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Chapter 7

Capability Building Mechanisms of Manufacturing Firms in China and India: A Comparative Study of Motorcycle Industry

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Abstract

This chapter compares firm-level capability building system in the case of motorcycle industry in China and India. Observations in Taiwan will also be used to accentuate the contrast between the two. There are two layers of analysis; (1) interfirm mechanism to nurture important suppliers, and (2) in-house mechanism of nurturing their own personnel. As a conclusion, it is shown that the characteristics found in the two levels of observations are complementary factors that comprise a whole firm system. As the interfirm relations, India and Taiwan are forming well-coordinated mechanism of nurturing important suppliers by managing risks among them. But only in China, firms are forming "dispersed" or "isolated" mechanism under which they try to minimize risks by shifting it to others, and to give suppliers pressures to upgrade. At in-house level, in India, firms tend to nurture personnel internally by tapping into stable labor relationship and skill evaluation mechanism. On the contrary, Chinese firms use strongly incentive-oriented wage system which goes along the workers' high attrition rate. In China, both at interfirm and in-house level, firms and workers have accepted such strong incentive mechanisms, and they seem to have developed their ways to minimize the problems under them. Openness in utilizing social resources both in and outside firms in China, where firms and workers can find variety of transaction partners and jobs opportunities, seem to be one of the key factors that underlie the mechanism.

Keywords: interfirm relations, capability building, in-house skill formation, human resource development, China, India, Taiwan, Motorcycle Industry

1 Introduction

This paper compares and figures out the characteristics of the firm-level capability building mechanisms, both interfirm and in-house, in China and India by closely observing the operations of major indigenous motorcycle manufactures (maker) and their major components manufactures (suppliers) in the two countries. For the variety of comparison, the observation in Taiwan is also integrated in the analysis of interfirm relations.

This study assumes that the desire of the economic agents, either firm-level or individual-level, to upgrade their capabilities to meet the business demand is one of the main engines of industrial development. Under the assumption, the study examines how the skill/knowledge formation of both staffs and workers has been undertaken inside the firms, and how inter-firm organization of the division of labor supports the upgrading of manufacturing capabilities.

As stated in Introduction of this volume, the author assumes that the way the economic system is constructed influences the nature and the manner of building capability/knowledge, and the latter also determine the future direction of the former (North 1990). By closely observing and comparing the sets of capability building mechanisms, both in-house and interfirm, we can expect to highlight the different natures of the society in the backdrop of them. This is the final aim of this chapter.

However, as an interim report, all the author can do at present shall be to depict the whole images of our research target. After introducing the data and background information of the industry, two research results will be demonstrated, (1) interfirm relations, and (2) in-house skill formations mechanism. The field research to tackle with the former was mainly done till 2004 in China, India, and Taiwan, and the latter was mainly out of the survey done after 2006 to 2008 in China and India.

2 Data and Interviewed Firms

Concerning China, we mainly observed Grand River Group Co., Ltd. (hereafter Grand River), China Jialing Industrial Co., Ltd (hereafter, Jialing) and Chongqing Zongshen Motorcycle Group Co., Ltd.(hereafter, Zongshen), and their 22 important suppliers (6 for Grand River, 7 for Jialing and 9 for Zongshen) that have or had specifically close relationships with them. Grand River is a private manufacture established in 1991 by

then the top engineer of other state-owned large motorcycle maker. It has enjoyed the largest production size in China successively since 2003. Jialing is a state-owned large maker that initiated the development of Chinese motorcycle industry as a pioneer since the late 1970s and used to have been the largest maker from 1980s to mid 1990s. Jialing deteriorated its market performance in the latter half of 1990s, however, it still have been one of the top several manufactures in China. Zongshen is a young maker which was established and began motorcycle production in mid 1990s. It is one of the most typical and successful privately-owned makers that grew very rapidly in the late 1990s by purchasing and assembling external standardized parts of existing dominant models. Jialijng represents traditional state-owned large makers that used to form an integrated interfirm organization in 1980s, whereas Zongshen represents new makers that utilized dispersed interfirm relations in 1990s. The author conducted surveys on these two makers and their suppliers twice, firstly in 1998-99 and secondly in 2002-04, and observed the changes during the interval period (Ohara 2006). Many of the suppliers that the author surveyed at that time now sell the largest part of their production to Grand River by declining the portion of Jialing or Zongshen in their productions for some reasons. In the latest survey conducted during 2007-08, the author re-organized the survey results as the three portions, 6 for Grand River, 7 for Jialing, and 9 for Zongshen.

In India, Bajaj Auto Ltd. (hereafter, Bajaj) and its 10 important suppliers were surveyed. For a comparison, Hero Honda Ltd. (a maker capitally affiliated by Honda, hereafter, Hero Honda) and other suppliers which are in close transaction relationships with Hero Honda, TVS, and second-tier suppliers were also surveyed.

Concerning Taiwan, Kwangyang Motor Co., Ltd. (hereafter, KYMCO) and its 6 important suppliers were observed in 2004 and 2005. 4 out of 6 suppliers surveyed were capitally affiliated by KYMCO. In Taiwan, Yamaha Motors Taiwan Co., Ltd.(hereafter, Taiwan Yamaha) and its important suppliers were also surveyed to make a comparison with KYMCO.

An outline of surveyed firms is presented in the Appendix.

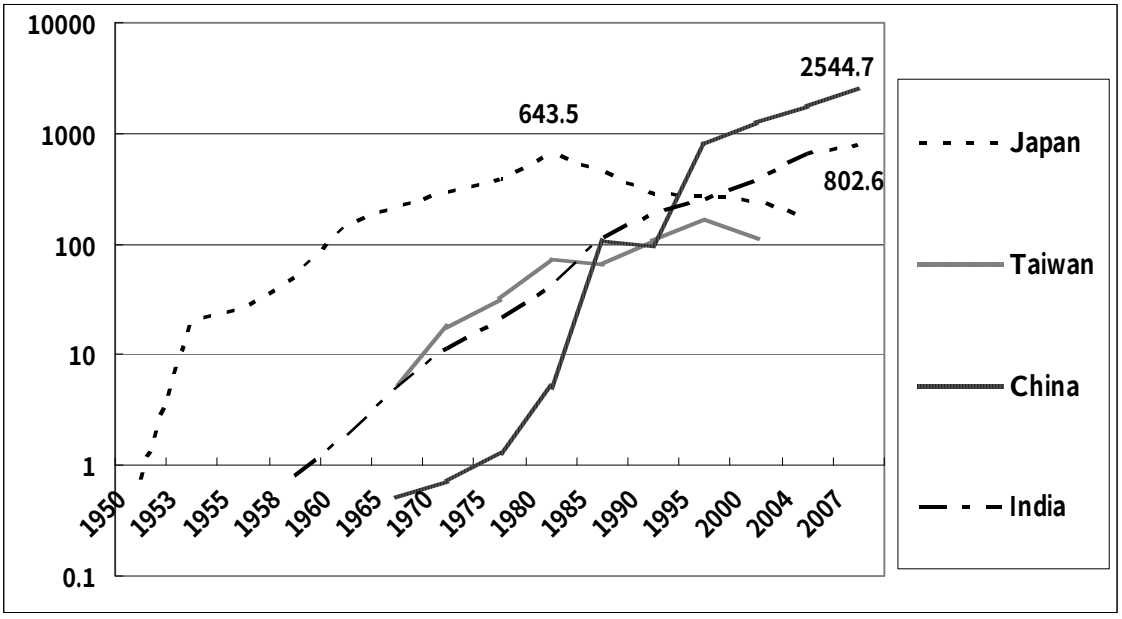
3 Overview of the Motorcycle Industry in the Three Countries

Almost 90% of world motorcycles are now produced and consumed in Asia (production-unit-wise), and 25 million motorcycles, more than a half of them, are

produced in China, and 8 millions, about 1/4 of them, are produced in India in 2007 (Figure 1). While the size of motorcycle production in Taiwan is not large (about 1.5 million), Taiwanese motorcycle has strong international competitiveness in the mid-ranged segment. And the per capita penetration rate of the products in the domestic consumption is the world highest[1]. These three countries occupy critical and unique positions in the world motorcycle industry.

Figure 1**:** Motorcycle Production of China, India, and Taiwan

(1000 unit)



Note: Y-axis is in Logarithm

Sources: ZQGNB(various years), CCYAH(1998), Shih and Chen(2004), and SIAM (various years), Honda (various years).

It should be noteworthy that, in these countries, indigenous makers stand in the leading position in the industry in each country (Table 1 and Figure 2).

In Taiwan, three private makers, KYMCO, Sanyang Motor Co., Ltd. (hereafter, Sanyang), and Taiwan Yamaha occupy about one third of market share each, with the sum of their shares exceeding 90% (Figure 3). KYMCO, along with Sanyang, is the oldest motorcycle maker in Taiwan. KYMCO and Sanyang started their motorcycle production with specific assistance from Honda, both at first started their business as Honda's exclusive importers of motorcycle products, and afterwards become motorcycle producers with gaining capital from Honda respectively. However, Honda

[1] 1.9 persons own one motorcycle in Taiwan. The domestic market is almost occupied with domestically produced motorcycles

has retrieved its capital from the two makers in 2000s, after these two became technologically independent from Honda.

