"A Comparative Analysis of Business Development in Japan, India, and China in the Global Perspective"

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The author discusses the business development of India, China, and Japan, focusing on India's future profile. Comparative analyses are made among the three nations in the global perspective, including an analysis of Japan's economic behavior in a chronological framework, with an effort to obtain implications for the description of the future of India. The analyses are made from both the demand and supply sides, encompassing the issue of the shift from hardware manufacture to software business. Although some aspects are discussed from the viewpoint of Japanese industry, the outcome of this discussion is applicable to all global industries of other nations.

A half century ago, when world business was dominated by European and North American nations, Japan entered this regime as the first non-Western nation. Since then, this was followed by other nations mostly from Asia such as Korea and Singapore. Now China and India are expanding their participation in global business. India's industrial development is discussed in this context, particularly in comparison with China's.

1. The Demand Side of the Indian Economy (Focusing on its Domestic Market)

First of all, the demand side of the Indian economy will be discussed.

As many aspects of demand correlate with economic level, represented by GDP per capita, the world position of India in terms of GDP will be outlined by cross-section analysis and time-series analysis.

(1) National Economy

India ranked No. 10 in terms of Gross Domestic Product (GDP) in 2003 (Table 1). Although its GDP per capita is now around US $600, it is growing rapidly.

Table 1. GDP , GDP per capita and Population (2003) (In current dollars)

Nation	GDP (US $ Billion)	No.	GDP per capita (US $)	Population (Million)
U. S. A.	10,857	1.	36,924	290.8
Japan	4,317	2.	33,819	127.7
Germany	2,403	3.	29,137	82.5
U. K.	1,799	4.	30,355	59.6
France	1,758	5.	29,222	59.8
Italy	1,466	6.	25,527	57.6
China	1,409	7.	1,100	1,292.3
Canada	854	8.	27,097	31.6
Spain	839	9.	20,424	41.9
India	591	10.	555	1,068.2

Source: Statistical Yearbook, Demographic Yearbook, UN.

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When we discuss the future of the Indian economy over a long timeframe, the past growth trends of the Japanese economy can provide some indications for India as well as for China. The figures of Japan's GDP per capita in Table 2 even make China's and India's recent growth rates look mild. The magnitude of their populations, together with the size of their geographical areas, may be among the causes holding their growth rates at this level. When the GDP per capita of China and that of India reach the US $3,000 level, their respective GDPs will exceed Japan's current GDP, probably sometime in the middle of the 21st century.

Table 2. Growth of GDP per capita in the U.S.A., Japan, China, and India (US$)

	1970	1980	1990	2000
U.S.A.	4,760	11,590	21,860	34,253
Japan	1,920	9,020	24,042	37,500
China	160	270	342	862
India	110	230	360	460

Source: For 1970, 1980, The World Bank Atlas.
For 1990, 2000, Statistical Yearbook, UN.

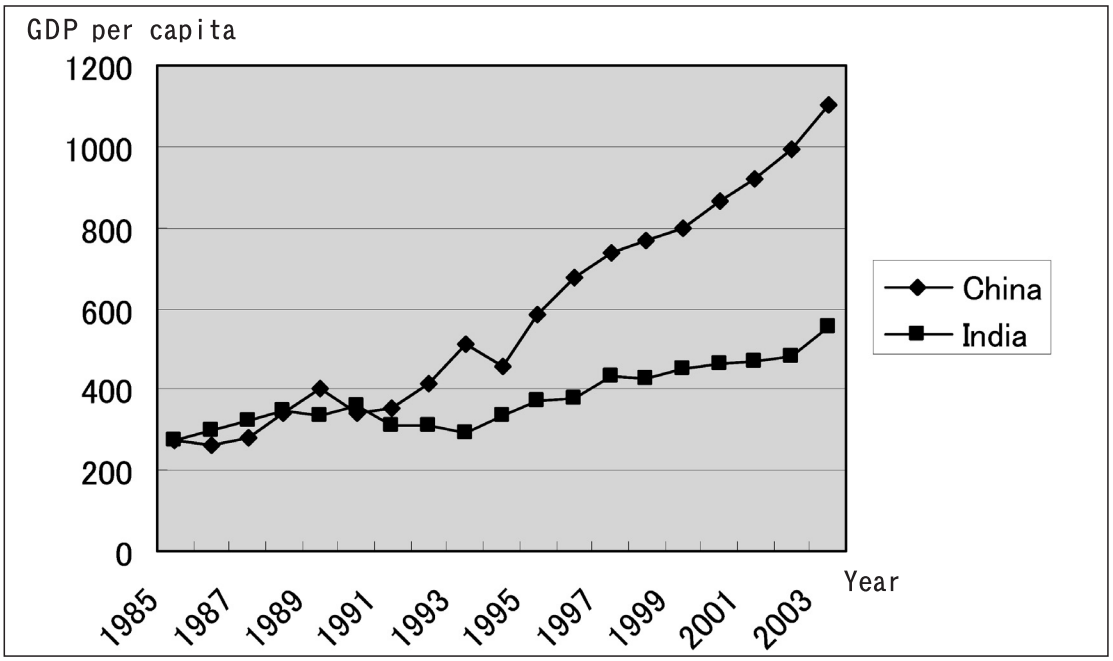
If we look at India's economy more closely in comparison with China's, similarities are found in several aspects. Before 1990, the Indian GDP per capita was almost the same as that of China. After 1993, China began its rapid growth at an annual rate above 8%. India started to rapidly grow in 2003. India seems to closely follow China's growth pattern, with a time lag of nearly ten years (Table 3). This trend is clearly observed in Figure 1.

