

# A Comparative Research on Competitiveness of Information Industry of China vs. Korea

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## Abstract

This paper explores the competitiveness of information industry of China and Korea by means of comparative research based on the analysis of statistic data and the definition of items denoting the competitiveness. Consequently, we analyze the competitive and complementary relation of information industry of China vs. Korea, and put forward a co-operation project of China-Korea information industry ultimately.

**Keyword:** competitiveness, competitiveness items, comparative research, information products

## 1. Compare Information Products International Trade of China vs. Korea

### 1.1. Computers and their fittings

Korea had maintained very high rate of increase in exporting computers and their fittings all along from 1994 to 1999, which was higher than 10% except for 1998 when the export decreased due to the financial crisis. Specially, it was 38.6% in 1999. While the importing also increased quickly. Although decreasing by 6.9% and 47% in 1997 and 1998 during the financial crisis respectively, the rate of increase reached 30% both in 1994 and in 1995, especially 65% in 1999. Consequently, the international trade had kept more and more surplus, which increased from 15 billion dollar in 1993 to 28 billion dollar and 43 billion dollar in 1997 and 1999 respectively.

What about China? China's computers and their

fittings foreign trade had favorable balance in 1999, but which was smaller than in 1998. In detail, the export was 107 billion dollar in 1998, while the importing is only 56 billion dollar the same year, as result of which the surplus trade balance was 51 billion dollar this year. But in 1999, the import increased by 2.9% and the export decreased by 10.1%, as result of which the surplus was only 39 billion dollar.

Table 1 shows the detailed data.

### 1.2. Communication equipment

The growth rate of Korea exporting communication equipment was about average 3% per year from 1995 to 1998, but it reached 33.2% in 1999. While the rate of increase of the import maintained more than 20% from 1994 to 1996, but the import began to decrease by 41% and 9.6% in 1998 and 1999 respectively. Consequently, the favorable balance of the communication equipment international trade was respectively: 20 billion dollar in 1993, 13 billion dollar in 1996, 27 billion dollar in 1998, 32 billion dollar in 1999. Specially, the favorable balance had a big jump in 1999 thanks for the export increasing and the import decreasing as result of the financial crisis in 1998.

With respect to China, the export was 67 billion dollar, and the import was 63 billion dollar in 1998. The export was 58 billion dollar and the import was 59 billion dollar in October 1999. So the trade maintained small favorable and small unfavorable balance of foreign trade, that is, revenues and expenditures were generally in balance.

**Table 1. Compare export and import of computers and their fittings of China and Korea (millions of dollars)**

		1995	1996	1997	1998	1999
Korea	export	4,810 (39.16)	5,518 (14.72)	6,266 (13.55)	5,276 (-15.79)	7,316 (38.65)
	import	3,282 (37.41)	3,800 (15.77)	3,537 (-6.93)	1,872 (-47.07)	3,081 (64.6)
	the favorable balance	1,528	1,718	2,729	3,404	4,235
China	Export	N.A.	N.A.	N.A.	10,736 (N.A.)	9,650 (-10.1)
	Import	N.A.	N.A.	N.A.	5,573 (N.A.)	5,735 (2.91)
	the favorable balance	N.A.	N.A.	N.A.	5,164	3,915

Resource: Information Annual of Korea, Statistic Annual of China International Economy.

The following table shows the detailed data.

**Table 2. Compare export and import of communication equipment of China and Korea (millions of dollars)**

		1995	1996	1997	1998	1999.10
Korea	export	3,919 (4.75)	3,899 (-0.53)	4,026 (3.26)	4,143 (2.9)	5,519 (33.21)
	import	2,146 (22.67)	2,604 (21.31)	2,530 (-2.83)	1,494 (-40.96)	1,350 (-9.02)
	the favorable balance	1,773	1,295	1,496	2,649	4,169
China	export	n.a.	n.a.	n.a.	6,659 (n.a.)	5,781 (-13.19)
	import	n.a.	n.a.	n.a.	6,308 (n.a.)	5,891 (-6.61)
	the favorable balance	n.a.	n.a.	n.a.	351	-110

Resource: Information Annual of Korea, Statistic Annual of China International Economy.

### 1.3. Semiconductors and their fittings

Korea increased the export of semiconductors and their fittings by about average 27% per year from 1994 to 1997. Although the financial crisis decelerated the rate of increase in 1998, the export in 1999 increased by 24.64% more than that in 1997.