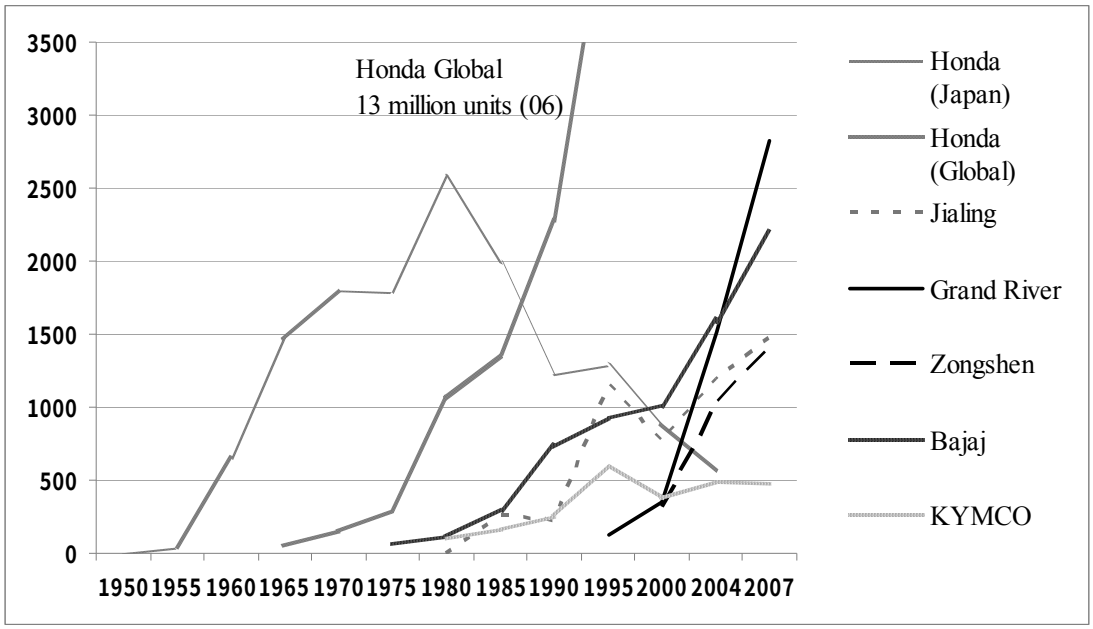
Table 1: Motorcycle Manufactures in China, Taiwan, and India (2006-07)

		Main Makers	Foreign Capital Share	Production (1000 unit)	Share (%)
China	1	Grand River Group Co. Ltd (Grand River)		2825	11.1
	2	Loncin Holdings Ltd.		1807	7.1
	3	Chongqing Jianshe Motorcycle Co.,Ltd.		1593	6.3
	4	Chongqing Lifan Industry (Group)		1571	6.2
	5	China Jialing Industrial Co.Ltd (Jialing)		1481	5.8
	6	Chongqing Zongshen Motorcycle Group (Zongzheng)		1394	5.5
	7	China Qianjiang Group Co.,Ltd.		1351	5.3
	8	Luoyang Northern Ek Chor Motorcycle Co.Ltd.	Thai Ek Chor	932	3.7
	9	Sundiro Honda Motorcycle Co., Ltd.	Honda 50%	888	3.5
		about 140 other makers (registered)			45.6
India	1	Hero Honda Motors Ltd.	Honda 26%	3207	39.3
	2	Bajaj Auto Ltd (Bajaj)		2202	27.0
	3	TVS Motor Company Ltd.		1352	16.6
	4	Honda Motorcycle & Scooters Ltd.,	Honda 100%	883	10.8
	5	Yamaha Motors India Ltd	Yamaha 100%	300	3.7
	6	Kinetic Engineering Ltd		74	0.9
	7	Enfield India		37	0.5
		a few makers			1.3
Taiwan	1	Kwang Yang Motor Co., Ltd (KYMCO)		478	33.8
	2	Yamaha Motor Taiwan Co., Ltd	Yamaha 51%	396	28.0
	3	Sanyang Industry Co.,Ltd (SYM)		374	26.5
	4	Tai Ling Motor Co., Ltd	Suzuki 40%	82	5.8
	5	Motive Power Industry Co., Ltd		41	2.9
	6	Her-Chee Industrial Co., Ltd.		15	1.1
		a few makers			1.9

Sources: ZQGNB (2008), SIAM (2008), Honda (2008).
Note: China and India for 2007, Taiwan for 2006.

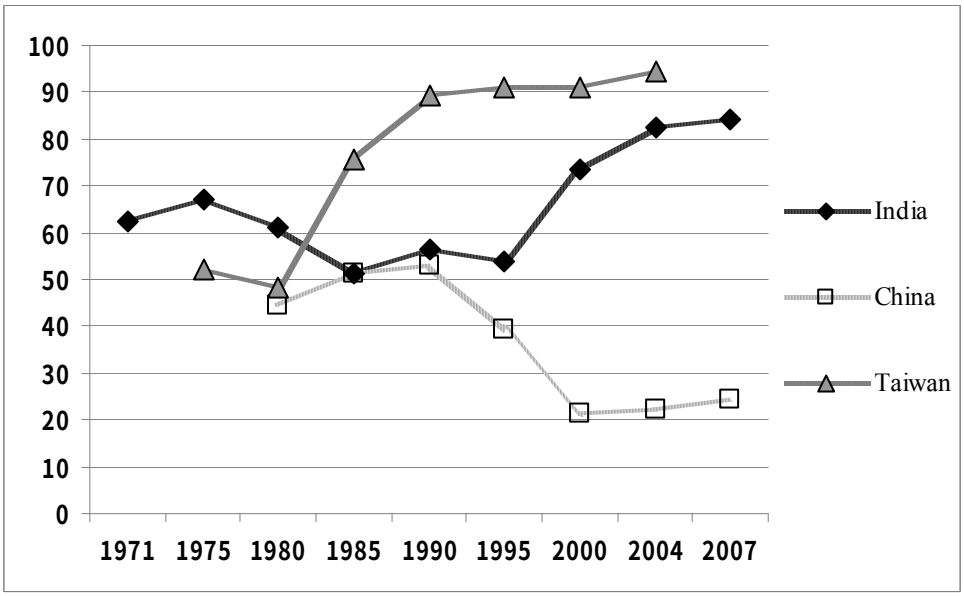
In India, the number of motorcycle maker in the domestic production is larger than in Taiwan, but 75% of the market share is still occupied by top 3 makers (Figure 3). Bajaj is India's oldest and most leading motorcycle maker, and, though it was overtaken by Hero Honda in market share from the mid 1990s, Bajaj is still no. 2 and is increasing its market share steadily in recent years.

Figure 2: Production of Asian Major Motorcycle Manufactures (1000 units)



Sources: ZQGNB (various years), SIAM (various years), CCYAH, IEKC-ITRI (various years), Honda (various years)

Figure 3: The Share of Top 3 Motorcycle Manufactures in China, Taiwan, and India (Production, %)

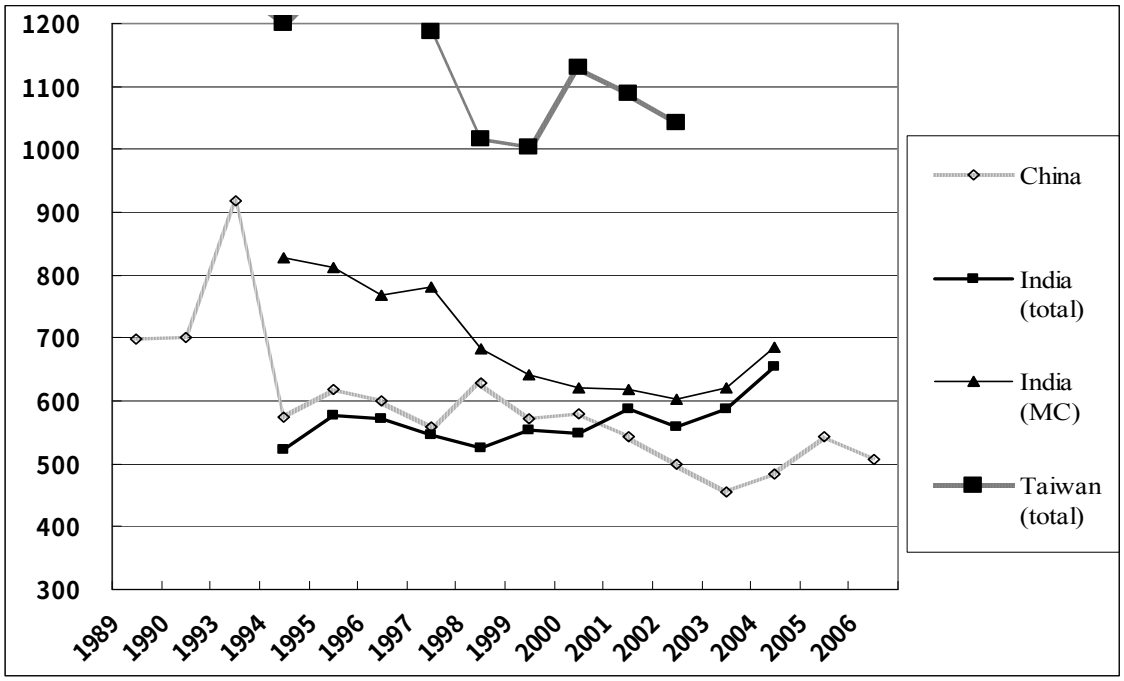


Sources: ZQGNB (various years), SIAM (various years), CCYAH, IEKC-ITRI (various years)

The picture of the Chinese motorcycle industry is very different from those of Taiwan and India. There are more than 150 officially-registered makers and their market share is fairly dispersed (Table 1 and Figure 3). No single firm has large enough market share to influence the rest. Jialing used to have as large share as around 1/4 until early

1990s. At that time, 80% of the market had been occupied by 10 largest firms, and all of them were state-owned firms. However, as domestic market expanded in an unprecedented pace in mid 1990s, many new makers which were very competitive in price, including Zongshen, emerged and many of traditional state-owned makers including Jialing declined not only in market share but also in absolute size. It is after the rapid expansion of Grand River that the share of top producers become slightly concentrated (Figure 3) after 2003. Now Grand River has become the largest indigenous motorcycle maker in Asia (excluding Japanese). It is noteworthy that, only in China, the share of Japanese-affiliated makers is very minor (the total sum of the shares of 9 Japanese-affiliated makers in China is as small as 10%).

Figure 4: The Average Motorcycle Price in China, India, and Taiwan
(Average shipment price, nominal, USD)



Notes: Avarage shipment price calculated by dividing total shipment (value) by shipped units of motorcycles. For India, production value is used due to the unavailability of sales of the industry.
Sources: China; ZQGNB various years, India; CMIE, 2001 and 2006

There is a large disparity in the motorcycle industry between China and Taiwan/India in terms of the harshness of price competition. In India, sharp drop in motorcycle price can not be observed during 1990s (Figure 4).[2] But in China, the

[2] In Figure 4, the average price of all Indian motorcycles, signified as "India (total)" has not shown significant price decline in 1990s, whereas the price of "100cc and 125cc," which is signified as "India (MC)," declined significantly during the period. This is because, the type of motorcycle was introduced in India newly and the initial market share was very small in the

average price has fallen as much as 40% during the 10 years from the early 1990s, despite the fact that their main products were upgraded from 100cc to 125cc during the same period.

