

Comparing Technological Innovation of Textile Industries in India and China

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Foreword

China and India are the top two textile producers in the world. The proceeds from textile and apparel exports have contributed greatly to the economic development of both countries. Millions of jobs are created in the related sectors. The continuous development of the textile industry is thus vital to both countries' socio-economic health. Interestingly, textile enterprises in China and India have adopted quite different business models and have followed divergent growth tracks. Through comparison of the textile industries in India and China, this paper aims to demonstrate the various technological evolution dynamisms in both countries and explore the reasons behind them.

Before the analysis, it should be pointed out that technological innovations do not always refer to automation or hi-tech. Sometimes enterprises may simply reorganize production procedures to increase the workers' productivity. Structural and organizational changes are innovations too. Every country has its own unique experience in establishing and developing new business models, in which the factors of cost, productivity, quality, technology and design are adjusted according to market demands and the enterprises' capacity. These improvements may be based on upgrading hardware, but often they are just the result of better management of the existing technology. The booming Chinese and Indian textile and apparel industries show us detailed, multi-faceted technological developments in their specific historical and social contexts.

I. Various Characteristics of Chinese and Indian Companies

Chinese companies are specializing in reducing the cost to a very competitive level, not only by means of cheap labor, but also through mass production and high productivity. In fact, the average wage of Chinese workers is higher than that of Indian workers. While a Chinese textile worker earns normally \$100 per month, an Indian worker is usually only paid \$70 per month.¹ However, the Chinese companies cut the costs even lower than their Indian and other competitors through mass production and returns-to-scale of the economy. The biggest factories in India look like lightweight players in China. For example, the largest spinning company in India, Vardhman Group, has a capacity of 500,000 spindles. In contrast, the largest Chinese spinning company, Weiqiao Textile, is running 3,000,000 spindles. The largest weaving company in India, Arvind Mills produces 110 million meters of denim and 30 million meters of fabric per year, while Weiqiao Textile has a capacity of 157 million meters of denim and 844 million meters of fabric in total. On average, the size of Chinese textile companies is five times larger than that of the Indian ones.²

Another important aspect of cost efficiency is high productivity per worker. Compared with their Indian counterparts, the Chinese workers are much more disciplined and work more intensively. The managers are strict in controlling the working time and efficiency of workers. Even military-style management is introduced to some factories. Besides, China has invested heavily in modern equipment to boost productivity. According to the International Textile Manufacturers Federation, between 2000 and 2010 over 55% of spinning machines and over 68% of weaving machines delivered worldwide went to China.³ Consequently the productivity of the Chinese worker is significantly higher, adding US\$5000 in value to what he produces compared with the US\$2600 for his Indian equivalent.⁴

Although Indian companies are not able to beat the Chinese in terms of cost and productivity, their strength is in small batch orders and customization. Because of the large capacity of Chinese companies, small orders are not attractive to them, since the rearrangement of working positions in a big factory may cause bigger costs, or the unused capacity may cause larger loss of opportunity cost. On the other hand, Indian companies are more flexible and can accept this kind of order. Besides, the English-speaking Indians have the advantage of communication with Western customers, and that is important for customized products. Last but not least, most of the Indian textile enterprises have a longer history and better management than the Chinese companies. Most of the Chinese enterprises have no more than 30 years of history and are still striving to standardize their manufacturing procedure and quality control because their expansion has been so fast. In contrast, most Indian companies are quite experienced in maintaining high quality and have an established control system. This also gives an advantage to Indian companies in customized production, as quality control is more important in the high-end market.

Customized products bring more profit. For example, China's export of textile products to the US in 2010 was \$ 38.47 billion in value and 26.00 billion square meters in volume. The average value of the Chinese exports is US\$1.48 per square meter. India's textile exports to the US in 2010 were US\$5.38 billion in value and 3.26 million square meters in volume. The average value of the Indian exports is US\$1.65 per square meter,⁵ about 12% higher than the Chinese products. The Indian companies are satisfied with their high-margin manufacturing. Indian garment producers make it clear: for items under US\$30, leave it to China. Above US\$150, leave it to European companies. In the middle, give it to India.⁶

II. Reasons for different models

Why is there such a difference in business models? Actually in both China and India the cost-conscious and the profit-conscious models exist. Although focusing on reducing cost, the Chinese companies do not forget to pursue more value-added products and profit. Indian companies also introduce new machinery and enhance management to improve cost-efficiency. However, historic, cultural, and social contexts in each country inform the various emphases and strategies that enterprises use in their decisions. Such decisions cannot be simply explained through static comparative advantages. As we see, labor costs in India are as cheap as in China, and China has as many engineers as India. Only by examining the development path comprehensively can we understand the reasons behind the divergence in business patterns.

