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The Competitiveness of Multinational Firms: A Case Study of Samsung Electronics and Sony

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Recently Samsung Electronics Co., Ltd. (SEC) has made headlines in the mass media for its outstanding performance. Reputable international newspapers and magazines have said that it was a shock to see SEC transform from 'low-cost and often unreliable' into 'high-quality and sophisticated'. SEC is often compared with Sony Corporation and some say that it has already caught up with the Japan-based giant. The purpose of this paper is to give answers to two questions: Is the media talking about the whole picture of competitiveness; is SEC really as competitive as Sony? Here we try to clarify the issue of competitiveness using the generalized double diamond model (Moon, Rugman, and Verbeke 1995, 1998), which was extended from Porter's (1990) diamond model. Also, we will suggest the main factors that determine the competitiveness of multinational firms in the global market.

Keywords: SEC, Sony, competitiveness, diamond model, generalized double diamond model

1. INTRODUCTION

1.1. Background

Samsung Electronics Co., Ltd. (SEC) started out as a producer of cheap 12-inch, black-and white televisions under the Sanyo label in 1971. After 30 years, SEC is now entering the top tier of the world's technology companies. Not only Korean newspapers but also renowned international magazines such as *Forbes* (2001), *Newsweek* (2002), *Fortune* (2002), *Time* (2002), and *BusinessWeek* (2003) have been comparing SEC and Sony in terms of competitiveness, especially since early 2002. According to Daewoo Securities, on April 1, 2002, SEC's market value (market capitalization) reached US$46.46 billion, surpassing Sony's US$46.24 billion. At the start of 2001, the market capitalization of Samsung Electronics was equal to 35.38 percent of Sony and it increased to 81.78 percent at the beginning of 2002. Does this mean that SEC is now more competitive than Sony? In this research, we focus on the competitiveness of SEC compared to that of Sony in order to shed light on its true character. This paper concludes that most of the reports comparing the competitiveness of SEC and Sony have not 'drawn the whole picture', meaning that there are other determinants to consider when assessing the competitiveness of a firm.

1.2. Company Profile

Samsung Electronics Co., Ltd. SEC was founded in 1969 and sold its first product (a black and white television) in 1971. It is one of the world's largest chipmakers and also South Korea's top electronics company. SEC produces various consumer devices, including

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DVD players, TVs, and digital cameras; computers, color monitors, LCD panels, and printers; semiconductors such as DRAM, SRAM, and flash memory; and communications devices ranging from cellular phones to networking switches. SEC intends to maintain its leadership stance in high value-added memory by being the first to market with leading-edge technologies in a wide range of configurations and densities. The company is also looking forward to greatly accelerated sales of its RDRAM (Rambus Dynamic Random Access Memory) Modules as new, inherently low cost versions of RDRAM become available. These modifications are projected to lower overall production costs. SEC is currently organized into four main areas of operation: Digital Media, Digital Appliance, Device Solution and Telecommunication.

Sony. Established in 1946, Sony Corporation is engaged in the development, design, manufacturing and sales of various kinds of electronic equipment, instruments and devices for consumer and industrial markets. The company develops, produces, manufactures and markets home-use game consoles and software. It is engaged in recorded music in all commercial formats and musical genres; businesses including insurance operations through a Japanese life insurance subsidiary and non-life insurance subsidiaries; banking operations through a Japanese Internet-based banking subsidiary; leasing and credit financing operations. Sony's strategies are making great strides in a knowledge society, vertical integration and "Soft Alliances", and speedy and unique management. Table 1 shows a comparison of the two companies in numbers.

Table 1. Comparison of SEC and Sony in Numbers

	SEC	Sony
Rank in the Electronics, Electrical Equipment Industry	5	3
Global 500 Rank by Revenues	59	32
Revenues	US$ 47.6 billion	US$ 61.3 billion
Profits	US$ 5.6 billion	US$ 948 million
Number of Employees	80,000	161,100
Market Value (April 2, 2002)	U$ 49 billion	U$ 48 billion

Sources: Fortune Global 500, 2003, http://www.fortune.com.
SEC Annual Report, 2003.
Sony Annual Report, 2003.
Daewoo Securities, 2002.

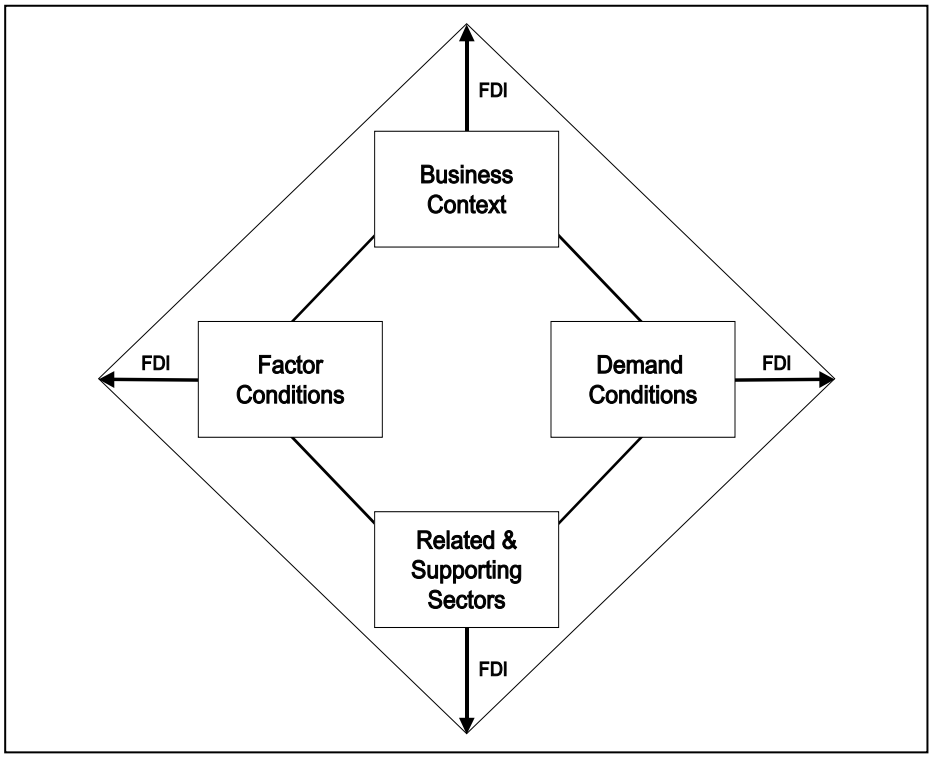
1.3. Importance of Research and Conceptual Framework

