

# Science and Technology based Industrial Vision of Pakistan's Economy and Prospects of Growth: The Case of Textiles and Leather

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*The textiles and leather sectors play a significant role in Pakistan's economy. In the rapidly changing global economic environment, there is an urgent need to strengthen the competitiveness of the textiles and leather sectors. This paper highlights the issues and challenges in the textiles and leather sectors, specifies strategic objectives and targets, and spells out an action plan for implementation.*

*The textiles and leather sectors are facing a number of challenges including a low technological base, lack of research and development, lack of trained manpower, low quality standards, concentration in low-value added products, and too much reliance on cotton. To address these challenges and to facilitate the transformation of these sectors into strong, dynamic, and internationally competitive industries led by the private sector, the public sector must create an enabling environment through a business friendly regulatory framework, appropriate incentives to the private sector, institutional support and provision of quality infrastructure.*

*The paper recommends an action plan aimed at: improving the regulatory and policy framework; human resource development through improving the HRD institutions and encouraging the private sector to invest in skill enhancement; promoting research and development through strengthening of the existing institutions and establishing new institutions; technological up-gradation; rewarding value addition; ensuring quality standards; and establishing common facility centers.*

## **1 INTRODUCTION**

The textiles and leather sectors play an important role in Pakistan's economy. In the rapidly changing global economic environment, there is an urgent need to strengthen the competitiveness of the textiles sector. Emphasis should be placed on the promotion of new products and processes to enable these sectors to compete both domestically and internationally. To become a global player, the textiles and leather industries need to improve product quality, move up the value chain, lay technological foundations, and strengthen global business operations. This transformation will have to take into cognizance the heightened global competition in textiles trade after the phasing out of the MFA.

## **2 THE TEXTILES SECTOR**

### **2.1 ISSUES AND CHALLENGES**

#### **2.1.1 Low Technological Base**

To a large extent, all segments of the textile sector from cotton cultivation to manufacturing of garments lack modern technology. Contamination in cotton resulting from improper picking and storage processes affects the cotton quality and is a major impediment in value addition. The technology deployed in cotton ginning is outdated,

inefficient and based on local manufacturing by semi-literate mechanics. The level of technology in the spinning industry is generally satisfactory and most of the industry is using state-of-the-art machinery. However, since the industry has suffered due to bad cotton crops in the nineties, it has not been able to fully meet its BMR requirements.

The weaving of synthetic fabric is done mostly on low technology power looms, with the inherent weakness of producing low quality fabric. Additionally these machines have limited capability to handle complex fabric constructions. The competitors such as Turkey, Indonesia and Korea have invested heavily in the latest water jet weaving technology which has helped them capture and sustain the market share in the global exports.

The global trade in artificial and synthetic fabrics is more than that of the cotton and blended fabrics. The competitors like Korea and Indonesia have developed this sector, realizing the important role of synthetics in the years to come. The drawback of this sector is lack of modern technology. In order to compete internationally, modern water jet weaving machines, with the capability to manufacture diverse qualities of fabrics are needed.

The production of fabric is dominated by the power loom sector, which accounts for almost 63% of the total production. The manufacturing capability of these machines is limited to the production of low-density fabrics. The processing industry is characterized by inefficient production processes leading to high wastage percentages. About 50% of the total installed processing capacity is more than fifteen years old and needs to be upgraded so as to enable it to cater to the growing demand of made-ups and high quality garments.

Further value addition through producing fabric that is required by the apparel sector is not possible unless there is a technology shift. The wider width high-speed shuttle-less looms have the capability of producing high-density fabrics. Modern air-jet and projectile looms are equipped with Computer Aided Manufacturing (CAM) facilities that enable the machine to handle complex fabric constructions without compromising quality.

The process of dye fixation is the single most important requirement for quality consistency. However, due to the absence of “continuous bleaching” process, problems are encountered in achieving homogeneity in the dyeing process. Better machines and workers trained on these machines will ensure consistent quality, which cannot be expected from the existing facilities.

The towel industry is largely using locally manufactured power looms. Only 8.5% of the total production comes from auto looms, which are better than power looms in terms of production capacity as well as product quality. A locally manufactured power loom produces 1000 kg of towels per month, whereas an imported auto loom produces 3500 kg of towels per month. Towels produced on auto looms fetch comparatively higher price in the international market. Very few units use shuttle-less and air jet looms for weaving towels.

The existing processing facilities in the towels segment are not equipped to produce better quality products. Most of the processing of towels is done in open winches

in a batch fashion. The quality of processing obtained from this process is inferior to the one obtained from continuous processing. There are very few continuous units in the towel industry, thanks to the dominance of small and medium sized units in the towel industry resulting in low production volumes that do not justify processing on a continuous unit.

The garments sector is characterized by limited design and product development capacity, high process losses, and inadequate investment in modern pattern making and cutting equipment. The growing number of new styles and collections required each year demands shorter lead times from design to sample, through to manufacturing and delivery require modern technology. As far as the consumer is concerned, an increased awareness of and requirement for qualities such as individual sizing and fit, patterning and coloration are beginning to appear alongside an established interest in new fabrics and garment styles. Recent technological developments in the garments sector have been in response to the growing consumer demand for new styles and improved quality products. For example, technologies such as Computer-Aided-Design and Manufacturing (CAD/CAM) are widely used across the globe. However, Pakistan still lags behind in the utilization of such technologies.

### **2.1.2 Lack of Research and Development**

There have been little research and development efforts in the private sector. There are a number of research institutions in the public sector in the area of textiles. However, their research output has not benefited the industrial sector not least because of the lack of effective links between research organizations and industry.

### **2.1.3. Issues in Human Resource Development**

A number of institutes have been established which cater to the human resource requirements of various segments of the textiles industry. The industrialists believe that the standard of the training programs carried out by these institutions is not in line with the requirements of the industry. The reason for this is lack of coordination between the institutes and the industry. The success of such institutes depends upon constant interaction and an effective feedback mechanism between the two. It is for this reason that most of the public sector initiatives established in isolation from the industry have not succeeded in achieving their objectives. The existing institutions are in need of restructuring to up-date their syllabus and upgrade the training equipment.

