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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Scope and Coverage

Geographical Coverage

Geographically, the study covers Bangladesh, Brazil, China, Egypt, India, Indonesia, Italy, Korea Rep., Pakistan, Turkey, the USA and Vietnam. These countries all actively participate in international textile trade as exporters and/or importers.

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 yarn made of 100% cotton of 1-1/8" staple length and a Ne 20 (Nm 33 / 30 tex) carded 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.

Mill Type and Size

The cost calculations are based on the assumption that the cotton yarn is spun in a new mill equipped with 16'320 Rieter ring spindles and 1'380 Rieter open-end rotors producing 400 kg per hour while the textured yarn is produced on 10 Barmag eFK with an output of 800 metres per machine and minute, or 2'000 kg of yarn per day (95% machine efficiency). In weaving, 96 Picanol air-jet weaving machines OMNIplus Summum-2-P-190 produce 19.4 meters of fabric per machine and hour (94% machine efficiency), 72 Picanol air-jet weaving machines OMNIplus Summum-2-P-190 produce 22.3 meters of fabric per machine and hour (94% machine efficiency) while 60 Picanol rapier weaving machines OptiMax-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 process route for woven - continuous open width - is assumed to be 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 Maag inspection tables with a production of 69'120 meter per day. The process route for Knit - continuous open width (COW) is composed of 1 Santex slitter, 1 Benninger Trikoflex bleaching line, 1 stenter frame, 2 Benninger Küsters CPB stations, 1 Benninger Trikoflex washing line, 1 Santex Santashrink with Infeed stenter Relaxdryer, 2 Santex Santacompact Compactor, and 4 Maag inspection tables with a production of 15 tons a day. The process route for Knit - discontinuous (JET) entails hydrodynamical JET, 2 Santex slitter for Wet, 1 Santex

Santashrink with Infeed stenter Relaxdryer, 2 Santex Santacompact Compactor, and 4 Maag inspection tables with a production of 16 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 12 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 year of reference. Cotton/polyester prices are those of the last week of February.

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. 43).

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

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 in Woven - Continuous Open Width entails weight loss in sizing and singeing, filters and other impurities. The waste in Knit - Continuous Open Width (COW) and Knit Discontinuous (JET) refers to other impurities.	**Waste**
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.	**Labour**
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.	**Power**
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).	**Auxiliary Material**
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.	**Depreciation**
Costs of capital interest.	**Interest**
The sum of the above group of costs represents the total manufacturing costs.	**Total Manuf. Costs**
Cost of raw cotton/polyester in the finished product in USD per kg or meter.	**Raw Material**
The “Total Costs” table present the sum of production costs across segments plus the cost of raw material (i.e. the cost of fibre reported as Cost Factors, expressed in USD per m or USD per kg depending on the unit of reference). Hence, the labour cost presented in the table “Total Cost: Spinning Ring/NE30” equals the labour cost reported in the table “Manufacturing Cost: Spinning Ring/NE30” only (because this is the first step in the value chain). The labour cost presented at each following step of the value chain (weaving/knitting and finishing) comprises the labour cost of the previous segments (i.e. cumulative costs over segments). Thus, the cost of labour in the table “Total Cost: Weaving Ring Yarn Fabric” equals the labour cost reported in table “Manufacturing Cost: Weaving Ring Yarn Fabric” plus the labour cost reported in the table “Total Cost: Spinning Ring/NE30“ expressed in the corresponding unit (i.e. USD per meter). The cost of labour in the table “Total Cost: Finishing - Woven - Continuous Open Width” equals the labour cost reported in the table “Manufacturing Cost: Finishing - Woven - Continuous Open Width” plus the labour cost reported in the table “Total Cost: Weaving Ring Yarn Fabric“. This is true for each process route and costs are transformed into the matching units (i.e. USD per m or USD per kg, depending on the segment).	**Total Costs**

Cost Factors: Spinning (Example)

Product	Unit	Bangladesh	Brazil	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												

(Notes: See page 17)

Manufacturing Cost: Spinning Ring/NE30 (Example)

Product	Unit	Bangladesh	Brazil	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												
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	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