Int. Studies of Mgt. & Org., vol. 28, no. 4, Winter 1998–99, pp. 57–72.

0020–8825 / $9.50 + 0.00.

SEONGJAE YU

The Growth Pattern of Samsung Electronics

A Strategy Perspective

For both economic and strategic reasons, Korean economic planners in the 1970s advocated the advantages of developing a domestic electronics industry. Economically, development of the industry was considered highly preferable because of its potentially high value-added, linkage effects (economic and technological), employment potential, and a fast-growing world market with high income elasticity. Strategically, the electronics industry was believed to be particularly suitable for a country like Korea with poor natural endowments but with abundant highly skilled human resources (KIST, 1976). In addition, the industry showed such characteristics as labor intensity,[1] knowledge intensity, low input requirements of energy and raw materials, and the increasing importance of electronic equipment in the emerging information industry.

Korea has successfully turned these potential advantages into reality. When the Second Five-Year Plan ended in 1971, total output of the electronics industry was a meager $0.14 billion. Over the next twenty-five years, however, it grew over 440 times (in current dollars) to $62 billion, making Korea the fourth-largest electronic-goods-producing country in the world. Many of the large *chaebols,* such as Samsung, LG, Hyundai, and Daewoo, have contributed to this phenomenal growth. In particular, Samsung's role is of great interest, as it represents a microcosm of the growth process of the Korean electronics industry.

Samsung Electronics Company (SEC), founded in 1969 as a member of the Samsung Group, has grown into the largest manufacturer in Korea, with a sales

Seongjae Yu is professor at Chung-Ang University, Seoul, Korea. The author is grateful to Jin Ku Kang, chairman of Samsung Electronics, for interviews and for sharing the insights involving many of the company's strategic decisions. He also acknowledges helpful assistance from Jin-Bae Choi and Doo-Woo Nam of Samsung Electronics in obtaining internal data and information pertinent to the growth of the company. This study was supported by a Chung-Ang University special research grant in 1997.

turnover of $23.9 billion in 1997, and accounting for 32.8 percent of the total output of the electronics industry. In investment, product development, marketing, and technology development, SEC has played the leading role in expanding the frontier of Korea's electronics industry. Since the introduction of monochrome television sets in 1971, Samsung has grown on average 38 percent a year, broadening its product range from simple consumer electronics and home appliances to sophisticated information and communications equipment, computers and peripherals, and semiconductors. SEC claims that, in the area of semiconductors, it has become the largest producer of dynamic random access memory (DRAM) chips in the world, with a market share of 17 percent (Samsung Electronics Group, 1996, p. 8), pulling ahead of such U.S. and Japanese giant corporations as NEC, Texas Instruments, Hitachi, and Toshiba.

Samsung has many other products that compete well in the world market. In 1996, for example, sales of computer monitors ranked first in the world, with 12.8 percent of the market; videocassette recorders were fifth with 9.5 percent; microwave ovens were second with 18.2 percent; and static random access memory (SRAM) chips were first with 15 percent. This achievement is remarkable, given that its takeoff occurred in the 1970s, when the Korean domestic economy was in a fledgling stage of development and Japanese companies were aggressively dominating the world consumer-electronics markets, eclipsing such U.S. firms as RCA, GTE, and Zenith.

This article investigates Samsung's growth strategies, which enabled the company to catch up in technology and product development. Specifically, it focuses on Samsung's strategic choices with respect to product development, technology, manufacturing scale and scope, and export marketing. It also analyzes Samsung's strategy in building the competitive advantages required to cope with the unfriendly market environment dominated by world-class U.S. and Japanese electronics corporations. There is a distinctive and coherent pattern underlying these strategic choices, all of which are closely related to the evolutionary learning process of the company and matched with prevailing environmental conditions facing Samsung. However, not all factors that accounted for Samsung's success are considered—such as the effect of government policies, corporate culture, and organizational structure.[2]

Growth strategy

From the beginning, the goal of the late B.C. Lee, founder of the Samsung Group, was to make SEC one of the largest manufacturers of electronics goods in the world (Kang, 1996, p. 20). However, the initial conditions facing Samsung in technology, market potential, industry infrastructure, and labor skill were too unfavorable to achieve this goal.[3] The tasks required for Samsung were then: (1) to invest in production systems; (2) to acquire the necessary know-how, and (3) to become competitive in world markets. In order for Samsung to achieve the goal envisioned by Chairman Lee effectively, correct strategic choices involving these three tasks had to be made simultaneously in a dynamic context. Investment in production systems was a matter related to the choice of *products* and to *manufacturing scale and scope*; acquiring production know-how was a matter of learning critical *technologies*; and competing in the market was related to the choice of target *markets* and the building of *competitive advantages*. These five dimensions—products, manufacturing scale and scope, technologies, target markets, and competitive advantages—constituted the basis for the growth vector Samsung has pursued. Each of these dimensions is discussed below, first, independently, then, together, to show how their strategic interrelationships enabled Samsung to establish competitive advantages dynamically over time.