The processing (dyeing, printing and finishing) industry is still dominated by dyeing masters who have not received formal training in the field; they have developed their skills through years of experience. Furthermore the training institutions focus on cotton-based yarns and fabrics, whereas the changing international trends require the textile professionals to have up to date knowledge of synthetic and artificial filaments, and their weaving/knitting and processing. A systematic evaluation of the performance of the training institutes has been neglected for a long time and has begun to receive attention only recently. There exists a wide discrepancy in quality of education provided by different institutions, even in the same subject. Absence of a quality assurance mechanism is the main cause of deteriorating education standard of a majority of textile institutes.

The industrialists consider training as an unnecessary expenditure on their workforce, which ultimately causes problems for them to retain their labor and managers. Hardly any textile industrialist in Pakistan invests in training of its human resource.

The training institutions generally cater to the industrial requirement for middle level management. There is however a huge shortage of facilities to enhance labor skills and produce competent supervisors who have in-depth knowledge of processes and hands-on experience. Consequently, the skills of the labor force are primarily developed through the process of learning by doing in almost all the sub-sectors. Diversity in technology and the nature of textile sub-sectors demands specialized sets of skills in the work force. Each sub-sector has its own issues and requirements of human resource development.

### ***2.1.3.1 Spinning Industry***

Spinning is a capital-intensive process: a project costing Rs.350 million or more employs around 500 persons. Mostly the spinning sector labor force is trained through informal on the job training. The floor supervisors serving as *Ustaads* hire apprentices, who get trained in their respective disciplines. Although the spinning industry does not rely on the training institutes to meet their labor force requirements, the process managers in different sections are qualified professionals, mostly degree holders in textile engineering with specialization in the spinning industry. With the increasing competition in global markets, the success of the spinning industry depends on its ability to adopt modern processes to improve product mix by shifting to higher count yarns and adding further value through use of modern processes. This would require better-equipped labor force capable of handling these processes; simultaneously the managers will also have to undergo skill enhancement processes to meet the upcoming challenges.

### ***2.1.3.2 Weaving Industry***

Weaving industry in Pakistan can be divided into two segments based on the level of technology. The power loom sector is the labor intensive sector where the machine operators get on the job training through the *Ustaad-Shagird* system. Middle level management is non-existent in this segment; the entrepreneur himself is the manager. The machine operators in this segment do not obtain any formal training. The other sector comprises of shuttle-less weaving machines. This capital intensive process segment also does not rely on the formal institutions for the provision of manpower. Some of these units have supervisors trained at vocational institutes and the floor managers are textile professionals. Recent developments in the weaving technology require the operators and managers to be familiar with electronic gadgets attached to high speed machines including CAM (Computer Aided Manufacturing). Skill enhancement would require increased usage of computer based systems to monitor and manage productivity and quality.

### ***2.1.3.3 Knitting Industry***

The human resource requirements in the knitting industry are very similar to those in the weaving industry. The labor force is dominated by the individuals without any

formal training. Due to the small size of operations, supervisors usually serve as floor managers.

#### ***2.1.3.4 Dyeing and Finishing***

The dyeing industry also consists of two segments: one using old techniques of winch dyeing and the other using state of the art continuous dyeing process. In both the industrial segments skills and expertise are of crucial importance. In the developed countries dyeing process is carried out under the supervision of dyeing experts who possess proper training and sound understanding of a diverse range of disciplines including chemistry, fibers and mechanical engineering. The complex process of dyeing can only be handled by experts having sound knowledge acquired through academic and practical training. On the contrary, in Pakistan the dyeing process is managed by dyeing masters who have acquired their skills by working in a dyeing facility. These dyeing masters operate on hit and trial basis without any scientific methods. The new trends and modern developments particularly new finishing processes, which require special treatments to fabrics and value addition, can only be successfully adopted through imparting training to existing manpower. Immediate training needs can be fulfilled by creating awareness among the industry and training of the existing workforce comprising of the dyeing masters.

#### ***2.1.3.5 Apparel Sector***

The apparel sector has not been able to exploit its potential in the international market due mainly to shortage of skills in apparel designing and stitching. The highest value addition in the textile sector can only be achieved through the development of manpower, equipped with the requisite skills to enable the country to compete in international markets.

The increasing global competition in the field of apparel requires the local apparel industry to gear itself to improve quality of the fashion garments and accessories. The high rate of growth in the international clothing market makes it inevitable for Pakistan to further increase human resource investment in the field of garments and fashion design. The existing number of graduates per year is too low to achieve a quantum leap in apparel exports through capturing medium to high-end markets.

#### **2.1.4 Low Quality Standards**

The low quality yarn and the use of poor weaving technology (power looms) are the main causes of all the fabric defects. While factors such as weaknesses in back process and working conditions in the weaving facilities are of secondary importance in fabric quality. Similarly there are no proper standards and identification systems for the evaluation of fabric being exported.

The fabric manufactured on power looms simply cannot meet the JIS standards. The rejection rates based on these standards are as high as 25% in the power loom sector. Up-grading the power looms with an automatic cop changer can control the number of mechanical defects and the fabric rejection rate drops to 13%. However, weaving of

fabric on advance shuttle-less machines: projectile, rapier and air-jet looms the state of the art weaving machines are the only ways to improve the fabric quality.

The dyeing and finishing sector is also characterized by poor quality. The smaller units mostly use locally manufactured machinery, which does not have the capability to achieve the desired fabric shade or finish. About 50 percent of the processing industry's capacity is based on over 15-years old machinery and require replacement. Declining demand for low count yarn and increasing export market demand for finished fabrics make it necessary for the industry to modernize its processing base. The industry must make considerable investments in bleaching, dyeing, printing and finishing machinery to catch up with its competitors.

### **2.1.5. Production skewed towards low end Commodities**

Due to the capital intensive nature of the high tech machines in the manufacturing of woven fabric, the focus of the local textile entrepreneurs has, in the past, remained on the power looms; the quality has been ignored all along. Because of the poor quality, its fabrics fetched unit prices well below the average international unit price. For example, Pakistan has the lowest unit price realization for bed-linen as compared with its competitors. For other products also, Pakistan is targeting lower market range. Countries having higher unit prices are mostly European and their prices are more than double than those of Pakistan.