So far, various reports have claimed that SEC has increased its competitiveness and is now taking the role of the world leader in several areas such as high-end cell phones, DVD players, plasma TVs and a wide range of other consumer products. Also, these reports are saying that compared to Sony, SEC is exceeding in brand recognition in consumer-electronics, revenue growth (*Time* 2002), market capitalization (*BusinessWeek* 2003), etc. Other criteria of comparison are brand value, profits, sales and market share. However, if a report is not balanced and is focused on only one or two criteria, there is a possibility that the evaluation may be biased or overestimating the competitiveness of a firm. This is why

we need a more comprehensive and balanced framework.

Among the previous reports, Fortune Global 500 is considered the most reliable framework, ranking 500 global enterprises using diverse variables. SEC and Sony were also ranked in the electronics, electrical equipment industry as shown in Table 1. However, we believe that this framework is biased towards a few determinants, not showing the whole picture of competitiveness. To the extent that Porter (1990) brings together firm-specific linkages between the determinants, his model is useful and potentially predictive for firm level as well as industrial and national level studies (Bark and Moon 2002). This paper suggests that the diamond model of Porter (1990) may do a job, but the generalized double diamond model (Moon, Rugman and Verbeke 1995, 1998) will do a job better, as shown in Figure 1.

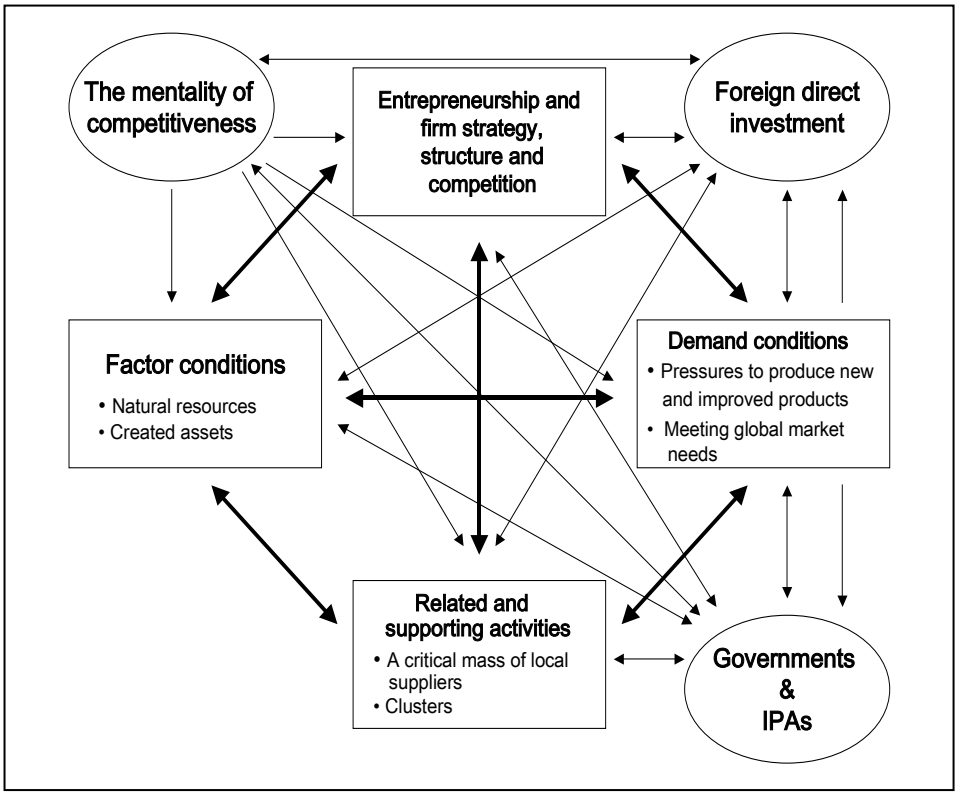
Figure 1. The Generalized Double Diamond Model



Source: Moon, Rugman, and Verbeke, 1995, 1998.

Especially, since both SEC and Sony are multinational companies and much of their operations are internationalized, it is necessary to discern domestic and international determinants. Porter's diamond is somewhat ambiguous in explaining the utilization of multinational activity of firms to enhance their competitiveness. Also, Dunning (1992, 2003) treats multinational activities as an exogenous variable that should be added to Porter's model, as shown in Figure 2.

Figure 2. The Diamond of Competitive Advantage



Source: Dunning, 2003.

However, in today's global business, multinational activities represent much more than just an exogenous variable (Cho and Moon 2000). Therefore, Porter's single diamond model and Dunning's model have been extended to the generalized double diamond model (Moon, Rugman, and Verbeke 1995, 1998), including multinational activity as an indigenous variable rather than an exogenous variable, making it a more comprehensive framework. Following is a comparison of the determinants on the previous reports including Fortune Global 500 and the generalized double diamond model (Table 2). It is notable that these existing studies are either lacking a number of determinants according to the generalized double diamond model or biased towards *factor conditions* and do not provide a satisfactory framework of analysis.