One of the critical technical reasons of China's sharp drop in motorcycle prices was that, since 1990s, numerous makers have produced redundantly the "imitations" or "minor-change versions" of a few standardized (dominant) models (which are originally developed by Japanese makers) (Ohara 2001). In Taiwan and India, leading makers especially KYMCO and Bajaj develop and produce their own models equipped with their originally designed engines, and such a blatant and harsh price competition among many homogeneous makers experienced in China has not been observed in the two countries. The status has not changed fundamentally in the latter half of the first decade of 2000s.

4 R&D Activities in the Motorcycle Makers

This section briefly overviews the different status of the innovative activities and capabilities of the motorcycle makers, Grand River, Jialing, Zongsheng, Bajaj, and KYMCO. By innovative activities, as stated in the introduction, this paper mainly focuses on their product development activities.

In fact, all the motorcycle manufactures in this study except for Zongshen had or have entered in the GPN of dominant Japanese motorcycle giants, such as Honda, as local final assembler of motorcycles and in some cases as distributors.

KYMCO started their business as an exclusive distributor of Honda in the late 1950s and, under the government's encouragements, turned to be the motorcycle assemblers after accepting Honda's capital and technological supports in 1963. The basic technological target after that was to nurture production capability to maintain the quality standard in Taiwan market and substitute imported parts by local parts to cut cost and satisfy government's localization requirements. After the financial crisis in the

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beginning of 1990s. It was expensive since the product was sold in a small number and the level of parts localization was also low. However, as the type of motorcycle become the main products of the market, taking place of the old products such as small scooters and mopeds, and as the level of parts localization increase, the price declined and the price trend of this category becomes almost the same as the India (total), meaning that it mostly represents the all the products in the market. Importantly, the average price has come to increase continuously after entering 21st century, which is opposite to the Chinese status.

1980s, KYMCO decided to launch its own product development without Honda's assistance. KYMCO's target was to cultivate foreign market by new products, which is completely out of Honda's aim since Honda did not want a competition arose in any other foreign markets by newly exported products from Taiwan. KYMCO got assistance from governmental industrial research institute, Industrial Technology Research Institute (ITRI), and launched R&D project with rival company, Sanyo, and Japanese related suppliers (which will be explained later). During 1990s, KYMCO gradually expanded its new products line-ups, especially in large-size engines mainly to Europe and US markets. Now it is technologically independent and competitive even to Japanese motorcycle manufactures in scooter segment from small to large size engines. The R&D ratio (R&D expenditure to sales) is as high as 6%, which exceeds the level of Honda and Yamaha (Table 2).

Table 2: R&D Status of Asian Motorcycle Makers

		R&D Expenditure		In-house R&D Engineers	Tech. Collabolation	Latest Tech. Achievement
		ratio/sales	mill.USD			
China	Grand River	na	na	260	Suzuki, Euro	
	Jialing	2	8	250	Honda, Euro	600cc, SP explosion
	Zongshen	2	19	300	Euro, Piagio, US	400cc, 250cc, racer
India	Bajaj	1.4	24	400	Kawasaki, Jap. Euro	DTS
Taiwan	KYMCO	6	40	410	Gov't Inst. Japanese suppliers, Euro	500cc, 700cc
Japan	Honda	5	320	1500		
	Yamaha	5	220	1300		

Sources: Interview by the author in above firms, Annual Report of Bajaj Auto Co.(2007), ZQGN (2008).
Note: R&D Expenditure is annual, Chinese makers and Bajaj for 2007, KYMCO for 2005

Bajaj started motorcycle production in scooter with the technological assistance from Piagio in 1970s. Thickly protected by the "license-raj" of Indian government, it enjoyed fairly preferential competitive environment till the economic liberalization. However, after the new competitor, Hero-Honda, Honda's affiliation in India, emerged in 1980s, Bajaj also started to prepare for the new era of competition by collaborating with another Japanese manufacture, Kawasaki in the field of motorcycle product. After the re-organization of supplier (which will be explained later), it strengthened its R&D capabilities especially after the late 1990s. Now, as table 2 shows, it enjoys the largest number of R&D staffs in Asia (excluding Japanese). The outcome of R&D activities are also prominent, releasing a new engine system with "digital twin spark" engine for more efficient fuel usage in 2005, and other new engines in small displacements under

150cc. Now Bajaj is recognized by Honda and Yamaha as strong competitor not only in cost and sales, but also in technological frontiers in small scale engines which is suitable in Indian market.

Many Chinese manufactures also have technological collaboration with Japanese dominant manufactures. Jialing had technological assistance from Honda since the early 1980s and established with Honda one jointly capitalized motorcycle manufacture. Grand River also has strong technological collaboration with Suzuki and has established jointly capitalized R&D center under it. It also launched new large scale motorcycle factory with Suzuki in another part of China.

However, in contrast to Indian and Taiwanese counterparts, they are not deemed as technologically (in terms of R&D in product) strong competitors by Honda and Yamaha. For example, Grand River, which is the largest manufacture in the world except for Japanese affiliated company, is rather decent in its expansion of R&D capability. It has two R&D center; one is for Suzuki's brand and one is for its own brand. The former is under the supervision of Suzuki's global R&D operation and thus Grand River can't control, though it can learn elements of the R&D activities, whereas it can't learn the whole R&D processes. The focus of its own R&D center is how to adapt to local market, especially in rural and small scale city areas, and thus it is not interested in large scale engines or other cutting-edge new functions.

Jialing and Zongshen are more challenging in adopting new technology into their products, and the two show apparent interest in larger engines such as 400cc, 600cc, or racers. They already started collaboration with European manufactures and distributors and trying to expand their export. However, the outcome of such challenges is not apparent yet. The export of the two, especially that of Zongshen is still mainly to the low-end world market such as Africa or other low-income countries and the product is C100, old and very standardized model of Honda which was originally developed in late 1950s by Honda. As table 2 shows, the size of R&D activities is not large, both in terms of the size of expenditure or personnel, compared to KYMCO and Bajaj.

As typically shown in Grand River's attitude, main target of R&D for Chinese makers is domestic market (mainly rural market) and other low-end world market, which in general does not require latest but costly technology. Rather, they prefer low cost minor-changes in the standardized technologies, which is basically the main target of Chinese R&D activities. As is shown clearly in the stagnation of Japanese brand in Chinese market, and the successful increase of Grand River at the same time, we should be noted in the technological appropriateness of Chinese makers in adapting to Chinese

market. And possibly important and remarkable innovations might be taking place in the Chinese R&D bases either in the field of product or production process. However, as far as the author observes, such innovations are still marginal ones and not original enough to appeal as "proprietary" innovations.

5 Comparison of the Mode of Networking: Interfirm Relations between Marker and Suppliers in Three Countries

This section compares the mode of production networking or interfirm relations in terms of how the participating firms are trying to build manufacturing capabilities between the final motorcycle manufactures (hereafter, maker) and their important first tier network firms that supply important parts to the maker (hereafter, supplier)[3] in China, Taiwan, and India. For comparison, we set two ideal types of the mode of networking, and compare the realities of different firms with the two to distinguish their organizational characteristics, similarities, and differences.

An "Integrated-type" is an organization of division of labor where the core maker sets a common target for suppliers, exerting active leadership over them in managing the mechanisms of incentives and monitoring to enhance the capabilities of the network as a whole. The risk of challenging the innovative activities, especially for the new product development, is also carefully managed by the core maker and distributed/dispersed within the network. It also can be described as "united development type" since they try to upgrade themselves in a united manner. "Dispersed-type" is an organization where the leadership of the core maker is weak, with fewer sharing of common goals and information/knowledge, and suppliers are seeking for their own upgrading of capabilities in an isolated manner. The risk of innovative challenge is also solely undertaken by the participating firms. We can call it as "isolated development type" as well.

[3] In Ohara (2001), the author has exemplified the clear difference in the patterns of forming interfirm relations in Japan and China. In Japan, manufactures have formed "integrated-type" (or "united-type") interfirm relations, whereas in China, major indigenous makers and suppliers have formed "dispersed-type" (or "isolated-type") relations (Ohara 2001, 2006). However, the studies did not advance further to explain the causes of such difference. And at the same time, by directly comparing firms in Japan, an advanced economy, and in China, developing country, it could not tell whether this gap has been caused mainly by the sheer difference in their developmental stages, or by other factors inherit to their characteristic economic systems or market society. This paper aims to make up for this weakness by comparing China with India, whose positions in the stages of economic development is more similar to China than to Japan. And by including another late-industrializer, Taiwan, may also help us to look into the problem.

The critical points to classify the two ideal types are following four[4]: 1) "maker's outsourcing structure"; how the maker divides in-house and outsourced parts, 2) "multi-sourcing" and "dependency"; how the maker gives competition to the rival suppliers that supply identical parts to the maker, 3) "risk sharing" and 4) "supplier development activities"; how the maker deal with suppliers directly in transactions. Point 3) shows how the risk arisen in developing new products is shared between them, and point 4) shows what kind of activities makers are initiating to upgrade suppliers' capability.

4.1 Maker's Outsourcing Structure and Dependence on GPN

Table 3 and 4 show the makers' outsourcing structure, showing the statuses around 2007-08 for China and 2004-05 for India and Taiwan, and the trend of change at that time. Changing direction of China in the tables is judged by comparing the first survey in late 1990s and the second survey in 2003-04 (for the detail of China, see Ohara 2006), and the third survey in 2007-08.

