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**INTERNATIONAL TRENDS IN THE TEXTILE AND CLOTHING INDUSTRY  
AND THEIR IMPLICATIONS FOR TECHNOLOGY TRANSFER  
AND DEVELOPMENT IN BANGLADESH**

Paper prepared for UNIDO, Country and Regional Studies Branch  
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## INTRODUCTION

As is well known, the newly industrializing countries (NICs) in Asia, accounted for more than 75% of textile-clothing exports from all developing countries during the 1960s and 1970s, enjoying an 18% average annual increase in trade growth over that period. The dynamic impact of this growth not only expanded the textile-clothing sector but also acted as a major stimulus to the pursuit of export-oriented industrialisation in these countries. In turn, the NIC experience persuaded other developing countries such as Thailand, Indonesia and now Bangladesh to pursue the establishment of an export-oriented textile-clothing industry in hopes they could follow this path to export-oriented industrialisation.

These efforts have been successful. "Second tier" developing country exporters almost tripled their share of world exports of textiles and clothing from 7.8% in 1975 to 20.9% in 1985, achieving annual rates of growth of 31.1% over that period. The performance of Thailand and Indonesia demonstrates this trend well. Between 1973 and 1985, Thailand averaged a 25% annual increase in its clothing exports; for Indonesia, the 1982-1988 period saw clothing exports grow 18% annually from a little over \$100 million in 1982 to \$771 million in 1988.

As an emerging textile-clothing exporter, Bangladesh's recent export performance demonstrates a similar pattern. The number of export-oriented garment manufactureres increased from 26 in the early 1980s to 764 units in 1989. Exports now well exceed Tk15 billion (up from Tk5 billion in 1979-80) and now account for nearly 50% of all non-traditional exports, second only to jute and jute products.

The success of the NICs and other developing economies has caused considerable problems for the industrially advanced countries (IACs). Their combined share of world exports dropped from 82% in 1965 to 55.1% in 1985 (from 65 to 40% in clothing). The U.S. alone imported \$17.7 billion worth of clothes from the Third World in 1987, accounting for 23% of its domestic market.

The long term response of the IACs has been the erection of tariff and non-tariff barriers to exclude textiles and clothes produced not only in the NICs but in second tier and emerging countries such as Bangladesh. However, for the IACs, trade barriers have not totally eliminated the "threat" posed by low wage imports. Thus manufacturers and capital goods suppliers have become increasingly preoccupied with the search for cost reduction via automation and technological change. With the rise of microelectronics technology, there were considerable fears in the early 1980s that automation in the North would undercut the low wage advantage of developing countries, particularly in the clothing sector.

At the start of the 1990s we can see that technological change has affected North-South trading patterns in the sector - but primarily in textiles (where the IACs are increasingly able to match the unit costs of production of the NICs in certain product categories) but not in clothing where automation is not expected to have a major impact on trading patterns for a considerable while yet.

However, more importantly, other factors and trends have emerged that are now of equal if not more importance than technical factors in determining international competitiveness in the textile-clothing sector and the pattern of North-South trade. There have been fundamental changes in the structure and nature of the market for both intermediate products (yarn and textiles) and final products (garments). The shift has been away from mass produced, standard products to demand for a more

differentiated range of products, exhibiting higher quality across the board and required in much smaller volumes than before.

The transformation of the nature of demand has led to a fundamental shift in the marketing and product strategies of retailers and manufacturers in the IACs. This has in turn stimulated a wave of major innovations in the way production is organized within firms and in relationships between buyers and sellers. It is now recognized, particularly in the clothing sector that management, design and production engineering skills are just as critical to international success in the textile-clothing industry as the use of the latest technology.

Another new dimension of the international textile-clothing sector is that it now appears that some of the most successful firms operating under the new conditions of demand have been small firms often organized co-operatively. Indeed, thousands of small firms (with no more than 50 employees each), operating collectively have been responsible for Italy's recent success as a textile and clothing exporter - in 1987, Italy had a positive net trade balance of over U.S.\$10 billion - the highest of all countries including the NICs.

These technological, managerial and organizational changes have already had a significant impact on the relative competitiveness of different firms and countries in the North. Developing country trading patterns are only just now beginning to be affected by them but there is little doubt they will spread widely and impact upon all developing countries seeking to develop and expand the textile-clothing sector.

The implications of these new international developments for developing countries are, somewhat surprisingly, potentially positive. For example, they reinforce the mainstream wisdom of the technology and development field, that the development and effective deployment of human technological and managerial resources is by far the most cost effective route to sustained productivity improvement. At the same time, the new approaches to management, production and interfirm relations appear to be transferable and applicable to developing countries at a much lower cost than the massive import of new plant.

Countries such as Bangladesh, which are seeking to build on their initial success as clothing exporters, to strengthen and expand their textile-clothing sector, must as a matter of urgency take account of these developments both at the level of firm management and government policy.

The objectives of this paper are twofold. First it sets out to map the main features of the wave of technological and market-driven organizational change now occurring in the IACs. Second, it will briefly explore the implications of these changes for industrial policy and firm strategy in developing countries, with particular reference to Bangladesh. In Section One, technological developments in the textile industry are reviewed; while the same topic is explored for the clothing sector in Section Two. Section Three discusses the way in which changing market preferences have hastened a fundamental recasting of the structure and organization of production and competitive strategies both at firm and sectoral level in the textile-clothing industry. The broad implications for commercial and industrial policy in Bangladesh are discussed in Sections Four and Five.

## Section One: Pervasive Technological and Structural Change in the Textile Sector

In direct response to the threat posed by NIC and second tier country exports of textiles, in the late 1960s, the textile industry in the IACs, embarked on a massive wave of investment in new technology coupled with structural change and a market driven industrial strategy. These changes have had profound impacts on its international competitiveness and are reviewed below.

### Technical Change in Clothing

The pace of automation among the western countries has been rapid involving sizeable investments in new equipment and radically new technologies. The sources of productivity growth and other improvements have been varied and spread across both natural and man-made fibers. In what follows we will concentrate on technological changes related to the manufacture of natural fiber textiles.

In the opening rooms, manual systems for opening, cleaning, picking and mixing bales of fiber are being rapidly replaced by automatic equipment that eliminates much labour input. In turn, slower carding systems are being replaced by high-speed chute feed systems that eliminate doffing, racking, manual transport to the card room and hanging the lap. Efficiency improvements of 200% have been recorded.

Quality has been improved as well through allowing a more consistent mix of cottons leading to more uniform and stronger yarn. In carding, new technology allows tighter, closer settings thus achieving better integration of fibers and reduced weight variation. Yarn quality is also improved due to the presence of fewer broken threads and from the elimination of thick lap joints.