### **2.1.6. Low Value-Added**

Pakistan's exports of textiles are concentrated in low value added products despite a rising share of higher value added textile products in global trade. In the category of blended fabrics with more than 85% cotton, the value addition is very low as 54% of the total fabric is exported without any processing, resulting in a low unit price realization.<sup>1</sup> To capture a greater share in the rapidly expanding global market for high value added textile products, the textile industry must move up the value chain and increase the share of high value added garments and made-ups in its export portfolio.

### **2.1.7. Too Much Reliance on Cotton**

The textiles sector in Pakistan remains largely cotton-based, despite an increasing trend towards synthetic and blended fabrics. Current spindles utilization for manmade fibers is very low compared with its competitors. Major reason for this is the protected manmade fibers industry. Import duties on manmade fibers make the raw material expensive for the spinning industry thereby making it non-competitive in yarn export market. Blended yarn sold in the local market at higher prices compared to international prices erodes the competitive edge of the weaving industry also. The overwhelming reliance of the textile sector on cotton makes it vulnerable to adverse shocks in the cotton market. In order to decrease the reliance on cotton, there is a need to encourage a shift towards manmade fibers.

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<sup>1</sup> The extent of value addition is much higher in the case of blended fabrics with less than 85% cotton: 92% of exports of such fabrics are processed domestically.

## **2.2 STRATEGIC OBJECTIVES AND TARGETS**

The objectives of the development strategy for the textiles sector are to:

- a) Facilitate the textile industry to attain and sustain a pre-eminent position in the manufacture and export of high value added and high quality textile products in an era of freer international trade.
- b) Revitalize the institutional structure to strengthen human resource skills and capabilities.
- c) Encourage research and development to enable the industry to build cutting edge manufacturing capabilities.
- d) Enable the industry to move into a higher technological orbit.
- e) Liberalize controls and regulations so that the different segments of the textile industry are able to perform in a greater competitive environment.
- f) Develop a strong multi-fiber base with emphasis on product up-gradation and diversification.
- g) Encourage the active involvement of both the private and the public sectors in attaining these objectives.
- h) Attain double digit growth in the production and exports of textiles on a sustained basis.
- i) Achieve and maintain a position among the top five textiles exporters in the world.

## **2.3 ACTION PLAN**

To facilitate the transformation of the textiles sector into a strong, dynamic, and internationally competitive industry led by the private sector, the public sector must create an enabling environment through a business friendly regulatory framework, appropriate incentives to the private sector, institutional support and provision of quality infrastructure.

### **2.3.1 Improving the Regulatory and Policy Framework**

#### ***2.3.1.1 Regulatory Framework***

Cumbersome procedures of government departments and the difficulty of dealing with a number of government agencies have been identified as major problems facing textiles exporters. For example, exporters have to deal with more than forty government departments, each having its own individual documentation requirements. The excessive procedural requirements not only raise the transactions costs of exporters but also impede their access to the benefits offered under various incentives and export facilitation schemes. It is, therefore, essential to streamline the regulatory framework to provide a hassle-free environment to the exporters.

### ***2.3.1.2 Trade Policy***

About 80% of the textile production is export oriented. On the other hand, the textile sector relies on a variety of imported raw materials ranging from man made fibers to dyes and chemicals. Therefore, a liberal trade regime for the textile sector is proposed. This would ensure the availability of imported raw materials at competitive prices to all segments of the textile industry.

### ***2.3.1.3 Technology Import Policy***

Textile sector in Pakistan is mostly at the lower end of the technology spectrum. Concerted efforts will have to be made towards moving the industry into a higher technological orbit to produce value-added goods that are competitively priced in the international markets. To enable the industrialists to up-grade their technology, import of new machinery and equipment should be exempted from import duty and sales tax. In addition, keeping in view that not all manufacturers may have the necessary resources to invest in brand new machinery and equipment, import of second-hand textile machinery may be allowed.

### ***2.3.1.4 Tariff Rationalization***

The textiles industry uses a range of imported inputs from synthetic fibers to dyes and chemicals. High tariff protection is being provided to the domestic producers of these inputs, thereby eroding the competitiveness of the textiles sector.<sup>2</sup> For example, despite a growing global demand for blended fabrics, Pakistan has not made any significant headway in this area, thanks to import duties on synthetic fibers which make the raw material expensive for the spinning industry. In this scenario, the recommended approach is to phase out the import duty on man made fibers. To compensate for the loss of tariff protection, the domestic synthetic fiber industry should be provided fiscal incentives such as tax holiday and accelerated depreciation allowance. In addition, there are many manmade fibers that are not manufactured in Pakistan and spinners have to import these fibers. Import duties on such fibers should be removed completely.

Recent years have witnessed a great increase in the demand for blended fabrics and garments, as the fashion trends have changed in favor of blended garments. The global demand for ‘performance wear’, which includes water, fire, chemical and wrinkle resistant garments, is also increasing rapidly. Blended garments require a higher level of fabrication skills and thus fetch a higher value in the global markets. Rationalization of tariff structure for man-made fibers would go a long way towards enabling the textiles industry to exploit the opportunities offered by this dynamic sector.

Higher tariffs imposed on dyes and chemicals to protect domestic producers seriously affect the textiles processing industries by raising their cost of production.<sup>3</sup> This problem has been compounded by the restrictions of Azo dyes in EU and USA, that have forced the processing industry to switch to costly European dyes and chemicals. To

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<sup>2</sup> To mitigate this problem, a temporary importation scheme is in place, but it has not benefited the textiles producers owing to procedural snags.

<sup>3</sup> Import of cheap chemicals from countries like India and China, coupled with improper controls, result in variation of shades, inconsistency in quality, and high rejection rates.

ensure the availability of these inputs to textiles producers at competitive prices, protection provided to domestic producers of these inputs be gradually withdrawn, eventually to be replaced by fiscal incentives if needed. Dyes and chemicals not produced domestically should be allowed to be imported free of duty.

### **2.3.2 Human Resource Development**

The problems of low productivity and poor product quality can only be addressed by improving the quality of human resources. There are a number of institutions that are involved in imparting higher education in the field of textiles. While these institutions have been instrumental in meeting the human resource requirements of the textiles industry, there is a need for a significant improvement in the quality of education. In addition, the private sector needs to be encouraged to invest in on-the-job training to upgrade the skills of their manpower.