Table 3. Growth Comparison of GDP per capita between China and India (US$)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
China	276	263	280	344	401	342	353	415	511	457
India	277	297	322	350	338	360	313	308	295	335
	1995	1996	1997	1998	1999	2000	2001	2002	2003	
China	584	674	736	768	798	862	918	995	1,100	
India	370	379	434	429	450	460	471	484	555	

Source: Statistical Yearbook, UN.

Figure 1. Growth Comparison of GDP per capita between China and India (US$)



Source: Author, from the data of Table 3.

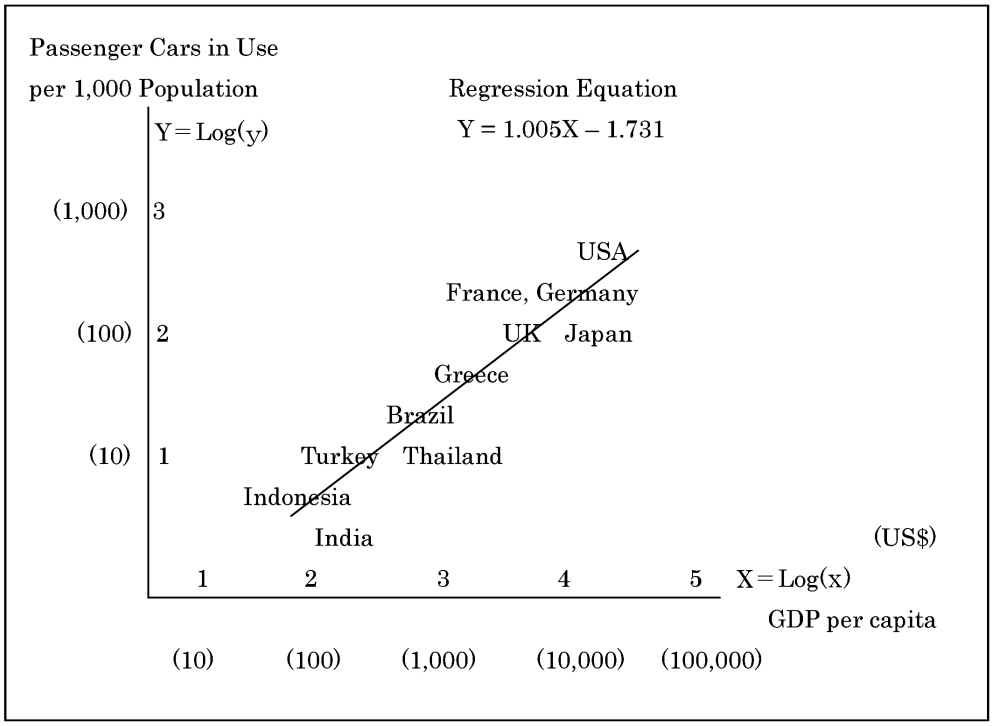
(2) Secondary Industry Represented by the Automotive Industry

Based on GDP per capita as explained above, we can now discuss the demand of the markets.

India will not be an exception to follow the economic development model which the author has developed (Kosaka, 1993, 2005), following the works of Warren J. Keegan (Keegan 1980), J. Scott Armstrong (Armstrong, 1970) and Reed Moyer (Moyer, 1968). The market demand of most products in the domestic market of any nation will be forecast by its GDP per capita and population. The regression equation to estimate the market demand for a particular product (including service) is identified by the cross-sectional analysis between the demands and figures of GDP per capita in a large number of nations at a particular point of time. This regression equation, working as a forecasting formula, maintains its validity as an estimating structure for a long time, with small parameter modifications over time. This regression equation also works as a tool for a time-series analysis, as a nation moves on this regression line with its growing GDP per capita.