In spinning, the labour-intensive heart of textile production, open-ended spinning technology eliminates many steps in the spinning process such as drawing and roving thereby greatly increasing labour productivity, while making change-overs easier as well. This equipment, along with attachments such as automatic loaders, yarn-splicers and computerized fault monitoring systems, is now four or five times as fast as conventional ring spinning; gives much greater quality and allows the processing of lower grades of cotton. Jet spinning, a Japanese innovation, spins yard for high quality shirting fabrics even faster than open-ended spinning.

In weaving, conventional shuttle looms are being replaced by high-speed, broader width shuttleless looms (using missiles, rapier, water-jet and air-jets). These looms are now three to ten times more productive than conventional equipment. Much better quality comes through increases in first quality woven cut lengths, the automated removal of bad picks, the repair of broken threads without leaving starting marks, and through perfectly woven, closed selvages. The pace of change in weaving continues - a British firm has developed a high-speed multiple rapier machine that weaves from both ends, while a Czech firm has a machine that weaves two fabrics at once.

There have been less gains from computer technology so far in terms of flexibility in weaving but there are examples where it has been applied with great success - in one U.S. plant, computer control and automated materials handling devices allow production of 1.2

million yards of fabric per week in 300 different styles, compared to 300,000 yards a week and 100 different styles without the computer. Computers are also extensively used in all phases of production management, financial matters, marketing, communication, etc. In some segments of the knitting sector, for example, automated knitting equipment capable of producing finished garments is increasingly common, as is the use of programmable knitting machines which allow changeovers to new styles to be accomplished in a matter of minutes.

Advanced applications of computer technology are also found in the dyeing and finishing stages allowing firms to respond to demands for short re-orders and variation. One European firm has jet dyeing equipment that can handle lots under 500 yards compared to the standard 10,000 yards of only a few years ago. Computer-controlled dyeing greatly improves quality by allowing precise colour matching when moving from batch to batch or producing to reorder.

Other examples of current computer applications range from the increasingly extensive use of CAD in the design stage feeding through into direct instructions for weaving machines; to computer-controlled, automated carpet-tufting machines; and finally to fully automated inventory systems where computer-directed sensors and robots operate fabric warehouses by keeping track of thousands of items and automatically filling orders for despatch as they are received.

#### Rationalization and New Product Strategies

Pervasive technological change has been accompanied by equally extensive rationalization measures on the part of the industry, often facilitated by major programmes of government support for this adjustment process. These rationalization moves involved better integration of design, spinning, weaving and finishing; the closure of old plants; and a large number of bankruptcies.

The net impact of this wave of technical change and rationalization is that in two decades, textile employment in the has been reduced from 8.9 million to 6.8 million. In turn, because of the higher capital costs of new equipment - a shuttleless loom and ring spinning mill in 1982 were 3.5 times and 5 times more capital intensive per worker than in 1950. - the textile industry in the IACs is now a capital intensive industry with value-added per worker in 1985 at \$18,000 compared to \$6,000 in developing countries.

Underlying these changes have been significant improvements in productivity. A modern spinning room is almost completely empty of people. Already by 1983, 7 out of 8 of new looms installed in developed countries were shuttleless. As a result, in the U.S., during the fifteen year period between 1972 and 1987, labour productivity in textiles has risen by about 90 percent - roughly double the rate at which productivity grew in manufacturing as a whole. Consequently, U.S. unit labour costs now compare favourably with those of its European competitors and of Japan and in some cases have begun to reach the levels of lower cost Asian and Mediterranean economies.

Perhaps most importantly, OECD textile manufacturers also vigorously pursued a variety of new marketing and production strategies explicitly designed to improve their international competitiveness in the face of low wage competition from developing countries. These strategies all differ in specifics but mostly

represent a shift away from mass production of standardized products to the production of smaller runs of more highly styled products.

Italy, West Germany and Japan all have textile industries that evolved from a mass production strategy to one based on shorter runs of more sophisticated products to serve highly defined niche markets. All are now highly successful exporters - with Italy and Germany now standing at first and second place in the value of textile-apparel exports in the world. The U.S. textile industry has been slower than the Europeans and Japan to pursue a niche production strategy but has gone further than the others in exploiting computer technology to reduce unit costs in high-volume production. Nevertheless even here there is evidence of a fundamental ongoing shift in strategy. The changes in production and marketing strategy that have occurred in textiles are paralleled by developments in the clothing sector which are discussed in the next section.

## Section Two: Uneven Technological Advance in the Clothing Sector

The assembly stage of clothing production, which account for 80% of value-added and involves 80% of the labour input, revolves around the manipulation of "limp" fabrics that have unstable and highly variable handling characteristics. Because of this, it has historically proved extremely difficult to mechanize materials handling and reduce dramatically the labour input into assembly. This remains true today even with the advanced computer and robotics technology that is available today. Consequently developing countries such as Bangladesh continue to retain a significant cost advantage over the IACs. Nevertheless there have been some significant developments in clothing automation - some of which represent state-of-the-art achievements not found in other sectors - that should be taken note of and are reviewed below.

CAD/CAM in Pre-Assembly. By far the most dramatic changes have occurred in the pre-assembly phase. Computer-aided design (CAD) systems are now widely used for grading patterns and marking; while automated cutting systems are making major inroads into the cutting rooms replacing entirely a highly skilled manual process.

These technologies offer a wide range of benefits. For CAD systems, while skilled labour input is reduced, the most important gains are faster turnaround time in grading and marking (by a factor of 4-6 times) and improvements in fabric utilization (up to 15%) due to making "tighter" lays of the patterns on the cloth for cutting.

In the case of automated cutters, skilled labour usage is reduced (from 25-60%), along with better quality (more accurate cutting) and materials saving via closer cutting of more tightly fitting patterns. The biggest gains, however, are from greater output (200-300% improvement) due to faster cutting speeds and the ability to cut more layers of cloth at one time than was possible with manual methods.

These systems are expensive, with prices ranging upward from \$100,000 for a single system to as much as \$10 million for a multi CAD/cutter installation. Nevertheless, diffusion has been relatively rapid, and now over 50% of all clothes produced in the U.S. come from firms using CAD systems and computer-controlled cutters, while more than 65% of all U.K. firms already have CAD systems and/or cutters installed or on order. More than half of the annual 3% productivity improvement in the U.S. clothing industry during the 1980s has been due to the use of automation technology in the pre-assembly stage.

Implications for Trading Patterns. Though having only limited effects on unit assembly costs, the use of these technologies is beginning to have an impact on North-South trading patterns, not via trade reversal but due to trade "relocation" from one region of the Third World to another.

In order to reduce turnaround times in the assembly stages, domestic producers in the U.S. and Europe who previously might have sent pre-cut pieces for assembly to Asia are now turning for offshore assembly to the Caribbean and Mexico and the low-wage countries of southern Europe, the Mediterranean and North Africa.

Wages in some of these countries may be higher than Asian locations - but the economic advantages derived from the use of pre-assembly automation are proving sufficient to tip the balance in their favour. Some analysts estimate that pre-assembly automation has already accounted for a 5-10% shift in the U.S. offshore assembly



trade from Asia to the Caribbean. This technology-induced sourcing shift denotes the growing importance of geographical proximity as a new competitive advantage for some countries.

