research, technology adaptive ability is measured by a firm's product change frequency, new product development time, and product quality, while marketing adaptive ability is measured by a firm's capability to provide a broad product mix, new products, a relatively low price, better use of a sales force, efficient advertising and promotion, better service offerings, a good brand image, and self-controlled distribution channels. Relative to profitability, the authors used return on investment (ROI); return on sales (ROS); and a profit-related measure, market share that were suggested to assess a firm's strategic performance [10]. Exhibit 1 presents all variables used in this paper.

Operationalization of Technology Adaptive Measures

The operationalization of a construct has not been an easy task. To select correct measures from an existing database is even tougher. According to Chakravarthy [9], a firm's technology adaptive ability is an important factor that determines if a firm can conduct proactive adaptations in order to ensure its business success. Such technology adaptive ability is not measured in absolute terms, but rather by its relative abundance in that industry. In this paper, technology adaptive ability is defined as the cumulative sum of a firm's knowledge and ability to produce goods and services of higher or better quality per unit of input [40]. In other words, technology adaptive ability is the state of a firm's technology capability for coping with dynamic changes in the marketplace.

EXHIBIT 1. RESEARCH VARIABLES

Control Variables:

1. Order of market entry: Market leaders, market followers.
2. Type of business: Consumer products, industrial products.
3. Location of served market: U.S., Canada, U.K., "Regional," "Other."

Technology Adaptive Measures:

1. Product change frequency (Product improvement).
2. New product development time (Product development).
3. Product quality (Manufacturing capability)

Marketing Adaptive Measures:

1. Relative product breadth
2. Relative % sales from new products
3. Relative price
4. Relative sales force expenses
5. Relative advertising expenses
6. Relative promotion expenses
7. Relative services
8. Relative image
9. Relative forward integration (distribution channels)

Profitability and Performance Measures:

1. ROI
2. ROS
3. Market share

In the literature, technology capability has been measured by the number of patents [3, 39], number of R&D staff [19, 45] and R&D expenditures [6, 28]. However, the number of patents may not provide a true measure of technology if it is used alone [3, 8]. R&D expenditures and the number of R&D staff represent a firm's efforts to develop and utilize its technology capability. he measures of R&D staff and R&D expenditures that may reflect the priorities of various industries are an indirect measurement of a firm's technology capability and have been considered inappropriate for measuring knowledge accumulation [52].

In this study, technology adaptive ability is measured by a firm's product improvement ability, product development ability, and manufacturing ability. From the PIMS database, the authors have identified three proxy variables: product change frequency, new product development time, and product quality, respectively. Product quality is measured in comparison with a firm's big three competitors, while the other two variables measure a firm's position in product development and product improvement.

The frequency of its product change indicates a firm's technology adaptive ability to respond to the competition. Product changes result from incremental product improvements. Firms that frequently initiate product change will be able to strengthen their competitive position through technology accumulation pertaining to product improvement. Product improvement can be accomplished by adding new features, by changing product design and styling, and by using new materials. Sunbeam, for example, has adopted an innovative manufacturing approach to respond to the competitive challenge from Black & Decker, which has used offshore production to obtain price competitiveness [18]. Instead of outsourcing its iron production to a low-cost foreign country, Sunbeam first redesigned its iron to reduce the number of needed parts thus lowering the unit cost from $9.5 to $6.7. With such cumulative knowledge, Sunbeam was then able to develop a global model to further reduce a significant number of needed parts and screws and eventually reached a unit cost of $5.33. In so doing, Sunbeam outpriced Black & Decker, which produced its iron in Singapore at a unit cost of $5.98.