As an example, the author applies this model for the estimate of market demand for passenger cars in India (Figure 2). Taking the GDP per capita of India in 2004 as US $640, X = log (x) = log (640) = 2.80618. Y = log (y) = 1.005X - 1.731 = 1.08921, y = 12.28. This means that the number of passenger cars in use per 1,000 population in India is 12.82. Multiplied by the Indian population in 2004, 1,085 million people, the total number of passenger cars in use in India is estimated by its GDP per capita and population as 13.3 million cars. Assuming the product life of a car as ten years, the annual market demand (sales amount) of passenger cars in India in 2004 is estimated to be 1.3 million cars.

Figure 2. Market Demand Forecast of Passenger Cars in Use (1989)



Source: KOSAKA, Hiroshi (2005).

The actual production statistics of automobiles in India is exhibited in Table 4.

Table 4. Automobile Production in India (Unit: Number of cars in thousands)

	2002	2003	2004	2005
Automobiles	895	1,161	1,511	1,627

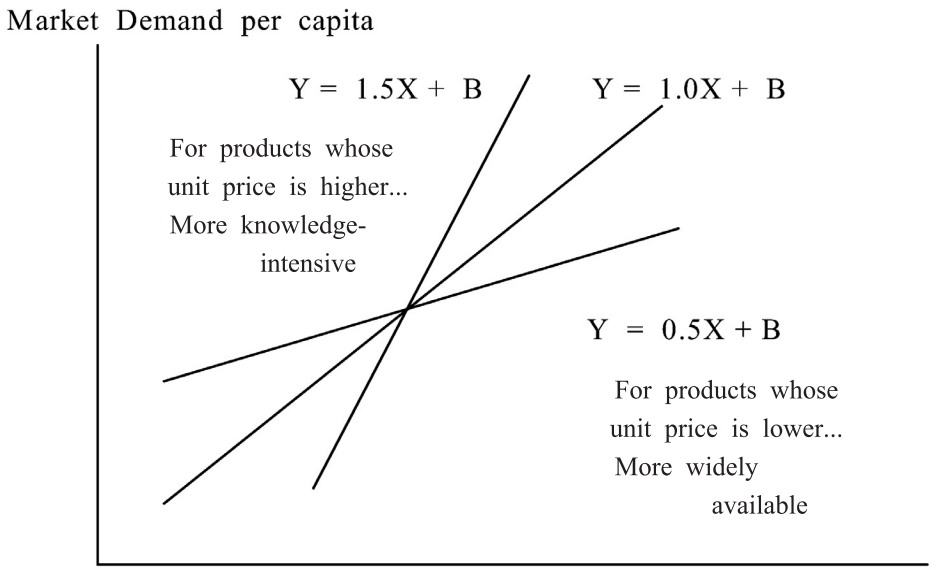
Source: The International Organization of Motor Vehicle Manufacturers.
(Japan Chamber of Commerce and Industry)

Japanese manufacturers, namely Suzuki, Toyota, and Honda, occupy a share of a little more than 50% of the production figure above.

This method of forecasting the market demand for passenger cars can be applied equally to China, as well as to other nations.

This approach to the forecast of passenger car market demand can be used for almost any other products by identifying the parameters of the regression equations for respective products, as illustrated in Figure 3.

Figure 3. The Structure of Market Demand



Source: KOSAKA, Hiroshi (2005).

(3) Imports in India

Major countries from which India imports vary over time, as indicated in Table 5, and Japan's relative position has been decreasing. Japan is now trying to enhance its significance in business with India. Major items of import in India from Japan are listed in Table 6.

No nation, including Japan, can ignore the huge future potentiality of India's domestic market.

Table 5. Imports in India from Major Nations (Unit: Import Amount (US$ Million))

	1987	1995	2000	2004
Total Imports	17,155	36,675	50,536	107,066
From China	118	812	1,502	6,746
From USA	1,543	3,861	3,015	6,291
.....				
From Japan	1,693	2,467	1,842	3,006
	(9.6%, No.2)	(6.7%, No.3)	(3.6%, No.5)	(2.8%, No. 10)

Source: Reserve Bank of India, Handbook of Statistics on Indian Economy.
(Japan Chamber of Commerce and Industry)

Table 6. Major Items of Import in India from Japan in 2005 (Unit : US$ Million)

Machinery (Except Electric)	942	(26.6%)
Electronic Products	469	(13.2%)
Steel	340	(9.6%)
Special Equipment	267	(7.5%)
Transport Machinery	230	(6.5%)
Organic Chemical Products	222	(6.3%)
Total (incl. others)	3,552	(100%)

Source: International Trade & Investment Whitepaper, JETRO, Japan.

