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Reinvigorating the Partnership**

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PROSPECTS OF KOREAN STARTUPS AND COOPERATION WITH SILICON VALLEY FIRMS

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- IV. Prospects for High-Tech Partnership between
Silicon Valley and South Korea

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I. Introduction

Since the mid-1980s, the Korean government has tried to nurture high-tech startups. In the 1980s, however, Korea's small startups were labeled high-risk, low-return investment vehicles, hampering the normal advance of venture capitalists. In addition, venture capitalists found it hard to recoup their investment on the stock market through initial public offerings (IPOs) and mergers and acquisitions (M&As) as the market had yet to mature. The shortage of target venture companies for reliable returns on investment and the underdeveloped market together with Korea's weaknesses as a technological follower delayed the growth of the venture industry¹ in Korea. It took about a decade for Korean venture capital² to emerge as a major capital-raising source for local venture startups.

Since the late 1990s, Korea's venture industry has turned the corner from government-led growth to market-driven development. A rapid and wide dissemination of Internet access and technology opened fresh territory for venture startups in Korea. In addition, after the Asian economic crisis swept the country and spurred restructuring, Korea's opportunity costs for venture businesses were already diminishing, and incentives for starting risky businesses were on the rise. In 1998, Korea maintained low interest rates, the stock market boomed, and a policy of venture promotion was aggressively enforced. All this resulted in an explosive growth of the technology-laden, over-the-counter Kosdaq stock market in 1999, leaving the door wide open for high returns on venture investment.

Of course, it would probably be foolhardy to expect that the number of bona fide high-tech startups could increase rapidly over such a short time period, despite the emergence of new markets and business opportunities arising from advances in the information and telecommunications sector.

For the past several years, the outlook for Korea's high-tech startups and venture capital companies has seemed to oscillate between positive and negative on the basis of the ups and downs of the domestic, technology-oriented Kosdaq market. Yet it is difficult to say that these swings in market sentiment, which recently have tended to occur in short cycles, are the result of accurate assessments of the future of Korea's venture industry. Notwithstanding the depressed share prices in the Kosdaq market since March 2000, the trading volume in terms of shares has increased ever since the boom year of 1999.

1. In this paper, the term venture industry refers to high-tech startups as well as venture capital companies.

2. Because Korean venture capital companies focus on investment, they are often regarded as private equity companies in view of U.S. standards and concepts.

This paper will examine and analyze the development and structural changes of venture-related markets in Korea and will try to show the prospects of cooperation between high-tech startups and venture capital firms in Korea and companies in California's Silicon Valley.

II. Development of Venture Capital in Korea

While the venture capital industry in the United States has continued to move forward quite independent of government involvement, the venture capital industry in Korea began to take off as a consequence of the government's business rationalization policy. The first venture capital company in Korea was Korea Technology and Advanced Company (KTAC), which was established in 1974. Its mission was to commercialize the results of research and development (R&D) by the Korea Advanced Institute of Science and Technology (KAIST).

In the 1980s, three more venture capital firms were born. In 1981, the Korean government together with the industrial sector established the Korea Technology and Development Company. (KTDC).³ Financial institutions also created their own venture capital firms—the Korea Development and Investment Company (KDIC) and the Korea Technology and Finance Company (KTFC) in 1982 and 1984, respectively.

The four companies—KTAC, KDIC, KTFC, and KTDC—formed the pillar of venture capital firms in Korea, having received operating licenses from the government and protection under the umbrella of the Ministry of Finance and Economy.

The legal basis for venture capital firms was provided in 1986 by the enactment of special laws such as the Small and Medium Startups Promotion Act and the Financial Assistance to New Technology Business Act. Since 1986, several venture capital companies have been established, and the number of venture capital firms in Korea totaled 147 as of 2002. *Table 1* shows the types of venture capital companies and their legal bases.

However, until the mid-1990s, many were skeptical about the growth potential of the venture capital business in Korea because most Korean startups suffered from poor profitability while they took high business risks.

During the period between 1989 and 1993, the return on equity (ROE) of venture capital companies was a mere 2.7 percent a year, while that of commercial banks and

3. KTDC changed its name to Korea Technology Bank Network (KTB Network) later in the 1990s.

Table 1: Venture Capital Laws and Governing Agents in Korea

Types of venture	Laws and subsequent changes	Governing agent	Investment target	Support type
KTB network	Established under the Korea Technology Development Company (KTDC) Law in 1981; revised under the Korea Technology Bank Law in 1992; privatized with the abolishment of the law mentioned above		Venture startups at home and abroad	Investment and loans; legal and tax consulting services
New-tech business firms	KTAC, KDIC, KTFC were established in 1971, 1982, and 1984, respectively, under the special law enacted in 1971; changed into new-tech business firms under the new laws enacted in 1986; more specifics added to the law mentioned above in 1998	Ministry of Finance and Economy	Business-people holding new technology	Investment, loans, lease, and factoring
Venture capital	Established under the Small and Medium Startups Promotion Act of 1986	Small and Medium Business Administration (SMBA)	Venture startup founders, or certified venture companies	Investment

Source: Seong 2001, 104.

merchant banks stood at 6.9 percent and 13.6 percent, respectively (Seong 2001, 106). This was not only because of numerous restrictions and unskilled businesses; the poor performance could also be attributed to frustrating circumstances surrounding the government-led growth policy.

Records of IPOs between 1987 and 1994 indicate that, when venture capital firms first appeared in Korea, few were successful in turning around the firms in which they invested. Only 25 of those startups that benefited from venture capital were listed on the Korea Stock Exchange (KSE) or the over-the-counter Kosdaq market during the 1987–94 period.

Most of the capital invested in the early stages of the late 1980s and early 1990s eroded in the face of economic downturns. In particular, between 1991 and 1993, a large number of venture capital firms were on the verge of bankruptcy. Despite the fact that capital investment returns of venture capital firms improved slightly in 1996, many suffered further setbacks in the aftermath of the regionwide financial crisis in late 1997. In 1998, enjoying the high interest rates in the wake of the financial meltdown in Korea, venture capital companies were able to recoup some of their past losses, but they failed to reach the level of investment return of other financial institutions.