As mentioned before, today's major Chinese textile companies are pretty young. While the old state-owned textile enterprises lost their competence and went bankrupt, competitive private textile mills and garment factories were set up only after the economic reform in 1978. Since the focus of early economic reform in China was in rural areas, some of the peasants and small hand-workers became the first beneficiaries of reform and established their enterprises. Today 87.5% of the textile and apparel enterprises are based in rural areas. Some of the most famous apparel brands such as "Younger," "Luomen," "Shanshan," and "Sanhong" were all founded and managed by former peasants. Chinese peasants at that time had very limited education: none of the founders of the companies just mentioned have education beyond secondary school, and none of them speaks English. Consequently these companies lag in human capital and technology acquisition. After the devastating Cultural Revolution (1966-1976), there were few engineers and skilled workers left in

the urban textile industries and even fewer in rural areas. The typical story is that several young men bought a machine together and commenced the most primitive “production” of cloth, socks, shirts, and trousers. The quality of such “production” was of course pathetic and there was no design, for they simply copied others’ products. However, in the early 1980s China was still largely locked into a planned economy. The shortage of consumer products was so serious that the consideration of quality and brand was merely secondary. The basic products were still salable on the world market, and China’s textile giants today obtained their first capital in this manner.

Because of the lack of skilled workers, experienced engineers, and qualified designers, these enterprises can do little to improve technology or fashion design. Their development is rather based on the efficient organization of mass production, promoting productivity and reducing cost. This also fits the Chinese work ethic. China’s cultural background makes Chinese workers relatively disciplined and willing to work hard. From the middle 1980s to the early 1990s, when the foreign orders arrived, Chinese manufacturers had neither modern machinery, nor technology strength, nor communication capability. Their only option was to use their advantage in a highly disciplined workforce and compete with others through astonishing productivity and cut-throat prices. Besides, the emphasis of the Chinese government on infrastructure construction, including road construction, power, and water supply development, provided the fledgling textile enterprises with substantial support that came from lower production and transportation costs.

Although the strategies of Chinese textile and apparel companies have changed a lot since then, established business models and existing customer groups still largely influence the direction of the companies’ technological development.

Reducing costs, increasing productivity and managing mass production continue to be the major themes of Chinese textile industry.

In comparison, many Indian textile enterprises have a long and stable development history, which can be traced back to the colonial era. Arvind Mills was founded in 1931; Premier Mills was set up in 1949; The Raymond Group was incorporated in 1925; Lakshmi Mills was established in 1910. Even the “younger brother” Vardhman, established in 1962, is almost two decades older than its Chinese counterparts.

Through a long period of market operation, Indian companies have relatively established market networks and regular customer groups. Not concerned with survival, they are aiming at higher profit.

Besides, the founders and managers of Indian enterprises are either experienced experts in the textile industry or industrialists who are able to understand sophisticated technology. The Indian entrepreneurs belong almost exclusively to the upper classes in the social (caste) system. They have the knowledge, the capital, and the social relationships to build up their enterprises. Their good educational background, systematic management, and technological and financial capability enable them to consider more value added and profit, whereas the Chinese village entrepreneurs struggled for survival under circumstances of little technology and little capital for a long period.

Apart from management, the external conditions in India are not friendly to mass production. The road traffic, train transportation, and harbor facilities in India are of poor quality. Restrictive labor laws prevent companies from recruiting large numbers of workers. When the enterprises hire more than 100 workers, they have to deal with worker unions. Under the unions' pressure, only 2% of Indian textile

factories have three shifts, whereas about 20% of Chinese counterparts are operating 24 hours a day.

In short, the choices between two paths of technological development – promoting productivity or customization – have been decided by the historical, cultural, economic, and social conditions in India and China. Under its particular socio-political conditions, it was reasonable for Chinese enterprises to prioritize a mass production model, which led to the Chinese textile industry’s amazing boom. By contrast, Indian companies based their strategies on market experience and mature management, which do not trigger explosive growth, but are stable and effective.

III. Technology Improvement and Adaptation

The aforementioned characteristics describe the general trends of technology management in the textile and apparel companies in India and China so far. In specific development phases and concrete enterprises, more varieties of developing approaches and strategies can be observed. There are continuous experiments for technological improvement; however, development is always a try-and-fail process. The final success of technological transformation usually means the adaptation of technology into the local social and market circumstances. Thus, there are also various development tracks in each of these two countries lately with the arrival of new technologies.