Growth path: Product dimension

Samsung's growth path along the product dimension may be viewed best from the perspectives of: (1) the product life cycle (PLC); (2) product price level; (3) diversification, and (4) product characteristics, which together provided a foundation for building SEC's unique competitive advantages. First, Samsung's product development from the PLC perspective shows a clear pattern of the company following the *PLC in reverse order*. When it started its operation in 1971, Samsung selected monochrome television sets as its first product, even though they were already in the declining stage of the market in the advanced countries. The next major product, color television sets, was introduced in 1977, elsewhere in the mature market stage as they had been produced for more than two decades. By the early 1980s, the company narrowed the technology gap by producing videocassette recorders (VCRs) and microwave ovens (MWOs) as the new champions of revenue generation, both of which were in the growing stage in the world market. Finally, by the early 1990s, Samsung was able to manufacture and sell state-of-the-art products, such as DRAMs and digital videodisc (DVD) players in the introductory stage of the world market.

Second, from a price-level perspective, the growth path began from products at the low end of the price range and gradually moved up in parallel with rising incomes and technological capability. The first product was a modest 12" monochrome television set, followed by a 12" color set, which gradually became larger and included more sophisticated functions and design. The same approach was applied to VCRs and MWOs. Starting from the low end was a strategic choice based on three environmental conditions prevailing at the time: low national income and limited purchasing power of the local market; a joint-venture partner that was unwilling to share technologies in high-end product ranges; and the availability of a niche export market (primarily in the United States) for low-end models.

Third, regarding diversification, Samsung Electronics initially operated with a rather simple product structure, mainly concentrating on television receivers and home appliances. From the early 1980s, the company began to diversify its product lines. The diversification, however, was strategically limited to the electronics-related area: Namely, as SEC's technological capability increased, it developed a *related diversification strategy* (Rumelt, 1982), first, into a broader range of consumer electronics and home appliances and then into more challenging areas, such as personal computers and peripherals, communications equipment, and semiconductors, thereby approximating Matsushita's product composition. But the Samsung product composition remained skewed heavily toward consumer electronics and home appliances, accounting for as much as 81.8 percent of the company's total sales revenues in 1988 (Kim, 1994, p. 255).

The diversification strategy was accentuated in 1988 when SEC merged with Samsung Semiconductor & Communications, which had been a separate member company of the Samsung Group. Recognizing the increasing trend of integrated systems products, Samsung's decision makers aimed at capturing the benefit of strategic fit by sharing the technology and management of the two companies.

These diversification efforts not only have resulted in a more balanced revenue structure by reducing the contribution of traditional consumer electronics and appliances (to less than 45 percent by 1995), but also have significantly built a basis for a viable business structure capable of sustaining growth in the highly competitive electronics industry. The company's product lines have grown to five major categories with such representative products as (1) television receivers, VCRs, audio systems, camcorders and DVD players in *consumer electronics*; (2) refrigerators, microwave ovens, and washing machines in *home appliances*; (3) personal computers, monitors, hard-disk drives and printers in *personal computers and peripherals*; (4) facsimile machines, CDMA digital cellular phones, pagers, fiber optics, and PABX and public switching systems *in information and communication*, and (5) DRAMs, SRAMs, and ASICs in *semiconductors*.

The fourth characteristic of the product path is that Samsung's first product choice (monochrome televisions) was a commodity product that was insensitive to brand name but highly price-elastic. This strategy of adhering to a commodity type was also applied to color TVs, VCRs, and MWOs by emphasizing low-end models. Even DRAMs, although a high-tech product, were considered a commodity in the sense that their demand is highly sensitive to price changes.[4] However, the strategy of emphasizing commodity products is now gradually shifting toward noncommodity products since the early 1990s: (1) SEC's product composition is moving from low-end to high-end models; (2) the number of products has increased substantially as a result of diversification into information and communications equipment as well as PCs and peripherals, and (3) the product life cycle is increasingly shortened, making the establishment of mass-production systems more vulnerable.

Growth path: Technology dimension

Technology acquisition was one of the key determinants in formulating Samsung's strategy. In the early 1970s, the required technologies were not available, even at a rudimentary level, within the company or in Korea, so that Samsung initially had to rely on foreign sources. Samsung sequenced its technological capability in five phases, progressing from the easiest to gradually more advanced levels:

Phase 1: Mastering simple assembly techniques of complete knockdowns (CKDs) imported from joint-venture partners;
Phase 2: Modifying the imported CKDs by sourcing some parts or components from third parties of Samsung's choice;
Phase 3: Designing new products through reverse engineering without direct reliance on foreign assistance;
Phase 4: Designing advanced products through reverse engineering with innovation;
Phase 5: Attaining technological competence whereby product and process innovation start to appear throughout the company.