It took about 10 years for Korean venture capital to emerge as a major capital-raising source for local startups. In 1996, the Korean government activated the technology-oriented Kosdaq market, which had been dormant until then. This allowed investors to recoup their investments in startups. In 1997, the Korean government took a big

step toward encouraging the industry by legislating the Special Act on Venture Business Promotion. Together with legal and institutional infrastructure, the Internet revolution provided Korean ventures a technological opportunity and new markets.

The mid-1990s saw a rapid and wide dissemination of Internet access and technology. New technologies and market opportunities opened fresh territory for startups in Korea. In the IT field, including the Internet, industries and markets themselves were in their early stages. In Internet business, the importance of component technologies often outweighed that of systems, narrowing the technological gap between advanced and developing countries. Market entry barriers were also lower than in other industries.

In addition, after the Asian economic crisis swept the country and spurred restructuring, Korea's opportunity costs for startups were already diminishing, and incentives for starting risky businesses were on the increase. In 1998, Korea maintained low interest rates, the stock market boomed, and venture promotion policy was aggressively enforced. All this resulted in an explosive growth of the technology-laden Kosdaq stock market in 1999, leaving the door wide open for high returns on venture capital business.

In 1999, few seemed to recall the poor performances of venture capital firms, and a huge amount of investment capital flowed into both the Kosdaq market and startups. More than 60 percent of the existing venture capital firms in Korea were established during the period of 1999 to 2000.

Thanks to the rapid escalation of the Kosdaq market and vigorous investments, the returns of venture capital firms improved sharply. As shown in **Table 2**, the ratio of return on equity capital (ROE) stood at 37.6 percent, with the ratio of return to assets (ROA) standing at 10.8 percent in 1999.

Table 2: ROE and ROA of Korean Venture Capital Firms, 1999

Net earnings (<i>R</i>)	445.461 billion won
Ordinary income (<i>I</i>)	517.223 billion won
Equity (<i>E</i>)	1,184.727 billion won
Assets (<i>A</i>)	4,136.766 billion won
ROE (<i>R/E</i>)	37.6%
ROA (<i>R/A</i>)	10.8%

Sources: Seong 2001, 108.

Note: Figures are based on the balance sheet for fiscal year 1999 and cover 73 venture capital companies. The fiscal year ended in December for 62 firms, in March for 9 firms, and in June for 2 firms.

Nevertheless, it was premature to conclude that the chronic problem of low investment gains by venture capital firms was resolved despite some improvement in the profitability of Korean venture capital firms in 1999. The Kosdaq price index plunged after its peak (282.44) on 10 March 2000, and the bubble soon burst. On 1 October 2003, the Kosdaq index closed at 45.19, about one-sixth of its peak in 2000. The boom in startups was expected to go through a correction phase, through which some will either become more competitive or be forced out of the market. Given the nature of startups, it would be no surprise if a large group of these companies disappeared.

III. Foundations of Korea's Venture Startup Industry

Following is a list of some major changes in the venture industry that have furthered its development since the mid-1990s:

- Institutional changes and policy measures;
- Dramatic growth of the Kosdaq stock market;
- Rich technological and market opportunities; and
- The domestic economic environment since the 1997 economic crisis, such as the lower opportunity cost of risk taking and the more competitive labor markets and capital markets.

Policy Measures to Promote Venture Industry

In the United States, high-tech startups that receive investment from venture capitalists are usually called venture companies. However, in Korea, it does not matter whether the company is a startup or not in a certain business field; what matters instead is that “venture companies” should meet government requirements set by the Special Law to Promote Venture Business, passed in 1997. Korea has a system in which the government screens eligible companies and certifies them.⁴ After certification is obtained, companies can get government assistance in finance, tax, employment, industrial parks, and other favors. Moreover, the certified companies are given easier access to the Kosdaq stock market listing.⁵ All of this has led to a dramatic increase in the number of certified companies.

4. In Korea, and in this paper, companies in this category are called certified venture companies.

5. Seong (2001) addresses startup support systems and Kosdaq listing qualifications in greater detail.

To be certified as a venture company, at least one of the requirements in *Table 3* needs to be met: the stake of venture capitalist should be more than 10 percent;⁶ research investment should account for 5 percent of the total revenue in the previous fiscal year; patent-based products should carve out more than 25 percent of the total revenue; and one of 11 rating agencies should recognize the potential of the company's technology and businesses for startups.

Table 3: Venture Certification System in Korea

Categories	Definition
Firms funded by venture capital	More than 10 percent of the stake should be invested by a venture capital firm
R&D-intensive firms	Research investment should account for more than 5 percent of the total revenue of the preceding fiscal year
Tech-based patent firms	New technology-based products should account for more than 50 percent of the previous year's total revenue or more than 25 percent of exports. In this case, new technologies include patents, utility models, or other new technologies developed by R&D projects designated under Presidential ordinances ¹
Positively evaluated venture startups	Firms having promising technologies and business ability, as recognized by the Small and Medium Business Industry Promotion Corporation, Korea Technology Credit Guarantee Fund, and other certified institutions ²

Sources: National Assembly 1997; National Assembly 1999a; National Assembly 1999b; SMBA 2000.

1 The R&D projects designated by Presidential ordinances include various R&D projects carried out by the Ministry of Commerce, Industry and Energy; Agency for Technology and Standards; Small and Medium Business Administration; Ministry of Information and Communication; Ministry of Science and Technology; Ministry of Culture and Tourism; Ministry of Environment; Ministry of Construction and Transportation; Ministry of Agriculture and Forestry; and Ministry of Maritime Affairs and Fisheries.

2 Eleven certified institutions are empowered to designate venture firms in Korea. In addition to the agencies mentioned in the table are the Korea Institute of Science and Technology, Korea Institute of Science & Technology Evaluation and Planning, Korea Venture Research Institute, Korea Health Industry Development Institute, Korea Institute of Industrial Technology Evaluation and Planning, Korea Institute of Design Promotion, Institute of Information Technology Assessment, Korea Institute of Science and Technology, and Korea Institute of Industry and Technology Information.