1. Digitalization of the Enterprises (ERP and CRM)

In the age of information technology, ERP (Enterprise Resource Planning) and CRM (Customer Relations Management) software systems have been introduced to

the textile and apparel industries in both countries. Some of the Indian textile entrepreneurs, owing to their higher education and better understanding of technology, even set up their own ERP/CRM companies several years ago as a strategy of business diversification. However, since the size of the Indian textile and apparel companies is usually quite small, there is not sufficient market demand for ERP software, which is designed for managing large-scale production. Many of the companies use only CRM software.

In comparison, the situation in China is much more complicated and needs multi-level technological adaptation. First, international ERP software companies like SAP and Oracle are too expensive for low-profit textile and apparel companies. The software produced by these international companies is not suitable to the unique business models and corporate backgrounds of local Chinese enterprises.

Second, for many companies, there is no need for an overall ERP/CRM software. These companies are primarily interested in managing the crowded manufacturing sector and raising production efficiency. Therefore the ERP software often is introduced together with (semi-)automated machinery. This actually avoids the problem of incompatibility of hardware and software too.

Third, the application of the ERP software means restructuring the company organization as well. For a few entrepreneurs, the major advantage of ERP software is not that it promotes productivity, but that it provides a chance to standardize the whole manufacturing process and modernize the enterprise structure. Standardization becomes the target of the managers because it significantly reduces the risk of accidents and lays the groundwork for further development.

As more and more Chinese textile and apparel companies utilize ERP software, one consequence is that Chinese companies are becoming more flexible so that they can cut into Indian companies' market territory. For example, previously an order of 5,000 pieces of knitwear was unattractive to Chinese companies, because the whole line of 40 workers would be trained for an entire day, but after maybe 3 days the order is complete and the workers need to be trained again. With the installation of ERP and automation machinery it is possible to allocate only 10 workers in the production line for a similar order. The other 30 workers can then be given other orders. The hanging circulation system enabled by ERP programming can send the required items to the designated positions so that the whole production line can be divided into several parts to fit the order. In addition, ERP systems enhance the capability of customization. Integrated with computer-aided design and manufacturing, circulation systems can flexibly move cloth between various procedures to make customized products.

2. R&D activities

Today Chinese apparel companies aspire to enter the high-end market, but one of the key obstacles is the lack of high-quality textile fabrics. Although China is the number one apparel export country, it imports large amounts of high-quality textile fabrics every year. Compared with the international leading brands, the Chinese-made fabrics are still not satisfactory in respect of color, texture, quality etc.⁷ China also exports immense amount of textile fabrics, but these exports are mainly little-processed or low-costs products. U.S. and European companies even use these very cheap primary fabrics (e.g. gray fabrics) for further processing and sell them back to China at a much higher price.

The main reason for this awkward situation is that Chinese companies used to compete in the low-end market for long time. Nonetheless, during recent years, there are more and more fabric companies that want to move up the value chain and are capable of manufacturing advanced textile materials. Yet, these new products are not yet widely known to industry or accepted by the designers in apparel companies.⁸

To solve this problem, Chinese textile companies need to do further research to improve the quality of the fabrics on one hand, and on the other they need to increase communication and interaction between fabric makers and apparel designers. Several textile trading platforms and research centers have been established for this purpose. A few large apparel companies are also planning to build their own fabrics branch in order to can catch the initiative of the market directly. For instance, one of the largest garment groups Youngor has invested over US\$ 100 million to develop high-end fabrics in cooperation with Japanese enterprises. Chinese apparel and garment companies are apparently eager to play a bigger role in the high-end market with its research on high-quality fabrics.

In comparison, many Indian textile enterprises are already able to manufacture high-quality fabrics. Their R&D interest lies rather in the prediction of market trends and control of quality; and because their business model depends on customization and high quality, they want to keep their edge over the Chinese competitors. Nevertheless, in response to competitive pressure from China and other developing countries, Indian companies are also thinking about raising productivity and reducing cost. The improvement of engineering and the application of IT are the major foci in related productivity research. They also carry out in-depth studies of energy efficiency in order to reduce cost.

For historical reasons, China and India have various market models and thus have various foci for R&D. However, their competitive dynamism reveals that Indian companies cannot comfortably keep their profit margin without improving productivity; whereas Chinese companies do not want to merely remain cheap labor providers and are expanding to more value-added products. This effort will be more obviously demonstrated in the last but the most difficult stage of technology management: building brand.