When the first monochrome television receiver was produced in 1971, Samsung was in phase 1 of assembling CKDs imported from Sanyo of Japan, which supplied the basic technology as the joint-venture partner. Samsung engineers were determined to learn and acquire the technologies necessary to produce the targeted products, but the technology-assistance agreement rarely produced critical technologies beyond basic assembly know-how. By aggressively studying, investigating, discussing, and exploring the secrets of the critical technologies, they overcame the seemingly insurmountable task of mastering the necessary know-how (Kang, 1996, p. 23). Soon, in phase 2, modified versions of monochrome TVs began to roll off the production line and, by 1977, Samsung had advanced to phase 3, when they began production of color televisions. In addition, the first VCRs and MWOs were reverse engineered in 1979. After mastering the basics through reverse engineering, Samsung managed to enter into licensing agreements with foreign companies that owned the patents and other protected rights related to manufacturing of the products. For example, Samsung had a licensing agreement with Toshiba in 1981 for MWOs, with Philips in 1982 for color TV technology, and with JVC in 1983 for VCRs. This sequence of reverse engineering, followed by a licensing agreement, was preferred because it not only gave Samsung a more favorable position in license negotiation, but, more importantly, it facilitated and hastened technology internalization.

During this process Samsung made serious efforts to develop its own product-design competence. It started to increase in-house R&D budgets and stepped up its efforts to assimilate advanced foreign technologies and to develop new products (Hobday, 1997, p. 12). By the mid-1980s, Samsung had entered phase 4 with the ability to reverse-engineer innovatively, and it produced such products as 1M DRAM chips (1986) and camcorders (1989).[5]

Having successfully caught up with foreign technologies for most conventional consumer-electronics products, SEC's management accelerated its technological capability from reverse engineering to innovations in advanced consumer electronics, PCs and peripherals, semiconductors and communications equipment. To support this strategy, Samsung increased its R&D budgets from 0.5 percent of sales in 1986 to 5.9 percent in 1992, and it established the largest R&D institute in Korea. By the early 1990s, Samsung demonstrated that it had reached phase 5 by developing such advanced products as the digital videodisc (DVD) player (1995) in consumer electronics, 64M DRAMs (1992) in semiconductors, and CDMA handsets and base-station equipment (1996) in the communications area. Samsung even managed to be first in the world to develop 22" thin-film-transistor liquid-crystal displays (1996), the prototype 256M DRAM (1994) and 1-giga DRAM (1996) chips.[6] And the company recently announced a new process technology, ahead of Japan's NEC, required to manufacture 4-giga DRAM (1998) chips.[7]

By reaching phase 5 of the technology-capability ladder, Samsung has finally narrowed to less than one year the gap with U.S. and Japanese companies in new-product development and in some cases is even ahead of its competitors. Being in phase 5, however, does not mean that Samsung is now independent of foreign technologies. In fact, the closer Samsung gets to the high-tech market, the more sophisticated technologies it will need. For this reason, Samsung has added two technology channels in addition to in-house R&D and licensing agreements: (1) acquisition of high-tech companies in advanced countries, and (2) strategic alliances with competitors. For example, SEC recently purchased LUX of Japan (1994) and bought a major share of AST Research of the United States (1995); it also entered into technology-sharing arrangements with Toshiba, NEC, Motorola, Digital, SGS-Thompson, and Siemens (Samsung Annual Report 1995, p. 69). By this time, Samsung's R&D competence had enabled it to negotiate strategic alliances on a more equal footing with overseas leaders, removing the company's image as a "junior partner" (Hobday, 1997, p. 12).

When the product and technology paths discussed above are combined in a two-dimensional space, an interesting pattern emerges that shows the growth vector Samsung has been pursuing. Figure 1 projects Samsung's strategy, showing how the company has deliberately related product choices to its technological capability. The growth vector is a steep right-upward one, reflecting that Samsung has consistently increased its technological capability whenever it moved up the PLC stages in product development. The slope of the line would have been flatter (i.e., the company still would have been in phase 2 or 3 at best) had Samsung failed to consider the technology dimension as the most important factor in its strategy formulation (Kang, 1996, ch. 2).[8]