After increasing quickly during 1994 to 1997, the import decreased in 1998, but increased by 16.44% in 1999. Because the world market of semiconductors and their fittings was pretty flourishing in 1995, the Korea's favorable balance of semiconductors and their fitting trade reached 87 billion dollar. After this, the favorable balance began to decrease because of the world market of semiconductors and their fittings falling off. It was 50 billion dollar in 1997 and 1998. With the demand of semiconductors and their fittings rebounding in 1999, in spite of the exchange rate decreasing, the favorable

balance reached 71.6 billion dollar.

China continued expanding the favorable balance in the world market of semiconductors and their fittings. The favorable balance was 3 billion dollar in 1998 and 13.08 billion dollar in 1999. Table 3 shows the detailed data.

## 2. Comparative Research on Competitiveness of Information Industry of China vs. Korea

### 2.1. The major competitiveness items

There are four items to estimate the competitiveness of information and communication industry in general. They are the market share in the third country, trade specialization degree index, market comparative advantage index (MCAI) and the export.

**Table 3. Compare export and import of semiconductors and their fittings of China and Korea (millions of dollars)**

		1995	1996	1997	1998	1999
Korea	export	17,740 (66.14)	15,158 (-14.55)	17,139 (13.06)	17,034 (-0.61)	21,241 (24.64)
	import	9,011 (40.12)	10,403 (15.45)	12,909 (24.09)	12,092 (-6.32)	14,081 (16.44)
	the favorable balance	8,729	4,756	4,230	4,942	7,160
China	export	n.a.	n.a.	n.a.	7,297 (n.a.)	9,650 (32.56)
	import	n.a.	n.a.	n.a.	6,910 (n.a.)	8,342 (20.72)
	the favorable balance	n.a.	n.a.	n.a.	387	1,308

Resource: Information Annual of Korea, Statistic Annual of China International Economy.

The export can apparently express the comparativeness, so we'll emphases on the others.

**The market share in third country:** That a country's products occupy how much the market share in the third country can show its competitiveness. It is easy to understand that the more share, the stronger competitiveness.

**Trade specialization degree index:** it is another item that can show competitiveness. It can be formulized as:

$$\text{Trade specialization degree index} = \frac{\text{export} - \text{import}}{\text{export} + \text{import}}$$

Trade specialization degree index can show the relative advantage in export. The value of the trade specialization degree index is from -1 to 1. We can also easily know that the more value of the trade specialization degree index, the stronger competitiveness.

**Market comparative advantage index (MCAI):** MCAI is revealable comparative advantage excluding the market scale. Thereby, it is necessary to introduce revealable comparative advantage (RCA) for understanding MCAI.

Revealable comparative advantage (RCA) can express comparative advantage of a group of countries with different comparable economy-scale. It can be formulized as:

$X^i$  shows the export amount of i product 's

$$RCA(i) = \frac{X^i / WX^i}{X / WX}$$

quantity of a country.

$WX^i$  is the total export amount of i product in the world.

$X$  is the total export amount of corresponding country.

$WX$  is the total export amount of the whole world.

$RCA(i)$  can indicate relative advantage of a country 's competitiveness of i product in the average competitiveness of this country. We can know that if a country had a bigger export scale, the country must have a big market share in spite with lower relative advantage.

When a specific export product occupies more market

share than the market share of total export product of this country, the value of RCA will be more than 1, which means this specific product have stronger relative advantage than others of this country. Hence, the comparative advantage between countries can be estimated by RCA. But RCA has a fault that RCA cannot

$$MCA(i, j) = \frac{X_j^i / TX_j^i}{X_j / TX_j}$$

exclude the influence of economy growth. To make up it, we put forward MCA. MCA can be formulized as:

$X_j^i$  is an export quantity of i product from a country to j market.

$TX_j^i$  is the total i product import quantity of j market.

$X_j$  is the total I product from j market to the corresponding country.

$TX_j$  is the total export from j market to the entire world.

If the value of MCA is more than 1, the i product is more popular in j market, vise versa.