Limited gains in assembly automation. Unlike the pre-assembly phase, the application of microelectronics technology to sewing has proceeded at a much slower, more incremental pace. The basic changes introduced have seen microelectronic-based control units added onto the sewing machine - but without any major redesign of the machine or of the principle of sewing two pieces of fabric together using a needle and thread. Consequently, with a few exceptions, the central determinant of international competitive advantage in the clothing industry remains largely unchanged.

This has important implications for developing countries such as Bangladesh. Rather than facing the rapid erosion of competitive advantage in one of their most important export sectors, assembly automation at the moment is in fact a barely visible phenomena. Assembly automation is unlikely to cause developing countries any significant worry in the short to medium term.

There are some ongoing technology-centered initiatives that suggest this may not be the case in the longer term. A number of Western countries (Japan, the U.S. and the European Community), their clothing manufacturers and capital goods suppliers are actively engaged in R&D projects focussing on the full automation of assembly.

These developments appear to have quite dazzling potential. However it is critical to bear in mind that no matter what progress has already been achieved, there are still major technical, structural and attitudinal obstacles to be overcome by the automation initiatives currently underway in the industrialized countries. These should not be underestimated for they have so far stymied assembly automation efforts. Thus there is a great deal of uncertainty still surrounding both the question of when automation of the assembly room will arrive and the nature of its eventual implications for developing countries.

#### Other dimensions of computer-based technological change

Computers are affecting other areas of assembly room activity. For example, automated materials transport and operator monitoring systems known generically as unit production systems (UPS) have allowed firms to drastically cut production and to slash 40-70% off work-in-progress inventory. Another aspect involves electronic communication within the firm. Low cost computer-based management information systems are being used to carry out tasks previously done manually such as the preparation of work dockets and stock control sheets.

Computer-based production control systems (such as MRP II) that allow "real-time" monitoring of work-in-progress and assist in production planning, line balancing and work measurement are also increasingly popular. A large U.K. producer, Courtaulds, using these techniques in their nightware division has seen sales rise by 50%, "seconds" reduced to 1% and raw material stocks cut by 30%.

The same technology also allows electronic communication between firms thereby facilitating greater buyer-supplier responsiveness. When linked up to electronic point of sale systems (EPOS) at the retail end, instant communication of production, product and delivery requirements can take place. Benneton of Italy relies heavily on computer technology in this way. The firms' 5000 retail outlets and 200 subcontractors are all linked into central headquarters.

Sales patterns in the shops throughout the world are rapidly translated into production orders sent out over the computer links. This allows subcontractors to respond to store specific demands and facilitates restocking in as little as 5 days in some cases.

Once again, these technological developments are impressive within the context of the IACs. However as discussed in the next section, there are other forces at work in the industry which from the perspective of Bangladesh deserve much more immediate attention and which have major implications for policy in the short run.

### Section Three: Market-led Changes in Retailing and Manufacturing Strategies in the International Textile and Clothing Industries

Fundamental changes are currently taking place in international clothing and textile markets and in the domestic industry in the main importing countries. In essence, a previously stable IAC clothing market allowing mass production of standard products has become highly fragmented and more sophisticated. The market is now composed of many differentiated segments with consumers in each preferring individual choice, constant variation and higher style content.

The retailers' strategy now is to target narrow market segments with a wide array of products. This is coupled with a speeding up of the cycle of fashion "seasons" on which the whole industry used to base its operation. Seasons are now shorter and more frequent, increasing in number from 2 to 3 to as many as 6 to 10 per year.

Adoption of these strategies is most pronounced in the upper and middle segments of the women's and men's market. As is now well-known, *Benetton* of Italy pioneered the new marketing strategy by targeting the youth segments of the market and by offering a wide variety of styles and colours that can be combined in many ways. Other firms have copied the Benetton strategy both in Italy and abroad such as Next and Hepworths in the U.K. More importantly, these strategies are now also increasingly visible throughout the whole of the sector including mass marketing/multi-outlet firms such as C&A and Marks and Spencers in the U.K. and Sears and K-Mart in the U.S.

These changes at the retail end of the market are having a series of "knock on" effects on the organization of the entire textile complex. Retailers are being forced to alter their sourcing strategies while both clothing and textile producers are in turn recasting their own relationships as well as reorganizing their manufacturing practices. In addition to these developments, other fundamental changes in inter-firm relations (between small firms operating within the same sector) have proved to be very successful under the new conditions of demand, particularly in Italy but also Japan. The discussion that follows briefly describes these three types of changes.

#### Changes in Relations between Buyers and Suppliers

Leading textile and clothing firms in the IACs are beginning to realize that the responsiveness and competitiveness of the textile-clothing complex can be strengthened significantly by the attainment of closer links within the industry between the major actors. The implications of this are becoming apparent in the actions of the industry in a variety of ways - almost all of which have relevance for developing countries.

Firstly, the design relationship has altered substantially. Before, the design process was entirely separate from the manufacturing process. Now there is a much more extensive consultation between retail designers and clothing manufacturers on all aspects of product design and fabric selection. In some cases they are entering into commitments to cover cloth purchases and set up costs. These new relationships are beginning to be seen even among retailers who have historically had a much looser and more traditional "arms-length" relationship with suppliers such as Woolworths and Richard Shops.

Second, a parallel development in buyer-supplier relationships is the growing necessity for manufacturers to be able offer a greater variety of product lines. Most significantly this means they must be able to switch production between styles rapidly in response to short term trends. Consequently, lead times for the supply of products right across the board in the clothing industry have shortened greatly - from an average of 15 to 22 weeks to between 2 to 8 weeks.

Correspondingly, these increases in variety and seasons and the reduction in lead times inevitably mean the production runs have become much shorter. Before orders would only need to be produced in thousands of dozens, now the order can be for 50 to 100 dozen, with specialist U.K. retailers such as NEXT averaging only between 1000 to 3000 units per style. Small lot sizes and short lead times also imply greatly reduced inventory levels thereby eliminating the need for stock ordering and production.

Third, and finally, a new element of stability and trust is deliberately being sought in the contractual linkages tying buyers and sellers together. One way this is emerging is by retailers being prepared to work with fewer suppliers on a longer term basis. At the same time, the retailers expect the manufacturers themselves to become more independent than previously, with a more diversified customer base. It is now commonplace for the larger manufacturers to keep their dependence on any one customer to below 50% of their business.

The three elements described above are now commonly subsumed within the the concept of "Quick Response" - the textile-clothing industry's specific term for what is commonly known throughout the rest of the manufacturing sector as "Just-in-Time" (JIT) production. Having a Quick Response system in place makes it possible for retailers to start a season offering customers a broad selection with only few units in stock. As stocks of particular items get low, the retailer can reorder and expect fast delivery - while having only a very small exposure on slow moving items.