2. The Supply Side of the Indian Economy (Focusing on its Global Expansion)

The supply side of the Indian economy will be developed both by domestic investment and by foreign investment.

(1) Investment in India from Abroad

Japanese investment in China began a visible increase when China's GDP per capita reached the US $500 level, and it started to exceed US $5 Billion after China's GDP per capita reached the US $1,000 level, as illustrated in Table 7 and Figure 4. Investments in India can considerably increase when India's GDP per capita reaches the US $1,000 level.

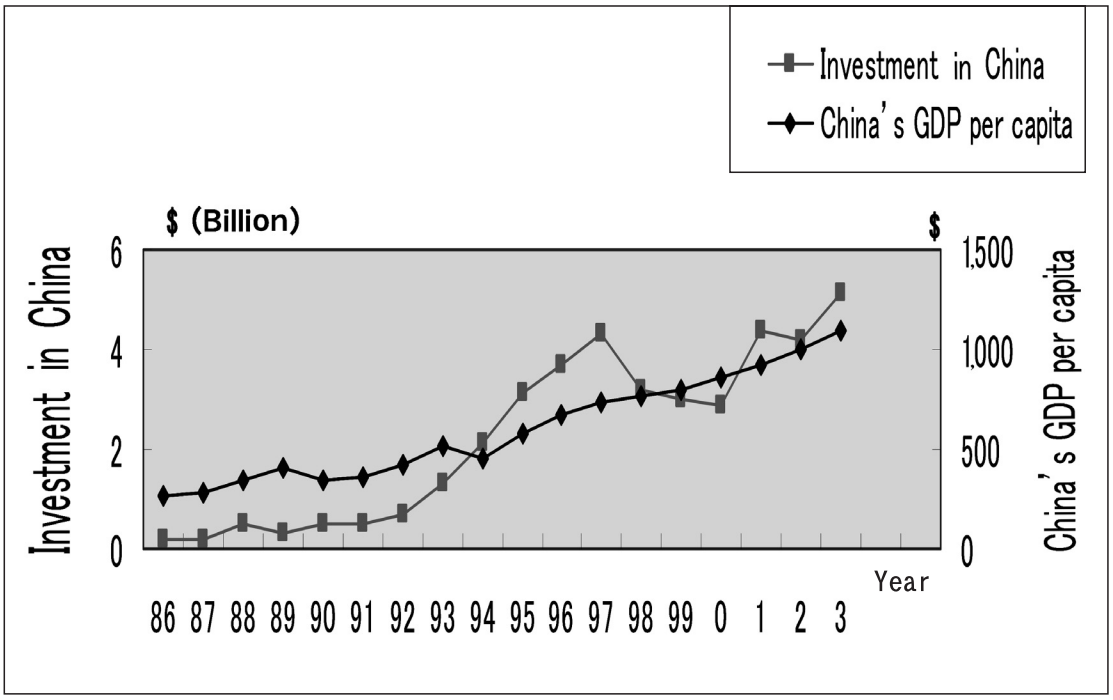
Table 7. Japanese Investment in China (U.S.$, Billion)

Year	86	87	88	89	90	91	92	93	94	95	96
Investment in China	0.2	0.2	0.5	0.3	0.5	0.5	0.7	1.3	2.1	3.1	3.7
China's GDP per capita	263	280	344	401	342	353	415	511	457	584	674

Year	97	98	99	00	01	02	03	04	05
Investment in China	4.3	3.2	3.0	2.9	4.4	4.2	5.1	5.5	6.5
China's GDP per capita	736	768	798	862	918	995	1,100	N.A.	N.A.

Source: Investment: Ministry of Finance, Japan.
GDP per capita: Statistical Yearbook, UN.

Figure 4. Japanese Investment in China (＄, Ｂ＄)



Source: Author, from the data of Table 7.

(2) The Framework for Global Manufacturing Strategy in Connection with Marketing

When the supply side of India as well as China is discussed, we should explore the global aspect of the supply side. The supply of any product or service from any nation to the global market can be made possible when any global corporation finds it possible to identify the supply location in such a nation. The author has developed a model for a global corporation to identify the best feasible location for manufacturing, in the global perspective.