Table 4 shows the detailed qualifications for certified venture companies. Only 13.6 percent of the certified companies were funded by venture capital in 2001. In the same year, research-intensive venture companies accounted for 11.3 percent of total certified companies. Venture capital-linked and patent-oriented startups made up 13.6 percent and 21.1 percent, respectively. In other words, the portion of venture companies recommended by outside rating agencies—the fourth category of the venture certification system in *Table 4*— was 54 percent. In a year-on-year comparison,

Table 4: Venture Firms Certified by Registration Requirements, 1999–2001 (end of year)

Categories	1999		2000		2001	
	Certified venture firms	Certified ventures listed in Kosdaq	Certified venture firms	Certified ventures listed in Kosdaq	Certified venture firms	Certified ventures listed in Kosdaq
Venture capital linked	845 (17.5%)	99 (57.2%)	1,393 (15.8%)	66 (26.6%)	1,545 (13.6%)	28 (8.0%)
R&D intensive firms	817 (16.9%)	34 (19.7%)	830 (9.4%)	57 (23.0%)	1,292 (11.3%)	80 (23.0%)
Tech-based patent firms	1,708 (35.3%)	29 (16.7%)	1,668 (19.0%)	49 (19.8%)	2,402 (21.1%)	68 (19.5%)
Positively evaluated firms	1,464 (30.3%)	11 (6.4%)	4,907 (55.8%)	76 (30.6%)	6,153 (54.0%)	172 (49.4%)
Total	4,834 (100.0%)	173 (100.0%)	8,798 (100.0%)	248 (100.0%)	11,392 (100.0%)	348 (100.0%)

Sources: SMBA, various years (for number of certified venture firms); Kosdaq, various years (c) (for number of certified ventures listed in Kosdaq).

venture capital–linked, research-intensive, and patent-oriented companies are declining while outside organizations have become more generous in certifying venture companies.

In addition, Table 4 provides data for Kosdaq-listed venture companies that also obtained certification from the government. The percentage of venture capital–linked ventures is tumbling while the number of companies with credentials from outside organizations is on the rise. In December 1999, 57.2 percent of Kosdaq-listed venture companies were classified as venture capital–linked companies, but that declined to 8.0 percent in December 2001. The percentage of companies with outside credentials increased from 6.4 percent in 1999 to 49.4 percent in 2001.

Government efforts, including the 1997 Special Law to Promote Venture Business, the opening of the Kosdaq market in 1996, and other supporting policies, contributed to buildup of the infrastructure of the venture industries in Korea.⁷ But it was not until the Korean government announced “measures to vitalize the Kosdaq market” in May 1999 that all the measures together significantly influenced the allocation of resources to startups. The 1999 measure fit well with the already upbeat stock investment boom in Korea and the ever-increasing Nasdaq price index in the United States at that time.

7. Financial aid for small- and medium-size enterprises (SMEs) in 2000 totaled 5.15 trillion *won*. If credit guarantees are added to this number, total support amounts to more than 6 trillion *won*. Financial support for startups is part of this government support for SMEs.

Dramatic Growth of the Kosdaq Stock Market

The technology-heavy Kosdaq stock market posted dramatic growth as it rode a boom that began in 1999 and continued through March 2000. Back in 1998, however, few stock market pundits predicted such a rapid growth of Kosdaq. Signs of a surge began in late 1998 when the main bourse in Seoul became bullish and surged forward, helped as it was by the low-interest-rate policy at the time. While the macroeconomic environment and other factors fueled the bullish drive, the Korean government did its part by churning out a string of aggressive Kosdaq support initiatives.

Kosdaq, launched on 1 July 1996, was designed to expand direct financing opportunities for small companies. The new marketplace introduced a competitive bidding process for over-the-counter stocks that had previously been covertly traded by stock investors and brokerage houses. Initially the system had many loopholes, and attractive companies were hard to find. As a result, investors did not pay much attention to Kosdaq, and trading volume was lackluster.

Momentum began in late 1998 when the main board began its bullish run. Interest rates were lowered in 1999, making the stock market a high-return investment for general investors. The market's growth was explosive, particularly as the Korean government kicked off economic stimulus packages in the wake of the Asian economic turmoil. Investors scurried to find a place to invest in this liquidity-driven boom. In the meantime, companies needed direct financing on the stock market in order to meet the more stringent debt-to-equity ratio required under the restructuring campaign. The dynamics of demand and supply sparked a wave of bullish trading in late 1998, a trend that migrated into the Kosdaq stock market later.

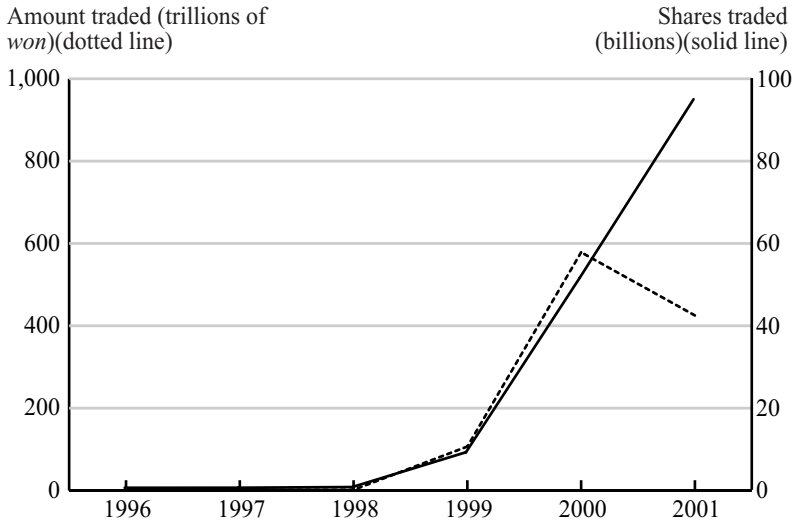
As **Table 5** and **Figure 1** demonstrate, the Kosdaq's accumulated trading volume increased at a breakneck pace, especially during 1999 and 2000. In 2001, the number of shares continued to increase although the amount of *won* transacted decreased.