Table 2. A Comparison of Reports and the Generalized Double Diamond Model

Generalized Double Diamond Model (1995, 1998)			Forbes (2001)	Newsweek (2002)	Fortune (2002)	Time (2002)	Business Week (2003)
Factor Conditions	Domestic	Basic	∨		∨∨∨∨∨∨∨	∨∨∨	
		Advanced			∨∨∨	∨∨∨∨	∨∨∨
	International	Basic	∨∨∨∨	∨∨∨			∨∨∨
		Advanced	∨∨∨	∨∨∨		∨∨	∨∨
Demand Conditions	Domestic	Size			∨	∨	
		Quality					∨
	International	Size	∨				
		Quality	∨	∨			∨
Related and Supporting Sectors	Domestic		∨				∨
	International		∨			∨	
Firm Strategy, Structure and Rivalry	Domestic	Strategy		∨	∨		∨∨∨
		Structure	∨		∨		∨
		Rivalry					
	International	Strategy	∨∨	∨	∨		∨∨
		Structure				∨	∨
		Rivalry	∨				∨

2. DIAMOND VARIABLES AND DESCRIPTIVE DATA

In this paper, we selected several variables for the determinants of the generalized double diamond model to compare the competitiveness of SEC and Sony. According to the model, the four determinants are factor conditions; demand conditions; related and supporting industries; and firm strategy, structure and rivalry, which are based on Porter's diamond model. Each determinant is divided into domestic and international variables. Proxy variables are then distinguished and weighted to represent the concept of each variable.

2.1. Factor Conditions

2.1.1. Domestic Factor Conditions

Porter (1990) distinguishes between basic factors and advanced factors. His basic factors include natural resources, climate, location, unskilled and semiskilled labor and debt capital. In this study, we choose firm size and productivity for the domestic basic factor conditions. Firm size is represented by the number of employees, total sales and total assets of the fiscal year of 2002. Productivity is represented by profitability, which is composed of both return on equity (ROE) and return on investment (ROI).

According to Porter (1990), advanced factors include modern communications infrastructure and highly educated personnel such as engineers and scientists. For the advanced domestic factor conditions, we chose R&D investment and research facility. R&D investment is represented by the five-year average (1998-2002) of R&D expenses over total sales. The number of research centers represents the research facility variable.

2.1.2. International Factor Conditions

For the international basic factor conditions, the variables are international sales and overseas factories. The proxies for international sales are the three-year average (2000-2002) of international sales and the three-year average (2000-2002) of the international sales ratio (international sales over total sales). Also, the proxies for overseas factories are the number of overseas factories in the year 2002. For the international advanced factor conditions, patents and research facilities are chosen as variables. Also, the five-year sum (1998-2002) of patents registered in the U.S and the number of overseas laboratories of each firm are used as proxies, respectively. Table 3 shows the descriptive data of the variables for the domestic and international factor conditions.

Table 3. Descriptive Data for Factor Conditions

Variable	Proxy	SEC	Sony
Domestic			
Firm Size	Number of Employees	80,000	161,100
	Total Assets (US$, mil.)	54,766	70,590
	Total Sales (US$, mil.)	49,640	62,280
Productivity	Profitability (ROE, %)	25	5
	Profitability (ROI, %)	10.7	1.4
R&D Investment	Five-year average of R&D expenses over total sales	5.58%	5.64%
Research facility	Number of research centers	9	15
International			
International sales	Three-year average of international sales	27,374	43,464
	Three-year average international sales ratio	0.69	0.71
Overseas factories	Number of Overseas Factories	21	33
Patents	Five-year sum of patents in U.S.	7,069	6,930
Research facility	Number of overseas research centers	6	8

Sources: Fortune Global 500, 2003, http://www.fortune.com
SEC Annual Report, 2003.
Sony Annual Report, 2003.

2.2. Demand Conditions

2.2.1. Domestic Demand Conditions

Porter distinguishes the size of demand and the sophistication of demand. The growth rate of home demand can be more important to competitive advantage than its absolute size. Rapid domestic growth leads a nation's companies to adopt new technologies quicker, with less fear that such technologies would make existing investments redundant, and to build large, efficient facilities with the confidence that they will be utilized (Porter 1990). Meanwhile, companies gain competitive advantage where home demand gives them a clearer or timelier picture of emerging buyer needs, and wherein demanding consumers give pressure on companies to innovate faster and achieve more sophisticated competitive advantages. They pressure them to meet high standards and prod them to improve, innovate and move up into more advanced segments (Bark and Moon 2002).

In this paper, the market size variable represents the size of domestic demand. Market size is divided into three proxies. The first is the population of the age group of 15 to 64, regarded as the main consumers of electronics in each country of Korea and Japan. The second proxy is the three-year (2000-2002) average of GDP in each country and the third proxy is the four-year (1998-2001) average of real GDP growth rates of each country. The variables for the sophistication of demand are consumer sophistication and customer satisfaction. Consumer sophistication is expressed through the 2002 Education Index announced by the United Nations Development Programme and the three-year average of GDP per capita of each country. According to Cho and Moon (2000), it can be hypothesized that a higher level of education of the consumers leads to higher demand sophistication. Thus, this paper also uses this index. It can also be hypothesized that a higher level of GDP per capita, which implies a high standard of living, leads to higher demand sophistication. The proxy for customer satisfaction was the rank of each firm from its domestic customer satisfaction index.

2.2.2. International Demand Conditions

Multinational companies may need to expand their markets internationally to achieve economies of scale and economies of scope. Especially, innovative firms such as SEC and Sony are constantly on the lookout for new markets. When the domestic market reaches saturation, firms have to turn to international markets and they often introduce new products simultaneously into the global market (Bark and Moon 2002). Thus, there is a need to consider the international demand as a determinant of a firm's competitiveness.