#### ***2.3.2.1 Improving HRD Institutions***

The performance of the existing institutes has been marred by a number of factors including: shortage of highly qualified faculty; out-dated training equipment; a syllabus that has not kept pace with recent technological advances; absence of networking among the academic institutions; and absence of links with the industry. There is therefore, an urgent need to revamp the education system to improve the quality of manpower. The following measures are recommended:

- a) Attract highly qualified faculty through market-based rewards.
- b) Revise curricula based on industry needs and recent advances in product and process technologies.
- c) Upgrade the existing training facilities and equipment.
- d) Introduce a strong system of quality control and supervision to ensure that minimum standards are being met.
- e) Provide hands-on experience to the graduates by making it compulsory for them to serve as interns with the industry for at least 6 months.
- f) Promote networking among the educational institutions.
- g) Conduct regular surveys and public-private consultations to identify the manpower attributes required by manufacturing firms in terms of knowledge and skills, and then communicate their manpower needs, in quantity and quality terms, to the educational institutions.

#### ***2.3.2.2 Encouraging the Private Sector to Invest in Skill Enhancement***

On-the-job training is essential for enhancing the skills of the workforce in line with market trends. In Pakistan, however, industrialists seldom invest in training and upgrading the skills of their manpower. To encourage entrepreneurs to invest in human resource development, they may be provided tax credit for expenditure on manpower

training. Also, firms that establish technical or vocational training institutions should be eligible for tax deduction out of its taxable income.

### **2.3.3 Promoting Research and Development**

Attaining competitiveness requires research and development activities focused on improving operation and maintenance of production facilities, product quality and designs, and process technologies. While there has been little research and development activity by the private sector, the public sector institutions have not been able to deliver either. There is, therefore, a need for a two-pronged strategy to promote research and development in the textiles sector. First, the public sector institutions need to be strengthened to provide market driven R&D support to firms. Second, the private sector needs to be provided incentives to invest in research and development. These may include tax exemptions on expenditure incurred on R&D activities as well as provision of matching grants for specific R&D projects.

#### ***2.3.3.1 Strengthening Existing Institutions***

A few institutions are involved in research and development in the textiles sector, but the research carried out by them is ‘supply driven’; research is performed according to the interests of the researchers rather than to meet the needs of the users. Other problems afflicting the public R&D apparatus include shortage of high-caliber researchers, ill-equipped research facilities, and lack of effective links with the industry. The following steps are needed to strengthen the existing institutions:<sup>4</sup>

- a) Attract highly qualified researchers through market-based rewards.
- b) Researchers should be provided 100% tax exemption on the income that they receive from the commercialization of their research findings.
- c) Create liaison offices to maintain links with the industry.
- d) Encourage research that caters to the need of the industry.
- e) Upgrade the lab and training equipment.

#### ***2.3.3.2 Establishing New Institutions***

- a) **Ginning Research Institute:** There is a need to set up a Ginning Research Institute. This institute will provide the much needed institutional support to the ginning industry in Pakistan. A proposal PC-1 for such an institution has already been submitted to the ministry for approval.
- b) **Textile Processing Institute:** In view of the lack of training facilities in textiles processing, there is a need to establish a training institute in this segment. This facility should be set-up through a joint effort by the public and private sectors with an active role of the Technical and Vocational

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<sup>4</sup> The Pakistan Council for Science and Technology has already launched a program to make the existing R & D institutions more responsive to the industry needs.

Training Authority (TEVTA). After its establishment, the management may be handed over to the industry.

- c) **Sample Development Labs:** To reduce the lead time in sample development, there is a need for the establishment of small commercially managed dyeing, printing and sample development labs. The necessary instruments/machinery required for such labs should be allowed to be imported duty free, so that these could be established with minimum costs and could provide a backup and regular support to the industry. Such labs will also play an important role in supplementing R&D efforts in fabric development, blends development, colorizations, patterns development, design developments etc.
- d) **Garment Technology Center:** Pakistan needs to develop capabilities in the garments sector—the highest value-added segment in the textiles chain. For this purpose, there is a need to establish a garments technology center at the National University of Textiles, Faisalabad. This center would play a pivotal role in developing and disseminating garment design and process technologies.
- e) **Knitting Technology Center:** Despite a growing trend in the global market towards knitwear, little attention has been paid to this sector. To develop the knitwear sector in Pakistan, there is a need to establish a knitting technology center at the National University of Textiles, Faisalabad. By providing the necessary product and process technologies, this center would go a long way in enabling the domestic entrepreneurs to capture a larger market share in the growing trade of knitwear.
- f) **CAD/CAM Center:** To promote the use of computer aided design and manufacturing facilities, there is a need to establish a CAD/CAM center at the National University of Textiles, Faisalabad. This center would be instrumental in promoting computer aided design and manufacturing in all segments of the textiles sector.

#### **2.3.4 Technological Up-gradation**

Despite global technological advancements, the textile sector in Pakistan is mostly characterized by the use of low-tech production facilities. The need for technological up-gradation is particularly acute in the weaving industry and garments and made-ups sections. The objective of manufacturing high value-added and superior quality products that can compete in international markets can not be realized without the up-gradation of technology in all segments of the textiles industry. Since the lack of funds for investment in new technology has been identified as a major constraint in technological up-gradation, a technology up-gradation fund is proposed that would provide long-term financial support for the installation of modern machinery and equipment.

### **2.3.5 Building Technological Capabilities**

The product and process technologies employed in the textiles sector have been mostly acquired from the industrialized countries. However, studies suggest that industrial growth relying on technology acquisition only misses out on a very large source of enhanced productivity growth and competitiveness through the development of domestic technological capabilities. Policies to strengthen technological capabilities need to focus on two areas: policy measures to strengthen the capabilities and activities of firms concerned with undertaking their own technology development; and policy measures to strengthen support institutions in undertaking scientific and technological activities for the benefit of industrial firms.

#### ***2.3.5.1 Firm-based Technology Development***

The fast growing Asian economies like Korea, Taiwan, Singapore, etc. have promoted firms not just as users of advanced technologies but as creators of technology and generators of skills and capabilities to do so. In these countries, as well as in more technologically advanced countries, firms now account for the larger proportion of industrial technology development.

There are at least four factors that are essential to nurture a firm-based technology development system: competition, effective demand from firms, a production structure based on the production of technologically advanced products and processes, and foreign direct investment.