New product development is crucial for firms in a highly competitive market in order to respond quickly to changes in consumer preferences. In the computer industry, firms have used time as a critical "competitive weapon" to steal an advantage in the marketplace [46]. In other industries where the competition is intense and the product life cycle is short, the speed of product development is the key that opens the door to participation in the marketplace [47]. In fact, new product development time can be considered as a function of a firm's effective use of its R&D staff and R&D expenditures. Firms can create either first- or second-mover advantages by reducing new product development time. Market pioneers can develop first-mover advantages if they effectively manage the new product development cycle and quickly launch a successful market introduction. Market followers, however, may develop second-mover advantages if they can quickly develop a new, “me-too” product in response to a competitor's new product introduction. In the late 1980s, the success of Sun Microsystems in the workstation market was due to its emphasis on the speed of new product development [48]. Because Sun was able to introduce a new product to the market faster than its major competitor, Apollo Computer, Sun's

product line actually encompasses more up-to-date technology than does Apollo's.

Quality has been a worldwide focus in every industry and is considered as the key to success in the global marketplace. A recent survey of 485 participants from high-technology industries, such as aerospace and defense, computers and components, production and medical equipment, semi-conductors and software, reveals that quality is the most important competitive success factor in all sectors [22]. Allen-Bradley Co., a Milwaukee-based company, has long been devoted to providing customers with quality products in a cost-effective way. Such a manufacturing strategy has allowed it to guarantee customer satisfaction by the use of computer-integrated-manufacturing (CIM) technology. Consequently, Allen-Bradley's cumulative knowledge in manufacturing has led to a new CIM operation that generates world-class product quality and, even more, a flexible manufacturing capability for the company [34]. In fact, a company that produces good quality products must have good manufacturing capability. In the fiber optics industry, for example, quality couplers are the result of good manufacturing techniques [1]. Without automated manufacturing capability, coupler manufacturers would not be able to meet the ever-increasing market demand from the telecommunications and cable TV industries. However, manufacturing techniques vary greatly in different industries. If one is to compare firms' manufacturing capabilities across a great number of industries, product quality seems to be a reasonable choice for measurement.

IV. RESULTS

Market Leaders vs. Market Followers

Hypotheses H1a and H1b postulate that market leaders can quickly expand their business into any national markets because they have better technology and marketing adaptive abilities. To test these hypotheses, the authors used standardized scores of aggregated technology and marketing adaptive variables. A firm's technology adaptive ability was calculated by standardizing the sum of three standardized technology adaptive measures. A firm's marketing adaptive ability was calculated in the same way. All 2,744 SBUs (Strategic Business Units) from the U.S., the U.K., Canada, European Common Market, and other regions were included in the analysis. The research findings support these hypotheses. As shown in Table 1, market leaders significantly possess a higher technology adaptive ability (mean = .2096) than do market followers (mean = -.1151) and a higher marketing adaptive ability (mean = .8940) than do market

followers (mean = -1.284). The findings support the argument that firms can easily expand their businesses into a new market (either a geographic or a product market) segment if they possess unique tangible and/or intangible assets such as new technology, patented products, product development capability, marketing and management skills, and experience-curve advantage.

TABLE 1. SUMMARY OF ANALYSIS OF VARIANCE

	Tech. Adaptive Ability	Mktg. Adaptive Ability	Observations
Market Leaders	Mean = .2096 (.0475)	Mean = .8940 (.1200)	1,429
Market Followers	Mean = -.1151 (.0495)	Mean = -1.284 (.1250)	1,315
Statistics	$F_{(1,2742)}$= 4.45 P = .035	$F_{(1,2742)}$= 157 P = .000	Total 2744

Note: Standard errors in parentheses.