For the international size of demand, we use market size as a variable. It is represented by two proxies: 1) the number of main areas of each firm multiplied by the number of countries where the products are sold; 2) the three-year (2000-2002) average of exports as a percentage of total sales. SEC focuses on home appliances, computer and related products, mobile phone, memory and TFT-LCD (Thin Film Transistor-Liquid Crystal Display) and sells its products in 43 different countries. Sony focuses on home appliances, computer and related products, non-memory, music, movies and video games and sells its products in 54 different countries. Meanwhile, the international sophistication of demand is composed of two variables: customer satisfaction and the diversification of markets. Customer satisfaction is represented by the brand value of each firm and the rank from *Financial*

Times/ PricewaterhouseCoopers' 'The World's Most Respected Companies', 2002. The diversification of markets is represented by the ratio of the number of countries of sales over the three-year (2000-2002) average of total export amount. It can be hypothesized that a high ratio of the diversification of markets indicates a highly sophisticated international market. The descriptive data for the domestic and international demand conditions are summarized in Table 4.

Table 4. Descriptive Data for Demand Conditions

Variable	Proxy	SEC	Sony
Domestic			
Market size	Population of the age group of 15 to 64	32,972,859	85,706,000
	Three-year average of GDP (US$, bil.)	455.3	4,295
	Four-year average of real GDP growth rates	3.3	-0.3
Consumer sophistication	Education index	0.96	0.94
	Three-year average of GDP per capita (US$)	9,540	34,195
Customer satisfaction	Rank percentage of each firm from its domestic customer satisfaction index (from under)	80%	78%
International			
Market size	Number of main areas of each firm multiplied by the number of countries where the products are sold	215	324
	Three-year average of export as a percentage of total sales	68.7%	70.8%
Customer satisfaction	Brand value of firm (US$, bil., 2003)	10.85	13.15
	Financial Times/PricewaterhouseCoopers' 'The World's Most Respected Companies', 2002 rank	42 (in 84%)	6 (in 12%)
Diversification of markets	Ratio of number of countries of sales over the three-year average of total export amount	0.0062	0.0072

Sources: Fortune Global 500, 2003, http://www.fortune.com
OECD Main Economic Indicators. 2002.
Ministry of Commerce, Industry, Energy (http://www.mocie.go.kr)
United Nations Development Programme Education Index, 2002.
National Consumer Satisfaction Index (http://www.ncsi.or.kr)
Interbrand (http://www.interbrand.com)

2.3. Related and Supporting Industries

2.3.1. Domestic Related and Supporting Industries

Related and supporting industries are those whereby firms coordinate or share activities in the value chain or those that involve products that are complementary to the firms of a given nation (Porter 1990). Also, firms can improve their competitiveness through easy access to components from suppliers and there may be both forward and backward linkages between the firm and suppliers. Furthermore, end-users and suppliers can share information to improve the process of innovation and upgrading.

For determinants, we chose infrastructure and the competitiveness of the domestic academy as variables. It is possible that domestic infrastructure can be regarded as an advanced factor. However, since the proxies are focused on technology synergy and diffusion, we believe that it is better to incorporate infrastructure in the category of related and supporting industries. The first proxy for infrastructure is the three-year average (1999-2001) of the National Informatization Index announced by the Ministry of Commerce, Industry and Energy of Korea. The index consists of the condition of broadcasting; the state of communication; and the spread rate of personal computers, televisions, internet users, telephones, and cellular phones. Thus, a high score based on the index indicates a good infrastructure for electronic businesses. The second proxy for infrastructure is the ICT (Information and Communication Technologies) Development Index. This index measures the technology development environment level of a country. Some of the indicators are R&D expenditure, average incoming/outgoing telecom traffic and the number of internet hosts. The proxy for the competitiveness of academy is the number of schools per 10 million persons of each country in 'The World Best Science and Technology Universities' ranking list announced by *Asiaweek* (2000). This proxy represents the cooperation between academia and business.

2.3.2. International Related and Supporting Industries

When multinational firms coordinate or share activities in the value chain within a geographic vicinity such as the clusters of Silicon Valley in the U.S. and Bangalore in India, they bring in new technologies and also benefit from acquiring related and supporting technologies (Bark and Moon 2002). In order to do so, these firms need a constant flow of financing, which itself requires a sound credit status and also that of the country where the firm is based.

Here, we have chosen three variables for determinants - credit, international competitiveness of academy and cooperation. Credit is comprised of the Moody's Credit Ranking of SEC and Sony in 2003 and the Moody's Credit Ranking of Korea and Japan in 2002. Credit ranking can be considered as a sign of the competitiveness to raise international funding and stimulate international strategic alliances. Funding entities and strategic alliance partners will have considered a firm's credit ranking before any actions are made. The number of international academic publications per ten thousand persons represents international competitiveness of academy, which shows the academic infrastructure. The number of overseas component complexes represents cooperation. The descriptive data for domestic and internationally related and supporting industries are summarized in Table 5.

Table 5. Descriptive Data for Related and Supporting Industries

Variable	Proxy	SEC	Sony
Domestic			
Infrastructure	Three-year average National Informatization Index	80	74.3
	ICT Development Index (2000)	0.5104	0.6090
Competitiveness of Academy	Number of schools in 'The World Best Science and Technology Universities' list per 10 million persons	0.63	0.58
International			
Credit	Moody's Credit Ranking of Company (2003)	A3	A1
	Moody's Credit Ranking of Country (2002)	A3	A2
International Competitiveness of Academy	Number of international academic publications per 10 thousand persons	10.85	13.15
Cooperation	Number of overseas component complexes	6	10

Sources: Ministry of Commerce, Industry and Energy, Korea (http://www.mocie.go.kr)
UNCTAD, ICT Index, 2000, http://www.unctad.org
Asiaweek, "Asia's Best Universities" (2000, http://www.asiaweek.com)
Moody's Investors Service (http://www.moodys.com)
Analysis Report for SCI publications of Korean Universities in year 2001 (in Korean)
Ministry of Education and Human Resources Development (http://www.moe.go.kr)
http://www.samsung.com
http://www.sony.com

2.4. Firm Strategy, Structure and Rivalry

2.4.1. Domestic Firm Strategy, Structure and Rivalry

This determinant reflects the context in which firms are created, organized and managed. However, Porter (1990) finds that no one managerial system is universally appropriate. Instead, he expresses a strong preference in favor of vigorous domestic rivalry for creating and sustaining competitive advantage. In this study, we have incorporated the results of a survey conducted in a previous study evaluating the strategy and structure of the two firms.