- Competition generates the pressures and opportunities in both domestic and export markets, and stimulates investment in technology development.
- The majority of firms in developing countries do not realize or recognize the need for change and do not know where and what they might improve. On the other hand, firm may recognize the need for change but are unclear how to go about it.
- Industries differ in the intensity of their technology development activities. Industries that are growing rapidly in world trade offer greater opportunities for deepening local technological development capabilities. Domestic production of more technologically advanced products and processes is the necessary base, though not sufficient, upon which to build incremental design and engineering changes. Technology development has to be undertaken in close proximity to where production and marketing operations are located.
- In industrialized and industrializing countries, the roles and strategies of MNC subsidiaries and joint venture partners seem to be shifting towards a greater localization of technology development activities. When MNC subsidiaries play a technology development role, they can develop spillovers to the rest of the economy. This opens up the potential for linking this process more strongly to local institutions and increasing the spillovers generated within the economy.

In view of the above considerations, efforts to foster a firm-centered structure of technology development need to focus on increasing competition, promoting effective demand for technology from domestic firms, shifting production towards more technologically advanced products, and attracting foreign direct investment.

### ***2.3.5.2 Public Technology Institutes***

A number of institutes are working in the public sector to promote the development of industrial technology in Pakistan. In addition, some universities also have science and technology research facilities. However, these institutes have had little or no impact in developing solutions to the technological needs of the textiles sector. These institutes suffer from a number of problems including: a bureaucratic structure and poor management; lack of vision; lack of adequate resources; lack of coordination and collaboration with other institutions; and lack of an effective mechanism to provide direct services to manufacturing firms. The system, therefore, needs a complete overhaul and streamlining with a view to meeting the requirements of the private sector in a more effective manner.

### **2.3.6 Rewarding Value Addition**

To maximize the gains from the emerging global environment of increasing competition and lower trade barriers, it is imperative to move up the value chain both within and across all the sub-processes of the textiles sector. For example, there is a strong need to shift from the manufacture of low counts yarns to finer counts yarns on the one hand, and from clothing to garments and made-ups on the other. To reward value addition, incentives provided to the textiles sector should be linked with the extent of value addition, as, for example, access to subsidized credit to exporters of high value added products such as garments. Similarly, other incentives such as export refinance should be cascaded across the value chain within a sub-process e.g. lower refinance rate for the finer counts and other value-added yarns and higher rate for the lower counts. In addition, the import of modern machinery that is meant for achieving value-addition should be facilitated through the provision of subsidized credit.

Garments are the highest value added exports in the textile sector. Even though exports of ready-made garments, have increased over time, they are still only US\$2 billion that is much lower than potential. The unit values are still low and through better design, pattern, and brands, the value of exports may grow at a rapid rate.

### **2.3.7 Ensuring Quality Standards**

The quality of final products depends on the quality of cotton and lint. Currently, there are no effective quality standards in place resulting in quality problems for the upstream industries<sup>5</sup>. Similarly, it is essential to implement quality standards for yarn. A Quality Control Authority needs to be established which should enforce minimum standards for phutti and lint, cotton yarn and cloth, and dyeing and finishing etc. The use of contamination detectors can reduce the risk of contaminated yarn going into further

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<sup>5</sup> The government has established Pakistan Cotton Standards Institute (PCSI). However, the implementation of its cotton grading standards is weak.

processing. The government should facilitate the availability of contamination detectors by granting duty concessions on the import of this equipment.

To ensure compliance with environmental standards, all the dyes imported into Pakistan should be certified by an international agency. While the global trade regime for textiles is being liberalized with the phasing out of the MFA, a major threat to exports from developing countries will be environmental restrictions imposed by developed countries. Importers in these countries have become increasingly conscious about dyes that can cause environmental or health hazards. Low cost but hazardous dyes should not be allowed in the country as this can cause severe long-term damage to the reputation of Pakistan as an exporter. The government should assist the entrepreneurs to obtain quality standards certification like ISO 9000 and ISO 14000 through ensuring better implementation of compliance related issues.

### **2.3.8 Encouraging Joint Ventures**

In countries like Bangladesh and China, joint ventures with foreign manufacturers have proved to be effective tools for the transfer of technology and managerial and marketing skills. While foreign investment in all segments of the textile industry would be beneficial, a particularly promising area for establishing joint ventures is the apparel sector. Apparel manufacturing industry in Pakistan has been very slow to introduce new technologies especially in cutting and stitching. Collaboration with foreign apparel manufacturers would help bring in new technology and shorten the learning curve for the apparel industry. Export Promotion Bureau, the Board of Investment, and the newly established Textiles Board can play an effective role in encouraging joint ventures in the textiles sector.

### **2.3.9 Marketing Support**

As most of the textiles industry is export-oriented, the government needs to assist the private sector in effectively marketing its products through improving image of Pakistani products in foreign markets and developing brand names. Pakistan's current image is of a 'low quality, low price, non-consistent and unreliable supplier'. Unless this image is changed, textiles exporters would not be able to expand their presence in foreign markets. Effective representation of Pakistan in international product exhibitions and trade fairs can play an important role in building Pakistan's image as supplier of quality products. Developing brand loyalty is also a powerful marketing tool. However, despite having a strong export base in textiles, Pakistani firms have not invested in developing their own brands, not least because of the high outlays involved. The Export Promotion Bureau should be involved more actively in helping the private firms in their endeavors to build image and brand name. Alternatively, a "Corporate Marketing Company" may be established to provide professional marketing support to the entrepreneurs. The company would be a joint venture between the private and public sector, and managed by the professionals.

### **2.3.10 Establishing Industrial Clusters**

The textiles sector comprises a significant number of small and medium enterprises (SMEs). The formation of clusters would be beneficial for such SMEs

because the former provide cost-effective solutions to deliver targeted technical assistance for upgrading technology, management and marketing. Experience in many countries has shown that industrial clustering leads to greater efficiency and flexibility not attainable by individual firms operating in isolation. For the textiles sector, industrial clusters may be established at Faisalabad, Lahore, and Karachi.