4.1.1Degree of the Dependency on Outsourced Parts and Suppliers

The outsourcing ratios[5] of KYMCO, Jialing, Zongshen are lower than Japanese makers. Jialing, as a typical large scale state-owned enterprise from planned economy era, has a tendency to produce important parts in-house. KYMCO has established several affiliated suppliers in collaboration with Honda's affiliated Japanese suppliers. However, KYMCO is increasing in-house parts production capabilities such as carburetor, which may be brought about by the recent stagnation of production.

It is noteworthy that Bajaj has fairly high outsourcing ratio, and this is the result of Bajaj's drastic transformation of purchasing policy under "vender rationalization policy". Bajaj used to produce in-house as much as 50% of necessary parts and to purchase the rest from as many as 1400 suppliers in mid 1990s. The outsourcing policy at that time was such that; they produce by itself as much as possible, purchase critical parts from foreign affiliated suppliers or import from abroad, and use many suppliers to make unimportant parts. However, from the late 1990s, it began to switch many in-house processing to outsourced parts,[6] and re-organized "flat-layer"

[4] This section is based on the analytical framework of Fujimoto (1999).

[5] The ratio of purchased material/parts cost to the manufacturing cost. The author acquired this data though his own interviews, however, some of interviewees may be misunderstood the definition.

[6] Suppliers i-3 and i-5 in this study employed staffs who spun-off from Bajaj during the

type supplier organization into more "multi-layer" or "hierarchic" type, by selecting capable 1st tier suppliers and arranging many others as 2nd and 3rd under them.[7] The primary aim of this re-organization is to enhance the capability of developing new models (Bajaj Annual Report 2002). By doing so, Bajaj can focus more resources to new model development activities, having more parts development activities outsourced to 1st tier suppliers. With such arrangements, Bajaj put emphasis on initiating activities to upgrade technological capabilities of suppliers.

Table 3: Outsourcing Structure of Asian Makers (1)

		Employee		Outsourcing Ratio	
			Change		Change
China	Grand River	11000(08)	↑	75	
	Jialing	6000(08)	13000(99)	65-70	
	Zongshen	4500(08)	↑	70	↓90(03)
Taiwan	KYMCO	2100(04)	↓	70	↓
India	Bajaj	10000(08)	21000(97)	85	↑50(90s)
Japan	Honda	25700(06)		80	
	Yamaha	23100(06)		75	

Sources: Interview by the author, Annual Report of Bajaj Auto Co. (various years).

Table 4: Outsourcing Structures of Asian Makers (2)

		No. of Suppliers		Affiliated Suppliers (cap.relations)	
			Change	No.	Foreign Collab.
China	Grand River	380	↓	5	0
	Jialing	350	↓	5	1(cab)
	Zongshen	500	↓700(90s)	several	0
Taiwan	KYMCO	130		6	6 (cab., sus., cru., elec., etc)
India	Bajaj	210	1400(97)	0	0
Japan	Honda	200		>30	
	Yamaha	200		several	

Sources: Interview by the author, Annual Report of Bajaj Auto Co. (various years)

Zongshen has fairly high in-house policy at present. However, it had very high outsourcing ratio as high as 90% until very recently. As stated above, high outsourcing ratio was the result of their technological characteristics when they started their business in 1990s. They started their business being dependent heavily on the "de facto standardized" parts (meaning, imitated commonly by very large number of firms)

process.

[7] Supplier i-7 became 1st tier supplier of muffler unit during the process.

purchased from large number of local suppliers in Chongqing. However, it should be noted that, as the requirement for quality and new product development increased mainly from 2000, Zongshen has increased the kind of parts manufactured/processed in-house. In particular, after completing the "Zongshen Industrial Zone" project where it established important parts production bases in 2005, it has significantly increased the in-house ratio as high as 30%.

Grand River's outsourcing structure is almost the same with Japanese counterparts.

A common characteristic aspect observed in three Chinese makers is that they use more suppliers than others. The recent number of suppliers they use for Grand River is 384, Jialing 300 and for Zongshen 500, and they used to transact with even larger number of suppliers in the late 1990s. This is the result of their "multi-sourcing" policy, as will be discussed soon.

4.1.2 Affiliated Suppliers-Intention to Build Own Technological Bases

One very interesting characteristics of KYMCO is that, among its 6 affiliated suppliers, all are capitalized by Japanese parts suppliers, in particular by Honda's related suppliers. One of the most critical parts for motorcycles, carburetor, is supplied by the manufacture which is established by KYMCO, Kehin, Honda's affiliated supplier, and Sanyang, largest rival of KYMCO. The other jointly-capitalized suppliers with Japanese companies include suspension (cushion), clutch, meter, and other electronics devices, all of which are essentially critical parts of motorcycle. These joint-capitalized suppliers were established during 1970s-80s to substitute the imported parts from Japan. And the critical point is that these suppliers have become the bases of the newly developed products of KYMCO and Sanyang during 1990s. Taiwan's motorcycle manufactures had a great advantage in utilizing a part of the original development capability of Japanese suppliers through these affiliated suppliers in Taiwan.

On the contrary, though Chinese three makers also have a few affiliated suppliers, but most of them are nothing to do with foreign companies. Only one exception is a carburetor supplier established between Jialing and Japanese Mikuni, which also has a strong expertise in the field. However, according to the author's interviews, Jialing has had little interventions to the management of the company except for imposing the profit target, and for the company Jialing is not important in terms of the volume of transaction anymore. Instead, its most important customer is now Grand River and it recently established a factory near to the Grand River to assist its new

product development.

The intention of the Chinese makers to establish affiliated suppliers does not seem to be the result of some strategic decisions to have important suppliers which assist their product development. For example, Grand River has 5 affiliated suppliers in CVT (for scooter), cushion (suspension), seats, air-cleaning parts, and electric plating process. All of them are either for the purpose of cutting cost by substituting the imported parts or the parts of domestically unstable supply in terms of quantity and quality, and most of them do not have strong enough competitiveness compared to the outside expertise suppliers[8]. There does not seem to be any intention in Chinese makers to depend on the powerful international players for several critical parts, in particular with a view to strengthen their development capability.

In this point, Indian Bajaj is more similar to Chinese counterparts, with almost zero affiliated suppliers with it. However, as will be analyzed later, Bajaj tend to have close and closed relationship with key suppliers, and, though capitally not related, it has several very critical parts suppliers (indigenous) of closed relationships in such areas as cushion (suspension), clutch, engine parts, and plastic cowlings. Bajaj seems to be trying to be technologically independent from foreign (in case of motorcycle, Japanese) powerful suppliers. In terms of the strong will to have its own supplier base for further capability both in terms of product development or manufacturing (quality control), Bajaj is more similar to KYMCO, but in terms of the independence from foreign capitalized suppliers, it is more similar to Chinese counterparts.

4.2 Multi-Sourcing and Dependency Rate

"Dependency rate" in Table 5 is the (average) ratio of the sales to main transaction partners (5 makers of 3 countries) out of all the sales of main products[9] of the surveyed suppliers. Average dependency of Bajaj's suppliers (to Bajaj) is the highest, 70%, and that of Chinese suppliers is the lowest. The dependency rate of KYMCO is in the middle. Concerning the direction of change in the dependency ratio, the figure is in the direction of declining in China and Taiwan, whereas it is increasing in India. The "number of transaction partners" in Table 5 is the number of the maker that the supplier is in a transaction relationship simultaneously. The figure is smallest in India and the highest in China, too. In sum, transaction relationship is the most closed in India, the

[8] Interview by the author to the president of Grand River.
[9] Not the whole sales of the supplier. If the supplier is selling various kinds of products, the dependency on the maker in sales will be less than the figure appeared in the Table.

most open in China, and Taiwan falls in middle.

As for the situation of multi-sourcing, Bajaj utilizes single-source policy in most cases. This is noteworthy if the maker's recent very rapid expansion of production volume is remembered. By the author's interview, Bajaj said that they use single source policy with suppliers of 80 % parts. From maker's perspective, under the single source transaction, the maker can more easily conduct technical evaluation and monitoring of each supplier,[10] and from suppliers point of view, they can make commitment (transaction specific investment) with more confidence. However, since the supplier can enjoy the monopolistic position on the transaction of the parts, for the maker, there is the risk that moral hazard problem occurs in suppliers.

Table 5: Multi-sourcing and Dependency

		n	dependency ratio		no. of transaction partners		multi-sourcing of identical parts		
			(%)	trend		trend	single	two	>3
China	Grand River	6	24	↑	8.5	↑	0	5	1
	Jialing	6	15	↓	15.4	↑	0	3	3
	Zongshen	9	22	↓	20.4	↓	0	4	5
Taiwan	KYMCO	6	48	↓	5.2		4	2	0
	(all)	12	47	↓	4.9		9	2	1
India	Bajaj	7	71	↓	2.3		4	3	0
	(all)	8	75	↓	2.1		5	3	0

Source: Interview by the author.

According to the interview at KYMCO, their basic policy is to use two suppliers for one identical part. However, the most of the suppliers in this survey answered that their transaction with KYMCO is basically done by single-source-base. This may reflect the bias of sample caused by the fact that the suppliers surveyed by this study are mostly producing the critical parts and many of them have capital relationships with KYMCO.

In contrast, we could not observe any cases of single-source base transaction in China. Top management of Zongshen said to the author that "If we concentrate our transaction to one supplier, it is often the case that we can not control them. That is why we use two suppliers for every single parts." Jialing also answered in the same way. However, according to suppliers, the two makers often purchase an identical part from

[10] The maker can secure "traceability" of problematic parts, as well.

more than three suppliers. It is probably because the two-source policy of the top management is not completely penetrated into terminal staffs in charge of purchase for some reason.[11] However, we can also observe the trend that makers are concentrating transactions to smaller number of suppliers in comparison to the late 1990s, having the ratio of two-source transaction become higher than that time.

4.3 Risk Sharing[12]

Table 6 shows the way of sharing of development cost of new product (motorcycle parts). For the sake of convenience of observation, we discuss mainly the sharing of die/mold cost that occupies a significant part of development cost. In this table, "fully paid by maker" means that the maker with assurance undertakes the depreciation of all the die/mold cost. "Fully paid by supplier" means that the maker does not assure the depreciation.[13] In this case, if the products did not sold well, the loss will be undertaken fully by suppliers. In this sense, all the development risk is bored by the supplier. "Sharing" means that, by providing advanced payment or assuring a part of the mold/die cost, they are sharing the risk.