The variables for domestic firm strategy and structure are strategy efficiency and management efficiency, respectively. The proxy representing the firm strategy determinant is company strategy, while efficiency of organization, flexibility of organization and leadership of CEO represent the domestic firm structure determinant. The variable for the rivalry determinant is market competition and for this we chose the number of the main

competitors of SEC and Sony in each domestic market (Table 6).

Table 6. Main Competitors of SEC and Sony

Firm	Main Product	Domestic Competitors	International Competitors
SEC	Semiconductor	Hynix	Elpida, Hynix, Infenion, Micron
	Telecom	LG	Ericsson, Motorola, Nokia, Siemens
	Television	LG, Panasonic, Sony	LG, Panasonic, Philips, Sony
	Computer and Related	HP Compaq, LG.Philips, LG IBM, Fujitsu, Sony, Toshiba, TriGem	Dell, Fujitsu, HP Compaq, LG, Philips, LG IBM, Sony, Toshiba
Sony	Television	Panasonic, Samsung	LG, Philips, Panasonic, Samsung
	Games	Microsoft	Microsoft
	Music	Avex, B-Gram, Trax, Toshiba EMI	BMG, EMI, Universal Music
	Movie Pictures	Doho, Toei, Shochiku	Disney, DreamWorks, Universal, 20th Century Fox
	Computer and Related	HP Compaq, IBM, Fujitsu, Toshiba	Dell, HP Compaq, IBM, Fujitsu, Toshiba

2.4.2. International Firm Strategy, Structure and Rivalry

Porter (1990) argues that domestic rivalry is superior to rivalry with foreign competitors. This argument may be true in large economies such as the United States, but not in small economies such as Canada (Rugman and D'Cruz 1993), Korea and Singapore (Cho and Moon 2000). The successful firms in these economies are more concerned about international rivalry than about domestic rivalry. What is more, multinational firms such as SEC and Sony are destined to constantly consider international rivalry since the operations of these firms are spread across the globe and much of the sales and profit are generated in foreign markets. In fact, Porter recognized the importance of international or global variables but his single diamond did not explicitly include these variables (Bark and Moon 2002).

In this paper, we incorporated the results evaluating the international firm strategy and structure determinants from the survey above. The variables used in the survey were global strategy and global business structure. The proxies for global business structure are global infrastructure, acceptance to global business environment and leadership of CEO in global business. The variable for the rivalry determinant is market competition and we chose the number of the main competitors of SEC and Sony in the international market (Table 6). The descriptive data for the domestic and international firm strategy, structure and rivalry are

summarized in Table 7.

Table 7. Descriptive Data for Firm Strategy, Structure, and Rivalry

Variable	Proxy	SEC	Sony
Domestic			
Strategy Efficiency	Company strategy	Questionnaire results	Questionnaire results
Management Efficiency	Efficiency of organization Flexibility of organization Leadership of CEO	Questionnaire results	Questionnaire results
Market Competition	Number of main competitors	12	14
International			
Global Strategy	Global strategy	Questionnaire results	Questionnaire results
Global Business Structure	Global infrastructure Acceptance to global business environment Leadership of CEO in global business	Questionnaire results	Questionnaire results
Market Competition	Number of main competitors	19	17

Source: Han *et al*., 2003.

3. EMPIRICAL RESULTS OF THE DIAMOND TESTS

3.1. Calculating Scores and Drawing the Diamond

The descriptive data for each determinant of the generalized double diamond model are translated into scores to quantify the competitiveness of SEC and Sony in terms of the domestic diamond and the international diamond. Each category of proxies that composes the variables is distributed with scores according to the weight of each proxy. Then, between the proxies of SEC and Sony, the proxy that has a higher amount according to the descriptive data is given a full score and the other proxy is given a lower score in proportion. An example is given below (Table 8).

Each proxy has a distributed weight and for the purpose of making a score scale from zero to ten, we have multiplied a value of ten to each weight. For example, since Sony has more employees than SEC, we gave Sony a full score of 0.6 (10 x 0.06). Then, we calculated SEC's score in proportion to the ratio of the number of employees from each company, which is 0.3 (10 x 0.06 x 80,000÷161,100).

Table 8. Example of Score Calculation

Variables	Proxies	SEC	Sony
Firm Size	Number of Employees	80,000	161,100

Variables	Proxies	Weight	Score	
Basic			SEC	Sony
Firm Size	Number of Employees	0.06	0.3	0.6

Currently, it is hard to draw a fine line between what activities of multinational companies are purely domestic and what are foreign. One of the reasons for this is because domestic and international operations of firms are closely linked together. Namely, multinational companies such as SEC and Sony have to consider domestic and international operations simultaneously rather than separately. Therefore after drawing separate diamonds, we merged the two diamonds to explain the competitiveness of the two companies in a truly global sense. Here we name the synthesized diamond as 'the global diamond'. The scores for each determinant of the three diamonds (domestic, international, global) are summarized in Table 9.

Table 9. Scores for the Domestic, International and Global Diamond

Diamond	Domestic		International		Global	
Company	SEC	Sony	SEC	Sony	SEC	Sony
Factor Conditions	8.17	8.33	8.12	9.94	8.15	9.14
Demand Conditions	6.43	8.82	7.67	10.00	7.05	9.41
Related and Supporting Industries	9.35	9.56	8.21	10.00	8.78	9.78
Firm Strategy, Structure and Rivalry	9.57	9.82	10.00	9.48	9.79	9.65
Total area of diamond	138.10	166.20	143.80	194.20	141.00	180.20

3.2. The Domestic Diamond

Following is the domestic diamond (Figure 3) and the scores for its proxies (Tables 10 and 11).

