Textile Finishing Industry: Needs to use higher value dyes and chemicals

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Pakistan textile sector is by far the most important sector of the economy contributing 67% to export earnings and engaging 35% of labour force. The entire value chain represents production of cotton, ginning, spinning, weaving, dyeing, printing and finally garments manufacturing. Pakistan has emerged as one of the major cotton textile product suppliers in the world with a market share of about 8% in world cotton cloth trade.

Fabric processing is the most critical stage of value addition in the entire value chain. Processing sector took off in early eighties and investments were made in the sector during the past few year. But despite this, it remains as the weakest link of the entire textile value chain. Woven or knit fabric can either be dyed or printed depending upon the requirement of the customer who is the garment or made-ups manufacturer.

Owing to inefficient process inconsistency in colours and shades, and weak colours that fade out the first washing are some common problems. Poor cotton quality and usage of substandard dyes and chemicals are major causes for inconsistent dyeing and bleaching. Other reasons include outmoded processing techniques and facilities. This motivates foreign customers to buy only yarn or grey fabrics from Pakistan instead of finished fabrics or garments.

Pakistan's textile finishing industry is embraces almost 731 units, the majority of which independent and complimentary to the weaving industry. About 650 independent processing units are working in and around Faisalabad, Gujranwala and Karachi, in which about 50 integrated units have complete finishing facilities.

The textile printing and processing units have classified into three categories:

1. Those integrated units, which process complete finishing facilities i.e. bleaching mercerizing, dyeing, calendaring and printing. They procure cloth and market, thereafter, under their own brand names. They also occasionally outsource finishing facilities to the traders.
2. Units in this grouping directly compete with the products of integrated units. In terms of quality, design and colours, their product is of same quality as integrated mills, and similar to those integrated units, they also sell their fabrics to the wholesale market.
3. Such units, which do not have complete finishing facilities, fall in this assemblage. They are engaged in bleaching and dyeing and perform more work on job order basis. They also produce cloth from the market place and sell thereafter under their own brand names.

The modern large-scale processing units are a part of the integrated mill sector, which process woven fabric. Most of the knit processing units are also small scale with traditional winch dyeing facilities. In some factories, the printing of textile is done manually by spreading the cloth on top of tables and pressing design screens on them, a method which is primitive as compared to the process in use by the modern and automated factories.

Of late Pakistan's textile sector has made considerable advances in production capacity and capability in the last five years. The year 2005-06 had witnessed low investment in the expansion of value added and BMR in the textile sector. The textile industry has taken post-quota regime as an opportunity and has been preparing them selves to face the challenges. Over the last six years this sector has invested $ 6.0 billion in modernization and higher value addition.

Import of textile printing and finishing machines increased from 6,722 numbers worth Rs 5.26 billion in 2004-2005 to 6,937 numbers worth Rs 5.49 billion in 2005-2006, thus showing an increase of 4% in terms of value. The above-mentioned investment in the textile-finishing sector is expected to enable the Pakistan's textile industry to face the formidable challenges resulting from the elimination of import quotas under the WTO rules. Import of textile printing and finishing machinery into Pakistan is given in Table-1.

Table - 1: Import of Textile and Finishing Machines

Quantity: Number
Value: Rs. in million

Machines	2004-05		2005-06	
	Quantity	Value	Quantity	Value
Textile printing machines	2,249	1,178	3,755	2,627
Drying machines	1,073	457	1,072	511
Bleaching machines	1,455	957	855	583
Dyeing machines	1,300	2,262	732	1,499
Machinery manufacture finish nonwovens	377	351	149	62
Machinery use ancillary printing	268	56	374	207
Total	6,722	5,261	6,937	5,489

Source: Federal Bureau of Statistics, Government of Pakistan.

Pakistan is fourth largest producer of cotton cloth in the world. Global textile trade has witnessed certain shifts in the recent times. It is noteworthy that over the past decade, clothing trade has advanced at a faster rate as compared to textile trade. Production of cloth (mill sector) increased from 437 million sq. meters in 1999-2000 to 965 million sq. meters in 2006-07, thus showing an average increase of 18% per annum. Out of total production of 965 million sq. meters of cloth only 9% produced is in blended. Production of cloth (mill-sector) is given in Table-2.

The global trade in woven fabric can be classified into two broad categories, cotton and blended fabrics and synthetic and artificial fabric, commonly referred to as man-made fabrics.

Table 2: Production of Cloth

(in 000 sq. meters)

Year	Cotton	Blended	Total
1999-00	369,713	67,474	437,190
2000-01	413,125	77,039	490,164
2002-03	475,824	92,612	568,436
2003-04	581,705	101,687	683,392
2004-05	842,292	82,380	924,672
2005-06	862,983	52,273	915,258
2006-07	879,940	85,310	965,250

Source: Textile Commissioner's Organization.

