Spinning / Texturing
Weaving / Knitting
Finishing

Scope & Coverage

INTERNATIONAL PRODUCTION COST COMPARISON

INTERNATIONAL TEXTILE MANUFACTURERS FEDERATION
FÉDÉRATION INTERNATIONALE DES INDUSTRIES TEXTILES
INTERNATIONALE VEREINIGUNG DER TEXTILINDUSTRIE

ITMF

International Production Cost Comparison

Spinning/Texturing/Weaving/Knitting/Finishing

The world's primary textile industry is engaged in a continuing modernization and restructuring process, spurred by the advent of entirely new or more sophisticated textile technology together with increasing competition for markets and products. Originating in the industrialized countries, the process has spread to newly industrialized and to developing countries, many of which are turning to the latest textile technologies as a means of ensuring their competitive position, especially in export markets. This trend has been clearly evidenced by the survey on world textile machinery shipments conducted by ITMF since 1974 (International Textile Machinery Shipment Statistics).

ITMF's International Production Cost Comparison, first published in 1979, is designed to trace the implications of the growing capital intensity in the primary textile industry. Thus, the presentation in this study of manufacturing costs and of total yarn/fabric costs includes a breakdown into the various cost elements which allows for a better appreciation of the relative importance of these elements and their respective influence on the total costs. When reading the report, the objectives of the study - trace capital intensity in each segment - must constantly be borne in mind. It should also be noted that international competition takes place between a much wider array of producers working with the most modern and highly capital-intensive equipment of the type assumed in this study or depreciated old or second-hand machinery, leading to wide variations in manufacturing costs.

Attention is furthermore drawn to the fact that the cost pattern as emerging from this report reflects one element entering into the calculation of the final sales price for yarns and fabrics, others being overheads, incentive schemes, transport and insurance, import and export duties, etc. Moreover, competitiveness is determined increasingly by such factors as quality and style, reliability, promptness of delivery, flexibility, etc., which fall outside the scope of this study. An international comparison of this order can therefore never be more than an approximation to the real market situation. Finally, the changing nature of macro-economic factors (wage levels, inflation, interest and exchange rates, tariffs, etc.) renders it difficult to calculate production costs which are valid for a longer period. Hence, as no attempt is being made in this study to neutralize the effects of changes in the economic environment, the cost data presented are those valid at the beginning of the investment period, their validity for the later phases of the period being dependent on changes in macro-economic factors.

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Wiedingstrasse 9	Phone	(+41-44) 283 63 80
CH-8055 Zürich	Fax	(+41-44) 283 63 89
Switzerland	E-mail	secretariat@itmf.org
	Web	www.itmf.org

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Scope and Coverage

Geographical Coverage

Geographically, the study covers Bangladesh, Brazil, Central America (i.e., estimates based on partial data from El Salvador, Honduras, and Guatemala), China, Egypt, India, Indonesia, Italy, Korea Rep., Mexico, Pakistan, Turkey, the USA and Vietnam. These countries/regions all actively participate in international textile trade as exporters and/or importers. The countries/regions are further referred to as countries.

Methodology

Every year, the machinery manufacturers on whose equipment the present study is based are conducting numerous cost calculations for prospective clients around the world. Based on factors supplied by these clients, manufacturing costs are measured and used in the evaluation of investment projects. By using the same approach, ITMF's International Production Cost Comparison attempts to simulate reality within the limits outlined in the introduction. Cost factors for the participating countries are supplied by individual companies, consultants and textile trade associations. They are carefully reviewed by the six machinery manufacturers cooperating in the study and represent average cost factors for the country concerned. The results are presented in a way that enables the reader to see the repercussions on the costing structure of diverging factors (e.g. labour and capital costs).

Product Coverage

The product base in spinning is a Ne 30 (Nm 50 / 20 tex) combed ring yarn made of 100% cotton of 1-1/8" staple length and a Ne 20 (Nm 33 / 30 tex) carded open-end yarn made of 100% cotton of 1-1/16'' staple length. In texturing, it is a 100% polyester POY 75 f72 den textured yarn. The cotton yarns are woven into a "print cloth" fabric of 27.6/27.6 threads per cm (ring yarn) and a ''print cloth'' fabric of 24.0/24.0 threads per cm (rotor yarn), and a textured fabric of 38.0/31.0 threads per cm. Fabric dimensions are 168 cm grey width (cotton ring and rotor yarn), and 177 cm grey width (textured yarn). In knitting, the fabric constructions are of the Single Jersey type, 192 cm unfinished width (cotton ring) and of the Lapique type, 224 cm (cotton rotor) and of the Interlock type, 190 cm unfinished width (textured yarn), resp. For finishing the products cover the cotton woven fabric (grey weight 190 g/m), the cotton knitted fabric Single Jersey (grey weight 230 g/m) and Lapique (grey weight 358 g/m) as well as the polyester knitted fabric Interlook (grey weight 209 g/m).

