

Economic Growth One Industry at a Time: Entrepreneurship in the Bangladesh Garment Industry

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Abstract

When vital production knowledge is tacit and cannot be generated indigenously, entrepreneurs in developing countries have to rely on the international transfer of the knowledge through on-the-job training. Once the initial seeding of tacit knowledge occurs, mechanisms concerning its propagation in the local economy allow the knowledge to be seeded in new firms, catalyzing the growth of the industry. A model of the propagation process is developed and its implications are tested on the Bangladesh garment industry. Empirical findings support that tacit knowledge seeding was essential for the initial establishment and subsequent expansion of the industry.

Executive Summary

Bangladesh is an extreme example of a country with one great export success—garments. Exports from garments today account for about 75% of the country's total exports of \$12 Billion. While in 1980 a handful of firms using primitive production methods struggled to make headway into foreign markets, by 2005 the industry had more than 4,000 factories, with no single firm or small group of firms accounting for a large share of exports. But how could a country with so few of the prerequisites of growth envisioned by modern economists manage this entrepreneurial miracle?

Rhee and Belot (1990) studied 10 the origin of successful export industries in 11 developing countries, including the Bangladesh garment industry.² They found that in each case the industry was jump-started by a single firm that initiated exports on a large scale. They traced the success of the pioneering firms to on-the-job training of the firms' workers by a foreign firm or agent. In all but one instance, the success of the pioneer galvanized entry into the industry, which played a key role in the expansion of the industry and its ultimate success.

In the Bangladesh garment industry, a key event was the establishment of Desh Garments in 1978, which trained 126 local workers at the facilities of a South Korean apparel giant, Daewoo, under a technical partnership program between the two companies. Desh soon became the first example of a great export-success in cotton garments from Bangladesh. Although little was known how the industry emerged and expanded by serving more products and markets, theories have been proposed to explain this spectacular growth and other celebrated cases of industry growth in emerging economies that appeared incompatible with mainstream economic views.

In an influential paper, Hausmann and Rodrik (2003) posit that entrepreneurs need to experiment to find areas in which a country's comparative advantage can best be exploited, but once revealed other entrepreneurs can readily observe and imitate successes, limiting the returns to the initial experimenting entrepreneur. From a social standpoint, the result is too little private investment in such entrepreneurial "self-discovery," stunting a country's growth.

² The 11 cases are: garments in Bangladesh, plywood in Indonesia, flowers in Colombia, uniforms in Zambia, condiments in Honduras, diamonds in India, semi-processed cocoa in Cote d'Ivoire, garments in Jamaica, shoes in Guatemala, software in Hungary, and aircraft in Brazil.

An alternative view is that instead of experimentation, entrepreneurs in developing countries need to access “organizational” knowledge generated in industrialized countries to be competitive internationally in industries in which they have the potential to enjoy some comparative advantage (e.g. Krugman, 1979; Grossman and Helpman, 1991). While knowledge is often considered to be a public good, I propose that in the typical industry some vital knowledge related to production is tacit and therefore entrepreneurs in developing countries cannot simply imitate the products manufactured in countries with successful firms. To access the relevant tacit knowledge, a domestic firm has to receive extensive on-the-job training by a foreign firm. The success of the pioneering firm then is not based on experimentation but on the voluntary planting of a seed by a foreign firm that provides the key tacit knowledge.

If the formation of the pioneering firm effectively reveals a country’s innate advantage in an industry then imitation could occur at a distance, without any direct transfer of knowledge from the pioneering firm to other entrants. But if the transmission of tacit knowledge via on-the-job training is essential for the pioneering firm to be successful, it would be expected that comparable mechanisms would be required for other entrants to be competitive. The growth of the industry then will be catalyzed not by imitation but by the mechanisms that allow the propagation of tacit knowledge from the pioneering firm to new firms. The production of technologically unrelated products is expected to require different tacit knowledge. Hence, further seeding through international transfer of knowledge would be needed to diversify the industrial base.

In this thesis I test the implications of the two competing theoretical frameworks to provide insights on the underlying mechanisms behind the growth of the Bangladesh garment industry. The main contention of the thesis is that the initial seeding of tacit knowledge by Daewoo through the creation of Desh was essential to get the garment industry going in Bangladesh. Prior to the formation of Desh, the productivity of garment producers was such that they could not compete internationally. This all changed with the partnership between Desh and Daewoo. Desh was able to attain a level of productivity that made it competitive internationally and enabled it to become a successful exporter of garments. In turn, workers at Desh learned about how to set up and manage garment production in order to be competitive internationally, which made these workers valuable to entrants that wanted to establish their own garment factories (primary diffusion). Once an entrant accesses the tacit knowledge

through primary diffusion, the knowledge becomes embedded in workers of the new firm, which over time become another source of transmitters of tacit knowledge (secondary diffusion).