### **2.3.11 Establishing Common Facility Centers**

Many small and medium enterprises lack modern design and production capabilities. To facilitate such enterprises, there is a need to establish common facility centers at Faisalabad, Lahore, and Karachi. By providing essential machining facilities and other common services, these centers would help in gaining greater competitive strength and developing collective efficiencies; and encourage cooperation between firms in upgrading technology, organizing consultative meetings, and disseminating information.

### **2.3.12 Establishing Co-operatives for Power/Auto Looms Sector**

The power/auto looms sector is fragmented with an average unit size of 7-8 looms per unit. The small size makes it difficult for the operators to upgrade their processes and technologies and to take advantage of the supporting services provided by the public sector. It is, therefore, proposed that the informal sector should be supported through the formation of co-operatives i.e. common manufacturing facilities with multiple ownership. Such co-operatives may be provided easier access to credit and technical and marketing support services.

## **3. LEATHER SECTOR**

The leather industry has developed progressively since Pakistan's independence. Following partition from India, there were few tanneries and hides and skins were imported. However, the leather industry today has developed into an indigenous industry that is the second biggest export-oriented industry in the manufacturing sector and third in the overall exports of Pakistan. Although the production of hides and skins used in the tanning industry-- cattle, goat, sheep, and buffalo--has been steadily increasing, the supply has not been able to keep pace with demand.

Leather and leather products play a significant role in Pakistan economy. Pakistan leather industry is the second largest foreign exchange earner after textile. As the country is predominantly agricultural, it possesses natural advantage in the area of live stock population. The leather sector contributes around 5% to GDP and 7% to the total exports of the country. Major leather products produced in Pakistan include footwear, leather garments, leather gloves, handbags, purses, key chains, wallets etc. Around 60% of domestically produced leather is consumed by footwear industry and another 30% is shared equally by leather garments and upholstery industry. The remaining 10% is

consumed in leather gloves, bags etc. The leather and leather product industry is employing around 250,000 workers.

Pakistan's leather industry is one of the major foreign exchange earners for the country. Almost 80% of production is exported and 90% of these in the finished form. During the year 2002-03, the total exports of leather and leather manufactures were of \$ 694 million and it is about 7% of total exports. The recent growth of the industry is mainly due to export of value added finished leather and leather manufactures like garments gloves, footwear and sports goods. The share of Pakistan in the global leather market is around \$ 0.6 billion (3%) out of the total \$ 20 billion; China is the leading exporter of leather with \$ 8.0 billion exports as shown in the following Table 1.

**Table 1: Global Leather Market**

Country	% Share	Export Value (US\$)
China	40%	8.0 billion
India	10%	2.0 billion
Turkey	8%	1.6 billion
Italy	8%	1.6 billion
Pakistan	3%	0.6 billion
Others	31%	7.2 billion

Source: Export Promotion Bureau (LIDO), Islamabad.

### 3.1 INDUSTRY STRUCTURE

There are 725 tanneries in Karachi, Lahore, Multan, Kasur, Faisalabad, Peshawar, Gujranwala, and Sialkot, with the majority of leather production taking place in medium-size tanneries.

**Table 2: Structure of Leather Industry**

Commodities	No. of Industrial Units	Total Capacities
Tanneries	725 Nos.	90 Mln. Sq Mtrs
Leather Garments/Apparel	461 Nos.	7 Mln. Pcs
Footwear	524 Nos.	10 Mln. Prs
Leather Gloves	348 Nos.	200 Mln. Prs

Source: EAC, 2004.

The leather industry as a whole--including both tanned leather and leather garments is an important foreign exchange earner. The leather tanning industry produces about 6 million hides and 36 million skins annually. The leather industry in Pakistan is expected to grow rapidly and will double its output in the next ten years. Pakistan being an agricultural country has a great potential of growth and is considered to be an export-oriented sector.

### **3.2 ISSUES AND CHALLENGES**

The chrome tanning method is the most widely used process in Pakistan's leather sector. However, the vegetable tanning method and a combination of chrome and vegetable tanning is also applied. The process includes a number of different steps during which large quantities of water and chemicals are applied to the skins. About 130 different chemicals are used in leather processing, depending on the type of raw material used and finished product. These may be divided into four major classes: pre-tanning chemicals, tanning chemicals, wet finishing chemicals and finishing chemicals.

Groundwater is used as the major source of water in Pakistan's leather industry. As the country is progressing towards industrialization, the rampant discharge of untreated effluents tanneries has been a growing problem. Pakistan's export of tanned leather is on the increase following a decline of leather production in the developed world due to more stringent environmental controls. The increase of tanneries in Pakistan is causing severe environmental degradation as the untreated effluent used in the tanning process is released into nearby water reservoirs and in the sea. In addition, air pollution is on the rise with the tanneries burning residuals (i.e. hair) from the tanning process into the atmosphere.

The primary pollutants that leather tanning in Pakistan creates are heavy metals (chromium, cadmium, etc.), various organic chemicals, and acids. The government tested the effluent runoff from leather tanneries in Pakistan and verified that the discharges were toxic. The sample of tannery effluent contained .30 copper milligrams per liter, .15 cadmium milligrams per liter, 7 zinc milligrams per liter, 1.14 nickel milligrams per liter, and 1.8 lead milligrams per liter. These levels are almost all well above the suggested standard for toxic substance concentrations in effluent. Very few of the tanneries have any type of waste treatment facility and this runoff is released into the nearest drain or body of water such as the sea or a river. The effluent is uncontrolled by any process treatment, waste recycling, or end-of-pipe treatment.

### **3.3 SECTORAL ISSUES IN LEATHER**

#### **3.3.1 Tanning**

- High proportion of damaged local hides and skins due to diseases, improper slaughtering/preservation.
- Shortage of local hides and skins
- Compliance to environmental standards

#### **3.3.2 Footwear**

- Undeveloped industry
- Non availability of quality shoe components/accessories
- Lack of marketing linkages
- Lack of trained human resources

#### **3.3.3 Garments/Gloves**

- Procedural impediments in import of raw material (finished leather and accessories)
- Narrow product mix
- Lack of design/development facilities

#### **3.3.4 Leather Goods**

- Undeveloped industry
- Low technological levels
- Lack of marketing linkages

### **3.4 STRATEGIES, OBJECTIVES AND TARGETS**

While the government of Pakistan needs to promote the industry in the country, and simultaneously is a custodian to environmental protection, there is a need for national environmental legislation on the leather industry, local laws could be introduced to curb the growing tannery effluent problem. In fact, certain industrial areas are suffering greater environmental damage and would benefit from local legislation. For example, in Karachi, the Korangi Industrial Area has the largest number of tanneries working in the leather sector and is the most polluted area with "open drains and effluent being discharged without any treatment".