Table 5: Transactions on Kosdaq Market, 1996–2001, annual totals

Transactions	1996	1997	1998	1999	2000	2001
Number of shares traded (millions)	35	47	206	8,674	51,050	94,393
Amount (billions of <i>won</i>)	535	1,166	1,607	106,808	578,490	425,180

Source: Kosdaq, various years(c).

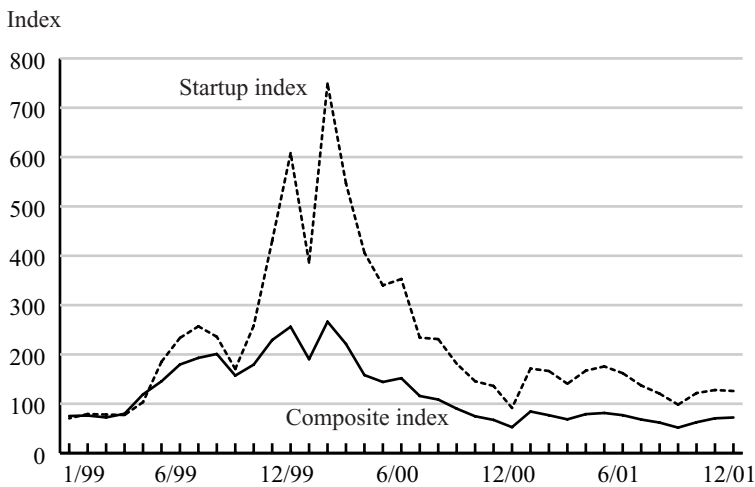
Figure 1: Kosdaq Transactions, 1996–2001



Source: Kosdaq various years (b).

Kosdaq’s surge was particularly impressive in March 2000. As *Table 6* and *Figure 2* indicate, the Kosdaq composite index in December 1998 was 75.18, then surged to 256.14 in December 1999. The Kosdaq composite index reached its peak of 283.44 on 10 March 2000 before losing steam. The downfall was also swift: the index in December 2000 was at 52.58, a level lower than at the end of December 1998.

Figure 2: Monthly Kosdaq Index, December 1998–December 2001



Source: Kosdaq various years (b).

Table 6: Monthly Transactions on the Kosdaq and Movement of the KOSPI, 1998–2001

Date	Number of shares trade (million shares)	Amount of transactions (billion won)	Korea Composite Stock Price Index (KOSPI)	Venture Composite Index
Dec. 1998	55.9	293.0	75.18	70.49
Jan. 1999	64.3	329.6	76.16	79.24
Jul. 1999	405.1	6,667.9	192.97	256.99
Dec. 1999	2,525.5	42,674.9	256.14	608.18
Jan. 2000	2,036.0	43,699.5	190.37	386.17
Feb. 2000	3,968.0	91,522.1	266.37	749.09
Mar. 2000	4,915.2	90,522.8	221.27	546.75
Apr. 2000	2,813.7	41,014.7	158.18	406.31
May 2000	4,276.1	57,437.1	144.15	339.98
Jun. 2000	5,145.2	66,977.4	151.86	352.91
Jul. 2000	3,962.1	42,832.8	115.80	234.06
Aug. 2000	5,272.5	46,275.3	108.59	231.12
Sep. 2000	3,042.3	20,420.1	90.17	181.19
Oct. 2000	4,793.4	27,757.7	74.68	145.68
Nov. 2000	6,000.0	30,664.4	67.26	136.04
Dec. 2000	4,825.7	19,366.3	52.58	91.53
Jan. 2001	9,150.6	45,090.1	84.36	171.32
Feb. 2001	9,911.6	54,652.5	76.76	166.42
Mar. 2001	7,322.0	35,083.7	68.43	140.58
Apr. 2001	6,992.5	33,490.3	78.97	167.03
May 2001	10,263.9	55,751.9	81.35	175.69
Jun. 2001	7,168.6	33,009.3	76.87	161.99
Jul. 2001	6,757.7	26,658.2	68.09	137.09
Aug. 2001	6,322.7	23,765.7	61.84	120.49
Sep. 2001	5,691.6	20,334.3	51.64	98.22
Oct. 2001	832,532	316,593	62.55	121.68
Nov. 2001	951,920	366,262	70.52	127.88
Dec. 2001	696,749	290,580	72.21	125.90

Source: Kosdaq various years (a).

Reflecting this mind-boggling gyration, Kosdaq's aggregate market capitalization rose from 7.9 trillion *won* in late 1998 to 98.7 trillion *won* in late 1999. But it tumbled more than 70 percent in one year to 29.0 trillion *won* in late 2000 (See *Table 7*).

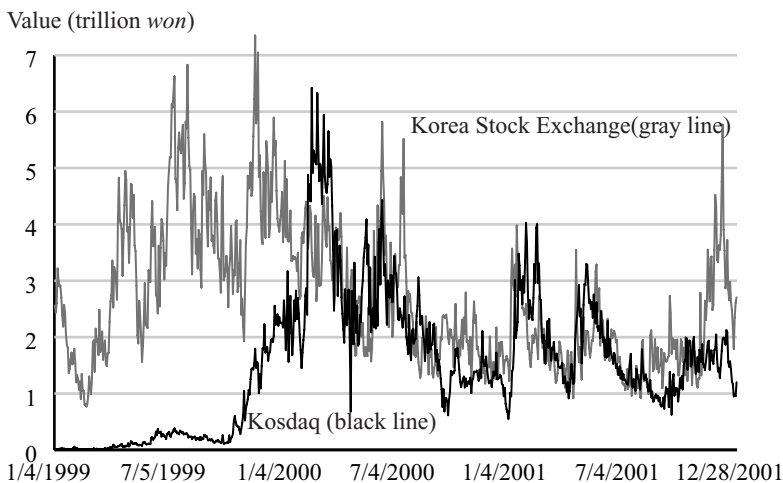
Compared with the main board, the Kosdaq market posted only 5.5 billion *won* in trading value on a daily basis in 1998, or 0.8 percent of the traded amount on the Korea Stock Exchange (KSE). Trading volume began to increase in 1999, as Figure 1 clearly shows. In particular, the trading value of Kosdaq outpaced KSE during the

Table 7: Market Capitalization of Kosdaq, 1996–2001

Date	Number of listed firms			Capital (trillion won)	Market value (trillion won)
	In	Out	Total		
1996	31	39	331	3.102	7.606
1997	83	55	359	3.495	7.069
1998	8	36	331	5.408	7.892
1999	164	38	457	13.062	98.704
2000	250	99	608	15.128	29.016
2001	177	64	721	14.735	51.818

Source: Kosdaq various years (c).