Figure 3. The Domestic Diamond of SEC and Sony

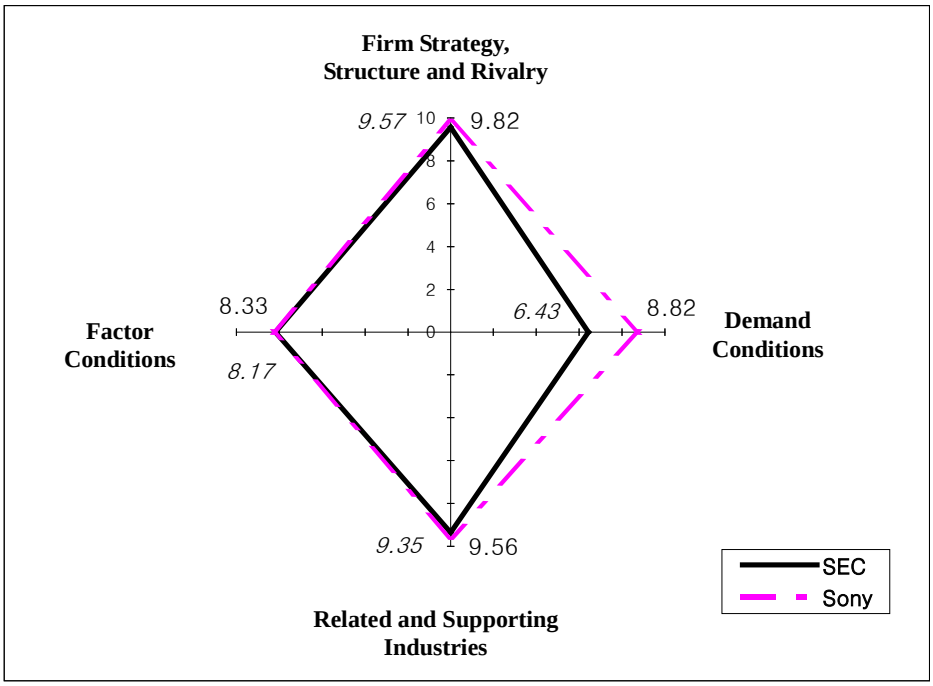


Table 10. Scores for Domestic Factor Conditions & Domestic Demand Conditions

Domestic Factor Conditions

Variables	Proxies	Weight	Score	
Basic			SEC	Sony
Firm Size	Number of Employees	0.06	0.3	0.6
	Total Assets (US$, mil.)	0.07	0.54	0.7
	Total Sales (US$, mil.)	0.07	0.56	0.7
Productivity	Profitability (ROE, %)	0.1	1.0	0.2
	Profitability (ROI, %)	0.1	1.0	0.13
Advanced			SEC	Sony
R&D Investment	Five-year average of R&D expenses over total sales	0.3	2.97	3.0
Research facility	Number of research centers	0.3	1.8	3.0
	Total	1.0	8.17	8.33

Domestic Demand Conditions

Variables	Proxies	Weight	Score	
Size			SEC	Sony
Market size	Population of the age group of 15 to 64	0.2	0.77	2.00
	Three-year average of GDP	0.1	0.11	1.00
	Four-year average of real GDP growth rates	0.1	1.0	- 0.09
Sophistication				
Consumer sophistication	Education index	0.2	2.0	1.96
	Three-year average of GDP per capita	0.2	0.56	2.0
Customer satisfaction	Rank of each firm from its domestic customer satisfaction index	0.2	2.0	1.95
	Total	1.0	6.43	8.82

Table 11. Scores for Domestic Related and Supporting Industries & Domestic Firm Strategy, Structure and Rivalry

Domestic Related and Supporting Industries

Variables	Proxies	Weight	Score	
			SEC	Sony
Infrastructure	Three-year average of the National Informatization Index	0.4	4.0	3.72
	ICT Development Index (2000)	0.4	3.35	4.0
Competitiveness of Academy	Number of schools in 'The World Best Science and Technology Universities' list per 10 million persons	0.2	2.0	1.84
	Total	1.0	9.35	9.56

Domestic Firm Strategy, Structure and Rivalry

Variables	Proxies	Weight	Score	
			SEC	Sony
Strategy Efficiency	Company strategy	0.4	4.0	3.87
Management Efficiency	Efficiency of organization	0.1	1.0	0.98
	Flexibility of organization	0.1	1.0	0.98
	Leadership of CEO	0.1	1.0	0.98
Market Competition	Number of main competitors	0.3	2.57	3.0
	Total	1.0	9.57	9.82

As shown above, the diamonds of SEC and Sony appear to be almost identical except for demand conditions. This implies that except for demand conditions, SEC is almost as competitive in Korea as Sony is in Japan. Some interesting points can be found. First, SEC is making efforts to utilize production factors as much as Sony does. In fact, while the firm size of Sony is much larger than that of SEC, SEC exceeds in profitability even when the level of R&D investment is about the same level.

Second, SEC and Sony are at a similar level of business contexts (firm strategy, structure and rivalry) in similar business environments (related and supporting industries). According to Table 11, the infrastructure and human resources related with the electronics business in Korea and Japan do not show much difference. Namely, when regarding the domestic situation only, SEC and Sony are competing on similar grounds and are following similar patterns to make use of their resources.