Table 6: Risk Sharing

		n	Dev't cost (die/mold)			Risk of dev't failure	Unpayment
			fully paid by maker	sharing	fully paid by		
China	Grand River	6	1	3	2	medium	non
	Jialing	6	0	2	4	high	sometimes
	Zongshen	9	0	3	3	high	sometimes
Taiwan	KYMCO	6	5	1	0	low	non
	(all)	12	8	2	2	low	non
India	Bajaj	7	2	1	4	low	non
	(all)	8	3	1	4	low	non

Source: Interview by the author.

[11] According to suppliers, such cases sometimes happen that maker's staffs in charge of purchase pursue personal benefit (bribe) and change arbitrarily the transaction partners.

[12] Analytical framework of this section is based on Asanuma (1989, 1997).

[13] Even when the depreciation of die/mold cost is not assured by the maker, if the new product sells in large enough volume, the supplier can complete the depreciation by adding it into selling price. However, if products do not sell well and could not complete the depreciation, the loss will be undertaken by the supplier that developed the new parts. In this sense, all the development risk is undertaken by suppliers in that case.

Table 6 shows that KYMCO undertakes most of the development risk of suppliers. According to the author's interview, KYMCO has institutionalized the mechanism of maker's risk absorption, under which suppliers are expected to make more commitment to product development. This is the same way as Japanese makers. Such a system can be manageable only in the situation where makers and suppliers share information/knowledge on the technology that suppliers use, and maker can make proper evaluation of the concrete cost of development based on the shared information.

On the contrary, Chinese makers force suppliers undertake most of the risk. When the development fails (meaning the product does not sell well in the market), suppliers take all the risk.

The failure rate of development is high in China. In particular, in the late 1990s, many suppliers answered that the rate of success (meaning the possibility the supplier can depreciate the development cost) was around 20%. Despite the high failure rate, during the period, since there were so many suppliers who seek for business opportunities, makers did not find difficulty to find transaction partners. In practice, suppliers also had measures to reduce their risk. Since their products were imitation or minor-change version of dominant models, suppliers could find other makers who would buy them. In addition, suppliers transferred their risks to their own (2^{nd} tier) suppliers in the same way. In 1990s, nonpayment behavior was so widespread over the business. When makers do not make payment to 1^{st} tier suppliers, the suppliers also do not make payment to 2^{nd} tier suppliers. Under such a circumstance, both the makers and suppliers were reluctant to make "transaction specific" investment, and their products become more and more "homogeneous" from parts level. Makers and suppliers were reluctant and actually unable to share technological information/knowledge between them. When defective parts were "found," makers simply returned them without analyzing true causes of the defections (meaning without knowing whether the parts were really defective) and even asked suppliers for compensations. However, it is noteworthy that, in 2003-04, the second survey in China revealed that more firms were beginning to share development cost compared to the late 1990s. Firms were more deliberate and using more systematic method to implement development projects, which made the rate of development failure decrease and had declined the risk of supplier significantly. Grand River is famous for its most deliberate attitude not to transfer risks to suppliers by deceiving them.

The cooperative system between Jialing and important suppliers until early

1990s should be mentioned here.[14] During the period from the early 1980s to early 90s (around 1993), Jialing had formed and managed with several important suppliers[15] a kind of closed group called "Jialing Motorcycle Economic Complex" (hereafter, "the complex"). The task of member suppliers was to localize the imported key parts of new models that Jialing introduced from Honda. Jialing coordinated the calculation of target cost of suppliers by sharing information with them. When some suppliers failed in achieving the goal, Jialing compensated a part of the losses from the pooled profit within "the complex" where Jialing exerted leadership in re-distributing them. In that sense, unlike after the late 1990s, Jialing had formed interfirm organizations with suppliers (though limited in number) where the maker played a central role in sharing risks among networks, by partly absorbing risks by itself, during 1980s. In the early 1990s, however, Jialing began to seek for maximization of production volume and the complex began to be dissolved.

Concerning India, according to Table 6, Bajaj's suppliers are also undertaking die/mold cost as in the case of Chinese firms. The difference with China is that failure rate of development is very low and nonpayment behaviors were not observed in Bajaj's case. In reality, it would to say that the development costs were virtually born by Bajaj, but the method of the sharing was not well institutionalized as in Taiwan.

4.4. Supplier Development

Makers can practice "supplier development" activities, by which the maker takes various kinds of measures vis-à-vis suppliers to promote their capability upgrading toward the directions that the maker expects (Leenders 1965, Krause 1997). "Supplier development" activities include direct measures to enhance transaction specific capabilities and indirect ones to develop infrastructural (multi-purpose) capabilities, including technological/financial assistance, personnel exchange, information sharing, stabilization of transactions (for ex. concentration of orders to specific suppliers), etc.

As mentioned above, under "vender rationalization policy," Bajai began to concentrate transactions to smaller number of 1st tier suppliers which have development capabilities. Since then, Bajaj has practiced several activities to nurture them. All the suppliers surveyed by this study participates TPM (total productivity maintenance)

[14] There are good literatures that introduced Jialing's interfirm cooperative system until early 1990s (ZMGB ed. (1995) and Zhang (1995)). The description here is mainly based on them but also is supplemented by author's interviews.

[15] In 1990, 12 suppliers were listed as formal members of the complex. 5 suppliers (c-3, 4, 5, 6, and 7) out of 7 surveyed by this study used to be the member.

activities that Bajaj has initiated since around 2000. Typical case of Bajaj's "supplier development" observed by the study is muffler supplier i-7. Before the policy change, Bajaj used to purchase parts related to exhaustion system from about 100 suppliers. However, from the end of 1990s, Bajaj designated 5 suppliers from them as unit parts (1st tier) supplier, and supplier i-7 came to manage the integration of many 2nd tier suppliers. Along with the change, i-7 accepted financial support at the initial phase and technical support form Bajaj including personnel exchanges. Bajaj also initiates technological learning of i-7 with 2nd tier suppliers.

An interesting point found in the survey about Bajaj's suppliers is that all the 6 metal-processing suppliers surveyed emphasized their effort in raising their own closely related 2nd tier suppliers, and they say some of the 2nd tier suppliers only make transaction with them. It is their endeavor to become superior 1st tier supplier with stable quality and delivery. The effort to raise 2nd suppliers was not very emphasized in the survey, not only in China, but also in Taiwan. This may suggest that in India, suppliers become weaker as the tiers descend in the hierarchy, compared to Taiwan and China.

Concerning KYMCO, except for the concentration of order to selected suppliers, concrete cases of the supplier development efforts were not mentioned during the survey. In particular, suppliers evaluate more highly about Taiwan Yamaha's activities, whereas, according to them, KYMCO is not active in supplier development and is not enough technically knowledgeable to do such arrangements effectively.

Several suppliers surveyed by this study include the ones that have capital affiliation from KYMCO, and they accept managers and, in one case (t-4), engineers from the maker. Most of the suppliers surveyed have ever introduced technology from foreign countries, in particular from Japan.[16] It seems that suppliers have strong tendency to pursue their development independently from KYMCO, compared to India's cases. Rather, it is KYMCO that have been actively utilizing the technological capability of suppliers, especially those of Japanese technological backgrounds.

Concerning Chinese three makers, like KYMCO, not many concrete cases of supplier development were observed during the survey, in particular in the late 1990s. Until 1980s, Jialing provided supportive actions to the member suppliers of "the complex" including technological training opportunities (via Honda) and financial support. However, in the late 1990s, such cooperative activities were seldom observed.

[16] 5 suppliers out of 6 KYMCO's suppliers, and 5 out of 7 other suppliers had technical cooperation (including capital affiliation) with foreign firms.

During 1980s, Jialing tried to nurture capable suppliers that can manufacture parts based on the design drawings developed by Honda. However, in 1990s, as many suppliers who had this type of capability emerged, Jialing came to find little necessity to raise such suppliers by themselves.[17] Jialing, at that time, also pursued massive expansion of production volume, and began to purchase parts from many suppliers since there were few large suppliers that could enough mass production capacity. In the late 1990s, however, disorder of supplier system caused by such changes brought Jialing a series of quality problems.

Grand River, on the other hand, was more active than Jialing in 1990s. Grand River's basic attitude for supplier development is "to wait patiently until they become competent". The strength of Grand River, according to the president of the company, is to directly apply what they learnt from Japanese manufactures, especially Suzuki and Honda[18], and does not pursue the rapid expansion but try their best to maintain the quality level. That was why the company was not one of the largest during 1990s.

Zongshen started to manage "quality assurance system" with its important suppliers with whom they established "Zongshen Group."[19] Under this scheme, Zongshen in collaboration with suppliers make operation standard, and engineers of Zongshen circulate routinely the suppliers and monitor whether or not they are operating properly as designated in the standard. However, in the second survey in 2004, such circulation was interrupted except for c-13. The reasons of interruption was that, since the capability raised by such system is an infrastructural (multi-purpose) capability such as production management, and since suppliers supply similar parts to Zongshen's many rivals, Zongshen found it does not pay for them. In 2004, however, Zongshen started a few new collective schemes in cooperation with important suppliers, including market (dealer) visiting project or discussion with material suppliers. Such collective coordination to enhance technological capability is noteworthy, though, at the time of the survey, they did such activities as ad hoc projects, not "routine" activities institutionalized in ordinary operations.

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[17] The member suppliers of "the complex" were all public-owned and were tended to be accused as "inefficient," compared to newly emerged firms. In fact, some suppliers also admitted their managerial inefficiency at that time during the surveys.

[18] Grand River has official technological cooperation with Suzuki since the early 1990s and the president was the head engineer of one state owned motorcycle manufactures when he was in charge of the technical cooperation with Honda in 1991.

[19] All the 7 suppliers surveyed in this study for Zongshen (c-8-14) were members of the "Group."

4.5 Summary: Modes of Interfirm Capability Formation

In sum, during 2003-05 and 2007-08 as well, Bajaj has formed a cooperative production network with important suppliers, which is the closest to typical "integrated type" than Taiwan and China. They shared risks and practiced active supplier development activities and have strengthened their integrity during this several years.