Consumer Products vs. Industrial Products

A review of the PIMS database reveals that the technology changes of consumer products are much fewer than those of industrial products. Such a situation may influence a firm's strategic choice in enhancing its technology and adaptive abilities. The authors postulate that industrial product manufacturers may have been forced by such a technology development trend to improve their technology adaptive ability to a higher level than consumer product manufacturers (Hypothesis H2a). On the other hand, the rapid changes in consumer preferences and the intense competition in the marketplace may have forced consumer product manufacturers to enhance their marketing adaptive ability more than that of industrial product manufacturers (Hypothesis H2b). As shown in Table 2, industrial product manufacturers possess significantly a higher technology adaptive ability than do consumer product manufacturers. However, there is no significant difference in marketing adaptive ability between consumer and industrial product manufacturers. The findings indicate that like consumer product manufacturers, firms specializing in industrial products also need to improve their marketing adaptive ability constantly in order to succeed in the markets they serve.

TABLE 2. SUMMARY OF ANALYSIS OF VARIANCE

	Tech.Adaptive Ability	Mktg. Adaptive Ability	Observations*
Consumer Products	Mean = -.6966 (.0622)	Mean = -.4142 (.1660)	766
Industrial Products	Mean = .1942 (.0406)	Mean = -.2394 (.1082)	1,803
Statistics	$F_{(1,2567)}$= 144 P = .000	$F_{(1,2742)}$= .780 P = .378	Total 2569

Note: Standard errors in parentheses. * Ecludes 175 firms in service sector.

Factors Contributing to The Firm's Profitability

Hypotheses H3a and H3b postulate that technology and marketing adaptive factors may play different roles in contributing to a firm's profitability in different markets. In order to examine H3a and H3b, the authors first selected exclusive clustering firms by controlling a firm's location of served market. As a result, there are five different identified target markets, including the entire U.S. (1183 firms), the entire U.K. (189 firms), the entire U.S/Canada (437 firms), regional markets (539 firms in the U.S., Canada, or Europe), and other (210 firms in other countries). The second step was to conduct OLS regression analyses for each target market to examine the contributions of the technology and marketing adaptive factors to a firm's profitability. The results support the postulated argument that firms should focus on different adaptive factors in order to cope with target market situations. Because the major concern of this analysis is to test which adaptive factor affects a firm's profitability, the authors did not record the constant and insignificant regression coefficients in Table 3-1a to Table 3-2c.

The low adjusted R^2s in Table 3-1a to 3-2c indicate that performance indicators such as ROI, ROS, and market share are largely explained by factors not included in the model. R^2 could be better improved if more appropriate factors were included. The purpose of this study was, however, to examine the relationship between those performance indicators and a firm's technology and marketing adaptive abilities, not to identify a set of factors that can precisely predict a firm's performance. Our analysis, therefore, focused on F values of tested equations and t values of those technology and marketing adaptive measures.

As shown in Table 3-1a to Table 3-1c, product change (a proxy of product improvement) and quality are very important for firms doing business in the U.S. that intend to improve their ROI, ROS, and market share. New product development time is crucial for firms trying to increase market share

only. In the U.S./Canada, product change and quality are also very important for improving ROI, ROS, and market share, while new product development time affects firms' ROS only. In the U.K. and "Other" countries, quality is the only factor significantly influencing firms' ROI, ROS, and market share. Product change and new product development time do not affect firms' profitability. In the "Regional" target markets, quality is always important for increasing firms' profitability; product change is good for improving ROS and market share, but not ROI.

As shown in Table 3-2a to Table 3-2c, product breadth, percentage sales from new products, and a firm's relative image are always important for improving ROI, ROS, and market share in the U.S. market. Firms that are concerned about their market share should also focus on advertising and services because these two factors also significantly affect firms' market share building. In the U.K. market, a firm's image is always crucial for improving ROI, ROS, and market share. In addition to its image, in order to improve ROI, a firm in the U.K. market should also enhance its relative services; to increase ROS, a firm should enhance its promotion, while to increase its market share, a firm should also improve its product breadth and sales force. In the U.S./Canada target market, product breadth, percentage sales from new products, and the firm's image are important for all three profitability measures in this research. To increase market share, a firm should also focus on advertising. It is interesting to see that offering better services erodes a firm's ROS. In a "Regional" target market, a firm's image and services are very important for increasing its ROI, ROS, and market share. Having a self-controlled distribution channel through forward integration lessens a firm's ROI. To increase its market share, in addition to image and services, a firm should consider a relative high product breadth, lower percentage sales from new products, a stronger promotional campaign, but a lower sales force expenditure. In "Other" national markets, all marketing factors do not affect a firm's ROI and ROS. However, to increase its market share, a firm should focus on providing a wider product breadth and a better company image.