Third, the difference in the competitiveness of demand conditions of SEC and Sony confirms that the reasons not only come from the size of demand, but the sophistication of demand as well. In fact, Hofstede (1983, 1997) and Moon and Choi (2001) have confirmed that Japan has a higher level of uncertainty avoidance than Korea. That is, Japanese consumers tend to be relatively highly sophisticated and picky. Sony has to meet the Japanese high expectations such as quality and consumer relations. Porter (1990) also pointed out this regard from the example of picky Italian female consumers stimulating the Italian shoe industry.

3.3. The International Diamond

Following is the international diamond (Figure 4) and the scores for its proxies (Tables 12 and 13).

Figure 4. The International Diamond of SEC and Sony

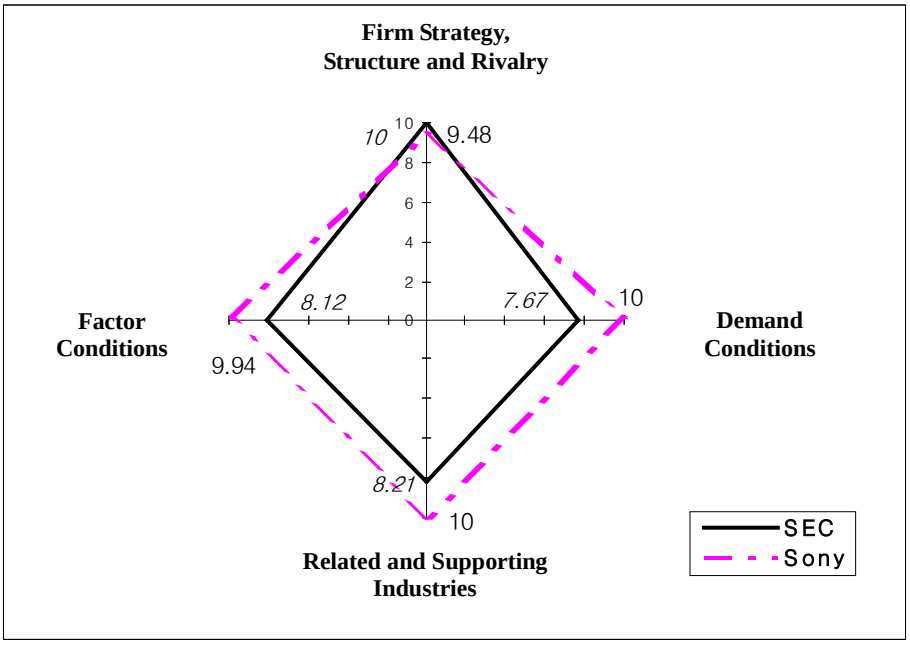


Table 12. Scores for International Factor Conditions & International Demand Conditions

International Factor Conditions

Variables	**Proxies**	**Weight**	**Score**	
Basic			SEC	Sony
International sales	Three-year average of international sales	0.1	0.63	1.0
	Three-year average international sales ratio	0.1	0.97	1.0
Overseas factories	Number of overseas factories	0.2	1.27	2.0
Advanced			SEC	Sony
Patents	Five-year sum of patents in U.S.	0.3	3.0	2.94
Research facility	Number of overseas research centers	0.3	2.25	3.0
	Total	1.0	8.12	9.94

International Demand Conditions

Variables	**Proxies**	**Weight**	**Score**	
Size			SEC	Sony
Market size	Number of main areas of each firm multiplied by the number of countries where the products are sold	0.2	1.33	2.0
	Three-year average of export as a percentage of total sales	0.2	1.94	2.0
Sophistication			SEC	Sony
Customer satisfaction	Brand value of firm (US$, bil., 2003)	0.25	2.06	2.5
	Financial Times/PricewaterhouseCoopers' 'The World's Most Respected Companies', 2002 rank	0.1	0.18	1.0
Diversification of markets	Ratio of number of countries of sales over three-year average of total export amount	0.25	2.15	2.5
	Total	1.0	7.67	10.0

Table 13. Scores for Scores for International Related and Supporting Industries & International Firm Strategy, Structure and Rivalry

International Related and Supporting Industries

Variables	Proxies	Weight	Score	
			SEC	Sony
Credit	Moody's Credit Ranking of Company (2003)	0.25	2.34	2.5
	Moody's Credit Ranking of Country (2002)	0.25	2.42	2.5
International Competitiveness of Academy	Number of SCI publications per 10 thousand persons	0.2	1.65	2.0
Cooperation	Number of component complexes	0.3	1.8	3.0
	Total	1.0	8.21	10.0

International Firm Strategy, Structure, and Rivalry

Variables	Proxies	Weight	Score	
			SEC	Sony
Global Strategy	Global strategy	0.4	4.0	3.91
Global Business Structure	Global infrastructure	0.1	1.0	0.96
	Acceptance to global business environment	0.1	1.0	0.96
	Leadership of CEO in global business	0.1	1.0	0.96
Market Competition	Number of main competitors	0.3	3.0	2.68
	Total	1.0	10.0	9.48

Considering the shape of the international diamond, Sony has a more balanced competitiveness than SEC. This may indicate that Sony has evolved into a successful international player through its long experience of international operations. When considering that the domestic diamond of Sony is relatively insufficient in factor conditions and demand conditions compared to the other two determinants, Sony has been successful in supplementing its competitiveness through multinational activities. Because Japan's economic indicators such as growth rate and productivity have been staggering recently, Sony has sought compensations through foreign resources and demand.