The proposed "Framework for Global Manufacturing Strategy in Connection with Marketing" (KOSAKA, Hiroshi 2002) is first composed of consideration of a marketing site space and a manufacturing site space, which in turn consists of an economic level dimension and a cultural dimension, as illustrated in Figure 5. Following the diagram are the equations, in italics, for a corporation to use in order to identify the best manufacturing location in the global perspective.

Utilizing this model, we first discuss the hardware manufacturing in the supply side of the Indian economy in comparison with China. Then, we discuss the software aspect of the supply side of the Indian economy.

The final purpose of this model is to maximize the profit of a corporation as represented by PF (Performance) :

$$Max\ PF,\quad PF = Q_s\ (SP - TC) \qquad (1)$$

where PF (Performance)

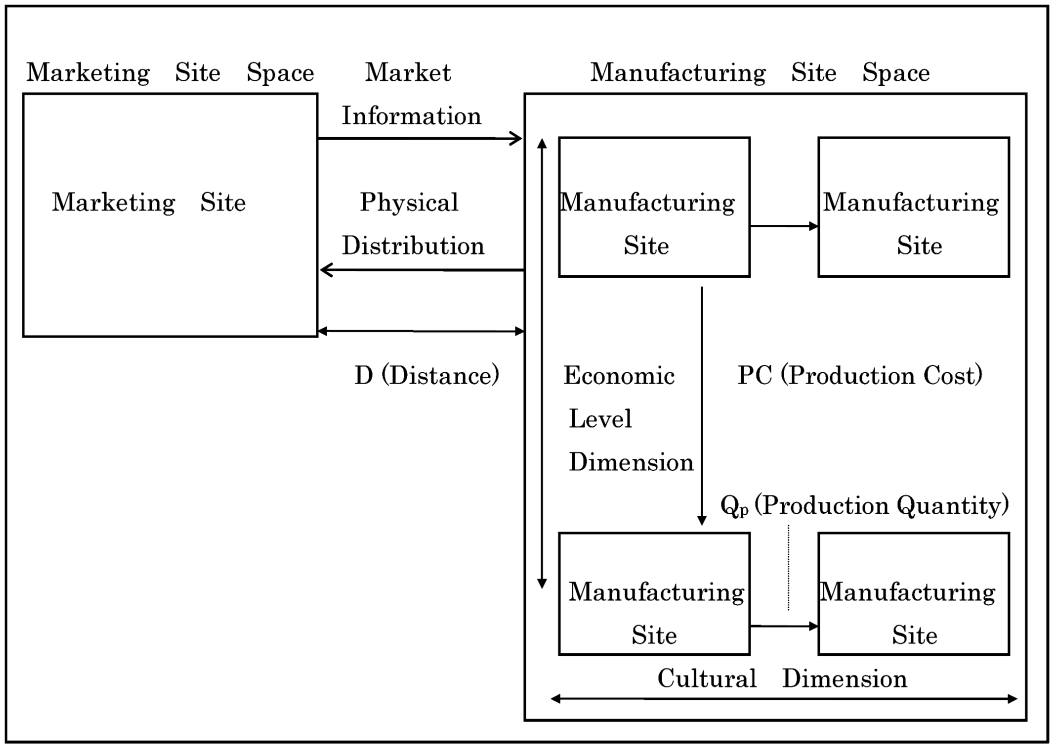
= Profit of a Corporation

Q_s = *Sales Quantity*

SP = Sales Price

TC = Total Cost

Figure 5. Framework for Global Manufacturing Strategy in Connection with Marketing



Source: Framework for Global Manufacturing Strategy in Connection with Marketing (KOSAKA, Hiroshi 2002).

In order to achieve the final purpose of the framework, (Q_s, SP : Uncontrollable),

MinTC, TC=F(PC,DC)=a_1 PC+a_2 DC (2)

where PC = Production Cost
DC = Distribution Cost
a_i = Constant

Minimizing the Production Cost along the Economic Level Dimension

Min PC, PC = G(LC/Q_p, CC/Q_p, MC) = a_3LC/Q_p+a_4CC/Q_p+a_5MC (3)

where LC = Labor Cost = Wage
CC = Capital Cost = Investment for Machine or Production Facility
MC = Material Cost per unit of product
Q_p = Production Quantity
a_i = Constant

(This model indicates that wage itself should not be the deciding factor for the manufacturing location selection, but productivity per wage unit – wage divided by production quantity – should be the deciding factor.)

