

POSSIBILITIES FOR GROWTH IN KOREA'S TECHNOLOGY TRADE

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The age of knowledge-based economy

Recently, Korea hosted a world knowledge forum with the theme “Knowledge is Power”. The speakers at the forum included Bill Gates of Microsoft; Donald Johnston, Secretary General of the OECD; Economist Paul Krugman; WTO Director-General Panichipakdi Supachai; and John Donahoe, Worldwide Managing Director, Bain & Company. At the forum, Bill Gates said that companies in the digital age can access knowledge easily, but need to establish infrastructure to enter the digital age. And though the future of digital age is promising, continuous R&D and investment are needed to guarantee future dynamism.

Korea has adopted a knowledge-based economic policy as a growth strategy since 1997's foreign currency crisis. This was due to the world economy's shift from manufacturing industries to knowledge-based industries.

Since 1997, Korean government policy centered on expanding information infrastructure, incubating venture business, and pursuing a knowledge-based economic development strategy as a vision for the Korean economy. The venture business policy of 1997 helped the number of venture businesses explode from 304 in early 1998 to 11,022 by October 2001. In 2000, a knowledge-based economic development strategy was created to improve Korea's innovation in science and technology.

These policies have facilitated the construction of a high-speed information infrastructure in December 2000, the increase of high-speed Internet users to over 6.5

Table 1. Knowledge Investment as Percentage of GDP

Country	Percentage of GDP (1998)			
	Total	R&D	S/W	Education
USA	6.0	2.6	1.5	1.9
Korea	5.2	2.6	0.4	2.2
Canada	4.7	1.6	1.6	1.5
Japan	4.7	3.0	1.1	0.6
Germany	4.2	2.3	1.2	0.7
France	4.1	2.2	1.2	0.8
U.K.	3.9	1.8	1.3	0.8
OECD Average	4.7	2.2	1.2	1.2

Source: OECD, STI Scoreboard 2001, 2001.

million (45% of all households) by July 2001, and Korea's status as the first country to establish free Internet networks in elementary, middle and high schools throughout the country. The OECD has recognized these results. In the OECD Science, Technology and Industry Scoreboard 2001, knowledge investment as a percentage of GDP was 5.2%, which was second only to the USA (6.0%). This performance shows the level of input that Korea is committing to build its knowledge-based economy.

Output is more important than input in establishing a knowledge-based economy. One indicator of output in a knowledge-based economy is the level of technology trade since the economic crisis. In addition to quantitative measures such as patents granted and publication of research papers, the progress of a knowledge-based economy can be shown by qualitative factors such as technology trade with foreign countries.

Technology trade can be defined as technology transfer between countries or companies for the purpose of profit creation, and it has various forms. These include technology dealing transfers through contracts, licensing for technology usage rights, M&As of technology owning companies, and technology transfer through invitation or dispatch of technical experts.

The pattern of technology trade has changed over time. Until the 1980s, technology trade focused on industrial technology, but information technology became the most important factor since the 1990s. Technology trade by industry shifted from textiles and railroads in the 19th century to autos and chemical industries in the 20th century, and recently to digital technologies such as computers, semiconductors and information & communication industries.

The most important factor in the shifting technology trade pattern is the intensifying competition in the development and protection of technology. Because of the fierce competition in information & communication technologies around the world, technology protection has become an urgent issue in every country. In addition, the growing value and demand for technology around the world has boosted technology trade.

Korea's technology trade performance

The growth of Korea's technology exports is still slow, although technology imports are rising quickly. As a result, the technology trade deficit rose from 2.2 billion dollars in 1997 to 2.5 billion dollars in 1999. Technology exports rose 11.8% yearly from 0.1 billion dollars in 1994 to 0.19 billion dollars in 1999. However, technology imports rose 16% yearly from 1 billion dollars in 1996 to 2.5 billion dollars in 1999.

Korean technology exports which recorded 21.8 million dollars in 1990 have grown continually. In 1994, technology exports totalled 110.9 million dollars, 162.9 million dollars in 1997, and 193.3 million dollars in 1999. The main markets for Korean technology exports were developing countries in east and south Asia. In 1999, Korea's main technology markets besides the USA and Germany were China, Malaysia, Thailand, Uzbekistan, and Indonesia.

Export concentration has appeared to some extent with the top five export markets' share of total exports rising from 54.5% to 71% from 1997 to 1999.