I develop a model of market for such knowledgeable workers to derive a few testable propositions if indeed the emergence of such a market was key to growth of the garment industry following the formation of Dosh. The model explains how a market for qualified technicians to set up other factories emerges, with both the entrepreneurs of certain backgrounds and the technicians benefiting. The alternative hypothesis is that the establishment of Dosh demonstrated Bangladesh's innate advantage in garments, enabling entrepreneurs to imitate Dosh without the need for any transfer of knowledge. In that case, mechanisms that allow for the inter-firm transfer of tacit knowledge would not be expected to affect firm performance.

I spent a little over a year on site in Bangladesh collecting data on the backgrounds of the founders of firms. Through interviews of early founders and a few reliable sources, backgrounds of 70.1% of the entrepreneurs who entered the industry by 1988 were identified. I traced the career paths of Dosh workers through interviews with 88 of the workers, who provided information about themselves and the bulk of their peers who were deceased or could not be found. A similar strategy was taken to chalk out the career tracks of early workers of Bond Garments. This firm initially hired a couple of Dosh technicians and heavily depended on them to build its technical capabilities and then became a rich source of technology for other entrants (secondary diffusion). To explore if new firms attain some technical capabilities by subcontracting for exporting firms, I also obtain information on subcontractors trained by a successful firm, Stylecraft, which was set up by a Dosh worker.

I also identified all the entrants in the industry by using archival data provided by the industry association and yearly membership catalogs it published since 1990. The catalogues contained information on products produced, number of employees and machines since 1995. The industry association also provided factory level yearly export data since 1995 for the majority of the factories in the population. Factories were grouped into firms and firm level data was then linked with information obtained through field work.

To study the development of the early stage of the industry, I analyze the earliest available performance data and find firms with educated entrepreneurs, diversifiers from other industries

(presumably because of greater access to finance and complementary assets) and those that hired Desh or Bond technicians to set up their factories were more successful. Hiring Bond technicians conferred some performance boost, but less so than hiring Desh technicians, as my model predicts. Furthermore, consistent with the model, it is the educated entrepreneurs and the diversifiers that were more likely to hire Desh technicians to set up their factories and the effects of entrepreneurial background are less pronounced in hiring Bond technicians. While subcontracting entrants perform worse than those that start production by directly catering to export markets, of all the subcontracting entrants identified those that worked initially for Stylecraft were better performers.

The main results were replicated in the sweater segment of the industry, which takes off at a later stage in the evolution of the industry. This new industry segment required firms acquire a different set of technological capabilities from those that were available to firms participating in the established industry segments. I find entrants that hired workers from Cheung Heung, which began its operations as a joint-venture with entrepreneurs from Hong Kong and Bangladesh and received a large-scale infusion of tacit foreign technology, performed better.

The significance of propagation of tacit knowledge is further investigated by analyzing the performance of spinoffs and the process by which they are generated, during the later stage in the evolution of the industry, when spinoffs became a major source of entry. Consistent with spinoff regularities observed in industries in more developed economies, I find that spinoffs in the Bangladesh garment industry perform better than de novo entrants, and their performance depends on the quality of their parent firms and the level at which spinoff founders were previously employed at the parent firm. Data collected through interviews of a sample of entrepreneurs suggests that at the time of entry spinoffs are less likely to tap into outside sources to build capabilities for their firms and are generally less daunted by environmental challenges. I also analyze the conditions that favor spinoff generation and find that high performing parents have a greater likelihood of spawning spinoffs. I discuss how inefficiencies in the capital markets severely limited the entry prospects of spinoffs at the early years of the industry.

Finally, I explore the product portfolio of firms and find diversification of the industrial base into new segments is driven mostly by entrants and not incumbents. Within an industrial segment, however, older firms and spinoffs are more diversified, indicating the importance of learning and industry specific knowledge in branching out to new products that are technologically similar. Analyzing segment

compositions of a sample of very successful firms reveals incumbent firms are more likely to enter in a new segment through acquisitions during its formative years. But once the segment is already established, incumbents are more likely to build their own factories to diversify into that segment. The evidence marshaled here suggests diversification into new segments of the industry is not a natural evolution for incumbent firms and reinforces the main contention of the thesis that infusion of external tacit knowledge through the creation of local seeds and subsequent transfer of the tacit knowledge through mobility of local technicians from the seeds are critical to get an industry going and flourish across industry segments.

Although the findings of the thesis are country and industry specific, the fact that the forces underlying the growth of the industry across industry segments repeat themselves speaks to the strength of their reproducibility within the context of an extremely impoverished nation and an industry that has been a common stepping stone to industrialization. By providing insights into a process of industrialization in such a country, this thesis makes an attempt to fill in various gaps that have been long existent in the literature of development, entrepreneurship and knowledge spillovers.