Even after a company identifies the countries where it can minimize the PC, however, the company can still select one country from among countries with the same economic level by searching along the cultural dimension, where the highest production quantity (Q_p) can be attained with the difference of cultures. In the rigidity culture and the intensiveness culture (Kosaka, 1993, 2005)*, productivity is regarded more highly in terms of higher yield, whereas in the flexibility and*

extensiveness cultures, productivity is regarded less highly.

$Q_p = H\ (CRF,\ CIE),$ (4)

where CRF = *Rigidity-flexibility culture*

CIE = *Intensiveness-extensiveness culture*

After the PC is minimized, DC has to be minimized.

$DC = K(D) = a_6 D$ (5)

where D = *Distance between Manufacturing Site and Marketing Site*

a_i = *Constant*

$D = L(a_7/ICN,\ a_8/RDC)$ (6)

where ICN = *Information Collection Necessity*

RDC = *Relative Distribution Cost* = *DC / (Product Cost)*

a_i = *Constant*

(3) The Hardware Manufacturing Aspect of the Supply Side

One of the basic questions asked by global corporations is whether or not India can be a globally competitive manufacturing site. The model or framework above can also be utilized to answer this question.

When a global corporation is located in North America, Europe, or Japan, although the distance (D) from India is not a very favorable factor for the corporation, due to their relative geographical locations, it does not seem to be enough of a detrimental factor to exclude India from its list of candidates. If the corporation compares India with China, the key factors for the location selection will be the cultural factors influencing productivity: Q_p = H (CRF, CIE), assuming that LC

Table 8. Analysis of Japanese Investment Behavior in China (Year 2000)

Regional Classification By Average Annual Wage (Yuan)	Number of Establishments Owned by Japanese Industry (Percent)						
	Total	Food Drink	Textile Apparel	Electronics Machinery	Transport Machinery	Other Machinery	Other Manufacture
19,000 --- --- 10,000	2,203 (70)	159 (48)	522 (78)	421 (78)	131 (59)	224 (78)	746 (68)
9,900 --- --- 8,000	665 (21)	125 (38)	110 (16)	83 (15)	57 (26)	45 (16)	245 (22)
7,999 --- --- 6,000	270 (9)	45 (14)	36 (6)	33 (6)	33 (15)	20 (7)	103 (9)
Total	3,138 (100) {100}	329 (100) {10}	668 (100) {21}	537 (100) {17}	221 (100) {7}	289 (100) {9}	1,094 (100) {35}

Source: Developed by the author from China Statistical Yearbook 2001 and Table of Japanese Establishments in China (Mitsubishi Research Institute).

(Labor Cost = Wage) and CC (Capital Cost) will be almost equivalent between India and China in future.

Many corporations have already acquired knowledge of the cultural characteristics of Chinese workers. Global corporations would also like to acquire the same kind of information on Indian workers, to help make decisions on location selections.

Once a global corporation has chosen India as its manufacturing location, the next question will be to identify the most suitable local area within India. For such a choice, the past investment behavior of Japanese corporations in China provides insightful comparisons.

Table 8 is a summary of the Japanese establishments in each region of China by wage levels. As clearly observed in Figure 6, Japanese investment is concentrated in the regions with the highest wages, rather than in those with the lowest wages in China.

As the above framework explains;

$$PC = G(LC/Q_p,\ CC/Q_p,\ MC) = a_3 LC/Q_p + a_4 CC/Q_p + a_5 MC,$$

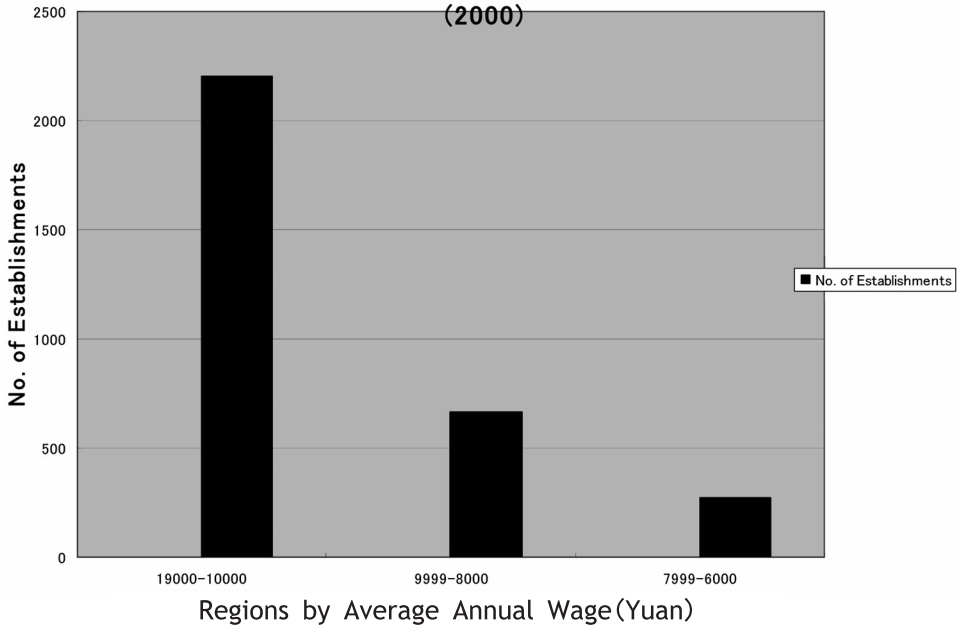
production cost is not a function of wage but a function of wage productivity, as well as of other factors. Wage productivity can be affected by various factors such as infrastructure. Although the model in the above framework is not directly proven by actual data, the statistics of Table 8 provide an indirect proof of the model.