Mill Type and Size

The cost calculations are based on the assumption that the cotton yarn is spun in a new mill equipped with 36'480 Rieter ring spindles producing 906 kg per hour and 3'072 Rieter open-end rotors producing 962 kg per hour. In texturing we are considering a plant size of 10 set eFK Machines, each having 384 working positons and cam shaft winding. The average operation speed is 800 m/min at 95% efficiency with 5 kg final packages. In weaving, 200 Picanol air-jet weaving machines OmniPlus-i-2-P-190 produce 19.4 meters of fabric per machine and hour (94% machine efficiency), 150 Picanol air-jet weaving machines OmniPlus-i -2-P-190 produce 22.3 meters of fabric per machine and hour (94% machine efficiency) while 60 Picanol rapier weaving machines OptiMax-i-4-R-190 have an output of 12 meters per machine and hour (95% machine efficiency). For knitting, Single Jersey (Lapique), 17 (13) circular knitting machines of Mayer & Cie, type Relanit 3.2 II, 30 inch diameter, gg 24, 96 feeders, with an output of 25.3 (31.4) kg per machine and hour (85% machine efficiency) are assumed, while for knitting Interlock, 8 circular knitting machines of Mayer & Cie, type OV 3.2 QC, 30 inch diameter, gg 28, 96 feeders, producing 10.7 kg per machine and hour (85% machine efficiency), are needed.In finishing, the continuous open width process route for cotton woven fabric is composed of 1 singeing machine, 1 BENNINGER bleaching machine, 1 BENNINGER mercerizing machine, 1 BENNINGER hotflue, 1 BENNINGER PAD steam, 1 stenter frame, 1 sanforizing machine, 4 inspection tables with a production of 69'120 meter per day.

The continuous open width process route for cotton knitted fabric is composed of 2 slitters, 1 BENNINGER Trikoflex pre-treatment range, 1 stenter frame, 2 BENNINGER CPB dyeing stations, 1 BENNINGER Trikoflex washing range, 1 belt dryer with infeed stenter, 2 compactors, and 4 inspection tables with a production of 20 tons a day. The discontinues process route for cotton knitted fabric entails 6 BENNINGER FabricMaster hydrodynamical jets, 2 slitters, 1 belt dryer with infeed stenter, 2 compactors, and 6 inspection tables with a production of 15 tons a day. The discontinues process route for polyester knitted fabric entails 2 slitters, 1 BENNINGER Trikoflex washing range, 1 stenter frame, 4 BENNINGER FabricMaster hydrodynamical jets, 2 rope opener, 1 belt dryer with infeed stenter and 6 inspection tables with a production of 15 tons a day. (s. details below each cost factors table on p. 9-16).

Efficiency Standards

Rates of output are assumed to be identical for all 14 countries concerned. The different efficiency standards prevailing in the countries have been taken into consideration by varying the number of workers required to obtain the output levels indicated.

Reference Period

The calculations are based on cost factors that prevailed in the 1st quarter of 2021. Cotton/polyester prices are those of the last week of February 2021.

Definition of Cost Factors

Reference Area

Manufacturing costs relate to the production area only, i.e., excluding overheads.

Wages

Wages include social charges, fringe benefits and shift work premiums. Note that the study is based on expenditure in the production area only and therefore excludes overheads (management, accounting, sales). Since, from experience, this cost factor differs widely from one company to the other, its impact on the total costing structure may clearly be considerable.

Operating Personnel

The number of operatives required are determined by work-study methods. The individual times are according to Benninger, Mayer, Oerlikon Barmag, Picanol, Rieter and Santex Rimar standards. Supervisors, as well as staff for laboratories, workshops, despatch, etc. are not included.

Overhauling and Maintenance Personnel

The requirements of skilled and unskilled workers for machine maintenance are determined according to Benninger, Mayer, Oerlikon Barmag, Picanol, Rieter and Santex Rimar standards for the overhaul and maintenance of their machines. The values indicated give the requirements per shift, similar to those for operatives.

Floor Space

The necessary average floor space for machines, gangways and reserve (can space etc.) was evaluated on the basis of a great number of spinning, texturing, weaving, knitting and finishing mill layouts. Certain alterations may arise, according to specific machinery layouts.

Building Costs

The cost of the buildings refers to the production area only and includes the costs of the air conditioning ducts for supply and recycled air, the lighting system, the installations for high and low voltage electricity supply, fire protection, etc. The dimension of the air conditioning installation is in direct relation to the specific climatic conditions in the respective countries.