For IAC clothing and textile manufacturers, the locus of competition and co-operation is thus beginning to shift, with contracts being increasingly awarded on the basis of quality, ability to change at short notice and reliability of delivery rather than on price alone. Price is still important but there is now an assumption that by creating a degree of contractual stability between producers and users, producers will be able to better improve efficiency and thereby reduce costs that can in turn be passed on to the retailer.

So far only a minority of IAC firms have adopted these new practices but industry leaders such as Marks and Spencers, Courtaulds and C&A in the U.K. and Wal-Marts, K-Mart, Levi-Strauss and Kellwoods in the U.S. are aggressively pursuing these strategies. Experience suggests that in time, these new buyer-supplier relationships will be a general feature of the clothing and textile industry in the IACs.

#### Intra-firm Changes in the Organization of Production

These changes in market demand and buyer-supplier relations have begun to erode the economic advantages of long-run garment (and textile) manufacture by shifting the focus of competition from price to variety, style, flexibility and rapid response. This is having major implications for the way manufacturers organize their

production. Rather than seeking enhanced flexibility through the use of automation, the necessary response capacity is being sought - albeit still by a minority of firms - in the redeployment and retraining of their assembly workforce, and in a basic reorganization of their production line.

For example, machinists are being trained to be proficient in a variety of sewing tasks rather than just one. In addition as discussed above, lot sizes are typically gradually reduced via elimination of the "progressive bundle" system (which required an operator to perform the same task on a large number of workpieces contained in the bundle).

In order to achieve lot size reduction, the physical configuration of machinery, the actual pattern of workflow and the organization of workers is being recast according to unit flow, "group" technology and "quality circle" principles. This means small lots of garments are assembled from start to finish by small groups of workers. Along with this change, operators are also increasingly being given responsibility for quality control, for making suggestions to improve efficiency and for planning their work schedule.

Payment and incentive structures are being altered as well. Whereas before uniform piece rates were the norm, now the pay scales for individual workers go up as they acquire additional skills through in-house training. At the same time, the basis for calculating payment is shifting from individual piece-work performance to the completed product performance of the group.

It should be noted that most IAC clothing firms have not yet fully embraced these new practices. However, there is little doubt that these changes in work practices and production organization are occurring and that the rate and scope of change will increase and expand in the future.

#### Small firm co-operation in Italy: a new structural model

As mentioned in the introduction, the highly successful Italian clothing industry is characterized by products with a high design content, extreme flexibility and strong price competitiveness. The key to this is an unusual industry structure that features close links between retailers and small producers, as with Bennetton, and also an extensive degree of regional co-operation between small producers who would otherwise be fierce competitors. There has also been an unusually high degree of co-operation between regional governments and groups of small firms working together in the way described below.

The average size of Italian clothing firms is only 5.3 employees, much smaller than the average in OECD and NIC firms. These firms have overcome the disadvantages of scale by setting up a variety of co-operative associations - termed *consortzia* in Italy - which undertake activities normally carried out by the head office in a larger firm such as design development, fashion forecasting, market research, training and technological development. Small firms, because of size and financial constraints, are typically unable to do carry out such activities - yet these are things that are often critical to maintaining market position. They also suffer from limited purchasing powers and from a limited capacity to undertake large orders.

Small Italian clothing and textile firms, often grouped together in one region have evolved specialized consortzia to deal with all of these activities - and others. For example, individual firm members of a consortzia in the Modena district often share out orders among themselves that previously they would have had to turn down - their turnover has increased as have their margins.

There are even consortzia that deal with straight forward accounting - one consortzia provides accounting, payroll and tax services for its members. In another case, one co-operative in the Carpi district was set up to guarantee the bank loans of its members. Each loan application is vetted by a committee composed of clothing managers who are far more expert in assessing the viability of the loan than any bank official. Once approved the application is passed onto the bank. Under this approach, the failure rate has been slashed from the Italian average of 7% to .003%; and because the commercial banks were so delighted with this they have cut four percentage points off the prime interest rate on the loans made to this consortzia.

The consortzia are typically financed and run by the firms themselves either directly through secondment or by hiring full time employees. However, in many cases as noted above regional governments (rarely the national government) have played a key role in providing "seed money" for the project to get off the ground.

In Italy, regional government has supported the efforts of industrialists to themselves provide the necessary inputs through their own consortzia - rather than the state taking on the role of providing these inputs directly. They have also funded training schemes, established industrial estates providing facilities at reasonable rents and encouraged co-ordination between firms.

The advantages offered by these structural features have catapulted Italy in the space of 10 years into a position of world leader in textile and clothing exports. In 1987, the Italian industry registered a trade surplus of \$10.2 billion - while many other European countries where clothing firms still operate along typical mass production lines have run substantial trade deficits. This success in Italy is based largely on the performance of the consortzia small firms who in many subsegments of the clothing industry account for a surprisingly high degree of world exports - 34% of footwear; 35% of leather handbags; 21% of mens suits; 35% of knitted pullovers. This is a remarkable feat considering that wage costs are twice those in the U.K., and twenty times those in countries such as Sri Lanka.

The structural features of the Italian clothing and textile industry - but particularly the collaborative efforts between small firms - represents a fundamental break with the mass production model followed by other western firms; a model that is, not surprisingly, also followed by most textile and clothing firms in countries such as Thailand. Interestingly, similar features are found also in parts of Germany, Denmark and in the textile and clothing industry in Japan.

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The new approaches to marketing, production management and inter-firm relations reviewed in this section have major implications for policy and commercial strategy in relation to developing countries such as Bangladesh and are discussed in the final sections.

## Section Four: Challenging Conventional Wisdoms on Policy and Practice in Bangladesh's Textile and Clothing Industry

I have been asked to assess the implications of the developments reviewed in Sections 1-3 for technology transfer and development in the textile industry of Bangladesh. Unfortunately, my knowledge of the industry is very limited and I am not in a position to undertake any substantive analysis of its particular characteristics and problems.

Rather what I propose to do in the final two sections of this paper is to draw out some of the key commercial and policy implications from the analysis given earlier in this paper and in so doing attempt to pose some challenging and provocative questions about that Bangladesh textile industrialists and government policy makers might usefully consider in planning for the future development of the industry. In this section we discuss the implications for the textile industry

### Threats and Opportunities in the New International Context

The pervasive changes in technology, markets, production and competitive strategies taking place in the IACs and described earlier in this report pose both threats and opportunities for the textile industry in all developing countries including Bangladesh.

In those product segments where emerging textile exporters such as Bangladesh have made their first entry and are seeking to expand their foothold, demand has slowed, market access has become more difficult, markets have contracted, competition has become fiercer and in many sectors, particularly in those segments where the products are standardized and less expensive, margins available to manufacturers are increasingly tight. These pressures arise from many directions.