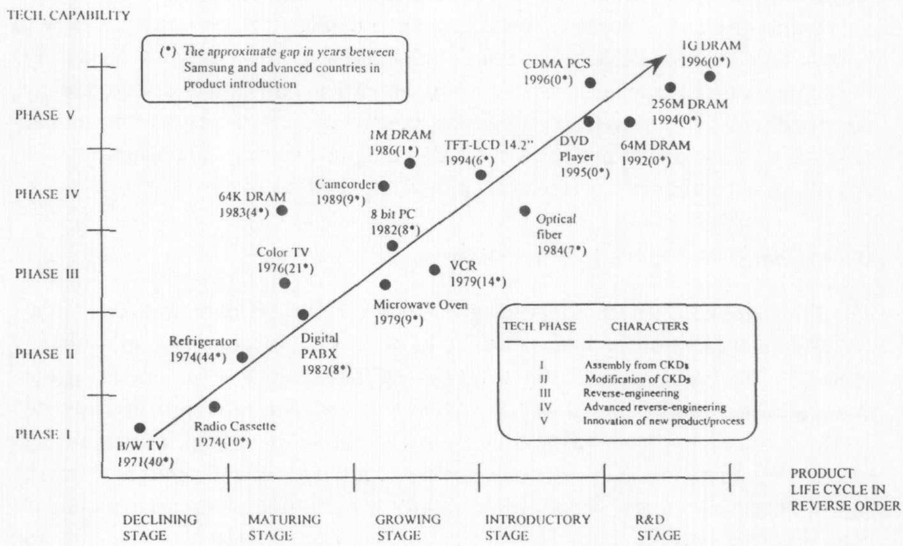

Figure 1 Samsung's Technology Path

Another observation from figure 1 is that the temporal pace of technology catch-up has become shorter and shorter over the past two-and-a-half decades. For example, when Samsung began making monochrome TV sets in 1971, it was about forty years after the product was invented in the United States where it was already in the declining stage of the product life cycle; when they began reverse-engineering color TV sets in 1977, it was about twenty-one years after their introduction in the market; and by the time the company acquired the large-scale production technology of VCRs in the early 1980s, the product had been around for some fourteen years since market introduction, and they were still in the growing stage of the market. This shortening trend continued even after reaching phase 4 of the advanced reverse-engineering stage around 1985; for example, the gap between Samsung and the advanced companies in Japan had begun to shrink at an accelerated rate, narrowing to near zero in less than ten years.

The accelerated gap reduction may be attributed to the synergy effect of three factors: (1) in-house R&D capability with a critical mass of more than 7,300 researchers;[9] (2) availability of multiple technology sources, such as licensing, technology alliances with advanced companies, overseas research centers in advanced countries, and foreign high-tech companies owned by Samsung, and (3) intensity of effort by management and personnel in research and product development. The in-house research teams provided the basis of tacit knowledge, whereas outside multiple technology sources provided explicit knowledge. With this tacit and explicit knowledge, new technologies were created through an upward-spiral conversion process, as discussed in the model of Nonaka and Takeuchi (1995). For Samsung, perhaps the "intensity" factor—the intensity of effort—should be considered a unique element that differentiates its success from many other companies in developing countries. Samsung's research teams, equipped with tacit knowledge, applied a focused as well as intense commitment to make the best use of explicit knowledge obtained through licensing, technology alliances, and overseas research units (Kim, 1997, ch. 4).[10]

Growth path: Manufacturing dimension

The third strategic variable Samsung controlled, after product and technology, was the manufacturing system designed to benefit from economies of scale and scope. From the beginning, the strategy was to create a *vertically integrated manufacturing system* structured to support the *mass production* of television sets with maximum local value added. An alternative to vertical integration was to rely on import of CKDs from the joint-venture partner and other suppliers in Japan, because the local capability to supply the required parts and components was almost totally lacking. However, Samsung determined that the risk and transaction costs associated with dependence on foreign suppliers were too high.[11] It chose instead to build local supply sources by establishing a minimum integrated production system consisting of a cathode-ray tube (CRT) plant (1970: Samsung Electron Devices, a joint venture with NEC), a parts and components plant (1973: Samsung Electronics Parts, a joint venture with Sanyo), and a CRT glass plant (1973: Samsung Corning, a joint venture with Corning Glass Works), respectively (SEC, 1989).

During the 1980s, the technology-assimilation process took place successfully not only within the Samsung system but also throughout Korea's electronics industry, resulting in a large number of independent small- and medium-size businesses (KIRI, 1989).[12] Their technology and quality levels were sufficient to make Samsung Electronics start outsourcing whenever possible. Externally, and as a way of circumventing the growing protectionism in export markets, Samsung started to establish overseas production bases. The first location was in Portugal (1982) and was targeted at the European market (SEC, 1989). By 1995, Samsung had established a globalized production network with twenty manufacturing bases, many of which are integrated complexes designed to achieve economies of scope and scale.[13] For example, a substantial portion of color TVs (54 percent), VCRs (41 percent), MWOs (36 percent), and computer monitors (29 percent) were produced in these overseas bases in 1995 (SEC, 1996).

Part of the mass-production system began to move toward a flexible manufacturing system by the end of the 1980s in order to accommodate a new product strategy. Samsung started to introduce multiple product models faster to meet the market demand imposed by an increasingly short product life cycle and by the increasingly intensive competition.

Growth path: Marketing dimension

SEC aggressively developed an export market from the beginning. Exporting was considered the necessary vehicle for Samsung to overcome the growth limit constrained by the limited domestic market. It has traditionally accounted for around 60 percent of total revenues. This proportion, however, has fluctuated since the introduction of semiconductors to as much as 69 percent in 1994 and 1995 and down to 55 percent in 1997.[14]

Initially, exports were carried out mostly using OEM (original-equipment manufacture) agreements. As internalization of product technologies was achieved (reaching phase 3 of the technology assimilation sequence), however, Samsung engineers began to design their own products, gradually replacing OEM with the ODM (own-design and manufacture) products.[15] But most ODM products were also exported under the buyers' brand name. A serious effort to export Samsung's own-brand name (OBN), although attempted earnestly from the early 1980s, took off only in the late 1980s, as Samsung's technological prowess and image became recognized in the world market. Supported by the export of memory chips, the ratio of OBN increased to 55 and 69 percent, respectively, in 1993 and 1995 (SEC, 1996).