3. Building Brand

Building brand is the highest level of technology and innovation management in the textile and apparel industry. On the one hand, it means unique prestige, lucrative profit, loyal customers and social recognition. On the other hand, it requires comprehensive knowledge in technology and marketing together with excellent management skill. In both countries, successful textile and apparel companies are striving to build their own brands, first in the domestic market, then on the global stage. Nonetheless, companies in different countries again show different strategies of brand building. The following are two case studies of leading textile companies in India and China.

3.1 Raymond Group

Raymond is the largest wool and worsted textile manufacturer in India and owns eight major brands. It has over 60% market share of the worsted suiting fabric market in India and exports to more than 50 countries in the world. Starting with low priced woolen fabrics in 1944, the company now is able to make the super 220S, the

world's finest fabric. The company enjoys a dominating position in one of world's most populous countries. There are more than 20,000 Raymond Suiting vendors and over 310 exclusive Raymond Shops in more than 135 cities in India. The existence of these shops promotes the brand image of Raymond everyday.

Although the Indian market is big, it is also very diverse: the income gap between the rich and poor is quite significant. Therefore, Raymond thinks out a two-level distribution model. For the low-end market they license the vendors as "Raymond Suiting," providing them with standardized "Raymond Suiting" signs and supplying them with low priced woolen fabrics. Although this part of the market does not bring much margin or prestige, its existence in such a huge market is a great asset for the company. In India, you will come across the "Raymond Suiting" sign in every marketplace. This gives the company immense publicity.

For the more exclusive class, the company provides its premium retail store "The Raymond Shop." These shops are located in the major commercial areas of cities. There are also around 30 shops in the Middle East. The magnificent shop outlook, the classic interior design, the quality of the finest woolen fabrics, and the well tailored clothes all represent Raymond as an exclusive brand. The price in the "Shop" is at least double than that in "Raymond Suiting."

In the "Shop" the company diversifies its brands according to different product categories. "Raymond" is for the worsted suiting fabrics. "Park Avenue" represents formal readymade garments and accessories for men. "Parx" is for semi-formal and casual wear. "Manzoni" is known as the luxury brand for men's shirts and ties. In the diversification strategy, the focus of each brand is clearly defined. Meanwhile, since they all stand under the umbrella of "The Raymond Shop," their development always contributes to the integral image of the company as a whole.

Meanwhile, the company is tracking the world's most advanced fabrication technology in order to maintain its image as a premium wool fabric provider, which the company views as the basis of all its other brand images. For decades, the company has been constantly upgrading its highest technology capacity. 1995 -1996 the best worsted fabric manufactured was still only 100-140S. By 1999 the norm was raised to 190S, which was in turn replaced by 200S after three years. The following two years witnessed continuous technological advances. 210S was developed in 2003, and in 2004 220S was introduced, which is still the best in the world today.

To summarize, Raymond is consolidating its image of high quality through continuous technological improvement. Meanwhile, the companies' successful multi-level distribution system helps the brand enter the mass market. Even upon entry into mass markets, the company continues to emphasize its high profile and gets the recognition of the customers. The company has a strategy of brand diversification, but the brands supplement each other and make an overall contribution to the company image. Such sophisticated brand building strategies are actually comparable to those of international companies, but due to its limited capital and business contacts the activities of Raymond are limited to India and neighboring countries.

3.2. Heng-Yuan-Xiang Group

China provides an interesting counter example of brand management in the wool fabrics and apparel industry. Heng-Yuan-Xiang used to be a well-known caddice store in Shanghai 20 years ago. It was among the first shops that registered their names as trademarks. Its manager Liu Ruiqi did not have university education, but he was very practical in business. First he wanted to transform the store into a real

brand. On the reputation of his store he had several factories supply caddice and wool for his brand. Seeing the decline of the caddice market, Heng-Yuan-Xiang diversified its product portfolio. After they found new suppliers, the brand has come to be used in knitted sweaters, scarves, hats and gloves.

What really made the brand popular was its TV advertising. In the early 1990s Chinese television advertised in 15 or 30 second spots. The company bought a 15 second spot, but persuaded the broadcaster to divide it into three 5 second segments. The company designed its own advertising, which says nothing other than “Heng-Yuan-Xiang Yang Yang Yang” (Yang means “sheep” in Chinese). Within 5 seconds, people can repeat this phrase twice. For the three 5-second periods, the company can get its brand broadcasted 6 times per night.

This seemingly primitive advertising has largely raised the popularity of Heng-Yuan-Xiang. After several years of fast growth, the company is finally able to launch its real systematic brand management model. It has established the unity of Heng-Yuan-Xiang since 1997, a business network similar to Nike’s model, but with many Chinese components.