The above analysis can provide valuable information to specify a supply location in India.

(4) The Software or Service Aspect of the Supply Side

Although India's economic level might be reaching the same level of China in the not-distant-future, the structure of India's economy is not exactly the same as that of China. The Indian economy is more service-oriented than China's, as indicated in Table 9 and Figure 7.

Figure 6 Analysis of Japanese Investment Behavior in China (2000)



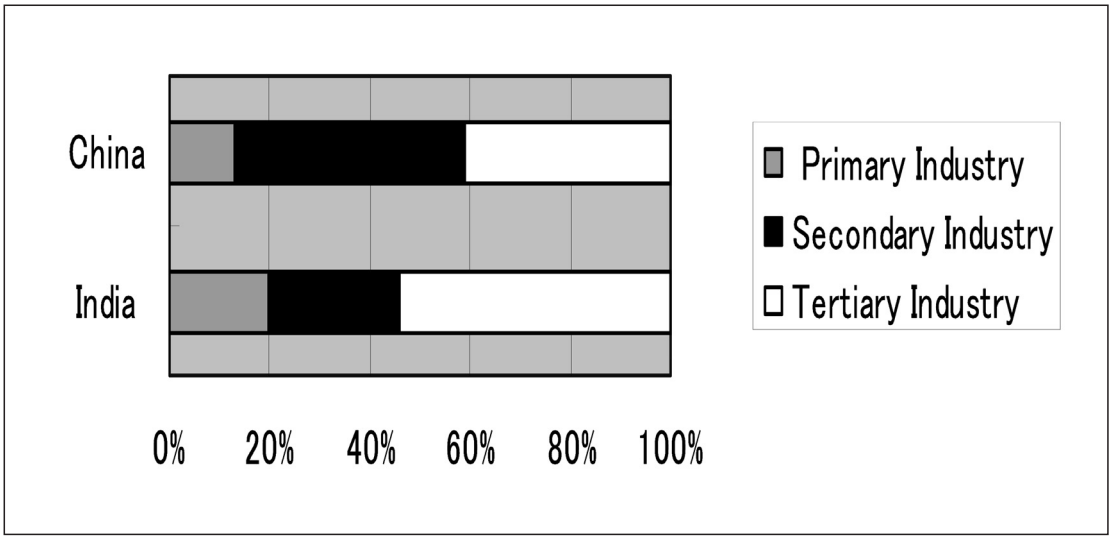
Source: Author, from the data of Table 8.

Table 9. Comparison of the Industry Structure between India and China

	Primary Industry	Secondary Industry	Tertiary Industry
India	20%	26%	54%
China	13%	46%	41%

Source: Ministry of Finance, Government of India, Economic Survey 2005-2006.
(Japan Chamber of Commerce and Industry)

Figure 7. Comparison of the Industry Structure between India and China (2005/6)



Source: Author, from the data of Table 9.