Growth path: Competitive advantage

Samsung's competitive advantages represent a culmination of various strategic processes, including the four growth paths previously discussed. The company's focal point for competitive advantages has shifted over time. During the 1970s, Samsung attempted to win the market by the best pricing strategy, which was feasible only by realizing the lowest costs in the industry. As Samsung became competent in manufacturing, the focal point for building competitive advantages shifted in the 1980s to quality. Continued advancement on the technology ladder enabled Samsung in the 1990s to emphasize technology and innovation as the source of competitive advantage.

Although the focus has shifted from cost to quality and then to technology, throughout SEC's history, price has remained the most effective tool to keep the company's competitive edge in the market.[16] In fact, one of the most important strategies to which the entire Samsung Group subscribes is the principle of *survival inequality,* which means that cost should always be lower than price, which in turn should always be smaller than product value (Jun and Han, 1994, p. 345). In addition to price, one other factor should be recognized as a unique strategic element effectively exploited by Samsung, namely, the concept of *speed management.* Samsung's corporate culture has put a strong emphasis on good decisions and fast implementation (Jun and Han, 1994; K.-H. Lee, 1997; Magaziner and Patinkin, 1989). In most cases, SEC not only made decisions on product development and technology acquisition far ahead of local competitors, but it also shortened the time to implement them into a viable position in order to take advantage of opportunities arising in the world market: VCRs, MWOs, and memory chips are good examples of such speed management.

Strategic implications of the growth paths

The analysis so far has concentrated on describing the five dimensions constituting the basis for Samsung's growth path but has not addressed the implications or strategic rationale for taking such actions. The evolutionary path for each dimension is summarized horizontally in figure 2. By looking at figure 2 vertically, a set of coherent strategic implications can be derived from these paths, showing the rational explanations why Samsung crafted such strategies for sustained growth.

Samsung's goal to build one of the largest electronics-goods manufacturers in the world did not seem feasible in the unfriendly environment SEC initially faced when the company began business in 1969. SEC did not have critical technologies; it had neither an established brand image nor a market waiting for Samsung's entry. Foreign leading companies were not interested in transferring their know-how, and Japanese companies seemed unbeatable. The only advantage SEC had at the time was the availability of a high-quality labor force and a very low wage level.[17] Government policies and the sheltered domestic market were other positive factors, but they were only strategic variables and did not guarantee success.

It is difficult to identify exactly the complex strategy formulation processes used by Samsung. Based on the revealed strategies indicated in the set of growth paths, however, it is possible to reconstruct the logic of Samsung's strategies. Reading figure 2 vertically, we can find a set of strategic choices SEC made in the 1970s, 1980s, and 1990s, respectively, which provides the basis for reconstructing the logic.[18]

Initially, in the 1970s, the driving factor for Samsung's strategy formulation was to make a relevant product choice. The choice had to be made carefully because it would affect (1) the acquisition of technology, (2) marketability, and (3) cost competitiveness. First, the acquisition of necessary technologies was the most important and difficult element. To give the least threatening profile to the technology supplier, SEC accepted products *in the declining stage of the product life cycle.* Then, to give a further incentive to the technology supplier, the *joint venture* form was used, whereby parts and components would be imported in the form of *CKDs* from the joint venture partner. Second, the chosen products needed to be exportable to compensate for the small domestic market. Lacking marketing experience and overseas sales networks, the form of *OEM* was the logical choice. Also lacking an image and brand name, SEC chose *commodity-type* products in the *low-end* price range. Third, Samsung's objective was to make the best use of the combined effect of the low-end commodity products in

GROWTH DIMENSION		GROWTH PATH 1970s	1980s	1990s
PRODUCT	• Per product life cycle:	Declining stage → Maturing stage →	Growing stage →	Introductory stage → R&D stage
	• Per scope: (diversification)	Narrow range in consumer-electronics, home appliances →	Broader range in consumer-electronics, home appliances, memory chips (DRAMs) →	Related diversification into PCs & peripherals, info & communication, semiconductors
	• Per price level:	Low-end product → Mid-low →	Mid-level →	Mid-high → High-end
	• Per character:	Commodity type →	Commodity type →	Non-commodity type
TECHNOLOGY	• Source:	Joint venture with licensing →	Licensing → In-house R&D, Licensing →	In-house R&D, Tech. alliances, M&A of hi-tech..
	• Assimilation sequence:	In the form of CKD+ → Modification of CKD →	Reverse engineering →	Advanced reverse eng. → Innovation
MANUFACTURING	• Scale:	Mass production →	Mass production →	Flexible production
	• Scope:	Vertical integration →	Vertical integration, Outsourcing →	Overseas integrated production network
MARKETING	• Export:	OEM* →	OEM and ODM** →	ODM and OBN***
COMPETITIVE ADVANTAGE	• Emphasis:	Cost and price, Speed →	Quality, Speed →	Technology, Speed