The production network of KYMCO can also be concluded as a kind of "integrated type," where the transactions are stable and the rule of the maker's absorption is well institutionalized. However, it is also true that their relationships are more open and supplier development activities are not active. The integrity of the relationships tends to be looser for this several years. In particular, historically speaking, it had been KYMCO that had tapped into the technological capability of suppliers, especially of Japanese affiliated suppliers.

On the contrary, the production networks of Chinese makers are "dispersed" type, in particular in the late 1990s. Their relationship has been more open and unstable, and the sharing of risks has not been practiced. In particular in 1990s, such tendency was prominent under the circumstances of very frequent failures of development and blatant risk transferring and nonpayment. However, after 2000, the relationship is transforming to the direction of "integrated type," as shown in our observations such as makers' higher concentration of order to less number of suppliers, less prominent risk transferring, and beginning of more systematic supplier development activities.

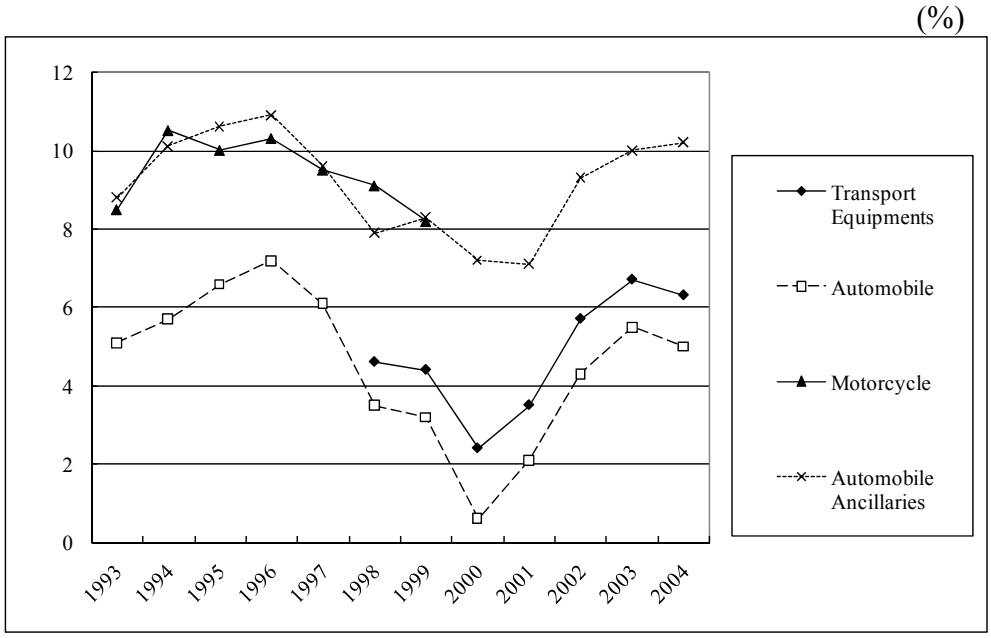
5 Comparison of In-House Skill Formation Mechanism

This section examines the ways of building capability inside firms in China and India. As the types of capability to analyze, this section focuses on the skill formation of staffs and workers in the motorcycle parts manufactures. The data of this section's are collected mainly from the interviews conducted in 2007 and 2008.

5.1 Profile of Operations

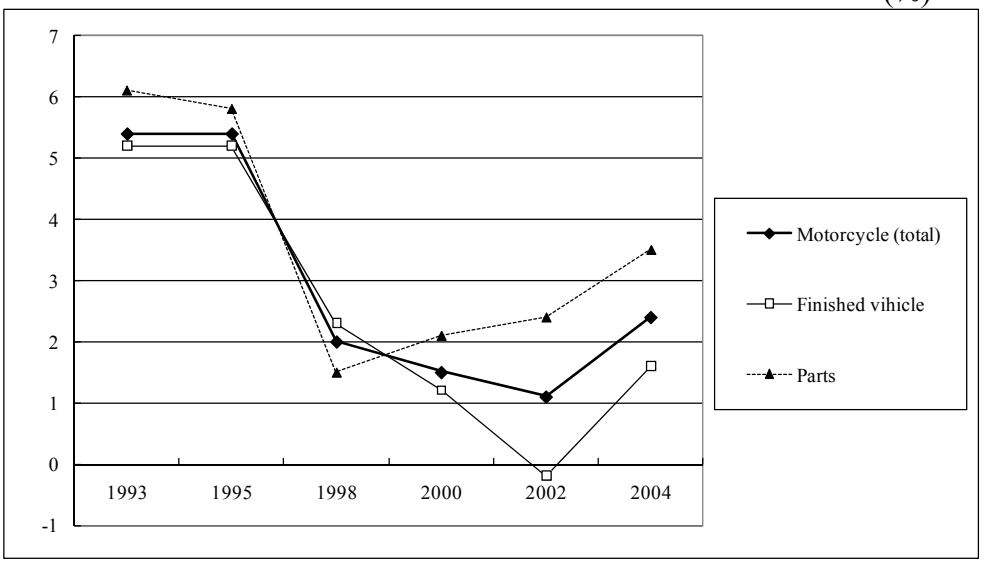
Firstly, the basic differences in the operation of parts suppliers between China and India are overviewed in this section. This is due to the assumption that the internal skill formation process and mechanism is considered to be closely related to the basic characteristics of their direction of management.

Figure 5: Profit Rate of Indian Auto Sector



Note: Operating Profit (after tax) / Gross Sales.
Sources: MOSP, various years.

Figure 6: Profit Rate of Chinese Auto Sector



Note: Gross Profit Margin / Gross Sales.
Sources: ACMR, various years.

5.1.1 Profit: Higher Profit Rate in India

Average "gross margin rate"[20] of 11 Chinese suppliers was 7.3%, whereas average

[20] Gross margin rate = total sales – manufacturing cost. This includes the sales and management cost and taxes.

"profit after tax" was 14.5% in case of 5 Indian suppliers that we could get the answers. It is generally said that, in order to secure positive final profit (after tax) for the manufacturing firms, the "gross margin rate" should be more than 10-12%. In fact, most of the Chinese suppliers that we interviewed said that their final profit is almost 0%.

The lower profit of Chinese motorcycle manufactures (and higher profit of Indian) can be examined by the larger publicized statistics in the similar industrial categories (Figure 5 and 6).

5.1.2 Expectation for Return: Slightly Longer Depreciation in India

Provably mainly due to the higher profit rate, Indian firms seem to expect to use slightly more years to recover their investments than Chinese. 16 firms in China expected 5.6 years on average to recover their new investment in equipments, 8 Indian firms answered to use 6.5 years for the purpose. Though we can't tell the significant difference from the data, however, considering the gap in their levels of profitability, Chinese counterparts seem to be more aggressive in recovering their investment. In particular, the suppliers answered that they usually used 1.5-3 years to recover in the early 2000s (around 2000-2003) when they were more profitable, which implies that, if they are more profitable, they operate the cycle of investment and re-investment more quickly.

5.1.3 Size of firms: employment, revenue, and production unit

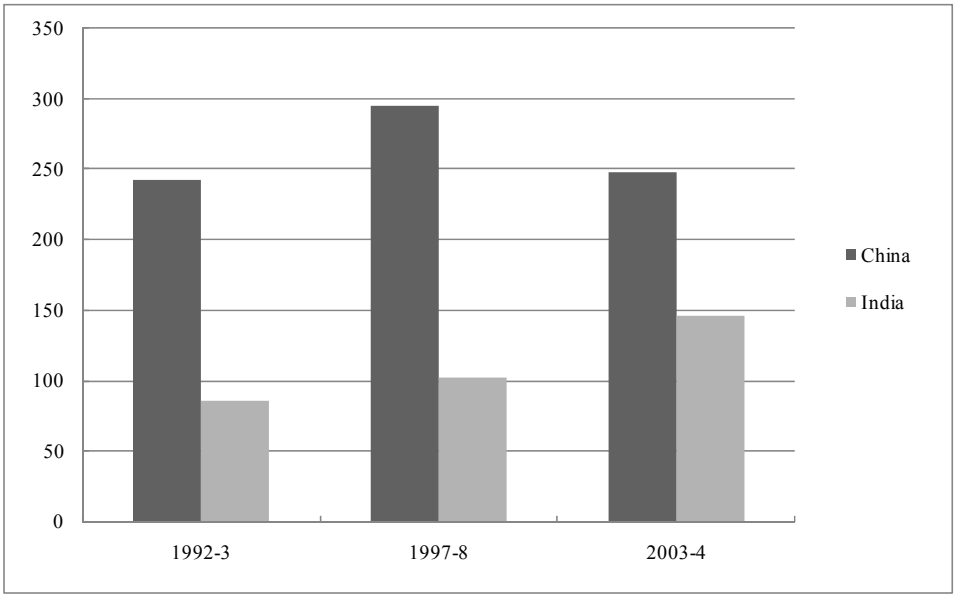
The average size of the parts suppliers investigated by the author is; (a) by employment size, 1585 employees per a firm (24 firms) and 640 employees for India (13 firms), and (b) by revenue size, 56.5 million USD for 11 Chinese firms and 56 million USD for 7 Indian counterparts. Interestingly, the revenue size is almost the same whereas Chinese firms employ more apparently employees.

The similar image can also be checked by the data of larger sample number. Figure 7 also shows that Chinese firms are apparently larger in employee size than Indians whereas in sales size they are more similar.