As Bangladesh well knows, the distortions imposed by quotas and other forms of protection are now, of course, a major factor. So too is the very real threat from China and other potential lower cost suppliers such as Vietnam who will soon be competing head on against Bangladesh in many product categories. In both of these areas but particularly with regard to low cost competition, these pressures and the problems they create are likely to grow in intensity.

Technology is playing a role as well, particularly in textiles, where IAC firms have begun to re-establish their competitiveness through fierce rationalization schemes and major investments in new technology. NIC competitors too are investing heavily in new textile technology in an attempt to strengthen their hold on the mid to upper level segments of IAC import markets. The general implications of these developments for Bangladesh are reviewed below.

### Impacts and Policy Implications

In assessing the implications of the developments reviewed in Section 1 for developing countries such as Bangladesh, a number of points need to be noted. Having survived the initial onslaught of low wage textile exports from the South, largely by hiding behind protectionist barriers, IAC producers are now beginning to reap the benefits of their investment in new technology - gains that in future could be extracted at the expense of the developing countries.

Moreover, recent changes in the pattern of market demand have played right into the hands of the Northern producers and their new technological base. The textile technology now in place is well suited to allow producers to respond to pervasive changes in demand which are now driving the market - more frequent style changes, greater emphasis on design and styling, shorter runs, and the use of finer yarns and more lightweight fabrics. In short, the greatly increased strength of the automating textile industry in the IAC countries has already introduced a permanent constraint on the textile export aspirations of the large majority of developing countries.

Thus because of technological change, government support, a new product mix and the niche marketing strategies pursued by IAC producers, a major component in the textile-clothing-export equation that historically had been expected to be the first step in industrialization for many countries has now been eliminated.

Nevertheless the wage gap between the IACs, NICs and other developing countries remains substantial in the textile sector. As a result of this traditional competitive advantage and because of the growing capital costs of the new equipment, most developing countries, such as Bangladesh, still rely on the labour-intensive spinning and weaving technologies of the 1960s. This makes sense in narrow economic terms because it allows them to retain existing markets for "undifferentiated" commodity-type fabrics and yarns that are low cost and also low value-added products. However, it does mean that these countries are inevitably falling even faster and even further behind the world technological frontier both in this product segment, and more importantly in the fast growing segment of "differentiated," specialty-type fabrics and yarns where the North has gained the technological and marketing edge.

It needs to be borne in mind that while microelectronics has played a role in the textile innovation process over the last twenty years, this role has been comparatively limited compared to the impact it has had in some other sectors. Moreover, where the technology has been introduced, it has been used to assist the automation of specific stages of the production process via the design of custom-engineered machinery built to do a specific task - i.e. hard automation. Hence the vast potential of the technology to facilitate systemic integration of the production process, coupled with much greater flexibility than is already possible, has not yet been fully exploited. Most observers fully expect that from here on in technological change in textiles is much more likely to be driven by the pervasive search for flexible, systemic, integrative applications of IT to textile technology than by the search for hard automation tied to the mass production of standardized products.

These short and long term factors taken together basically mean that the poorer countries such as Bangladesh, though retaining some competitive advantage in certain segments such as lower cost commodity fabrics, including unfinished fabrics, will be less and less able to expand their export production at the expense of producers in the developed countries - though tariff induced distortions in international trading patterns means that their textile exports should continue to grow slowly at the expense of the NICs. Any real growth will only come from expansion of their domestic and regional markets.



Some features of the modern textile sector in Bangladesh and government strategies for its development

The technology policy implications derived from this assessment for Bangladesh cannot be deduced in isolation. They must emerge out of a well-planned restructuring and modernization strategy that sets out its objectives in terms of scale, products, marketing strategies and arrangements, efficiency levels, technology base and industry structure. Such a strategy can only be developed on the basis of a thorough examination of the current status and future possibilities of the domestic textile industry. Factors to be taken account of in such an assessment would be product prices, product mix, quality, volume and output levels, relative factor costs and production cost structures compared against international standards.

A modernization strategy of necessity would incorporate a wide range of policies and programmes that go well beyond technological issues - fiscal policies, trade policies, support for restructuring and diversification, export promotion policies, input subsidies, forward and backward linkages to the raw materials and clothing industries, institutional and conceivably sector-wide initiatives for training, marketing information, design, etc.

With particular reference to the modern segment of the Bangladesh textile sector, the government has indicated its preferred strategy for the development of the sector over the course of the Fourth Five Year Plan. Below we would like to make some comments based on two aspects of the proposed plan and our secondary assessment of the current situation in the sector.

The first aspect is that the modern segment of the textile industry, which at present is predominantly within the public sector, is only capable of meeting 10% of the fabric requirements of the export-oriented clothing sector. This is due to both capacity and quality constraints. Consequently, the government has already proposed that by the end of the Fourth Five Year Plan, that the sector should be providing 50% of the fabric demand of the export-oriented garment industry.

The new capacity required to meet this demand is estimated to be the equivalent of 17 composite mills which would cost some Tk 2400 crores. The government is keen to encourage participation of the private sector in this expansion of capacity and has therefore decreed that there shall be no investment in new capacity in the public sector over the course of the plan period.

The second aspect relates to the current conditions of production and efficiency in the existing mills being operated under both the public and private sector. Currently these mills are operating at only 50 per cent capacity with 10 per cent permanently inoperable either because of manpower shortages or due to infrequent power supply. Financial constraints and irregular raw material supply are partly responsible for this poor performance. However, it appears that the greatest share of responsibility can be laid at the door of outdated technology and inadequate managerial, engineering, maintenance and operative capabilities coupled with, in the private sector at least, the lack of an appropriate incentive structure to encourage mill management to achieve increased productivity.

Two aspects of the government strategy with regard to existing capacity should be noted here. First, under World Bank encouragement, the government has embarked on a far reaching plan of privatization by which some 36 mills have already been returned to the private sector, 4 have been liquidated and 49% of the remaining 41 units are to be sold off the private sector in due course. Second, a mill modernization programme has been established which envisions the gradual refurbishment and technological upgrading of existing capacity. So far there have been major problems with this programme - only 6 of 41 mills have been successfully modernized.

Some observations on the current strategy being pursued. In light of our earlier assessment of international trends in technology and competitiveness, and the selected characteristics of the industry and government strategy as picked out above, we would offer the following observations.

1) Given the growing international competitive pressures emanating from the IACS and NICs who have invested in new technology Bangladesh appears to have made an appropriate choice in seeking to strengthen its domestic textile sector primarily in order to meet pre-existing demand for fabric from its export-oriented clothing producers. This means they will not be competing head on in the international textile market but will be able to "control" the terms on which they do compete on the domestic market with imported fabric.

2) Nevertheless, to avoid injuring the international competitiveness of their garment exports, the modern textile sector must strive to match international fabric suppliers in all areas - price, quality, variety and availability in as short a time as possible. Consequently, they cannot hide behind tariff walls and import quotas for very long but must improve their own technological capabilities.