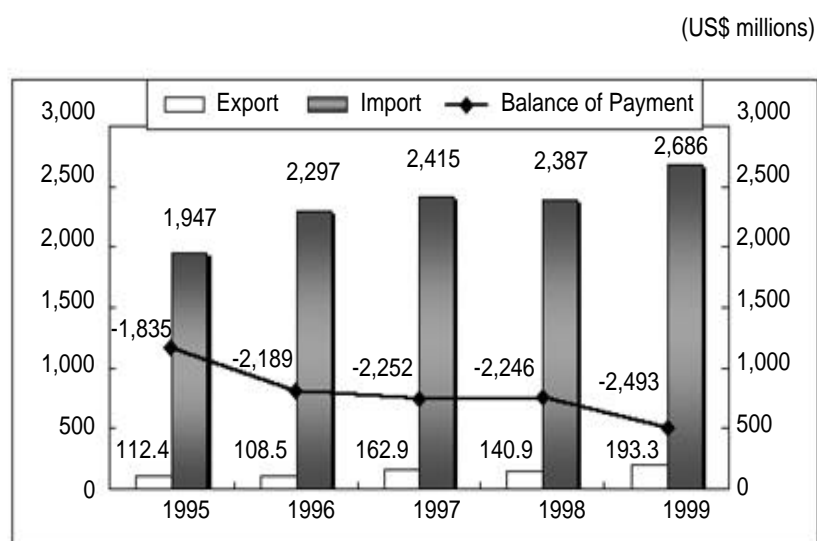
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Figure 1. Korean Technology Trade



Source: Korea Industrial Technology Association

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Possibility of boosting technology levels and exports

Korea has been successful in technology development. According to the IMD World Competitiveness Yearbook, Korea granted 35,900 domestic patents in 1998.

Table 1. Korea's Technology Trade with Other Countries

(US\$ millions)

	1997			1998			1999		
	Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
USA	10.6	1,468.9	-1,458.3	14.0	1,330.0	-1,316.7	17.2	1,620.8	-1,603.6
Germany	5.1	105.5	-100.4	0.2	121.6	-121.4	8.1	102.2	-94.1
China	44.5	1.0	43.5	31.2	0.5	30.7	94.7	2.2	92.5
Malaysia	16.5	0.01	16.5	16.0	0.2	15.8	15.2	0.5	14.7
Thai	5.4	0.08	5.3	2.7	0.1	2.6	11.9	0.2	11.7
Uzbekistan	8.6	0.0	8.6	6.7	0.0	6.7	8.8	0.0	8.8
Indonesia	13.8	0.04	13.8	7.0	0.01	7.0	6.8	0.6	6.2

Source: Korea Industrial Technology Association

This was 3rd in the world following Japan's 125,704 patents, and the USA's 80,292. However, Korea ranked only 11th in patents granted abroad (6,501).

Korea still imports high technologies from developed countries and exports existing technologies to developing countries. Since 1997 however, the digitalization policy built up Korea's technological infrastructure resulting in a greater capacity for technology development and export.

First, R&D expenditure has increased in Korea. The IMD World Competitiveness Yearbook stated that Korea's R&D expenditure as percentage of GDP was 2.47 in 1999, ranking the country 7th following the USA (2.619). Second, the number of scientific and technical papers published from Korea in 1999 was 11,010, ranking 16th in the world. During the last 5 years, the increase rate was 19.44% (2nd in the world), and Korea's position rose from 23rd to 16th. 1,960 journals published Korea's science and technology papers, and 32 journals published

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Table 3. Publication of Scientific and Technical Papers

	1995	1996	1997	1998	1999
USA	257,738	253,086	251,062	252,459	252,984
U.K.	63,819	65,823	64,498	67,701	69,220
Japan	58,911	61,413	61,929	66,931	68,775
Germany	54,468	56,627	59,873	63,917	64,379
Korea	5,414	6,430	7,818	9,513	11,010

Source: Ministry of Science and Technology

more than 50 Korean cases. This shows the increasing activity and recognition of Korean scientists.

Third, Korea has good information infrastructure. According to the IMD World Competitiveness Yearbook, Korea had 313 computers per 1000 people which ranked 23rd in 2000. And the number of Internet users per 1000 people was 7th in the world at 401.78. These information infrastructure levels exceed those of developed countries like the UK and Japan.

National and corporate growth depend on infrastructure and the use of information technologies. The OECD and World Bank noted that only countries and companies with the ability to create and use knowledge will have continuous growth. This is a reality in the knowledge-based economy. **VIP**

Korea's timely investment in information and R&D infrastructure have set a solid foundation for growth.