In the development literature, there seems to be little consensus on the prescriptions for generating industrial growth. Proponents of trade have long argued for openness as a means to attract foreign investment and access to foreign know-how (Bhagawati, 1988). However, recent scholars have deemphasized the need for foreign capital or technology and focused on developing local entrepreneurship as a means of finding out what the country is good at producing (Hausmann and Rodrik, 2003). The findings from this thesis underscore the importance of both foreign technology and local entrepreneurship, but outline a different path to industrialization that is neither driven by foreign investment nor by a simple process of self-discovery.

Bangladeshi garment producers did not reinvent the wheel. The transfer of extensive technology from foreign entities was crucial to get the industry going and branching out to new segments. But this technology, which was essentially tacit in nature, was transferred in rather unusual circumstances. The recipients, the seeds, were local organizations. This allowed the creation of a large pool of local technicians who became agents for inter-firm tacit knowledge diffusion. Local entrepreneurs tapped into tacit organization knowledge from the seeds through a few specific channels, with the variation in entrepreneurial ability and sources of tacit organizational knowledge contributing to heterogeneity among exporting firms.

The thesis also enriches the existing nascent but vibrant literature on entrepreneurship. Much like the Schumpeterian entrepreneur, the entrepreneur in the Bangladesh garment industry may be characterized as one who spots new opportunities and gathers resources to capture those opportunities. In this regard, the thesis makes two contributions. First, the importance of the entrepreneur's education is underscored, in addition to his prior experience, which has been the major focus of study in recent years. Second, complementing entrepreneurial ability is tacit organizational knowledge, the acquisition of which is facilitated by the development of a market for local technicians who can help set up factories. Furthermore, while few studies have analyzed the process governing the entry of spinoffs (see for example Klepper and Sleeper, 2005), little is known about the necessary conditions for their generation. This thesis provides suggestive evidence that inefficiencies in capital markets can delay generation of spinoffs. Nonetheless, once spinoffs become prevalent, they appear to be better prepared in dealing with various challenges in the environment.

There remains a puzzle in the literature on knowledge spillovers on the reason behind the lack of improved productivity of local firms from the entry of multinational firms (Aitken and Harrison, 1999). This thesis makes the argument that multinational firms are not likely to train local workers to be managers when they establish their facilities in less developed countries, especially in industries that have low start-up costs. The development of local talent could potentially create agents for inter-organizational diffusion of tacit organizational knowledge, limiting the returns of the multinational firm. Since multinational companies are less likely to groom local workers to be managers, the mere presence of multinational companies is not likely to benefit local firms in the industry. Moreover, unlike the growth process described in Lucas (1993) in which industrialization is driven by learning-by-doing and knowledge spillovers, the evidence from the Bangladesh garment industry indicates that there is a limit to the extent firms can diversify into new products, with those that are technologically distant requiring further infusion of foreign technology through the creation of seeds.

It is rather rare that foreign companies make large infusions of technology in a local firm and help establish seeds. In the end, neither Daewoo nor the foreign partner of Cheung Heung was able to capture persistent rents from their involvement in Bangladesh. In an environment where contracts are hard to enforce, few foreign companies with technical capabilities want to provide tacit knowledge to local companies. And if multinational firms directly invest in that country, it appears they do not train local workers to the point these workers can become agents for inter-organizational diffusion of the tacit knowledge that are vital for the local industry to flourish. Growth within industries appears to be

thwarted by the lack of a sufficient number of seeds. This could potentially explain why exports from less developed countries consist of narrowly drawn products even within industries (Hausmann and Rodrik, 2003).

What then can less developed countries do to sow more industrial seeds? Since social returns from establishing seeds is greater than private returns, government-led initiatives to induce foreign firms to bring their technology to less developed countries. However, policies such as providing tax breaks or reducing set-up costs through the establishment of industrial parks may not be sufficient. The challenge is to engineer policies that will ensure foreign firms train a substantial number of local workers across all organizational functions within the industry and employ them to the point that they become managers and are able to train workers in new organizations. . An interesting case in this regard is the way the government of Taiwan dealt with Singer, which received extensive incentives for setting up its facility in Taiwan but at the same time was forced to train local workers and those of its local suppliers (Ranis and Schive, 1985). It remains to be seen if such a carrot and stick approach would be effective in another industry or country.

Improving institutions could perhaps attract more foreign participation, as foreign firms are likely to do business in an environment with better enforcement of contracts and protection of property rights. However, the evidence from this thesis suggests such improvements could potentially restrain tacit organizational knowledge from spilling over to indigenous agents. While all the workers trained in Korea signed contracts binding them to work at Desh for five years, most of them left the company before then and the company failed to prevent such departures. Lack of contract enforcement appears to have facilitated inter-firm diffusion of knowledge throughout the industry. The finding is not peculiar to Bangladesh; recently, scholars have argued that casual governance or protection of property rights may actually engender industrial growth, with China being an exemplar (Hausmann and Rodrik, 2003).