3) There appears to be a tendency on the part of the government to look first to the expansion of capacity through new investment in composite textile mills as the main means of increasing the share of locally supplied fabric - rather than by upgrading the capacity and productivity of existing mills. I would argue that the opposite strategy should be followed with existing mills be strengthened and upgrading as a first priority before undertaking investment in new capacity.

Experience elsewhere (for example in Kenya and the Phillipines) has shown that it is far more cost-effective to improve capacity and productivity by attacking the causes of X-inefficiency in existing mills than to invest in new mills. This means launching a major effort to strengthen firm technological and managerial capacities to organize and run production efficiently and to generate a continual stream of productivity improvements through in-house training programmes and some form of externally organized training for managers and engineers. Associated with such an effort could be a U.N. assisted long term "technology transfer" programme involving the use of resident foreign experts whose main purpose is not to solve problems but to create the local capacity to solve problems.

4) At the present time, the existing textile sector training capacity within Bangladesh is both very weak and biased towards the public sector. Existing training institutes must be strengthened to be able to handle both formal courses in all areas of management,

production and operation as well as providing support to in-house training programmes. If at all possible, private sector firms should be encouraged and given incentives to become actively involved in the management, operation and even funding of textile sector training programmes.

5) Too much reliance must not be placed on privatization as a panacea for the problems of the existing textile mills as privatization in and of itself does not guarantee productivity improvements - particularly if the newly privatized industries are able to hide behind protective, and highly profitable tariffs. The appropriate external policy environment will have to be created as well.

A programme of sector-wide fiscal and other incentives designed to stimulate investment in efficiency improvements, investment in training and, if absolutely necessary, in the purchase of the appropriate types of new equipment would have to be designed. Overall the emphasis of the incentive system must be shifted away from protection and encouraging investments in hardware towards promoting competition and the encouragement of investment in training, production reorganization, quality improvements and least cost engineering solutions.

6) This reoriented incentive scheme could be accompanied by a sector supported information unit to provide up to the date information on available technology choices and their appropriateness for local conditions and the objectives of the sector modernization strategy. Beyond that demonstration projects/centres/ firms might also be supported to increase firm awareness of the technology choices available and their impacts on performance.

The technology choices available on the international market are still quite wide even though there has been relatively little specific R&D aimed at developing state-of-the-art equipment specifically suited for developing countries. One possible technological factor working in the favour of countries such as Bangladesh over the longer term is the trend towards computer-based equipment that is both more flexible and cost effective at lower volumes of output. This possibility needs to be examined closely for its relevance in specific circumstances.

This brings us to the issue of investment in new capacity. Assuming some new capacity is required at the level proposed by the government we would make the following points:

7) The decision to encourage new investment to take place in the private sector is the correct one. However, given this, the government must be prepared to once again open up the planning process for the future of the industry so that the private sector itself is able to make its best judgements of where, what type and what scale of investment is required. Thus the targets and objectives of the Fourth Five Year Plan may need to be revised in light of what the private sector wants to do.

8) As part of this revision, I would argue that the proposal for 17 composite mills incorporating the latest technology be reviewed very carefully in light of the changing characteristics of the international market as discussed earlier. Bangladesh textile producers in future must be able to provide the garment producers with the variety and quality of cloth that is demanded by the international market as well as having the flexibility to respond to changes in that

demand. Therefore care must be taken in the area of technology choice to avoid being overburdened with high cost, inflexible technology that is not suitable to Bangladesh conditions.

9) While 17 mills maybe the ultimate objective, it is clearly impractical to assume these could all be built and come online within a short period. The industry urgently needs to increase capacity and therefore ~~but~~ this should be done in a phased manner that ensures at least 2-3 mills are built as soon as possible with others brought in later as resources allow.

10) Given severe existing capital, technology and management constraints, fairly extensive foreign involvement will obviously be required in order to bring about the proposed strengthening of the textile sector. In principle foreign involvement via TNCs is an ideal vehicle to accomplish the necessary transfer of technology into the sector. However, it is critical that care be taken to maximize the "learning" potential of the planned new investments so that Bangladesh capabilities in management, engineering, plant and equipment design, installation and operation can be gradually strengthened.

## Section 5: New Opportunities for Sustaining Export Expansion and Improving Productivity in the Clothing Sector

Unlike <sup>in</sup> the textile sector, technological change has yet to fulfill its potential for attacking the low wage advantage of developing countries such as Bangladesh. Consequently, there are relatively few dramatic technological implications for Bangladesh in this situation. Of more immediate interest are the fundamental changes taking place in the nature of demand and retailer marketing and sourcing strategies in the major IAC markets.

The domestically owned, export oriented Bangladesh clothing industry must take account of these changes. It is significant that the production and export of the Bangladesh clothing industry is concentrated in precisely those market and product segments where demand is contracting, market access is becoming more difficult, competition is fierce and rates of return are being slashed.

So far, this change has probably not filtered through into the order books of Bangladesh manufacturers. As the figures show, exports of inexpensive, simply styled garments produced by low skilled workers continue to grow, giving the impression of a pattern of demand likely to continue into the longer term. I would argue that this trend does not however represent the future pattern of demand in the IACs. Rather it is the tail end of a market structure that is declining in importance - not only in clothing and textiles but in all manner of products from automobiles to washing machines. The market for mass produced clothing products where price and volume are the main determinants of sales and sourcing contracts will never disappear of course. But it may never ~~again~~ regain its former prominence.

Bangladesh, as it plans the future development of its clothing industry, thus faces a decidedly different market and competitive context internationally now and in the future from what existed in earlier periods. The low wage advantage currently enjoyed over the NICs and the IACs still provides Bangladesh clothing firms with a position at the "starting line" in the competitive pursuit for export markets. Low wages will continue to ensure that some of the races that it enters will be won. But looking into the longer term - 5, 10, 15 years from now, it is no longer certain that low wages will permanently continue to let them stay in the race till the finish.

And if they seek to enter other markets where fashion, quality and rapid response are now the sine qua non for success, they will soon learn that low wages are daily growing less important as a determinant of competitiveness.

It seems clear then that under the new conditions of competition, the big winners and major losers will be distinguished by those who have been able to master the non-wage and non-technology determinants of competitiveness discussed earlier. This means that Bangladesh should avoid, if at all possible, solely depending on policies that seek to exploit its low wage advantage as an international subcontractor. Indeed, the logic of the above suggests that Bangladesh should strive to also pursue the alternative path of restructuring its comparative advantage and moving away from sole reliance on low-wages towards capturing market share on the basis of the skills of its workforce, the quality and variety of the clothes it

can produce and the flexible responsiveness of its manufacturers to changes in the market.

The relative weight that Bangladesh should give to the pursuit of such adventurous strategic objectives cannot be predetermined. Ultimately however, at least some of these may have to be tackled if the industry has any intentions of expanding beyond its current position. Demonstrable productive efficiency, speed of delivery and flexibility are necessary for unknown manufacturers to break into new markets and consolidate their position in established markets while improved design content and greater market responsiveness are necessary to allow expansion once the foothold is secured.