* OEM = Original Equipment Manufacture ** ODM = Own-Design and Manufacture
*** OBN = Own-Brand Name + CKD = Complete Knock-Down

Figure 2 Summary of Samsung's Evolutionary Growth Paths

the declining stage of the product life cycle and Korea's high-quality, low-wage labor force. One way of achieving this objective was to maximize cost competitiveness by *mass production* of the commodity products, which would offer the benefit of the experience-curve effect. In the case of Samsung, this benefit of the experience curve effect was further accentuated by Korea's high labor quality, which gave an extra edge to Samsung by generating a higher learning rate which decreased costs faster than could be done with low-quality labor.

In the 1980s, the driving factor shifted to technology, although all the strengths and advantages acquired through cost competitiveness in the 1970s were retained. Successful technological assimilation enabled Samsung to be more aggressive in product choice, moving from the declining to the maturing stage and on to the growing stage in the product life cycle. Furthermore, technological competence allowed Samsung to move from OEM to *ODM* and to emphasize quality as a competitive advantage. Overall, Samsung's strategies in the 1980s were more a linear extension of the 1970s, based on consumer electronics and home appliances.

Since 1988 the strategic driving factor has shifted again, but this time to product diversification supported by *technology and innovation*. The environmental conditions that enabled this shift are fourfold: (1) the prospect of intensive competition in a globalized world economy that was expected to emerge from the Uruguay round of GATT; (2) the increasingly short product life cycle, which deprived Samsung of the time needed to acquire technologies from foreign sources and to establish mass-production systems; (3) the fact that SEC had attained a critical mass for serious in-house research activities, and (4) a new competitive spirit instilled by Chairman K.H. Lee of the Samsung Group, who succeeded the late B.C. Lee in 1988. These factors together made SEC strategists believe that technology and innovation were the only recourses for the company to keep growing in the coming decade.

Having acquired technological competence, Samsung no longer needs to follow the reverse order of the product life cycle in product development. In a time frame of approximately twenty-five years SEC has graduated from the "reverse order" strategy that had been applied to the "commodity-products-of-mass-production-for-export-market." The company is ready to move along the ordinary sequence of the PLC, starting from the R&D stage. Furthermore, it can introduce high-end products of the noncommodity type under Samsung's own brand name, as produced by flexible manufacturing systems. In fact, the emphasis on technology and innovation opened up for Samsung a new horizon. The company not only is now *reversing* the "reverse order" strategy, but also has to compete head-on with world-class premier electronics corporations in the high-tech market, where SEC faces unfamiliar rules of the game dominated by the advanced countries.

However, at just about the time when SEC could pursue a new growth strategy, the local and world markets have started a profound transformation under (1) the newly emerging world economic order characterized by the WTO system, and (2) the economic turmoil triggered by the Asian financial crisis started in 1997 (*BusinessWeek*, January 26, 1998). These changed environmental conditions have affected Samsung's growth trajectory: SEC, which until 1995 had never experienced a negative growth in sales, showed for the first time a 5 percent decline in revenues in 1996 and is expected to have a further decline in 1998.[19]

Conclusions

The fact that Samsung achieved its relative success in what was originally a developing economy bears close examination. Samsung initially did not have the economic and technological infrastructure of the United States to rely on. Instead, it had to depend on its own internal strategies to develop its technology base and to ensure that its products were suitable for the world market. The implications of Samsung's strategies should be evaluated closely by management strategists, policy planners, and CEOs, especially those in developing nations who believe that they are at a severe disadvantage in relation to established companies and economic systems.

SEC's performance is neither a miracle nor a growth distorted by government subsidy. It is the result of a very carefully crafted strategy following an evolutionary learning process from simple to more complex technologies, and taking advantage of synergy effects by synchronizing the strategy variables of different dimensions, all supported by Samsung's highly disciplined corporate culture.

Samsung's history is unusual, if not unique. In just a few decades it has managed to catch up with, and in many instances surpass, rival larger and exceptionally competitive companies in the United States and Japan. Moreover, this success was achieved in the cutting-edge field of technology, requiring Samsung not only to adapt acquired technologies successfully but also to develop its own. To the CEOs of other firms and to researchers, observing the successes and flaws of a firm that progressed from simple monochrome television sets to state-of-the-art semiconductors provides important clues, benchmarks, and ultimately recommendations for the study of newly emerging high-tech companies.

Samsung's approach to strategy formulation consistently has been to match internal technological capabilities with externally available opportunities and conditions. The "reverse order" strategy is a reflection of this approach. Therefore, the growth strategy based on the reversed product life cycle may not be relevant to a firm in environmental conditions and opportunities different from those Samsung faced in the 1970s and 1980s. It should be examined minutely, both to determine its own success and difficulties in following this reverse order strategy and to ascertain whether this strategy can and should be adapted by emerging companies in a new world economic order under the WTO regime.