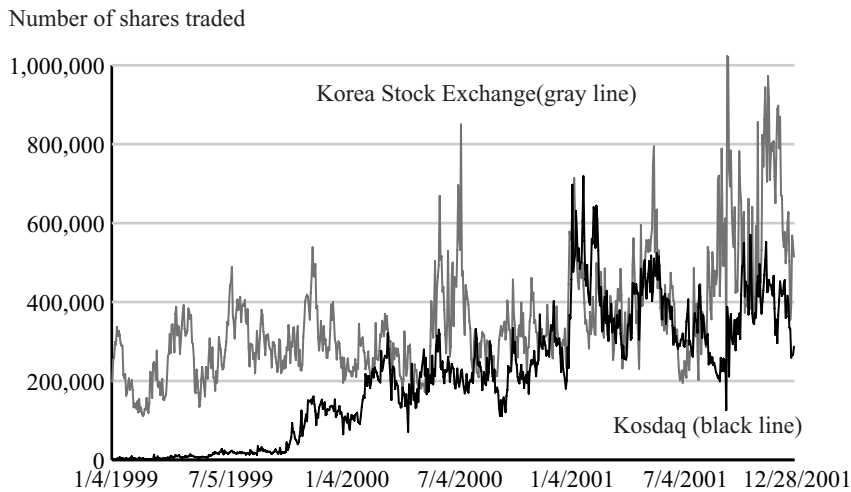
one-month period right after February 2000, as *Figure 3* indicates.⁸ This surge suggests that Kosdaq's value soared abruptly, especially because Kosdaq's trading volume rarely outpaced the KSE as illustrated in *Figure 4*. All in all, the indexes and tables testify to the red-hot period of the Kosdaq.

Figure 3: Value of Shares Traded on the Korea Stock Exchange and Kosdaq, 1999–2001

Sources: Korea Stock Exchange various years; Kosdaq various years (b); Seong 2001, 50.

8. For a month-long period that started on 8 February 2000, Kosdaq's trading value often outpaced that of the main board. On 22 February, the main board posted the trading value at 2.9 trillion won (244 million shares), while Kosdaq came in with 6.3 trillion won (234 million shares). Kosdaq's trading value, in other words, was 2.16 times bigger than the main board's.

Figure 4: Number of Shares Traded on the Korea Stock Exchange and Kosdaq, 1999–2001



Sources: Korea Stock Exchange various years; Kosdaq various years (b); Seong 2001, 51.

Kosdaq's surge was helped by the Korean government's eager support and related policy initiatives. The government revised the Securities Exchange Act in April 1999, eliminating the disadvantageous rules over share buybacks for Kosdaq-listed companies. In May 1999, the government loosened regulations over capital and debt ratio while it offered a string of favorable incentives for companies listing on Kosdaq.⁹

As a result, the timing of the government's Kosdaq policy went hand in hand with the full-blown Kosdaq bull market, as Table 6, Figure 2, and *Figure 5* indicate. The Kosdaq index and other related data show that it was in May 1999 that all the indexes began to rise at a brisk pace. The venture subindex also outpaced the Kosdaq main index in May 1999. The gap between the venture subindex and the Kosdaq index widened in October on the strength of trading volume and value, which were exploding, as Figure 2 showed.

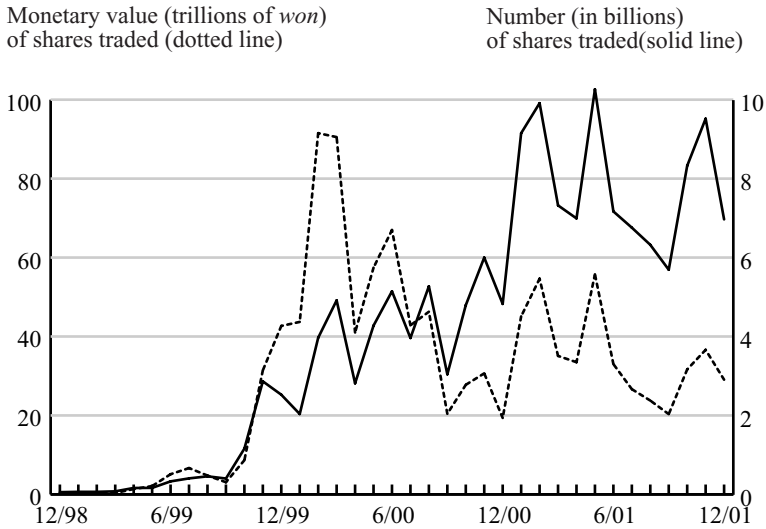
Figure 5 shows that Kosdaq's trading volume and value began to surge in October 1999. In December, trading volume slowed slightly, but trading value continued to climb, showing signs of overheating. Later that month, the government introduced a policy aimed at stabilizing Kosdaq,¹⁰ and the Kosdaq index tumbled shortly after the

9. See Seong (2001) for the Kosdaq boosting measures in detail.

10. The measures aimed at stabilizing Kosdaq were announced jointly by the Ministry of Finance and Economy and the Financial Supervisory Commission; details are in Seong (2001).

stabilization package was announced. It rebounded again after a month-long downturn (see Table 6 and Figure 2).

Figure 5: Kosdaq Monthly Transactions, December 1998–December 2001



Source: Kosdaq various years (b).