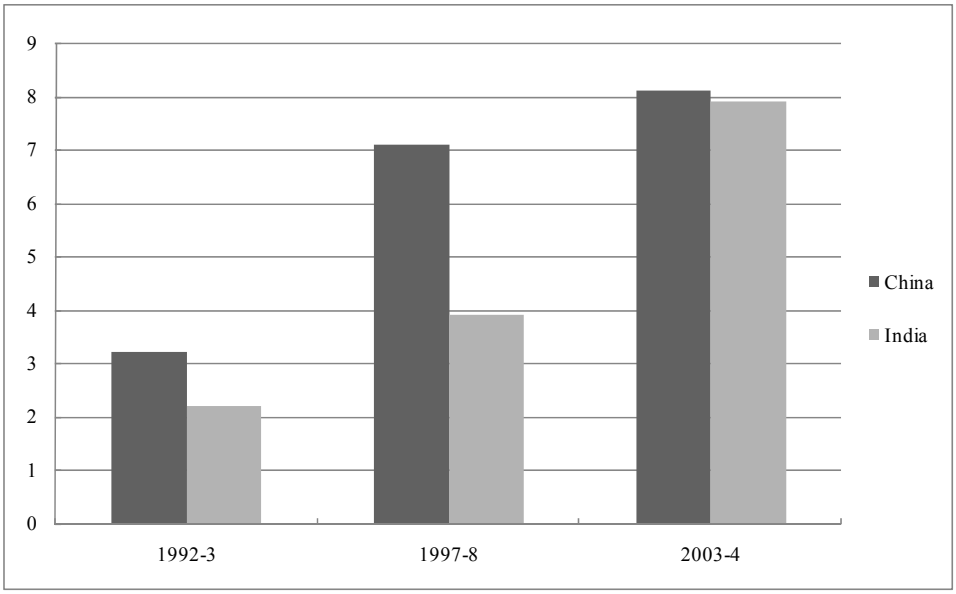
This is partly the outcome of the gap in profit between the two. However, the price (cost) of the production and production size (in unit) seem to be also decisive factor for this phenomenon. The cost can not be comparable between the firms of two countries since their products are all not the same. But for the production size of some similar company, there is difference. Chinese largest engine parts die-casting (alumi) manufactures produce as much as 7 to 12 million units, largest gear manufacture

Figure 7: Average Size of Motorcycle Parts Supplier in China and India

(1) Number of Employees Per Firm (Unit: persons)



(2) Sales Size per Firm (Unit: million USD)



Sources: For China (763 firms in 1993 and 1462 firms in 2004), ACMR, various years, for India (488 firms in 1992 and 590 firms in 2003), MOSP, various years.

produce 10 million sets of transmission gear units, and piston suppliers produce 9.5 million units, whereas the range of the production level of Indian counterparts is somewhat 2 to 3 million units for crank cases or transmission gear units. Usually, the size of production units of Indian 1st tier suppliers does not exceed 1 million, but many

of Chinese counterparts surveyed produce more than 1 million. We can speculate that Chinese firms are using larger number of workers to make larger number of units, and the price of one unit is far cheaper than India. And from the case of the final production (motorcycle) in the market, Chinese firms produce far larger volume for one lot (kind of parts) than Indian. And it is also easily presumed that workers are engaging in more specialized works than Indians counterparts in their in-house division of labor, where far larger number of workers is making smaller kinds of products.

5.2 Wage Rate and Liquidity

The average monthly wage rate for staffs and engineers is 420 USD in 6 firms, and that of workers is 208 USD in 7 firms in India. In China, staff/engineer's wage rate is 370 USD (20 firms) and work's is 213 USD (20 firms). The wage rate of worker level employees is almost the same between China and India, but at the staff/engineer level, wage rate is higher in India than that in China.

There is the difference in the liquidity of labor between the two. In Indian firms, average attrition rate at staff level (managers, engineers, core technicians) is 13.2% (for 6 firms) and that of general operator level is 5% (7 firms). The latter figure is calculated from the data including contracted workers. In China, that of staff level is as low as 1.4 (for 20 firms) and that of operator level is 11.1 (for 20 firms). In India, staff level workers have more incentives or opportunities to move firms than worker level employees. On the contrary, Chinese operators have more incentives to change firms than staffs. It should be noted that most of the firms answered that more than 5 years ago, the attrition rate was far higher than at present, such as 20-30% a year.

Combining the fact that staff level labors earn higher wages and higher liquidity, presumably in India, such level of labor is scarcer than workers. In China, on the contrary, worker level labor is scarce vis-a-vis staffs in severer degree than in India. This interpretation sound odd from the viewpoint of conventional image of the both country, where it is believed that massive amount of abundant rural workers have been the source of Chinese competitiveness, and the large number of elite people produced in India's education system which is famous for their historical emphasis on higher education.

However, thinking about the demand side for respective type of labor, it may make sense. It may be the result of the fact that in India, where highly educated people tend to enter into IT service sectors which absorb large amount of the graduates of

engineering colleges, the staffs in the traditional manufacturing sector such as motorcycle industry might be scarce compared to workers. On the contrary, manufacturing sector in India has not yet fully developed as China did, which might restrict the demand for the worker level labors. In China, since there are also massive amount of other manufacturing factories with job opportunities, workers in motorcycle parts suppliers can find more opportunities outside than India.

5.3 Career-Up Opportunity from Bottom

In Chinese firms, it is not rare to hit upon the case that former line-operator level workers climb-up to the management staffs. 5 firms out of 15 that were asked the question have factory managers who climbed up from operator level workers, and 10 has line-chiefs climbed from workers, and most of the unit-chiefs are from workers. In India, 2 of 4 firms have supervisor (equivalent to China's unit-chief) who climbed up from workers, and 4 firms do not have section chiefs (equivalent to China's line-chief) from workers. In India, unit-chief (the head of the base unit of the operation) is mostly for staffs (new graduates from higher education), but in China, it is for the talented persons among workers. The highest position that worker can expect in general case is "leading hand", a multi-skilled supervisor of workers. Supervisor is deemed as staffs.

It is true that, in China, the educational background is very important to climb the ladder of personnel system, especially large firms, and the chance is limited for base workers to do that. However, compared to the clear divide which is easily observed in India, it seems that Chinese firms (society) tend to provide more opportunities for base workers to career up. One of the important reasons of this phenomenon is that, since many of the firms investigated have shorter history than India,[21] and since many of them have started from very small firms predominantly consisted by workers with low educational background in their early years of operation, so that now such persons has become manager-class personnel in some observed companies. However, in a large company with long history of operation, Jialing, also had small number of former workers who climbed up to vice-factory manager. This kind of case was not heard in India.

From this, we can conclude that in-house labor market is strictly divided in India, whereas relatively speaking, China is less divided and more open to the talented workers to climb up the ladder if possible.

[21] Average year of establishment of 27 firms in China is 1991, whereas that of 16 Indian firms is 1982.

5.4 Incentives (Manner to Determine Wages)

The way to determine the wage reflects the firm's attitude toward the formation and evaluation of the skills of personnel.

In Indian motorcycle parts supplier, regular staffs and workers are employed without the condition of the employment period. Their wages (salary) is in general determined once a year partly by simply adding inflation rate or other unified rate of upgrading within the firms, and partly by evaluating the performance and increased skills. In India, there is a difference between "skilled" and "unskilled" workers for each job category. This also reflects the fact that Indian firms try to evaluate the skill levels, meaning that they are rewarding party to the result of the work, but also partly to their skills. In India, the status of personnel is relatively stable, and the wage level also grade-up in a stable manner every year.

In China, however, for the management of workers, firms tend to rely on piece-rate wages, strong incentive, heavily. Only 1 firm out of 20 answered this question completely gave up piece-rate system. However, this does not mean that firms regard piece-rate system the most proper way for them. In fact, 10 firms said that they will decrease the portion of total salary paid by piece-rate and increase the portion paid by time or fixed salary. At present, most of them use a mix of piece-rate and fixed salary, out of which the former consist as much as 40-100%.

The reason that firms try to decrease the piece-rate portion is that they perceive the system has deficiency in motivating the worker to keep the quality level. Obviously, the piece-rate system tends to encourage the workers to produce more in number, and it is often the case that workers disregard the quality to increase the volume of works. This aspect has become more and more serious problem for most of the Chinese firms who have faced continuous pressure from their customers to increase their quality levels.

However, some firms returned to piece-rate system after trying more fixed wage system for some time period. Most of them confessed that without the system, it was extremely difficult to maintain the motivation of workers, and it is often workers that require the resumption of piece-rate system, since for them it is the most "fair" system for them.

For them, one solution of the dilemma is to elaborate the design of piece-rate system where every different job has different wage rate which is proper in both the ways, on one hand, in reflecting the actual demand-supply gap (of workers), and on the other hand, in encouraging the workers to upgrade their skills.

It is interesting that, in China, we seldom hit upon the words, "skilled" and "unskilled", in the interview on the wage system. Since wage rate is mostly determined by piece-rate, and skilled workers and unskilled workers will be paid differently automatically according to their performance, management side does not have to evaluate the skill levels of respective workers.

This systematic lack of evaluation mechanism of respective worker's skill level in many of Chinese firms may influence their system of training or nurturing their own personnel. However, they may figure out fairly well-designed piece-rate mapping of jobs after researching seriously the sample of workers.[22]

As for staff level personnel, Chinese firms widely use yearly contract system for the wage. Basically, the annual salary is determined based on the performance of the previous year. Though not as strong as worker's piece-rate system, however, highly incentive-driven system is adapted to staff level personnel in China.

5.5 Multi-skill Formation

Multi-skill formation is widely deemed as an excellent practice commonly in the manufacturing sectors of various countries. Both in China and India, firms are generally aware of the nice aspects of this idea. Whereas, in India, the idea recently came to be generally accepted in the shop floors, however, in China, it is not really practiced widely for their own reasons.

All the Indian firms answered that they are aware of the virtue of multi-skill formation of workers and some has deliberately started planned job rotation system in some part of their shops. Most of the small manufactures with very limited human resources are doing that naturally in the course of catching up the daily orders.

The aim of the job rotation for most of the firms interviewed is mainly for backing-up the absent workers, and the other reasons, such as increasing the labor productivity by operating different machines by fewer persons, is not seriously considered. Upgrading and widening the range of worker' skills is in general not considered important.