Notes

1. In the 1970s, before the introduction of automatic insertion machines and industrial robots, the labor content was high for many consumer-electronics goods.

2. For the effect of government policies, see L. Kim (1997), the World Bank (1993), and Cha and Kim (1995). For an overview of the Samsung corporate culture, see Jun and Han (1994) and Lee (1997). The article by Magaziner and Patinkin (1989) is also useful to understand Samsung's corporate culture.

3. The only major electronics product Korea was producing in the late 1960s was the transistor-based radio assembled with parts and components imported mostly from Japan.

4. One piece of supporting evidence for this claim is found in the effects caused by the "Fair Market Value" agreement signed in 1986 to resolve the semiconductor trade conflict between the United States and Japan. While Japanese manufacturers were expected to export at prices not below fair market values, Samsung, not bound by this agreement, could sell the DRAM chips in the U.S. market at lower prices. Although Samsung was not an established name in high-technology semiconductors, its low-price strategy helped SEC substantially increase the export of DRAM chips from $90 million in 1985 to $10.6 billion in 1995, or some 120 times in the space of ten years (Kim et al., 1994, p. 238).

5. Samsung's reverse path of the product life cycle for technology development is consistent with the concepts suggested by Utterback (1994), L. Kim (1980, 1997), and Lee, Bae, and Choi (1988).

6. In addition to engineering prowess, Samsung in phase 5 acquired a more sophisticated design capability. For example, the company garnered nine design awards in 1997, including three from the prestigious IDEA (International Design Excellence Award) of the United States (*BusinessWeek*, June 2, 1997) and three from the industrie Forum (iF) Design Award of Germany (*Samsung Family News*, June 1997).

7. According to an article in *Joongang Daily* (June 10, 1998, p. 21), SEC managed to successfully test a 0.13μm circuit design, which is necessary to meet the requirement for manufacture of 4-giga DRAM chips.

8. Many firms in developing countries tend to experience a less steep line as they are less intensive in their efforts to close the technology gap. Hobday's (1997) article implies a similar interpretation.

9. In 1995, Samsung Electronics had more than 7,300 researchers and an annual budget of $1.07 billion, or 5.2 percent of sales turnover.

10. As to how Samsung increased tacit knowledge in developing semiconductors, see L. Kim (1997).

11. Transaction costs are those involved in the transfer of goods and services from one operating unit or firm to another. Chandler (1990) discusses the relationship between transaction costs and vertical integration.

12. In each of these three companies in the Samsung system, the same technology-assimilation process experienced by Samsung Electronics took place, i.e., the five-phase sequence took place along the path of the reverse product life cycle.

13. The spread of the twenty overseas production bases are as follows: three in the European Union; one in the Commonwealth of Independent States (or the former Soviet Union), six in China, one in the Middle East, six in Southeast Asia, two in North America, and one in Central America. The largest integrated complexes are in Tijuana, Mexico, and Wynyard, UK.

14. This fluctuation of export volume was attributed to drastic changes in the sales price of DRAM chips in the world market.

15. Samsung uses the term OEM broadly to include the concept of ODM. The term ODM was first used in 1989 to describe the Taiwanese electronics industry (Hobday, 1997).

16. A Samsung internal document reveals that consumers' perception of the Samsung brand in the emerging markets is lower than that of the Japanese brands. The gap is even greater in advanced country markets. Under these circumstances, Samsung has to maintain price as a key for competition while stepping up the emphasis on quality and technology.

17. Korea's per capita income in 1971 was only $266. It was one-ninth that of Japan and one-nineteenth that of the United States (*Major Statistics of Korean Economy*, 1982).

18. The classification of Samsung's strategies by a ten-year interval may be subject to argument. But for the purpose of this paper, the classification provides a relevant framework for analysis.

19. The predicament Samsung now faces in this transitional period is clearly described in the cover story of *BusinessWeek* (Asian edition, March 23, 1998).

References

Abernathy, W.J., and Utterbak, J.M. "Patterns of Industrial Innovation." *Technology Review* (June–July 1978), 41–48.

BusinessWeek. "The Hungriest Tiger." *BusinessWeek*, Asian edition (June 2, 1997), 47.

———. "What to Do About Asia." *BusinessWeek*, Asian edition (January 26, 1998), 14–18.

———. "Samsung: A Korean Giant Confronts Crisis." *BusinessWeek*, Asian edition (March 23, 1998), 14–17.

Cha, D.S., and Kim, K.S. *Hankuk Kyungje Bansegie* [A Half-Century of Korean Economy]. Seoul: Korea Development Institute, 1995.

Chandler, A.D., Jr. *Scale and Scope: The Dynamics of Industrial Capitalism.* Cambridge, MA: Harvard University Press, 1990.