In this unity, Heng-Yuan-Xiang has about 20% of the total capital of the participating enterprises, and takes 50% of the gross profit from each enterprise. It invests nothing in machinery or land but allows the participating companies to produce and distribute Heng-Yuan-Xiang products. The participating companies in the unity must accept Heng-Yuan-Xiang’s basic management principles such as building brand, ecological manufacturing and scientific planning. Meanwhile the participating companies need to spend about one year in restructuring its organization to meet the detailed requirements of joining in the unity.

In Liu Ruiqi's opinion, the strength of a company is not its material property, but rather its intangible property, including patents, technology, and the brand and product that ultimately integrate them. By stressing the importance of brand and his Nike-style licensing system, Ruiqi considers himself as China's pioneer of brand management. While all the participating companies are manufacturing and distributing, Heng-Yuan-Xiang's headquarters of 150 persons is entirely dedicated to brand building. Several important brand building activities include:

- Inviting former soccer superstar Diego Maradona to China (1996)
- Helicopter shooting of 14,000 sheep in the grassland of Australia as a nationwide TV ad (1997)
- Acquiring the world's finest and most expensive wool for over \$ 500,000 (2005)
- Becoming the official sponsor of the Beijing Olympic Games (2006-2008)

The uniqueness of Heng-Yuan-Xiang is that the products are hardly mentioned in its branding campaign. Besides some basic concepts, like sheep and wool, the advertising never refers to concrete products but is only designed to increase the popularity of the name Heng-Yuan-Xiang. Consequently the brand can be easily diversified from caddice wool to bed sheets, curtains, and further to knitwear, shirts, suits, and trousers. However, this advertising method has its shortcomings too. Very few consumers know Heng-Yuan-Xiang's area of specialization.

In general, Heng-Yuan-Xiang is a success story of brand building in China. Since the launch of the unity of Heng-Yuan-Xiang system in 1997, the group has already recruited almost 100 participating companies and over 5000 distributors

nationwide. The yearly turnover is over 3 billion Yuan (\$400 million). Yet, a lot of the group's policies have yet to be tested by time.

In comparison with Raymond, the advertising skills of Heng-Yuan-Xiang seem much less sophisticated; however Heng-Yuan-Xiang's advertising is very effective in the Chinese market. The Nike-style brand management model is pragmatically adapted to the reality of the Chinese market. The member enterprises have much more freedom and autonomy in sales and distribution than the original model. This is because the Chinese market is still an unstable market. During 20 years of reform and fast development, the market environment in China is always in transformation, the tastes of the customers are changing fast, and the enterprises must change themselves correspondingly since there is no rule of success in such a context. The only rule is the trial-and-error process.

To be sure, Heng-Yuan-Xiang's business model has a number of defects; for example, promotion activities are separated actions lacking systematic connection, and brand building does not sufficiently take technological development into account. Yet, Heng-Yuan-Xiang, together with other Chinese companies, has achieved significant progress and found its own feasible business strategy on the ground. It, together with other Chinese national brands, is gradually growing and moving towards the high-end of the market.

However, when it comes to international expansion companies are extremely cautious. Mr. Liu, now the CEO of Heng-Yuan-Xiang, says that since the apparel market in China is so vast and underdeveloped, there is no need to take a costly adventure outside this lucrative market. Additionally, the different market circumstances between China and foreign countries may produce more difficulties for Chinese enterprises when they go global.⁹ The majority of Chinese textile and apparel

companies still center on building their own brands in the domestic market and accumulating technological and financial strength through supplying to international brands. Only after a long period of market experience and capital accumulation will these enterprises be confident to enter the Western consumer market directly.

IV. Conclusion

The development of textiles industries in China and India has shown different paths of technological innovation. Whether promoting productivity or enhancing customization, both approaches are viable strategies for local industries. A company's choice largely depends on historical, cultural, social and other factors. Meanwhile the decisions made by the companies will influence the paths of further technology development in the industry and the society.

Starting from humble beginnings, China developed mass production in the 1980s and 90s. Indian companies, with more advanced technology and better market knowledge, preferred the market of customization and high-margin products. However, these enterprises did not simply take over the technological innovations of developed countries, but made adaptations to the original models to fit the reality of their own countries, as we can see in the digitalization process and the brand building strategies of Chinese and Indian companies.

It also seems that both countries are trying to break their limits: China wants to enter the high-end market and India has to increase its production scale. As the technological transformation of the textile industries continues, the respective national characters of India and China are going to change with time too. In the aftermath of the Multi-Fiber Agreement, the global textile market is further integrating and the

competition is growing fiercer. Facing new market challenges, Indian and Chinese textile industries are again facing fundamental transformation. New models of innovation are on the way.

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