Table - 3: Export of Cotton cloth			
Year	Quantity (Million sq. meters)	Value (US$ million)	Average (US$ per square meter)
1999-00	1,575	1,096	0.71
2000-01	1,736	1,035	0.60
2001-02	1,957	1,133	0.58
2002-03	2,036	1,346	0.66
2003-04	2,409	1,711	0.71
2004-05	2,399	1,863	0.78
2005-06	2,634	2,108	0.80
2006-07	2,212	2,026	0.91

Source: Export Promotion Bureau, Government of Pakistan.

Asia is fast emerging as major source of exports, especially of textiles, to the USA, EC and other countries of the world.

Pakistan export of textile manufactures were $10 billion during 2006-2007, which is 67% of the total exports. Export of cotton fabrics increased from 1.57 billion sq meters worth US $ 1.10 billion in 1999-00 to 2.2 billion sq meters worth US $ 2.03 billion in 2006-2007, thus showing an average increase of 10% in terms of value. Major markets for Pakistan's fabric are USA, Turkey, Hong Kong, Italy, UK, Bangladesh, Spain and Dubai. Export of cotton fabrics from Pakistan is given is given in Table-3.

Technology options

The preferred technology for a new finishing unit in Pakistan is briefly recounted below:

1- Roller Printing

This technology has limitations of width and colours and has now been largely overtaken by rotory printing.

2- Rotory Screen Printing

Technologically the most advanced form of printing and also the most highly productive (in terms of printing speed and productivity). Relatively the most economical method of printing (low unit cost) rotory machines are preferred globally owing to their ability to print all colours (upto 32 colour machines now available) without design limitations (as in other machines/processes).

High speed and precision machines for associated processes (bleaching, equalizing, screen engraving, curing, stenters, calandering, etc.) have made this technology comparatively most advanced and internationally acceptable.

Production process

1- Inspection, Piecing and Batching

Inspection detects major flaws which cannot be removed by processing (fabric cuts, deep oil spots, etc.) after which the ends are joined and batched to make large runs possible.

2- Singeing & Desizing

A strength enhancing chemical coating is applied on yarn to prevent breakage during weaving which also impairs its absorbency. A desizing enzyme is padded and left overnight to allow the yarn to absorb chemical/liquor to improve the fabric's appearance.

3- Bleaching

Natural cotton fibre is dull/off-white in colour. To give it a bright white colour and enhance its absorbency, the desized fabric is padded with hydrogen peroxide or chlorine, or both, and left to steam for short durations.

4- Equalizing

Fabric printing requires precise width to prevent selvedge damage. Fabrics received from earlier processes tend to vary in width and need to be passed through the equalizing machine to solve this problem.

5- Mercerizing

This process consists of passing the fabric through a 20% caustic soda solution which improves its strength, elasticity, lustre and dye affinity.

6- Printing

Rotory machines print designs/patterns through engraved copper shells (one colour per shell).

Machines with 8, 12, 16, 20, 24 and 32 colour options are currently available. Subsequent to printing the cloth is dried through dry cans and processed in accordance with the dye/colour used.

7- Curing

Dyes affix themselves on to textile fabrics through chemical bonding (in differing types of heat conditions). A single curing machine possesses several forms of heating specifications enabling usage/applications of all types of dyes.

8- Stentering

Fabrics which have undergone varied chemical processes tend to lose weight and become harsher by the time it comes out of curing. Stentering adds chemicals to restore weight and handle to the fabric.

9- Calandering

Fabrics exiting from the stentering process (where chemicals have been added) need to be smoothened. Calandering machines apply tremendous pressure to bring about this mechanical change, allowing the fibre to become smooth and lustrous.

10- Inspection and Packing

Final quality control inspection separates defective material whilst approved fabrics pass on for packing and dispatch.

At present, the far most important factor is consideration is the carcinogenic effects of the chemicals, which are used for manufacturing dyes and intermediated. These hazardous compounds either directly or indirectly related with acute of the molecule. Some of the very serious diseased like cancer, tumors of the urinary bladder and certain skin diseases has got a connection with these chemicals. Azo dyes are toxic only after reduction and cleavage of the linkage to give aromatic amines. Azo dyes with structures containing free aromatic amines can be metabolically oxidized without Azo reduction.

The common complaints about Pakistani fabrics include the colours/shades mismatching and dye bleeds out in the first washing.

Due to WTO regime effects from 2005, ecological factor has been motivating stricter environmental regulation as part of survival strategy. The processing sector seems to be mostly affected for there is no adequate disposal of industrial chemical waste the absence of which can adversely impact the textile industry. The processing hence has a vital task ahead for establishment of treatment plants. They need to devise programs to reduce chemical consumption via recycling and use of more concentrated dyes and/or effective chemical formulations will limit volume.

Colorants and related auxiliaries will remain by far the largest product segment, accounting for almost half of overall total sale. Growth in demand for these products will rebound considerably due to improved pricing and a shift toward more expensive dyes and auxiliaries which provide environmental and/or productivity benefits. Pakistan should also pursue use of these higher value dyes and chemicals to meet standards in key export markets.◆