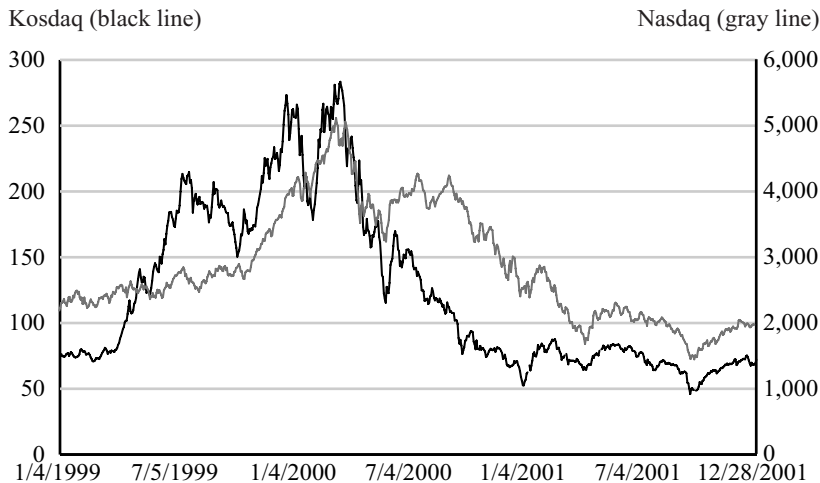
It is not difficult to see that Kosdaq's dramatic expansion period beginning in early 1999 coincided with the Korean government's policy initiatives. It is not possible to say, however, that Kosdaq's dramatic gyration was controlled by government policy. Korea was not alone in witnessing a drastic upturn of its stock market. **Figure 6** shows that the upturn of the U.S.-based Nasdaq was similar to the upturn of the Kosdaq. The Nasdaq index was 2,208.05 in early 1999, then surged to 4,069.31 in December, posting a gain for the year of 184 percent. The Nasdaq surge was particularly visible in October 1999. In March 2000, Nasdaq reached a peak of 5,048.62 before nosediving in December to 2,470.52, to register a 48.9 percent decrease for the year. In other words, Nasdaq in December 2000 pulled back to a level seen in the spring of 1999.

Rich technological and market opportunities

Rich technological and market opportunities were created by the ever accelerating progress of computer-related technology and the rapid penetration of the Internet. Those opportunities were not only for firms in advanced countries but also for startups and SMEs in Korea. The Internet revolution especially, after 1995, lowered entry barriers and reduced transaction costs in many industries. New industries such as e-

commerce and communication services flourished. Many traditional industries adapted to new opportunities that emerged through the Internet. Companies in the information industry—computer, software and services, communication, and the Internet—are currently major players among Korean startups. In the United States, also, approximately 78 percent of venture capital was invested in the information industry in 1999.¹¹

Figure 6: Comparison of Kosdaq and Nasdaq, 1999–2001



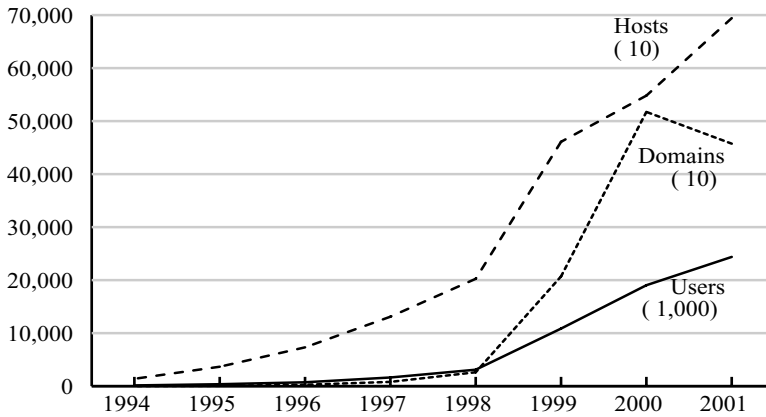
Source: Seong 2001, 55.

Korea has seen a rapid increase in Internet access since 1998. *Figure 7* shows that Internet users in Korea totaled 10.86 million as of December in 1999, a threefold increase from the prior year. During the same period, the number of Internet domains increased 790 percent; and, compared with August 1998, the number of Internet hosts rose 230 percent to 460,974 as of August 1999. In June 2000, one-third of the Korean population was logging on to the Internet. The proliferation of Internet access has also laid the groundwork for such businesses as e-commerce and telecommunications services.

The value-added growth rate of the information technology sector continues to exceed the growth rate of other industries. Data from the Bank of Korea (2001) show that the IT industry's growth rate was more than 40 percent in 2001, far higher than the 10 percent growth rate of other industries (*Table 8*). Consequently, the IT sector's share of the Korea's gross domestic product (GDP) increased sharply—to 16.1 percent in 2000 from 5.6 percent in 1995.

11. National Venture Capital Association (2000).

Figure 7: Number of Internet Hosts, Domains, and Users in Korea, 1994–2001



Sources: KRNIC various years; Seong 2001, 126.

Table 8: Growth Trends of Korea’s IT Sector, percentages

	1993	1994	1995	1996	1997	1998	1999	2000
IT sector’s value-added growth rate	19.9	26.4	38.3	17.1	30.5	20.7	36.0	36.5
GDP growth rate for all sectors	5.5	8.3	8.9	6.8	5.0	-6.7	10.9	8.8
IT sector as percentage of Korea’s GDP Contribution of	3.8	4.4	5.6	6.2	7.7	9.9	12.2	15.3
IT sector to growth	0.7	1.0	1.7	1.0	1.9	1.6	3.6	4.4

Source: Bank of Korea 2001.

Note: IT sectors are defined to include electric office equipment for calculating and bookkeeping, semi-conductors, telecommunications industry and equipment, broadcasting, software products and computer-related services. The definition of the IT sector in this table differs from the OECD’s version; the OECD includes publishing, copying printed materials, and precision equipment-making industries, but this table excludes those sectors.

The increasing number of startups is also an indication of the speedy growth of the IT industry. The Ministry of Information and Communication reports that IT-related startups accounted for 8.9 percent of the total number of startups in 1999, and by November of 2000 they accounted for 17.9 percent.

The information telecommunication industry took the lead in boosting the Kosdaq in 1999. The top 10 companies in terms of trading value in 1999 were mostly Internet

and high-tech developers.¹² Meanwhile, frontrunners in the list of market capitalization were also information and telecommunication players.¹³ In 1999, all of the top five companies on the Kosdaq were engaged in the information and technology business. Nine out of the top 10 companies and 39 out of the top 50 belonged to the information and technology industry.