The tanneries could benefit from R&D in order to not only cut down on polluting effluents, but also how to recycle many of the discharges. In addition, effluent treatment facilities need to be established in order to limit the environmental damage caused by the direct dumping of untreated effluent.

A strategy for general remedial measures is presented below:

- Short-term training on occupational health and safety, modern practices of handling chemicals, etc. should be conducted for tannery staff and operators.
- Information about safety, health and environment should be visibly displayed in the workspace.
- The provision and use of safety items such as face protective shields, acid resistant gloves, aprons, masks, etc. should be strictly enforced.
- Careful monitoring of water use needs to be implanted. Appropriate water conservation measures such as placing automatic stop valves on water supply pipes, converting from running water washing to batch washing, etc. should be adopted as appropriate.
- The appropriate environment friendly technologies need to be adopted according to the particular needs and conditions of particular tanneries.
- Improvement in drainage system to avoid the formation of hydrogen sulphide gas inside the tanneries is suggested.
- Proper arrangements should be made to stop the use of tanned 'Solid waste in the preparation of poultry feed.
- Chemical re-cycling should be practiced.

It is observed that about 25% of the chrome that goes into wastewater can be reused. The liquor is almost free of chromium and contains most of the dissolved solids and other impurities. The chrome sludge cake can be dissolved in sulphuric acid to form tanning liquor which can then be reused.

### **3.4.1 Short Term Actions**

- Latest plant & machinery is available in the international markets and can be purchased, shipped and installed in a short span of time. Unrestricted access to this may be facilitated through lowered tariff measures.

- To improve quality and increase value addition, recruitment of foreign experts may be facilitated through subsidy by the government or technical assistance programs offered by various international agencies.
- The policy of lowered tariffs would bring a change in relative prices of products across the chain, reallocate resources to greater production, technological innovation, new production structures and changing patterns of competition.
- For growth to be sustainable, time bound policies must be given to the industry. This would create an investment friendly atmosphere to foreign as well as local investment resulting in increased growth.
- One window operation for tax collection may effectively be introduced to replace the lengthy procedures that involve interaction of manufacturer with various agencies.

#### **3.4.2 Long Term Actions**

- Government may utilize the Global Environmental Facility to obtain credits for effluent treatment plants like the ones in Kasur and Karachi for other dispersed units also. Under the existing situation, the small manufacturers cannot afford to comply with international standards on effluent control.
- To achieve higher growth, special incentives may be provided for setting up of industries for the manufacture of international quality trimming, accessories and component required by the leather industry.
- Technological up-gradation through joint ventures with leading international manufacturing houses.

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**Suggested Projects in Textiles**

<b>Action</b>	<b>Cost</b>	<b>Time</b>	<b>Agency</b>	<b>Impact</b>
<b><u>Developing Human Resources</u></b>				
➤ Attract highly qualified faculty through market-based rewards.	Rs.100 million	Short-term	HEC, APTMA	Strengthen the knowledge base and thereby improve the efficiency of the work process.
➤ Revise curricula based on industry needs and recent advances in product and process technologies.	Rs. 25 million	Short-term	HEC, APTMA	Technical knowledge and skills will reduce the process losses and improve efficiency. Save foreign exchange spent on hiring of foreign experts.
➤ Upgrade the existing training facilities and equipment.	Rs.450 million	Short-term	MOST, PCST	Improved quality of education in line with industry needs.
➤ Promote networking among the educational institutions	Rs.80 million	Short-term	HEC	
➤ Create liaison offices at educational institutions to maintain links with the industry.	Rs.50 million	Short-term	HEC, APTMA	Improved productivity due to the availability of most desired skills in the workers.
➤ Conduct regular surveys and public-private consultations to identify the manpower attributes required by manufacturing firms.	Rs.50 million	Short-term	PCST, HEC, APTMA	
<b><u>Promoting Research &amp; Development</u></b>				
➤ Strengthen the existing R&D institutions in terms of faculty and equipment	Rs.400 million	Short-term	MOST, PCST, APTMA	Improved product quality. Efficiency in production processes.
➤ Establish Ginning Research Institute (already proposed but implementation required)	Rs.150 million	Short-term	PCST, TCO, EPB, APTMA	Improved cotton quality will make exports more valuable and competitive.
➤ Establish Textile Processing Institute	Rs.200 million	Short-term	TCO, EPB, APTMA	Improved quality of inputs and processes in the textile value chain, resulting into substantial increase in the exports of value added products like synthetic fabrics and ready made garments.
➤ Establish Dying, Printing and Sample Development Labs	Rs.200 million			

<p><b><u>Upgrading Technology</u></b></p> <ul style="list-style-type: none"> <li>➤ Establish Garment Technology Center at National University of Textiles</li> <li>➤ Establish Knitting Technology Center at National University of Textiles</li> </ul>	<p>Rs.100 million</p> <p>Rs.20 million</p>	<p>Short-term</p>	<p>HEC, Textile Board, APTMA</p>	<p>Bridge the existing technology gap in garments and knitwear – sectors with high value added and strong growth potential.</p>
<p><b><u>Common Facility Centers</u></b></p> <ul style="list-style-type: none"> <li>➤ Establish common facility centers at Faisalabad, Lahore, and Karachi</li> </ul>	<p>Rs.1.5 billion</p>	<p>Medium-term</p>	<p>Textile Board, EPB, APTMA</p>	<p>Help in developing collective efficiencies; boost textile exports by giving a competitive edge in the world market.</p>
<p><b><u>Increasing Value Addition</u></b></p> <ul style="list-style-type: none"> <li>➤ Establish a CAD/CAM Center at National University of Textiles</li> </ul>	<p>Rs.25 million</p>	<p>Short-term</p>	<p>HEC, Textile Board, APTMA</p>	<p>Increased value addition; Higher unit prices of textile exports; Increase in the profitability of the textile sector as well as of upstream industries.</p>