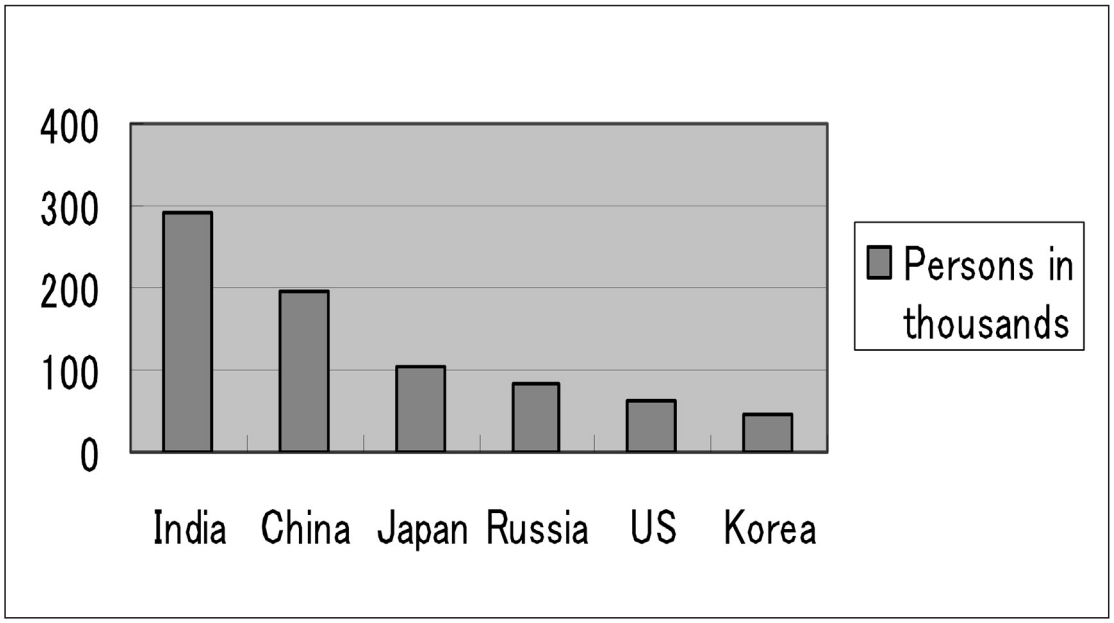
The number of university graduates from technological departments supports India's advantage in this field (Table 10), (Figure 8).

Table 10. No. of University Graduates from Technological Departments (2003)

Nation	India	China	Japan	Russia	US	Korea
Persons in thousands	292	195	103	82	61	45

Source: NASSCOM Website, "Resource Center."
(Japan Chamber of Commerce and Industry)

Figure 8. No. of University Graduates from Technological Departments (2003)



Source: Author, from the data of Table 10.

The IT industry in India employs above one million people, though its weight is only 0.1 % of the Indian population. Although the importance of the IT industry within overall Indian industry is relatively small, its competitiveness is globally renowned. While total exports from India amount to around US $80 Billion, the IT-related exports from India exceed US $16 Billion. Global corporations are eager to exploit India's IT industry. A considerable portion of investment in India is directed toward the IT industry (Table 11).

Table 11. Cumulative Investments in India until 2005 (Rupee, Billion)

Nation of investment	Mauritius	USA	Japan	Holland	UK	Germany
Amount	474	201	86	85	80	54

Source: SIA Newsletter,
(International Trade & Investment Whitepaper, JETRO, Japan).

Table 12. Major Items of Japan's Exports to & Imports from China in 2005 (%)

Export Item	(%)	Import Item	(%)
Chemical Products	(13.0)	Food (Seafood, Grain, etc.)	(7.6)
Material Products (Steel, Non-ferrous M., Textiles, etc.)	(16.5)	Materials (Wood, Soybeans)	(1.5)
General Machinery (Motors, Computer Parts, Milling Machines, etc.)	(21.3)	Fossil Fuels (Coal, Oil, Gas etc.)	(3.0)
Electric Machinery (Semiconductors, Parts, Audio-Visual Equipment, etc.)	(25.9)	Chemical Products	(3.9)
Transport Equipment (Automotive, Parts, etc.)	(5.0)	Material Products (Steel, Non-ferrous M., Textiles, Wood Products)	(12.1)
Others	(18.3)	General Machinery	(17.1)
		Electric Machinery (Parts)	(19.1)
		Transport Equipment,	(1.4)
		Others	(34.3)

Source: Ministry of Finance, Japan.
(International Trade & Investment Whitepaper, JETRO, Japan)

The Japanese business relationship with China is more hardware-oriented, as observed in Table 8 and Table 12.

Investment in India is also urged in Japan. Investment in manufacturing industries is one thing, but stronger attention is now being paid to the advantage of investing in the IT industry. Utilization of India's software industry by Japan is sharply increasing, both its utilization in India and in Japan. The number of Indian engineers working in Japan is greatly increasing, firstly in Western corporations operating in Japan and currently in Japanese companies in Japan.

3. Remaining Tasks

Further developments in India, both on the demand side and on the supply side, including software as well as hardware, should continuously be explored.

The significance of India, as well as that of China, will certainly increase in the world economy.

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