## 2.2. Comparative research on competitiveness of information industry of China vs. Korea

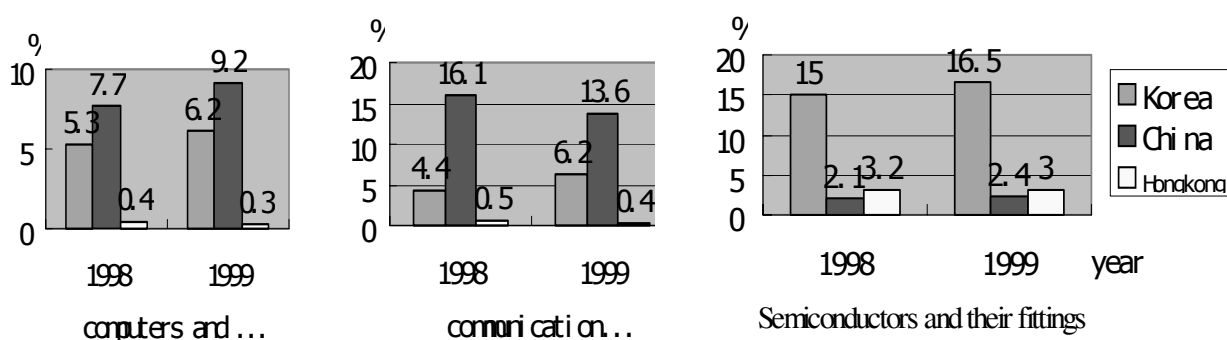
The following, we will compare Chinese and Korea competitiveness by the three items.

(1) We saw about Korea communication products' share in USA communication market to compare the competitiveness of China and Korea. It is necessary to note that we measured the Hong Kong's share separately and together with the mainland when explained.

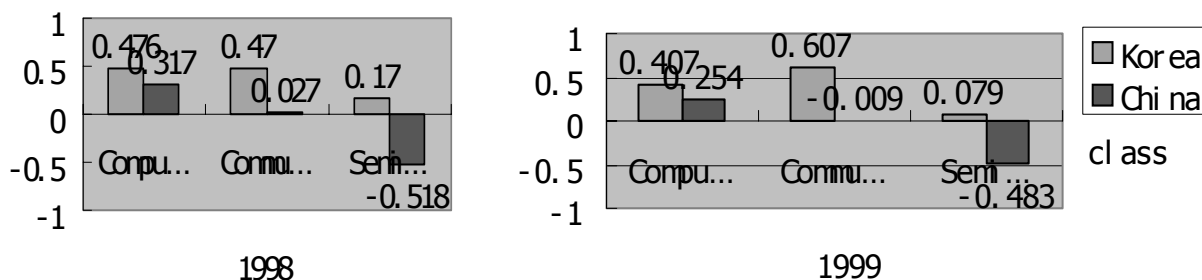
We chose the USA market as the third country market based on the following reasons: First, USA is the most trade-partner of both Korea and China. Secondly, USA has less import-confine than others due to its pretty opening economic policy. It is better to compete freely in the market to estimate the competitiveness, while USA just advocates free competition. Finally, the import statistic data of USA is more complete, which will do good to compare.

The correlative data is in chart 1.

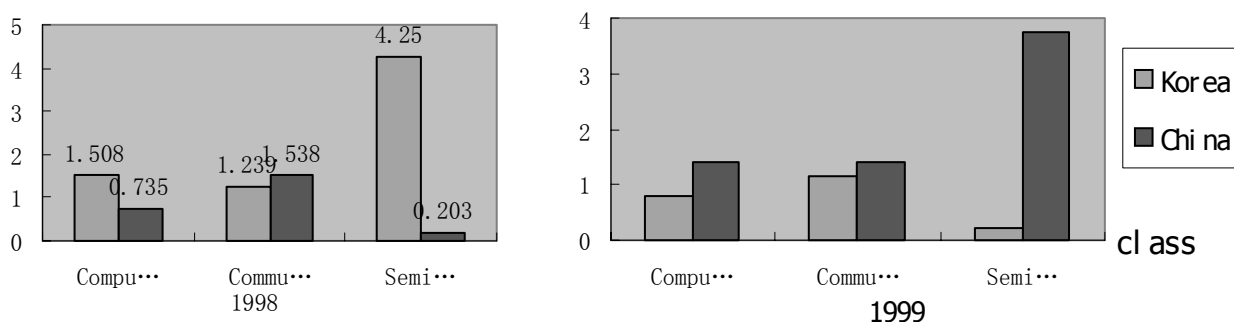
Chart 1. The market share in USA (%)