Chinese firms are generally more passive to introduce the practice concretely to their shop floors. They are also aware of the necessity to do that for the abrupt job vacancy (due to the high attrition rate in workers). However, since the workers are organized basically in the piece-rate system, it is often the case that workers are not

[22] Some Chinese firms say their quality level improved after increasing the piece-rate portion.

willingly to change the jobs for fear of being unproductive (meaning their wage declines) during the period when they are not accustomed (unskilled) to the new jobs. Another worry about the job shift, for the side of management, is that workers are aggressive to challenge to new jobs of higher piece-rate, and even incapable workers also try to such jobs which will add some troubles to the shop. In particular the firms which are running in fully-capacity are very passive for fear of such losses. Some firms express their clear preference to confining workers' job range so that they can maximize their skill level (hence productivity) to the limit.

As for the staff level personnel, both in China and India, they do the rotation in an ad hoc way to nurture the candidate of future core personnel for them. This is not clearly for the sake of widening the range of technical skills, but rather for the sake of wider knowledge of the firms' management and operation.

5.6 Training Activities

Necessity of training activities are well perceived both in China and India, but relatively speaking, Chinese seem to utilize outside training services more than Indians, and Indian seem to rely on the in-house training more than China.

For staff or engineer level personnel, some Chinese parts suppliers dispatch them to schools (even university level), and larger firms send them even to MBA courses. This kind of investment in higher management knowledge may be a specific case for present Chinese firms, especially for private firms which were founded by men of low-educational background, but as they grow larger, they are aware of the necessity to attend the school designed for contemporary managers.

At the worker level, Chinese firms also come to emphasize the necessity of training for them. According to the managers, there are two main reasons; (1) to catch-up with new technology (for example NC machines), new standard of quality, or new demand for participating development of new products, even workers also have to upgrade their knowledge, and (2) to attract workers at the firm (for not letting them quit), they have to be encouraging or at least generous for the workers' desire to skill up themselves. In particular, for workers of low educational background, they have to have the qualification of finishing schools, say, polytechnic or equivalent schools. Most of the firms systematically allow or encourage workers to attend school outside after work hours or in the weekend. In this several years, especially after 2004 or 05, Chinese firms have drastically changed their attitude for the worker's trainings.

For the supply side, the training has become a massively blooming business in

China for more than 10 years. Not only the number of schools (polytechnic, junior-college, or university) increased, but also the schools themselves have come to be more keen on collecting money from outside by providing services. In reality, opening up training course and contributing society is highly evaluated as the role of schools in China.

Compared to the status of recent China, the personnel of Indian firms seem to have limited opportunities to attend schools outside. In particular, the workers seem to be so. Indian firms are rather dependent on in-house training activities. Main 1st tier suppliers of Bajaj are very keen on practicing TPM (total productive maintenance) activities in cooperation with Bajaj, with most of the firms have specific training facilities inside the firms and continuing the team activities.

The aggressive attitude of Chinese workers for more training (including school qualifications) might come from the fact that they have more chances to raise wage using the qualifications, whereas in the case of India, there might be less incentive for workers for the reason that their chances to do that is less. And the reason that a part of Chinese firms dispatch the core staffs to MBA is due to the lower attrition rate which they can accommodate. In India, since the rate is relatively high, so that such provision of training opportunity for staff might be risky for firms.

5.7 Summary of In-house Skill Formation

Like the interfirm relations, in-house skill formation mechanisms are also significantly different between China and India. In China, firms are keen on upgrading the skill level of staffs or workers. But due to the piece-rate nature of their wage system, which well functions in maximizing production size, firms have faced difficulty in widening the scope of their skills, but rather many firms, and at the same time, workers themselves as well, regard that confining the skills in some narrow range will be beneficial. Mainly due to the uprising consciousness of workers, firms become very much generous on offering training opportunities than before. However, it seems that they are more advantageous at utilizing outside training courses rather than developing their own training standards and programs. The liquidity of the labor or the more opportunities outside the firms, including job opportunities and training opportunities, seem critical in forming such status.

On the contrary, Indian firms seem to be more conscious about in-house mechanism of training. Their labor relationship is more stable than China, and as the way of evaluating of wage shows, firms seem to be more concerned on the level of the

workers. However, it is not clear that whether this conscious in caring the in-house skill upgrading is mainly the result of the firms' earnest desire to do so in the harsh competition, or it is rather result of the fact that workers are more confined in terms of outside opportunities. Rather, staff level personnel are more liquid and seem to be more conscious about their own skill upgrading.

6 Concluding Remarks

The Capability building mechanism both of interfirm relations and that of in-house share some common characteristics; the "unified" or "integrated" nature in India and "isolated" or "dispersed" nature in China. In Indian interfirm relations, suppliers are guided by Bajaj in terms of the future direction of development (such as quality upgrading via TPM activities) and of providing other resources including man power and small portion of financial resources. In case of in-house nurturing of skills, Indian firms are utilizing stable labor relations and evaluation of their skills. However, in both cases, in comparison with Chinese counterparts, there is a common backdrop: limited opportunities of finding other transaction partners for suppliers and individual workers (but for lesser extent for staff level personnel).

In case of China, though suppliers and workers are trying to figure out the way of survival in a more "isolated" manner, but there is a different backdrop; both suppliers and workers find themselves more choices of transactions and courses of upgrading their skills.

Prominent characteristic of China is its strong incentive-orientation both in the interfirm relations and in labor relations. Piece-rate system is widespread in their transactions to the degree that both many of the firms and workers are accustomed in this, and it seems that some of them are constructing unique ways or methodologies to solve problems such as between quality control and incentives of labor by elaborating the mapping of skill chains that workers follow under the piece-rate mechanism.

Compared to China's uniqueness, the development paths of Indian firms, as far as interfirm and in-house capability building mechanisms are concerned, seem more similar to East Asian experiences, including Japan and Taiwan. The reason of the emergence of the gap in the growth mode among the economies can not solely be attributed to the sheer difference in their "developmental stages", since China and India should be counted as similar rather than distinguishable in terms of the stages of the

development of the motorcycle industry, at least compared to Japan and Taiwan. We should expect that the factors that have caused the differences in industrial development process among economies can be found internally in the economic or social conditions of respective economic systems. Finding the factors should be further challenge for us.

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Appendix: List of the Suppliers Surveyed

Chinese Motorcycle Parts Manufactures Observed								
	Product Type	Main Transaction Partner	No. of Employees	Year of Establishment	Capital Relations	Year of Observation		
						1998-9	2003-4	2007-8
c-1	Electronics(CDI)	GR (Jialing)	280	1988		○	○	
c-2	Carburetors	GR (Jialing)	300	1994	Jialing, Japanese	○	○	○
c-3	Valve, FWM	Jialing	5500	1964		○	○	
c-4	Engine Parts	Jialing	1040	1960		○	○	○
c-5	Brake	Jialing	400	1983			○	
c-6	Handling bars	Jialing	200	1970			○	
c-7	Mufflers	Jialing	500	1982	Jialing	○	○	○
c-8	Transmission	Jialing	450	1993		○		○
c-9	Cylinder	Jialing	320	1998	Jialing			○
c-10	Shock Absorbers	ZS	220	1986		○	○	○
c-11	Clutches	ZS	560	1992			○	○
c-12	Cylinder	ZS	170	1994		○	○	○
c-13	Engine Gear	GR (ZS)	670	1997		○	○	○
c-14	Cylinder Head	GR (ZS)	1500	1994		○	○	○
c-15	Crank Case	GR (ZS)	2000	1991		○	○	
c-16	Crank Shaft	ZS	400	1984		○	○	○
c-17	Shock Absorbers	ZS	650	1996				○
c-18	Engine Gear	ZS	380	1997				○
c-19	Electronics (FWM)	ZS	280	1993				○
c-20	Shock Absorbers	ZS	720	1999				○
c-21	Crank Shaft	ZS	300	1995				○
c-22	Carburetors	Yamaha	412	1994	Japan	○		○
c-23	Brake System	GR	700	1995			○	○
c-24	Crank Shaft	others	530	1993				○
c-25	bolt nut	2nd tier	100	1980				○
c-26	brake valve	2nd tier	130	1988				○
c-27	forging parts	2nd tier	120	1995				○

*GR=Grand River, ZS=Zongshen

Indian Motorcycle Parts Manufactures Observed

	Product Type	Main Transaction Partner	No. of Employees	Year of Establishment	Capital Relations	Year of Observation 2003-4	2007-8
i-1	Ignishon Coil	Bajaj	500	1971		○	
i-2	Lamp	Bajaj	130	1961		○	
i-3	Engine Gear	Bajaj	200	1999		○	
i-4	Flame, Case	Bajaj	72	1984		○	
i-5	Engine Gear	Bajaj	50	1985		○	
i-6	Cylinder	Bajaj	900	1973		○	
i-7	Mufflers	Bajaj	300	1974		○	
i-8	Cowlings	Bajaj	2500	1988			○
i-9	Die Cast Parts	Bajaj	3600	1985			○
i-10	Die Cast Parts	Hero Honda	2000	1986	Hero Honda	○	
i-11	Battery	TVS	260	1970		○	
i-12	Schock Absorbers	TVS	325	1974			○
i-13	heat treatment	2nd tier	8	1993			○
i-14	die casting parts	3rd tier	43	1998			○
i-15	steet metal stamp	Bajaj	1500	1986			○
i-16	die and mold	2nd tier	31	1998			○

Taiwan Motorcycle Parts Manufactures Observed

	Product Type	Main Transaction Partner	No. of Employees	Year of Establishment	Capital Relations	Year of Observation 2003-4	2007-8
t-1	meter	KYMCO	200	1977	Japan	○	
t-2	hundle switch	KYMCO	150	1980	KYMCO, Japan	○	
t-3	switch lock	KYMCO	75	1974		○	
t-4	clutch	KYMCO	119	1992	KYMCO, Japan	○	
t-5	schock absorber	KYMCO	469	1969	KYMCO, Japan	○	
t-6	caburetor	KYMCO	289	1981	KYMCO, SYM, Japan	○	
t-7	lock	Yamaha	191	1982		○	
t-8	engine geer	Yamaha	109	1962		○	
t-9	wheel	Yamaha	250	1974		○	
t-10	rubber tube	Yamaha	95	1978		○	
t-11	schock absorber	Yamaha	390	1964	Japan	○	
t-12	frame	SYM	80	1974		○	
t-13	bearing	non	78	1981		○	