In 1999, more than half of the companies listed on Kosdaq were information technology players. As **Table 9** shows, 55 information technology companies were listed on the Kosdaq in 1999; they raised 1.2 trillion *won*, which accounted for 55.4 percent of

Table 9: Public Offerings by Information and Telecommunications Firms Listed on the Kosdaq, 1999

Areas	Computer and semiconductor ¹	Communication and network ²	Internet ³	Total
Number of firms	20.0	27.0	8.0	55.0
Value of shares offered (in trillions of <i>won</i>)	311.8	875.8	47.6	1,235.2
Equity capital before public offering (in billions of <i>won</i>)	81.9	880.6	21.9	984.4

Source: Seong 2001, 66.

1 The computer and semiconductor sector includes firms producing computer CPUs and peripheral parts, TFT-LCD, software products, semiconductors and equipment to make semiconductors (for example, Jusung Engineering).

2 The communication and network sector includes firms related to such areas as telecommunications service, telecommunications equipment, system integration, cellular phone handsets, LAN equipment, and optical cables (for example, Hansol PCS).

3 The Internet sector includes firms related to such areas as ISP, solutions, e-commerce, portal service, and online advertising (for example, Daum Communication).

Note: According to earnings documents submitted to the Kosdaq stock market, startups turned out to have outpaced general companies in terms of profitability and growth potential. Of 319 Kosdaq companies whose fiscal years end in December 1999, 131 startups posted a better growth rate in revenue, current profit, and

12. The following companies comprised the top 10 in terms of trading value on the Kosdaq in 1999: Hanaro Telecom Inc. (7.77 percent), Haansoft (6.10 percent), Goldbank (2.67 percent), Serome Technology (2.47 percent), Telson Electronics (2.40 percent), Insung Information (2.39 percent), Korea Information & Communications Co. (2.29 percent), Korea Technology Investment Corp. (2.29 percent), Intepark (1.96 percent), and Humax (1.86 percent). Except for Hanaro, the shares of all these companies were split.

13. The definition of the IT industry is based on the standard set by OECD (Organization for Economic Cooperation and Development) and the Korean Standard Industry Classification.

Kosdaq's total. By sector, telecommunications network companies made up the bulk of the Kosdaq listings.

Domestic Economic Environment

Korea's domestic economy was greatly impacted by the economic crisis and the restructuring process thereafter, which contributed to promoting startups by lowering the opportunity cost of starting them. Layoffs and unemployment were rising, and Korea's too-big-to-fail legend faded away. These conditions constituted favorable environments for startups. Some people had no other choice but to start their own businesses, and many people believed that holding a job in a major *chaebol* was not as attractive as before. Incentives for starting a new business were heightened. Reflecting the enhanced incentives and economic recovery, the number of new businesses showed steady growth after the end of 1998. In 1999, especially, the number of new businesses increased dramatically to almost 30,000.

The growth of startups also reflected a recovery in the macroeconomy. The number of new establishments hit a low in late 1997 when the country was swept by the Asian financial crisis and before it began its steady recovery after late 1998. **Table 10** shows that the number of new establishments reached approximately 30,000—a record high—in seven major cities in 1999. The number of companies about to go bankrupt (dishonoring bills) was just 2,429, setting the net ratio of startups at 12.3 times the number of companies that failed to pay bills, the highest level since 1993 when these statistics were first compiled.

At the end of the 1990s startups could compete with the *chaebol* in both the labor market and the equity market, where *chaebol* often exercised monopoly power in the past. During this period many capable managers and executive officers moved from

Table 10: Comparison of Startups and Bankruptcies in Seven Major Korean Cities, 1993–1999

	1993	1994	1995	1996	1997	1998	1999
Number of new establishments (A)	11,938	16,723	17,245	19,264	21,057	19,277	29,976
Number of companies with dishonored bills ¹ (B)	2,669	3,573	4,559	3,879	6,132	7,538	2,429
A/B	4.5	4.7	3.8	5.0	3.4	2.6	12.3

Source: Bank of Korea, various years.

¹ This term is often used in Korea for firms that are about to exit the market.

Note: The seven major cities are Seoul, Busan, Daegu, Incheon, Gwangju, Daejeon, and Suwon.

large conglomerates to startups. Companies in the information industry were especially threatened by large-scale emigration of high quality human resources to startups. In the stock markets, it was not rare for the capitalization of some startups to surpass large, traditional *chaebol* during the startup boom period. The impact of these experiences should not be underestimated. Prospering startups helped the Korean financial market and the labor market become more competitive. Also, the corporate culture in startups and the characteristics of the information industry compared with the culture and characteristics of the *chaebol* contributed to enhanced flexibility in the labor market.

Startups constitute only a minor share of SMEs; however, they work diligently to explore new markets and opportunities and thereby facilitate structural reform across various economic sectors. In addition, they provide significant momentum for healthy market competition in the form of rapid entry into and exit from the market.

IV. Prospects for High-Tech Partnership between Silicon Valley and South Korea

What is the current position of Korea's venture industry? Is the steady growth of startups and venture capitalists possible in Korea? How would a deepening high-tech partnership between South Korea and Silicon Valley in the United States benefit both countries?

The worldwide Internet revolution and a series of reforms after Korea's financial meltdown in late 1997 created fertile ground in which startups could grow. The rapid growth of the Kosdaq market was a catalyst in developing venture capital firms in Korea. As a result of the industry's compressed growth, the infrastructure of the Korean startup industry is not sufficiently mature. It is important to consider, however, that the Kosdaq market has become an important capital-raising resource for startups in Korea.

Since the late 1990s, the industry turned from government-led growth to market-driven development. Structural changes in Korea paved the way for the growth of startups and a brighter outlook. Conditions are better than ever for venture industry in Korea.¹⁴ The future is clear that long-term innovation and learning will lead to progress in the coming years.

High-tech startups are currently outsourcing many parts of their businesses, including their manufacturing operations and marketing. They are also continuing to slim down their internal organizations by spinning off non-core business divisions. In addition,

14. Seong 2001, 123–39.

high-tech startups are aggressively seeking strategic alliances with leading companies all over the world to improve their business prospects. Many IT-related firms continue to seek a mergers or business partnerships in Silicon Valley.