TABLE 3-1a. TECHNOLOGY FACTORS INFLUENCING ROI

Tech Factors	U.S.	U.K.	U.S./Canada	Regional	Other
Prod Change	1.508**		1.815**		
New PD Time					
Prod Quality	3.832***	6.077***	4.658***	4.057***	4.447***
Adj. R^2	.0491	.1370	.0995	.0529	.0620

	F=20.3***	F=9.79***	F=15.9***	F=9.97***	F=4.54**

Note: *** indicates P < .001; ** indicates P< .01; * indicates P< .05.

TABLE 3-1b. TECHNOLOGY FACTORS INFLUENCING ROS

Tech Factors	U.S.	U.K.	U.S./Canada	Regional	Other
Prod Change	.7547**		1.026**	.8842*	
New PD Time			-.9329		
Prod Quality	2.214***	3.256***	3.061***	2.617***	2.576***
Adj. R^2	.0564	.1592	.1279	.0776	.0523
	F=23.5***	F=11.7***	F=21.2	F=15.0***	F=3.79*

Note: *** indicates P < .001; ** indicates P< .01; * indicates P< .05.

TABLE 3-1c. TECHNOLOGY FACTORS INFLUENCING MARKET SHARE

Tech Factors	U.S.	U.K.	U.S./Canada	Regional	Other
Prod Change	1.287**		1.850*	3.099***	
New PD Time	1.090*				
Prod Quality	5.086***	6.830***	5.814***	4.373***	6.922***
Adj. R^2	.0947	.0632	.1253	.0875	.1141
	F=41.1***	F=4.16**	F=20.7***	F=17.1***	F=8.84***

Note: *** indicates P < .001; ** indicates P< .01; * indicates P< .05.

TABLE 3-2a. MARKETING FACTORS INFLUENCING ROI

Mktg Factors	U.S.	U.K.	U.S./Canada	Regional	Other
Prod Brdth	1.066*		2.267**		
% New Prod	-1.139**		-1.051*		
Price					
Sales Force					
Advertising					
Promotion					
Services		4.688**		1.584*	
Image	4.319***	2.995*	3.691***	3.170***	
Channels				-1.378*	
Adj. R^2	.0823	.1031	.0818	.0640	.0438

	F=11.7***	F=2.29*	F=4.23***	F=4.02***	F=1.02

Note: *** indicates P < .001; ** indicates P< .01; * indicates P< .05.

TABLE 3-2b. MARKETING FACTORS INFLUENCING ROS

Mktg Factors	U.S.	U.K.	U.S./Canada	Regional	Other
Prod Brdth	.7352**		1.581***		
% New Prod	-.5444*		-.9494**		
Price					
Sales Force					
Advertising					
Promotion		1.717*			
Services			-.9804*	1.107*	
Image	2.251***	1.472*	3.246***	1.623***	
Channels					
Adj. R^2	.0871	.1194	.1311	.0819	.0427
	F=12.4***	F=2.70**	F=7.16***	F=5.24***	F=.99

Note: *** indicates P < .001; ** indicates P< .01; * indicates P< .05.