Under the old market conditions of demand and supply, these possibilities were not open to countries such as Bangladesh. Now they are - but only if the collective will to seize these opportunities can be created, and followed up by the implementation of a strategy to turn the vision into concrete action by firms and the state.

Of course, there are risks associated with pursuing such a strategy. Bangladesh is a relative new entrant to the clothing sector, its skill base is weak, infrastructure limited and at the moment it has little international standing among IAC retailers as a reliable producer of high value-added products. Overcoming these constraints will be difficult, time consuming and costly.

But it seems equally risky for Bangladesh to carry on relying solely on its low wages to secure market share in an increasingly insecure and more competitive market where margins on mass produced standards products are constantly under pressure. Bangladesh firms could choose, therefore, to essentially stay where they are and hope for the best in the future. This might work in the short run. But I fear that such a strategy could also eventually relegate Bangladesh permanently to the international backwaters of the international clothing industry.

Fortunately, the earlier discussion in this paper provides some insights into how to fashion policies and strategies that might allow the first steps to be taken away from this rather dreary future for the Bangladesh clothing industry. As we shall see, technology transfer and international corporations can play a critical role here - but the technology to be transferred is not the hardware of new clothing (and for that matter new textile) technology but person-based managerial and technological skills.

#### Defining a New Direction for the Clothing Sector in Bangladesh

In the above comments, I have, in effect argued that the Bangladesh clothing industry may need to follow a very different path in the future. It could deliberately set out to gradually move away, over say 5 to 10 years, from its role as a low-cost supplier of basic goods and aim to slowly develop its international competitiveness in the manufacture of higher-value added products.

Such an ambitious move can only be contemplated on the basis of a well-planned blueprint or what might be better referred to as a comprehensive sectoral strategy. Such a strategy needs to be broadly based on a comprehensive "vision" of what the Bangladesh clothing sector will look like in ten years time. It would include a clear statement of the objectives being pursued, a specification of the

concrete steps required to get there, and the creation of the necessary mechanisms to put these policies into practice.

The experience of other countries suggests that one key to successful strategic planning at the sectoral level is that it must involve both the public and the private sector. Indeed industry should be encouraged to take the lead for it is they who must bear the brunt of any concrete action to put the strategy into effect.

Government, however, can and must be involved with and support industry's strategic planning efforts through various mechanisms, because it is they who must provide the overall policy framework and particular forms of intervention to support the strategy. Above all they must seek to achieve consensus about the aims of the strategy between the related parties involved in the sector. This approach is likely to be a new departure for government and difficult to manage since it implies a diminution of control. But a way must be found to do this.

Doing all of this is no easy matter. But I am prepared to argue that conventional approaches to policy formulation in this sector that are typically partial and based on outdated comparative cost, macro-economic logic will have little long run beneficial effects.

The sort of strategy that I am calling for would have many elements - including the formulation of a textile sector development strategy integrated with the clothing sector strategy; the development and strengthening of links between small and medium-sized firms on the one hand and large firms on the other; and the development of a capacity within the industry to provide services on a collective basis. All of these points fall naturally out of the analysis presented in Section 3. However, given that the main concern of this conference is with issues centering around technology transfer, this is the area where I will concentrate my final comments.

#### The Transfer of Best Practice Marketing and Distribution Technology

Most developing countries are "price-takers" in the international clothing sector, and Bangladesh is no exception. Bangladesh firms act primarily as subcontractors for Indian, South Korean and other East Asian producers who have already established themselves as independent players in the market. While often leaving little room for manoeuvre if countries wish to move upmarket, subcontracting can also be a valuable learning mechanism provided Bangladesh firms are willing to learn. As we note below, Bangladesh clothing firms have proved to be fairly adept learners in the area of production technology.

However, as our analysis showed in Section 3, the marketing, design and fashion element is becoming just as important a determinant of competitiveness as productive efficiency. This is an area where Bangladesh firms have still to acquire "technology", skills and expertise. Given the present rather underdeveloped state of this aspect of the industry, Bangladesh clothing firms can best upgrade their marketing and distribution technology through involvement with outside firms. Market access, expertise, publicity research and design all represent major barriers to entry that can be alleviated somewhat through a close and stable relationship with a trading or buying house, parent firm or experienced local agent. Through such arrangements costs and risks can be reduced, while information on

production techniques, quality standards and specific market characteristics can be channelled back to the local firm.

There are many such IAC based organizations who can engage in this sort of relationship with Bangladesh firms and no doubt they are already aware of this possibility. The key is linking up with an organization willing to pass along both technical assistance on production as well as the all important information on markets, fashions, designs and quality standards. Of interest is the fact that in recent years Japanese organizations and trading companies have become particularly active in marketing and distributing the products of Asian developing country producers in Japan. Since the design and quality requirement for the Japanese market are very high, they usually also assist their Third World clients to upgrade their skills in these areas as well. In 1987 and 1988, Japanese private sector organizations supported by government assistance have undertaken very successful technical assistance and marketing programmes in Sri Lanka, China and Thailand.

However, Bangladesh firms must also seek to develop their capabilities and knowledge in this area outside of links with foreign firms. Four routes are open to them to do this. The first is straightforward collection of market research and intelligence information on major and emerging markets. Bangladesh firms need to become familiar with the major distribution channels, the major buyers and the retail structure of the countries in which they hope to export. This information must be country by country and segment by segment.

A second mechanism is through the promotion of trade missions and attendance at trade shows. Trade shows are useful, cost effective ways to create awareness among potential buyers of what the country's producers have to offer since most major buying firms, retailers, importers and manufacturers regularly attend such fairs. Those held recently in Bangladesh, Thailand, Malaysia and Taiwan have all been major successes - in the case of Bangladesh, the first Apparel and Textile Expo (1989) was attended by 43 buyers from 16 countries and local agents for 65 foreign buyers attended. Order for clothing worth Tk 1,000 million were taken.

Trade missions are also useful vehicles for achieving greater notoriety in targeted markets. The Hong Kong Trade Council regularly sponsors trade missions for its manufacturers to major IAC markets and the returns from these missions in terms of new orders usually easily covers the cost of the mission.

Thirdly, state run marketing organizations in developing countries have garnered a justifiably bad reputation over the years in the clothing industry as being largely ineffectual. Nevertheless, local firms could in principle get together and collectively establish support a marketing organization that would provide a direct and profit generating service. This is done elsewhere (for example in Italy) and would simultaneously overcome both the negative aspect of state involvement in such organizations and diseconomies of scale.