**Pakistan Council of Scientific and Industrial Research,  
Leather Research Centre, Karachi**

Sr. No.	Problems	Solution
1.	Pakistan's exports of leather to European Countries are declining due to shifting of training industries to China, Korea and other Asian Countries. The exports to U.S.A. the main market for leather apparel has declined 9%. The cost of production is very high in Pakistan as compared to our competitors like China and India. The high cost of various inputs especially utilities and taxes make our products uncompetitive in international market.	We have to reduce our cost of production and also maintaining the improvements in productivity. Tanning to finishing chemicals should be provided at cheaper rates.
2.	Due to shortage of live stock in the country the cost of raw hides has been on the increase regularly.	Modernization of live stock farming on scientific pattern is needed for better growth of live stock.
3.	Pakistan being a developing country its leather products has to face barrier to export opportunities by the use of sanitary and Phytosanitary standards from the developed countries i.e. Europe, U.S.A. etc. European union countries are demanding that leather goods should carry the certification marks of International Standard Organization (ISO) regarding pollution free environment at the factory premises where the product is manufactured.	The survival of leather industries lies in enhancing through adoption of quality standards in obtaining certifications ISO-14000, ISO-9000, ISO-17025, SA-8000.
4.	According to the survey, in leather and leather garment industries only 15% are qualified and experienced workers while 85% are employed on the basis of experience only. Finishing recipes are prepared by the uneducated technicians not knowing the relationship between the binders and top coats but of previous experience. Exported leather during the storage and transportation because of change of climate the chemical reaction takes place and problems like spew are developed.	LRC offers three and six months courses for the managers and supervisors to give them know how of rectification of problems and to provide technical awareness to the personnel as per modern requirements.
5.	Leather garment industry is facing the problem of non availability of raw materials for their finished goods. At present lot of companies are exporting the leather in the form of wet blue semi tanned leather to avoid the effluent treatment problems which is a tremendous waste.	It is of paramount importance that we should export value added finished goods of leather. Therefore ban should be imposed on the export of hides and semi tanned leather or imposition of 25% export duty on export of semi finished and finished leather.
6.	Leather shoes which are much in demand all over the world but Pakistan was unable to get its proper share due to high duties imposed on raw materials made the shoe process uncompetitive in the international markets restricting the growth of footwear industry in Pakistan on the one hand and causing loss of export markets available in Indonesia, Philippines, Malaysia, Thailand.	Duties on tannery machines spare parts and raw materials should be reduced or should be made duty free.
7.	Good quality leather is mostly exported and is not available for high value-added Leather Garments	It is proposed that 20-25% export duty should be imposed on finished leather. This would

	& Leather Products. Leather garments in Pakistan are made mostly from low grade & medium grade leather. These garments face stiff competition from Chinese & Indian products. Unless good quality leather is made available to value-added sectors, these sectors will continue to suffer and lose their market shares in global markets for Leather Garments and Leather Products.	help availability of good quality leather produced locally.
8.	Government of Pakistan has reduced the rate of rebate on leather products for exporters. But they are unable to reduce the cost of productions and also maintaining their international market standard. The margin of profit has considerably reduced due to shortage of raw hides.	Govt. should revive the old rate of rebate as an incentive to increase the exports.
9.	Pakistani exporters are facing difficulties in getting refunds from the income tax collectorate because of in-ordinate delay by the income tax collectorate in giving refunds to exporters and not honouring SROs issued by CBR from time to time.	Income tax collectorate should be according advised.
10.	Pakistani leather garments exporters are unable to penetrate into the markets of Poland, Japan and Russia be cause of high import tariff. These three markets have huge potential for leather garments.	Pakistani leather garments exporters should focus on marketing efforts in these three countries.

## Targets

We should strive to excel in leather production techniques, through continuous research and development.

1. Development of better & cost efficient sourcing of hides and skins.
2. Development of production techniques: development of the most efficient method of producing leather that should also consists of:
  - Improving the quality of leather through introduction of new processes and introduction of just in time production methods.
  - Introduction to new machines, that are not only more efficient but are also safer to use, and have given rise to development of new technologies that have resulted in shortening the process cycle.
  - Researching application of new chemicals so as to develop cleaner and environment friendly technologies. This has also resulted in overall reduction of process costs.
3. Development of skilled personnel: Through development of specialized personnel for production of various types of leather. To successfully compete in the market we much be able to attract and retain well-trained and experienced technicians and high caliber staff.
4. Organizations must develop training programmes that encourage technicians to improve and develop new technical skills.
5. We must to research to have a roadmap for quality. Quality is process consistency that effects both costs and customer relations. The industry must implement quality control systems and testing regimes to ensure zero defects.

## **Benefits**

Although leather and leather products have ample scope for exports in the international market yet the leather industry is suffering from irritants such as trained manpower, shortage of raw hides and skins, duties on tannery machines and its spare parts etc.

It is proposed LRC should be strengthened with more manpower and equipments. Although LRC is providing trained manpower to the tanning industry also LRC being and ISO-1725 accredited lab is extending testing facilities to leather products exports in Pakistan for which they were approaching Hong Kong, England, Germany laboratories at a cost almost less than one third that they were paying to laboratories abroad.

**PROJECTS: LEATHER INDUSTRY**

<b>Action</b>	<b>Cost</b>	<b>Time</b>	<b>Agency</b>	<b>Impact</b>
Strengthen the tanning institute	Rs.100 million	Short-Term	HEC/MOIP	Improved product quality
Establish Footwear Design Centre in Sialkot and Karachi	Rs.250 million	Short-Term	HEC/EPB in partnership of private sector.	Improved quality and variety would enhance the exports of footwear.
Establish Leather Garments Centre in Sialkot and Karachi	Rs.500 million	Short-Term	MOIP	Increased export market share
Technological Up-gradation	Rs.700 million	Medium-Term	HEC/MOST in partnership of private sector.	Value-addition in the leather products would not only enhance the quality of the product but would also be a source of foreign exchange earnings.
Establish Leather Technology centre at Sialkot	Rs. 350 million	Short-Term	HEC/MOST	
Established Technical Training Centre at Karachi and Lahore	Rs. 300 million	Short-Term	HEC/MOST	
Adoption of Environment Friendly Technologies	Rs.450 million	Medium-Term	HEC/Ministry of Environment in partnership of private sector	Complying with the international norms would increase the leather exports.