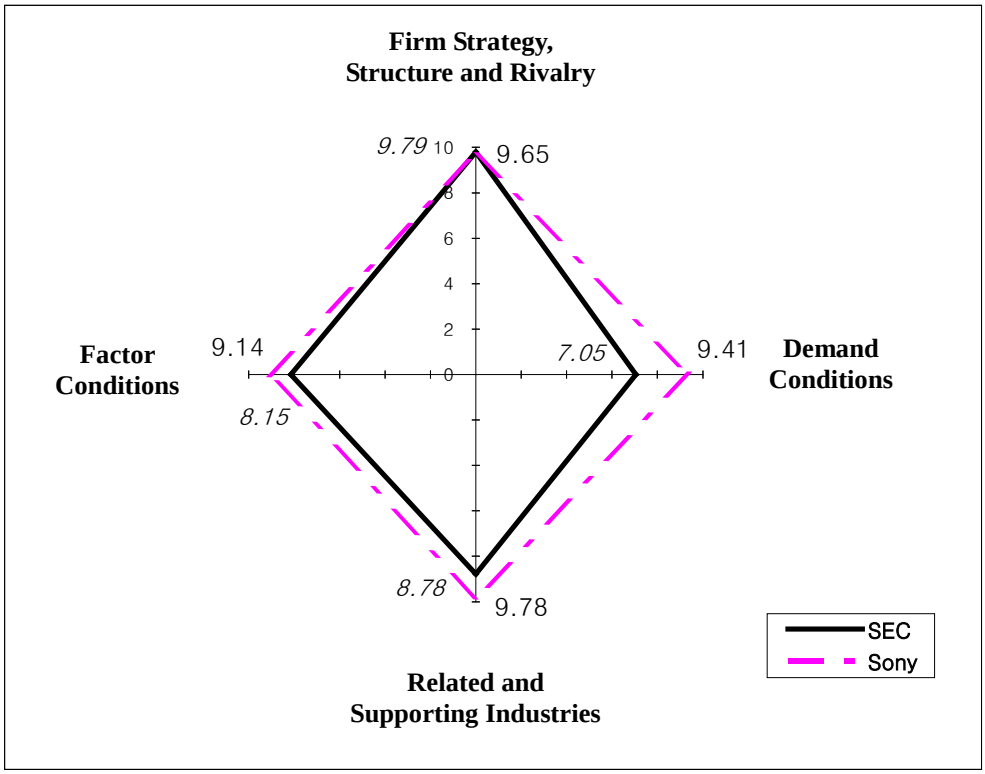
Regarding size, SEC's international diamond is 74 percent of Sony's international diamond while SEC's domestic diamond is 83 percent of Sony's domestic diamond. Sony has an absolute advantage in terms of domestic and international competitiveness and also a

comparative advantage in terms of international competitiveness against SEC. While SEC has a strong competitiveness in international firm strategy, structure and rivalry compared to the other determinants of the diamond, it may not have fully utilized international resources such as foreign human resources and international technology. SEC's thrive for efficiency through an orientation to make almost everything by itself; namely, the 'Samsung Way' *(BusinessWeek* 2003) may actually be an inertia for internationalization. Therefore, when assessing the international competitiveness of SEC and Sony, we should not only consider international factor conditions but also the other three determinants as well.

3.4. The Global Diamond

Following is the global diamond (Figure 5). All scores for the global diamond are calculated as the average sum of the scores from the domestic and international diamonds. Refer to Table 9 for the summary of the scores for each determinant.

Figure 5. The Global Diamond of SEC and Sony



Looking into the domestic and international diamonds separately and regarding the determinants of each firm's competitiveness, we can now have a clearer picture through the global diamond, which synthesizes the domestic and international diamonds. First, considering the shape of the diamond, Sony is more balanced than SEC and it has a

competitive advantage in all determinants except in firm strategy, structure and rivalry. However, Sony is not lagging behind SEC by this determinant, either. Therefore it is hard to agree with the recent headlines in the media that SEC is as competitive as Sony only because its market value has surpassed that of Sony's.

Meanwhile, SEC has recently been successful in envisioning being the world leader in its business areas and setting up strategies to catch up with the current leaders by means of aggressive rivalry. Namely, it has been successful in increasing its competitiveness of firm strategy, structure and rivalry. However, to become a world leader, SEC will have to figure out how to mobilize and harmonize the other determinants of the diamond. For example, while SEC surpasses Sony in basic factor conditions such as ROE and ROI, it lags behind Sony in advanced factor conditions such as R&D investment and research facilities (Table 10), which may be critical factors in the electronics business.

Second, regarding the size of the diamond, SEC has room for further improvement through internationalization. This indicates that even though a firm may be competitive in its domestic market, it may not be as successful as anticipated if it neglects international variables. On the other hand, even if a firm may *lack* competitiveness in its domestic market, it can supplement its weaknesses through appropriate multinational activities.

4. CONCLUSION

4.1. Implications

There is much to consider when evaluating a firm's competitiveness, especially when the firm is a multinational firm that has a wide spread of activities across national borders. Internationalization makes things more complex and certainly a firm cannot be evaluated just by its market value. Porter's diamond is a good paradigm to start with for analyzing a firm's 'global' competitiveness. However, Porter's original diamond model is incomplete, mainly because he does not adequately incorporate multinational activities. The paradigm of the generalized double diamond model, which extends the single diamond model, offers us a more comprehensive framework because it explicitly incorporates multinational activities. Since the global diamond model in this paper allows us to distinguish, with relative ease, the competitiveness of SEC and Sony through the comparison based on the size and shapes of the domestic and international diamonds, major strategic differences between the two companies can be revealed. From our analysis, it is evident that Sony is more advanced than SEC in internationalization with a better balance.

4.2. Limitations of the Study and Suggestions for Further Studies

While our methodology is comprehensive in a sense that a number of proxies were used to measure the competitiveness of SEC and Sony, it can be further improved. First, it can be emphasized that a more rigorous statistical justification on proxy selection and quantitative data should be made. Therefore, our study is adequate for a relative comparison only. Absolute measurements using statistically significant data can improve the content of this paper. Second, while this paper has focused on competitiveness at the firm level, a further study on the aggregate competitiveness of electronic related firms at the industrial level may shed light on the relationship between a firm's competitiveness and the industry's

competitiveness. It will be interesting to study how the diamonds of firms and industries interact with each other.

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