**Chart 2. Compare the trade specialization degree index of Korea and China by class**



**Chart 3. Compare MCA of Korea and d China in USA**



It can be inferred: Chinese computers and their fittings market share was appreciably more than Korea ( $7.7+0.4>5.3$ ,  $9.2+0.3>6.2$ ). With respect to communication equipment, Chinese market share was greatly more than Korea ( $16.1+0.5>>4.4$ ,  $13.6+0.4>>6.2$ ). But with respect to semiconductors and their fittings, Chinese market share was greatly less than Korea ( $2.1+3.2<<15.0$ ;  $2.4+3.0<<16.5$ ).

(2) The trade specialization degree index of Chinese and Korea is in chart 2.

As can be seen from the chart, Korea's trade specialization degree index of computers and their fittings and communication equipment was 0.48 and 0.47 respectively, which are pretty higher. With respect to semiconductors and their fittings, the trade specialization degree index is only 0.17, which is pretty lower.

China's trade specialization degree indexes are pretty lower except for computers and their fittings. Specially, the trade specialization degree index of semiconductors and their fittings is negative, which means the export of semiconductors and their fittings is less than the import.

(3) The MCAI of Chinese and Korea in USA is in chart 3.

The chart shows that: 1) Korea's MCA of computers and their fittings is 1.508, which is 0.735 higher than China's. This trend has lasted to 1999. 2) In 1998, China's MCA of communication equipment is 1.538, which is

higher than 1.239—Korea's MCA of communication equipment. But in 1999, Korea's MCA of communication equipment is 1.404, which is higher than 1.160—China's MCA of communication equipment. 3) With respect to semiconductors and their fittings, Korea's MCA is apparently higher than China's both in 1998 and in 1999.

### 3. Co-operation Project of China-Korea Information Industry

According to their status, we can infer Korea and China are in different developing stage. Korea has founded fundamental communication equipment, and some products have shared more the great world market. Although China has enormous potential for developing and has been growing fast, it was so late for the activity that China lags behind Korea, which is apparent according to a series of index, such as the overseas market shares, trade specialization degree index and market comparative advantage index, etc. Ground on the principle of win-win, the companies of Korea should continue transferring a great deal of technology to Chinese market. Simultaneously China should take great part in R&D relative to technology transferring, which can also flourish the northeast Asia economy.

The co-operation can be processed by three stages:

1). The first stage is from 2000 to 2001. This stage is an experiment stage, a prepare stage of co-operation. China, Korea and Japan carried out a co-research in November 1999 on economic community. The conclusion showed the major feasible co-operation domain was

information industry. During this period, we can experience the conclusion from the former research and study the experience of the former co-operation to ascertain the principle and direction of the developing. We also should research the appropriate environment policy as well as how to co-operation. Besides, the co-operation between companies and local government is also popular just like between central government.

2). The second stage will be from 2002 to 2005. This stage is the initial stage of co-operation. In this stage, confirming the specific co-operation domain and extending the former co-operation will be the emphasis. It was known that the most promising domain includes the penetrate of technology relative to CDMA, the developing of AP II Test-bed and the communion of the human resources. Nowadays, China is paying more and more attention to the introducing this technology. That is to say, Korea attaches the most importance to the CDMA, while China is eager to introduce the world-class technology accordingly to benefit domestic relative industries. We can conclude that the co-operation will be feasible.

3). The third stage will extend from 2006 to 2010. This stage can regulate the co-operation. In this stage, the e-commerce and information-communication network will get great progress. During this period, China will join some international organization (like WTO), so following a rational line will complete the regulation. At that time, the information industries of China will be very strong; some impossible things of nowadays will change to be possible.

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## References

[1] Samsung Economics Institute. *A Korea, China and Japan Co-operation Project of Internet Industry*. 2000, Samsung Economics Institute.

[2] Ping Li, *The Economic Structure Regulating of East Asia and China*. 2000, Economic Science Press.

[3] The Department of Statistic, China. *The Statistic Annual of China*. 1995-2000, China Statistic Press.

[4] China Statistic Press, *China statistic Annual of Foreign Trade*. 1996-2000.

[5] The Bank of Korea, *The Statistic Annual*. 1995-2000. The Bank of Korea.