Providing greater access to capital to managers to establish firms in the same industry should encourage entry by spinoffs. The findings from this thesis suggest spinoffs perform better than de novo entrants even in the later stage of the industry when markets for technicians were well developed. This indicates that hiring a technician to set up a factory is not likely to fully offset the lack of industry specific experience of the entrepreneur. Moreover, hiring a technician to set up a factory is likely to have additional agency costs. Since firm failure rates are greater at the early stage of an industry, making credit more accessible to managers can foster spinoff generation and put the industry on a stronger

footing early on. However, it should be acknowledged that with more spinoffs there would be fewer technicians to help set up factories, reducing the likelihood of multiple factory set-ups by one technician and therefore potentially limiting knowledge spilling over to the industry.

This thesis illustrates that education of the entrepreneurs was critical for the industry to succeed. Despite having a high illiteracy rate with a large population, Bangladesh had a sufficient number of educated entrepreneurs to establish firms. The education of the entrepreneur may be correlated with the ability to lead an organization, communicate with foreign buyers or even raise capital. The vast majority of the workers came from poor families and had limited formal education. But the industry was relatively low-tech, and with on-the-job training they could pick up the skills necessary to carry out manufacturing operations. One would expect an industry with a higher technology requirement—such as electronics—would need workers with higher formal education to succeed.

The spectacular growth of the industry suggests that rampant corruption had a limited effect on the growth of the industry, perhaps because it was sufficiently “institutionalized” to be predictable by industry veterans. While it appears that entrants over time learn how to deal with such a hazard, at the time of entry those with pre-entry experience, thanks to their prior knowledge about the industry and bribing, appear to be less daunted by corruption. If most local entrepreneurs are daunted by corruption at the time of entry, then foreign companies with no experience of doing business in a country where corruption is rampant would be even more daunted by it.

The current work opens up a number of research avenues to explore. While entrants were the driving force behind diversification of products across new segments, which firms led the initiative to diversify into new markets? Exports from Bangladesh to the US market were subject to quota restrictions. How did firms respond to changes in quota allocations? In particular, did the imposition of quota restrictions on a product force firms to diversify into other products? How did competition from other countries affect the product portfolio and market reach of Bangladeshi firms?

A far reaching question to explore is whether the process of industrial development identified here can be replicated in other industries in less developed nations. Rhee and Belot (1990) document 11 cases of export industries that flourished in less developed nations, one of which is the Bangladesh garment industry, and provide anecdotal evidence suggesting that the critical ingredient for successful entry into export depended on the establishment of “catalysts,” similar to the idea of industrial seeding

discussed in this thesis. But little is known about the characteristics of the seeds in those industries and the channels by which other entrants built their capabilities once the seeds were established.

The central premise of this thesis is that once an industrial seed is planted the mechanisms outlined above naturally arise to transfer the tacit knowledge from the seed to other firms, even in a dysfunctional economy. This premise has been borne out by the data on the Bangladesh garment industry. If indeed the process of industrial development described here is found to be at work in other successful industries from less developed countries, it should offer a promising avenue for engineering industrial growth in underdeveloped economies. Variations in characteristics of countries and industries could be exploited to identify necessary and sufficient conditions for fostering industrial seeding, and a parsimonious set of policies may be designed accordingly. Through repeated seeding, less developed countries can hope to achieve economic development, one industry at a time.

References:

- Aitken, B. and A. Harrison. 1999. "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela." *American Economic Review* 89:605-618.
- Bhagwati, J. (1988). "Export-Promoting Trade Strategy: Issues and Evidence." *World Bank Research Observer* 3, 27-58.
- Hausmann, R. and D. Rodrik (2003). "Economic Development as Self-Discovery." *Journal of Development Economics* 72, 603-633.
- Grossman, G. M. and E. Helpman. 1991. "Quality Ladders and Product Cycles." *Quarterly Journal of Economics* 106:557-586.
- Klepper S. and S. Sleeper (2005). "Entry by Spinoffs." *Management Science* 51, 1291-1306.
- Krugman, P. 1979. "A Model of Innovation, Technology Transfer, and the World Distribution of Income." *Journal of Political Economy* 87:253-266.
- Lucas, R. (1993). "Making a Miracle." *Econometrica* 61, 251-272.
- Ranis, G. and C. Schive. 1985. "Direct Foreign Investment in Taiwan's Development." In *Foreign Trade and Investment Economic Development in the Newly Industrializing Asian Countries*, edited by W. Galenson. Madison: University of Wisconsin Press.
- Rhee, Y. and T. Belot. 1990. "Export Catalysts in Low-Income Countries: A Review of Eleven Success Stories." *World Bank Discussion Paper*. Washington: World Bank.