TABLE 3-2c. MARKETING FACTORS INFLUENCING MARKET SHARE

Mktg Factors	U.S.	U.K.	U.S./ Canada	Regional	Other
Prod Brdth	3.571***	5.173***	5.151***	2.791***	4.365***
% New Prod	-1.173**		-1.665**	-1.787**	
Price					
Sales Force		3.166**		-1.647*	
Advertising	2.471***		3.524***		
Promotion				2.682***	
Services	2.406***			1.747*	
Image	3.305***	6.635***	3.893***	3.323***	3.928*
Channels					
Adj. R^2	.2108	.3864	.2702	.1907	.2090

	$F=34.8^{***}$	$F=12.5^{***}$	$F=17.6^{***}$	$F=14.4^{***}$	$F=5.87^{***}$

Note: *** indicates P < .001; ** indicates P< .01; * indicates P< .05.

V. CONCLUSIONS

Firms that intend to expand their business globally face many challenges--new business environment, unfamiliar consumer preferences, location choices for performing business activities, internal communications and planning processes, and effective coordination of global operations. These challenges require firms to develop better adaptive abilities for coping with rapid changes in the business environment. A firm's success results from its ability to create customer value, which requires a good adaptive capability to develop a product and a marketing mix suitable to its target consumers. A firm can enhance its adaptive capability by improving technology, marketing skills, and management competence. Such improvements help a firm to move from a lower state of adaptation to a higher state of adaptation. In so doing, strategic managers can enhance a firm's adaptive capability to fit the firm more, particularly if the firm is to exist in a changing environment [9].

In this paper, the authors first examined the relationship between the firm's adaptive ability and its order of market entry. The results indicate that market leaders possess higher technology and marketing adaptive abilities than do market followers. This finding supports the internationalization literature, which suggests that firms with intangible asset advantage can easily expand their businesses into new geographic markets. Firms can easily enter a national market and succeed as market leaders if they possess unique asset advantage. However, market followers can also prosper by focusing on marketing programs that offer their customers quality products and services [6]. In other words, firms acting as market leaders should possess a higher technology level, while market followers must have strong marketing capabilities in order to succeed in a given national market.

Next, the authors tested the differences of technology and marketing adaptive abilities between consumer and industrial product manufacturers. The results show that industrial product manufacturers possess a higher technology adaptive ability than do consumer product manufacturers. However, there is no significant difference between the two in marketing adaptive ability. This finding indicates that in order to succeed in their target markets, industrial product manufacturers need marketing skills as much as consumer product manufacturers do.

Third, in order to understand the influence of technology and marketing adaptive factors upon a firm's success in each national market, the authors used OLS regression analysis to discover the real contribution of each study variable to the firm's profitability in every market. Table 3-1a to Table 3-2c summarize the research findings. Among three technology adaptive factors, quality is the only variable that has a significant contribution to a firm's profitability in every national market. Product change frequency contributes to profitability in the U.S., the U.S./Canada, and "Regional" (within the U.S., Canada, or Europe) markets only. New product development time positively influences the firm's market share only in the U.S. market, but negatively affects the ROS of firms doing business in the entire U.S./Canada market.

Among nine marketing adaptive factors, brand image is the only variable that contributes to the firm's profitability in all national markets except "Other" (not U.S., U.K., Canada, or Europe), while relative price and forward (distribution channels) integration are two adaptive factors that show no significant contribution to the firm's profitability. Product breadth is important for increasing the firm's ROI and ROS in the U.S. and U.S./Canada, while service is important for firms in the U.K. and "Regional" markets. Percentage of sales from new products decreases the firm's profitability in the U.S. and in U.S./Canada. The negative sign of percentage sales from new products means that the higher the percentage sales from new products, the lower the profitability. The finding differs from the product life cycle argument in the marketing literature, which suggests that firms introducing new products would have a better chance to use skimming pricing and to generate a higher profit margin because of less competition at the early stages of the product life cycle. A further study is necessary to find out what factors could have changed the association of the two variables from positive to negative.

REFERENCES

[1] Barr, S. (1994). “In The Market for A Good Coupler?” *Telephony*, March 21, 226(12): 24-29.

[2] Bartlett, C. A. & Ghoshal, S. (1992). *Transnational Management*. Homewood,IL: Irwin.