Choi, Y.R. *Dynamic Techno-Management Capability: The Case of Samsung Semiconductor Sector in Korea.* Aldershot, UK: Avebury, 1996.

Garvin, David A. "Building a Learning Organization." *Harvard Business Review* (July–August 1993), 78–91.

Hobday, Mike. "East vs. South East Asian Innovation Systems: Comparing OEM with TNC-led Growth in Electronics." Paper presented at the Symposium on Innovation and Competitiveness in Newly Industrializing Economics organized by the Korea Science and Technology Policy Institute, May 26–27, 1997, Seoul, Korea.

Jun, Y.W., and Han, J.W. *Cho Illyu Giup-euro Ga-neun Gil*: *Samsung-ui Sungjang-gwa Byunshin* [A Road Leading to the Best Enterprise: Samsung's Growth and Transformation]. Seoul: Gimyoungsa, 1994

Jun, Y.W., and Kim, S.G. "The Korean Electronics Industry—Current Status, Perspectives and Policy Options." Report prepared for the Development Center Project Technological Change and the Electronics Sector—Perspectives and Policy Options for Newly Industrializing Economies. Paris: OECD, 1990.

Kang, J.K. *Samsung Jeonja: Shinwha-wa Geu Bimil* [Samsung Electronics: The Myth and Its Secrets]. Seoul: Koryowon, 1996.

Kim, K. "Pushing the Limit: SEC's 1-Gigabit DRAM." *Samsung Quarterly* (Winter 1996), 8–11.

Kim, L. "Stages of Development of Industrial Technology in a Developing Country: A Model." *Research Policy, 9*, 3 (1980), 254–277.

———. *Imitation to Innovation: The Dynamics of Korea's Technological Learning.* Boston: Harvard Business School Press, 1997.

Kim, S.-H., et al. *Hankuk-ui Daepyo Giup* [Korea's Representative Enterprises]. Seoul: Daewoo Research Institute, 1994.

KIRI. *Sanup Gisool Baekseo: 1989* [The Industrial Technology White Paper: 1989]. Seoul: The Korea Industrial Research Institutes, 1989.

KIST. *Jeh 4 Cha Kyungjeh Gaebal 5-Gaenyun Gyehwek: Junja Bumun* [The 4th 5-Year Economic Development Plan: Proposal for the Electronics Sector]. Seoul: Korea Institute of Science and Technology, 1976.

Lee, H.C. *Hankuk Giup-ui Munwha-juk Teuksung-gwa Sae Giup Munhwa Gaebal* [Korean Enterprises' Cultural Characteristics and the Development of New Corporate Culture]. Seoul: Bakyoungsa, 1997.

Lee, J.; Bae, Z.-T.; and Choi, D.-K. "Technology Development Processes: A Model for a Developing Country with a Global Perspective." *R&D Management, 18*, 3 (1988), 235–250.

Lee, K.-H. "From Do Faster to Act First." *Dong-A Ilbo* Daily (July 9, 1997), 8.

Maidique, M.A., and Zirger, B.J. "The New Product Learning Cycle." *Research Policy, 14*, 6 (1985), 299–309.

Magaziner, I.C., and Patinkin, M. "Fast Heat: How Korea Won the Microwave War." *Harvard Business Review* (January–February 1989), 83–93.

Major Statistics of Korean Economy. Seoul: Economic Planning Board, Government of Korea, 1982.

Nonaka, I., and Takeuchi, H. *The Knowledge-Creating Company.* Oxford: Oxford University Press, 1995.

Rumelt, R.P. "Diversification Strategy and Profitability." *Strategic Management Journal, 3* (1982), 359–370.

Samsung Annual Report 1995. Seoul: Samsung Group, 1996.

Samsung Electronics Annual Report 1996. Suwon: Samsung Electronics Co., 1997.

Samsung Electronics Group. Suwon: Samsung Electronics Co., 1996.

SEC. *Samsung Jeonja 20 Nyunsa* [A Twenty-year History of Samsung Electronics]. Suwon: Samsung Electronics, 1989.

———. *Samsung Jeonja-ui Segyehwa Jeonryak* [Samsung Electronics' Globalization Strategy]. SEC internal document, 1996.

SEC Family News. Suwon: Samsung Electronics Co., June 1997, p. 23.

Shin, H.-C., et al. *Hankuk-ui Benchmarking (2): Sarye Bunsukseo* [Benchmarking in Korea (2): Case Studies]. Seoul: Sagyejul, 1994.

Utterbak, J.M. *Mastering the Dynamics of Innovation.* Cambridge, MA: Harvard Business School Press, 1994.

Westphal, L.E.; Kim, L.; and Dahlman, C.J. "Reflections on the Republic of Korea's Acquisition of Technological Capability." In N. Rosenberg and C. Frischtak (eds.), *International Transfer of Technology: Concepts, Measures, and Comparisons.* New York: Praeger, 1985, pp. 167–221.

World Bank. *The East Asian Miracle: Economic Growth and Public Policy.* New York: Oxford University Press, 1993.