Finally, the Bangladesh garments (and textile sector) must begin to develop its own design and fashion capabilities. This can be done gradually and over time but must inevitably center in the beginning around formal training carried out either in mainstream education or in specialized training institutions. However, increasing the supply



of design skills must be matched by an increase in the demand for design skills among local clothing firms. Bangladesh clothing firms who do not already recognize the value of design must be encouraged and indeed educated to understand its growing importance as a determinant of competitiveness. State subsidies to encourage the hiring of designers and the underwriting of the costs of development and marketing of a range of own design garments are one means of supporting this evolution.

**Strengthening the Competitiveness of Bangladesh Clothing Firms Through the Development of Technological Capabilities and the Transfer of New Management Practices**

The productivity and competitiveness of clothing firms can always be improved. I would expect that like the textile factories referred to earlier, Bangladesh clothing firms probably still have a long way to go to match productivity levels in the North. There is of course an understandable tendency on the part of factory managers and policy makers to believe that the best way to improve productivity is through the importation of new equipment. Undoubtedly in the case of Bangladesh, many clothing firms may be operating below the minimum level of technology and need therefore to upgrade the equipment they use.

This upgrading need not involve acquisition of the sorts of computer based technologies described earlier - with one important exception. In Section 2 we stressed the growing importance of CAD capabilities as a determinant of international competitiveness. This is certainly true now for all IAC firms and increasingly for NIC firms as well. Even though the Bangladesh clothing industry may be a long way from being able to justify the use of CAD equipment on narrow economic grounds, there are already strong strategic grounds for arguing that steps should be taken soon to develop a national CAD capability in the clothing sector. Steps need to be taken by the government to facilitate the early acquisition of this equipment so that the learning process can begin immediately. This can easily be organized on a bureau basis, accompanied by the necessary training and support. Large and small firms alike will benefit.

Beyond this sort of technological upgrading, and the minor investment in equipment mentioned earlier, I would not, a priori advocate a major new programme of technological modernization in the clothing sector. If Bangladesh clothing (and textile) firms are anything like the clothing firms in other developing countries with which I am very familiar, then I would expect that new technology is by and large not the answer to low productivity and low standards of international competitiveness. Rather, these problems almost certainly result on the one hand, from limited skill levels among operators, technicians and maintenance people; and on the other from the failure of management to appreciate the economic value of investing in the in-house accumulation of technological knowledge and capabilities to carry out incremental technical change.

Incremental technical change refers to technological improvements to existing production techniques that can be carried out with little or no new investment. These types of change are by far the most important source of technology centered productivity improvements open to clothing (and most other industrial) firms in developing countries.

Yet they are precisely the sorts of technical change activity that management is usually unwilling or unable to pursue.

Knowledge transfer through the long term involvement of foreign technical experts is one method of upgrading indigenous technological capabilities - but only if the principle remit of the foreign expert is training and the deliberate passing on of knowledge. Simply having experts around to solve problems is no long term solution. There is massive evidence to show that productivity levels in developing country plants run or maintained by foreign experts often decline precipitously after their departure because no efforts were made to transfer their knowledge to local users.

A more intractable problem arises when trying to develop managerial capabilities. This now has a new dimension. Previously, the shortage of managerial skills was recognized as a problem that could only be overcome in the long run by investment in the education of new managers. With the emergence of the new ideas on production management that were discussed in Section 3, it is becoming increasingly clear, that managers trained within a conventional, Western oriented, mass production approach to management are ill-suited to respond to the need to adopt the radically different management techniques now available which seem to be capable of generating sustained improvements in productivity far beyond what is possible by simply investing in (expensive) new equipment.

The competitive strategy of using skilled managers and unskilled operators is simply not suited to the production of higher quality and design intensive clothing being sold into a differentiated and frequently changing market. Success in these markets demands semi-skilled and skilled labour as well as high-skilled managers and other technical experts.

Unlike earlier years, it is now clear that a central feature of the present situation is that there is now an alternative pathway to productivity and quality improvement from that traditionally pursued by developing country firms. I believe the new approaches to management, production organization and the training of workers described earlier in Section 3 offers a way forward for the Bangladesh clothing industry that should not be ignored.

Intra-firm Organizational Change: The Possibilities for Bangladesh. This is where the involvement of foreign firms in local production can be extremely useful because they can help to inculcate the new attitudes in management and the workforce. However, this can only happen if the foreign investor already understands and practices the new approaches. Firms that are still pursuing a mass production approach and look to Bangladesh solely as a source of low-cost, exploitable labour are not the sort of firms that should be encouraged to invest locally. Somewhat surprisingly, there is already evidence from Bangladesh that the new practices can be successfully introduced on a wide ranging basis in the country through the involvement of foreign firms.

There is in fact no dispute that much of the enormous increase in Bangladesh's clothing exports during the 1980s can be attributed to successful technology transfer between a South Korean firm, Daewoo, and a private sector Bangladesh firm, Desh. As part of a privately contracted technology transfer arrangement, Daewoo provided extensive on the job training in garment making and production management at one

of its factories in Korea. these skills were then effectively transferred via the trained personnel back to the Desh factory in Bangladesh. In time, Desh supervisors and managers began to leave the company to set up on their own, taking with them the expertise gained from Daewoo.

While further research is required it is possible that the South Korean style of production and management that was transferred from Daewoo to Desh contained elements of the new practices. It has been confirmed to us that in fact some Bangladesh clothing firms set up as spinoffs from Desh, for instance, do organize production in small groups and have their work station arranged in a circular fashion.

If this is so, then the Bangladesh clothing industry has a major advantage over some of its competitors. If possible, it should move as quickly as possible to spread this knowledge of organizational best practice among all firms in the sector without worrying too much about the effects on individual profitability. A sector that can be made more competitive overall by the adoption of these new practices will generate much more business for everyone involved than if only a few firms operate in this fashion.

This is possibly an area where the government can play a role in encouraging and supporting the diffusion of best practice via training, model factories and demonstration sites. Fortunately the knowledge required to introduce the new practices is neither patented nor expensive to acquire. Thus the government can take steps to build up a supply side capacity at relatively low cost. However, management, and for that matter government policy makers have first to recognize that it is in their interest to go out and acquire this knowledge - both because of its short term potential for increasing productivity and the long term contribution that can be made to achieving the strategic objectives discussed above.

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The international clothing industry is clearly undergoing changes that present opportunities and threats to the Bangladesh clothing sector. There will continue to be possibilities for Bangladesh firms to export into the low-cost end of this market on the basis of their low wages. However, they should consciously use this opportunity as a learning vehicle to build up the sort of marketing, production and design skills they need to eventually move out of what is an increasingly crowded highly competitive market segment.

The questions raised in this last section - about the need for Bangladesh to pursue the formulation of a sectoral strategy based on mutual consultation and the relevance of the new forms of production management and organization to the Bangladesh clothing (and textile) industry go far beyond the brief I was given to address in these comments. However, given the points raised above, these issues are, I believe, among some of the most critical questions that policy makers and firms in Bangladesh must face as they set about charting the future course of their industry. I hope that this paper makes a contribution to that judgement.