Competent corporate managers are crucial for startups, especially when they leap into a more mature stage. Highly trained and experienced chief executive officers, however, are still scarce in Korea. Accordingly, it is important for Korean startups to attract competent corporate managers experienced in global networking. Many venture capital firms in Korea do not perform any roles beyond that of investor, while in the United States such firms not only invest in startups but also provide a wide range of services essential for survival in the intensely competitive high-tech markets.¹⁵ In Korea, specialized manpower and effective networking among players are expected to develop in the long run.

More than half of all venture capital firms in the United States are located in Silicon Valley, and the United States has overwhelming dominance in the world venture capital market.¹⁶ Technology firms, venture capital firms, professors, and students near the Silicon Valley area have created a close-knit society with effective networking. Silicon Valley has enjoyed sustained growth through a vigorous exchange of information and human resources as well as through cultural openness and a proper application of a broad knowledge base.

Korean venture capital and startup companies are eager to find counterparts in Silicon Valley where highly skilled human resources, a well-established business service industry, abundant technological opportunities,¹⁷ and ample markets are available. Many Korean startups and venture capital firms did open branch offices in Silicon Valley, hoping to network with top foreign companies, venture capital firms, and sales partners. Their performance in networking has been lackluster, however, owing to a lack of core competencies, marketing know-how, and other experiences. It might take Korean companies quite some time to catch up.

As a way to overcome language barriers and cultural gaps specifically, Korea-based venture capital firms and startups often try to capitalize on the Korean network as well as the Asian network.¹⁸ For example, the Korean-American network in Silicon

15. In this respect, one might argue that Korean venture capital firms are actually private equity companies.

16. For example, U.S. venture capital firms recorded a market share of 71.8 percent in terms of investment and 70.6 percent in terms of fund raising in 1999 (Ritchie et al. 2000).

17. The United States is the only country in which technology exports exceed imports.

18. Asian networks include the Asian Silicon Valley Connection (ASVC) and the Silicon Valley Asian Society of Entrepreneurs (SVASE).

Valley includes the Korean American Association of Entrepreneurs (KASE),¹⁹ the Korean American Professional Society (KAPS), the Korean American Chamber of Commerce of Silicon Valley (KACCSV), and the Silicon Valley IT Forum (SVIT).

To assist Korea-based startups with outreach in the Silicon Valley area, the Korean government is supporting a startup incubator facility, the I-Park. The Korean government is also supportive of startups' networking efforts such as the Korean IT Network (KIN) and the International Network of Korean Entrepreneurs (INKE).

What can Korean companies provide to Silicon Valley firms as partners? In many respects, firms in Silicon Valley have an absolute advantage in startups. Korean companies, however, can claim a relative advantage in certain areas of technology and manufacturing such as telecommunication, multimedia, and mechatronics. In the field of IT, Korean firms are regarded as having a relative advantage in network and handset interface, mobile phone handsets, and handset contents. Also, Korea is well known as a good test bed for new IT technology and products because Korea has a dense population, is a country of early adapters to new IT products, and has purchasing power.²⁰ As the most famous information technology hub, Silicon Valley could find attractive business opportunities by working with Korean business partners and exploring the Korean market.

Korea's R&D spending has maintained an average annual growth rate in double digits in real terms since 1980. Korea is the eighth largest R&D-spending country as of 2000. *Table 11* shows that Korea's ratio of R&D spending to GDP has kept abreast with such spending in advanced countries. Korea also enjoys the highest growth rate in terms of the volume of industrial properties such as patents. The number of R&D facilities operated by private companies has also increased sharply since the 1980s, from 54 in 1980 to 9,070 in 2001. In Korea, the private sector has taken the leading role in R&D activity, accounting for 73 percent of total R&D expenditure in 2001. The Roh Moo-hyun administration has been strongly emphasizing the importance of basic research and the role of government in generic technologies. The government plans to increase the R&D budget in these areas.

The IT revolution, new business opportunities, structural changes, and progress in innovation will pave the way for Korea's startup industry to remain competitive in the future. In the short run, it is probable that the rate of startup failure will increase as

19. KASE is a group of Korean American professionals such as lawyers, accountants, consultants, entrepreneurs, and venture capitalists.

20. A representative success case is the code division multiple access (CDMA) technology developed by QUALCOMM.

investors do a better job of scrutinizing their business prospects. The residual value of the ousted startups will be dispersed to shareholders through sell-offs, and accumulated knowledge at the companies will be transferred to others. In the long run, however, Korea's startup industry, venture capital firms, the Kosdaq market, the business service market, and the process of mergers and acquisitions will evolve into a more solid and efficient structure.

Table 11: Ratio of R&D Expenditure to GDP, Various Countries

Country	1994	1995	1996	1997	1998	1999	2000
Japan	2.76	2.89	2.77	2.83	2.94	2.93	2.98
U.S.	2.42	2.51	2.55	2.58	2.60	2.65	2.76
Korea	2.44	2.50	2.60	2.69	2.55	2.47	2.68
Germany	2.26	2.26	2.26	2.29	2.31	2.44	2.46
France	2.34	2.31	2.30	2.22	2.17	2.19	2.15
Canada	1.77	1.74	1.70	1.72	1.82	1.83	1.94
U.K.	2.07	1.98	1.91	1.84	1.83	1.87	1.86
Italy	1.05	1.00	1.01	0.99	0.98	1.03	—
OECD average	2.09	2.11	2.14	2.16	2.18	2.21	—

Source: OECD 2002; MOST various years.

There will be abundant opportunities for the South Korean and Silicon Valley startup industries to create positive synergy through cooperation such as in joint investment funds and M&As,²¹ strategic alliances, outsourcing, and joint ventures. In the short run, collaboration between Korean companies and Silicon Valley companies might not show great activity partly because of the cyclical phase of the bearish stock market and the excess capacity of venture capital companies in both Silicon Valley and Korea. However, structural fundamentals are promising as Silicon Valley companies should have no difficulty finding profitable ways to collaborate with Korean business partners to explore the Korean market.

21. For example, E-Bay acquired the Auction, a Korea-based startup in February 2001.

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