Depreciation

The straight-line method (as against the degressive method) was used to calculate depreciation costs which are based on the period most commonly applied in the countries concerned (as against those provided for in tax laws). Where depreciation rates differ from those assumed, the company-specific depreciation costs may be re-calculated using the formula in the Annex (p. 44).

Interest Rates

Interest rates vary not only from country to country but also from company to company within one single country. In this study the average interest rates that prevailed in the first quarter of the reference year were assumed

Definition of Cost Elements

Waste

In spinning, revenue from the sale of waste (waste from slivers, filters, flats and grid droppings, etc.) is considered when calculating waste costs. In knitting, absence of waste is assumed. In finishing, the waste for both, Woven and Knits, refers to fibres and impurities loss during processing.

Labour

Wage costs are calculated on the basis of the wages paid to operatives and to skilled and unskilled labour for maintenance work. All social charges and shift-work premiums are included. For reserve personnel a percentage figure is added.

Power

Energy costs include the costs relating to the actual power consumption of the machines, the illumination and the air conditioning (in weaving and finishing, also steam, gaz, and heating). It is assumed that the mill is lit for the entire production time.

Auxiliary Material

The costs for spare parts, lubricants, cleaning materials and maintenance work on the buildings represent the costs for auxiliary material (this includes preparation costs in weaving and dyestuff and chemicals in finishing).

Depreciation

This element includes depreciation of machines, accessories and buildings. Machinery costs include free delivery to the mill, erection and - where applicable - customs duty and taxes.

Interest

Costs of capital interest.

Total Manuf. Costs

The sum of the above group of costs represents the total manufacturing costs.

Raw Material

Cost of raw cotton/polyester in the finished product in USD per kg or meter.

Total Costs

The tables with “Total Costs” present the cumulative sum of production costs across segments plus the cost of raw material in each segment (i.e., raw material costs presented in the tables with cost factor). In other words, the total cost for spinning equals the manufacturing costs for spinning plus fibre costs. The total costs for any subsequent segment (i.e., weaving/knitting and finishing) entail the total costs from the previous segment plus its respective manufacturing cost and fibre costs. This is true for each process route. Costs are transformed into the matching units, i.e., USD per m or USD per kg, depending on the segment requirements.

Ex: The labour cost in the table “Total Cost 2021: Spinning Ring/NE30” equals the labour cost in the table “Manufacturing Cost 2021: Spinning Ring/NE30”. The labour

cost in table "Total Cost 2021: Weaving Ring Yarn Fabric" equals the labour cost in table “Manufacturing Cost 2021: Weaving Ring Yarn Fabric” plus the labour cost in the table “Total Cost 2021: Spinning Ring/NE30“ expressed in the corresponding unit (i.e. USD per meter).

Cost Factors: Spinning (Example)

Product	Unit	Bangladesh	Brazil	Central America	China	Egypt	India	Indonesia	Italy	Korea, Rep.	Pakistan	Turkey	U.S.A.[6]	Vietnam
Hourly wage for skilled personnel	USD													
Hourly wage for machine tenders	USD													
Hourly wage for unskilled personnel	USD													
Operating hours (per year)	Hour													
Cost of electric power (per kWh)	USD													
Cost of buildings (per m2)	USD													
Annual building maintenance (% of building cost)	%													
Depreciation period for machinery	Year													
Depreciation period for accessories	Year													
Depreciation period for buildings	Year													
Customs, import tax, etc. (% of machinery price)	%													
Capital interest rate (%)	%													
Raw material cost (per kg of cotton 1-1/8", ring)	USD													
Raw material cost (per kg of cotton 1-1/16", rotor)	USD													

Manufacturing Cost: Spinning Ring/NE30 (Example)

Product	Unit	Bangladesh	Brazil	Central America		Egypt	India	Indonesia	Italy	Korea, Rep.	Pakistan	Turkey	U.S.A.	Vietnam
Waste	USD per kg % of Total													
Labour	USD per kg % of Total													
Power	USD per kg % of Total													
Auxiliary material	USD per kg % of Total													
Depreciation	USD per kg % of Total													
Interest	USD per kg % of Total													
Total	**USD per kg** % of Total													
Index: Italy														

Total Cost: Spinning Ring/NE30 (Example)

Product	Unit	Bangladesh	Brazil	Central America	China	Egypt	India	Indonesia	Italy	Korea, Rep.	Pakistan	Turkey	U.S.A.	Vietnam
Waste	USD per kg % of Total													
Labour	USD per kg % of Total													
Power	USD per kg % of Total													
Auxiliary material	USD per kg % of Total													
Capital*	USD per kg % of Total													
Raw material	USD per kg % of Total													
Total	**USD per kg** % of Total													
Index: Italy														

*depreciation & interest