[3] Basberg, B. L. (1987). “Patents and the Measurement of Technological Change: A Survey of the Literature.” *Research Policy*, 16(2-4): 131-141.

[4] Boone, L. E. & Kurtz, D. L. (1992). *Contemporary Marketing*, *7th ed*. New York: Dryden Press.

[5] Brittain, J. (1989). "Strategy and Time-Dependent Failure Probabilities: Experience, Obsolescence, and Strategic Change." *Academy of Management Best Papers Proceedings 1989*: 173-177.

[6] Buzzell, R. D. & Gale, B. T. (1987). *The PIMS Principles*. New York: The Free Press.

[7] Caves, R. E. (1971). "International Corporations: The Industrial Economics for Foreign Investment." *Economica*, February: 1-27.

[8] Chakrabarti, A. K. (1989). "Technology Indicators: Conceptual Issues and Measurement Problems." *Journal of Engineering & Technology Management*, 6(2): 99-116.

[9] Chakravarthy, B. S. (1982). "Adaptation: A Promising Metaphor for Strategic Management." *Academy of Management Review*, 7(1): 35-44.

[10] Chakravarthy, B. S. (1986). "Measuring Strategic Performance." *Strategic Management Journal*, 7: 437-483.

[11] Chang, T. (1995). "Formulating Adaptive Marketing Strategies in A Global Industry." *International Marketing Review*, 12(6): 5-18.

[12] Christenson, C. J. (1973). "The "Contingency Theory" of Organization: A Methodological Analysis." Harvard University, Graduate School of Business Administration Working Paper.

[13] Cyert, R. M. & March, J. G. (1963). *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

[14] Darling, J. R. & Taylor, R. E. (1989). "A Model for Reducing Internal Resistance to Change in a Firm's International Marketing Strategy." *European Journal of Marketing*, 23(7): 34-41.

[15] Douglas, S. P. & Wind, Y. (1987). "The Myth of Globalization." *Columbia Journal of World Business*, 22(4): 19-29.

[16] Doyle, P., Saunders, J. & Wright, L. (1988). "A Comparative Study of British, U.S. and Japanese Marketing Strategies in the British Market." *International Journal of Research in Marketing*, 5(3): 171-184.

[17] Dunning, J. H. (1973). "The Determinants of International Production." *Oxford Economic Papers*, 25(November): 155-177.

[18] Flaherty, M. T. (1988). "Emerging Global Business Environment and Managerial Reaction to It." Paper COF-8, Presented at *the Ministry of International Trade and Industry Conference*, Tokyo.

[19] Forbes, K. F. & Zampelli, E. M. (1991). "Growth, Technology, and the Demand for Scientists and Engineers." *Industrial Relations*, 30(2): 294-301.

[20] Fraser, C. & Hite, R. E. (1990). "Participation in the International Marketplace by US Manufacturing Firms." *International Marketing Review*, 7(5): 63-71.

[21] Hannan, M. T. & Freeman, J. (1984). "Structural Inertia and Organizational Change." *American Sociological Review*, 49: 149-164.
[22] "High Technology Strives First for Quality." (1994. October) *Manufacturing Systems*. 12(10): 6.
[23] Hofstede, G. H. (1980). *Culture's Consequences: International Difference in Work-related Values*. Beverly Hills, CA: Sage.
[24] Hymer, S. H. (1976*). The International Operations of National Firms: A Study of Direct Foreign Investment*. Cambridge, MA: MIT Press.
[25] Ito, K. (1988). *Sources of Global Competitiveness of Japanese Manufacturing Firms*. Unpublished Ph.D. Dissertation, U. of Michigan.
[26] Keegan, W. J. (1969). "Multinational Product Planning: Strategic Alternatives." *Journal of Marketing*, January: 58-62.
[27] Kindleberger, C. P. (1969). *American Business Abroad*. New York: Yale University Press.
[28] Kogut, B. & Chang, S. J. (1991). "Technological Capabilities and Japanese Foreign Direct Investment in The United States." *Review of Economics and Statistics*, 73(3):401-413.
[29] Kogut, B. & Singh, H. (1988). "The effect of National Culture on the Choice of Entry Mode." *Journal of International Business studies*, 19(3):411-432.
[30] Levitt, T. (1983). "The Globalization of Markets." *Harvard Business Review*, May/June: 92-102.
[31] Lawrence, P. R. & Lorsch, J. W. (1967). *Organization and Environment: Managing Differentiation and Integration*. Boston: Harvard University.
[32] Luostarinen, R. (1980). *Internationalization of the Firm*. Helsinki: the Helsinki School of Economics.
[33] Mascarenhas, B. (1986). "International Strategies of Non-dominant Firms." *Journal of International Business Studies*, 17(1): 1-25.
[34] McKenna, J. F. (1992). "Not A Facility, but A Capability." *Industry Week*. June 15, 241(12): 60-61.
[35] Miles, R. E. & Snow, C. C. (1978). *Organizational Strategy, Structure, and Process*. New York: McGraw-Hill.
[36] Miles, R. H. (1982). *Coffin Nails and Corporate Strategy*. Englewood Cliffs, NJ: Prentice Hall.
[37] Mitchell, W., Shaver, J. M. & Yeung, B. (1993). "Performance Following Changes of International Presence in Domestic and Transition Industries." *Journal of International Business Studies*, 24(4): 647-669.
[38] Morck, R. & Yeung, B. (1991). "Why Investors Value Multinationality." *Journal of Business*, 64(2): 165-187.

[39] Narin, F. (1993). "Technology Indicators and Corporate Strategy." *Review of Business*, 14(3): 19-23.

[40] Narula, R. (1993). "Technology, International Business and Porter's "Diamond": Synthesizing a Dynamic Competitive Development Model." *Management International Review*. 33(2): 85-107.

[41] Porter, M. E. (1986). "The Strategic Role of International Marketing." *The Journal of Consumer Marketing*, 3(2): 17-21.

[42] Porter, M. E. (1987). "From Competitive Advantage to Corporate Strategy." *Harvard Business Review*, May/June: 43-59.

[43] Prahalad, C. K. & Doz, Y. L. (1987*). The Multinational Mission: Balancing Local Demands and Global Vision*. New York: Free Press.

[44] Quelch, J. A. & Hoff, E. J. (1986). "Customizing Global Marketing." *Harvard Business Review*, May-June: 59-68.

[45] Sciberras, E. (1986). "Indicators of Technical Intensity and International Competitiveness: A Case for Supplementing Quantitative Data." *R & D Management*, 16(1): 3-14.

[46] Slatter, S. (1992). *Gambling on Growth: How to Manage the Small High-Tech Firm*. New York: John Wiley & Sons.

[47] Sonnenberg, H. (1993). "Balancing Speed and Quality in Product Innovation." *Canadian Business Review*. Autumn, 20(3): 19-22.

[48] "Sun's Sizzling Race to the Top." (1987, August 17). *Fortune*, 89.

[49] Taylor, R. E. (1988). "Reducing Resistance to New Marketing Strategies." *Business Forum*, 13(2): 12-15.

[50] Teece, D. J. (1980). "Technology Transfer by Multinational Firms: The Resource Cost of Transferring Technology Knowhow." *Economic Journal*, 81: 242-261.

[51] Vernon, R. (1966). "International Investment and International Trade in the Product Cycle." *Quarterly Journal of Economics*, May: 190-207.

[52] Winter, S. G. (1987). "Knowledge and Competence as Strategic Assets." in D. J. Teece (ed.) *The Competitive Challenge: Strategies for Indusrial Innovation and Renewal*. Cambridge, MA: Ballinger.