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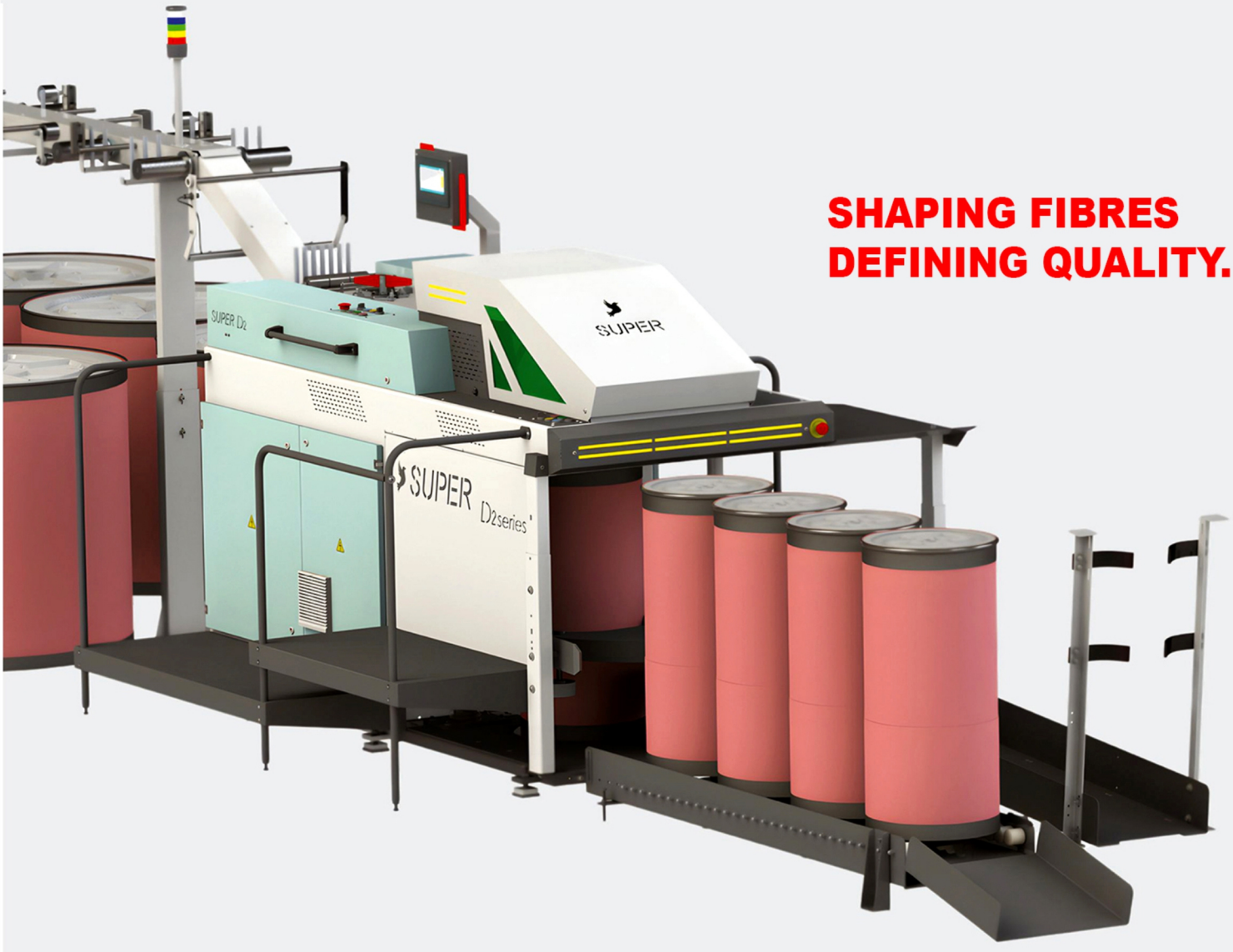
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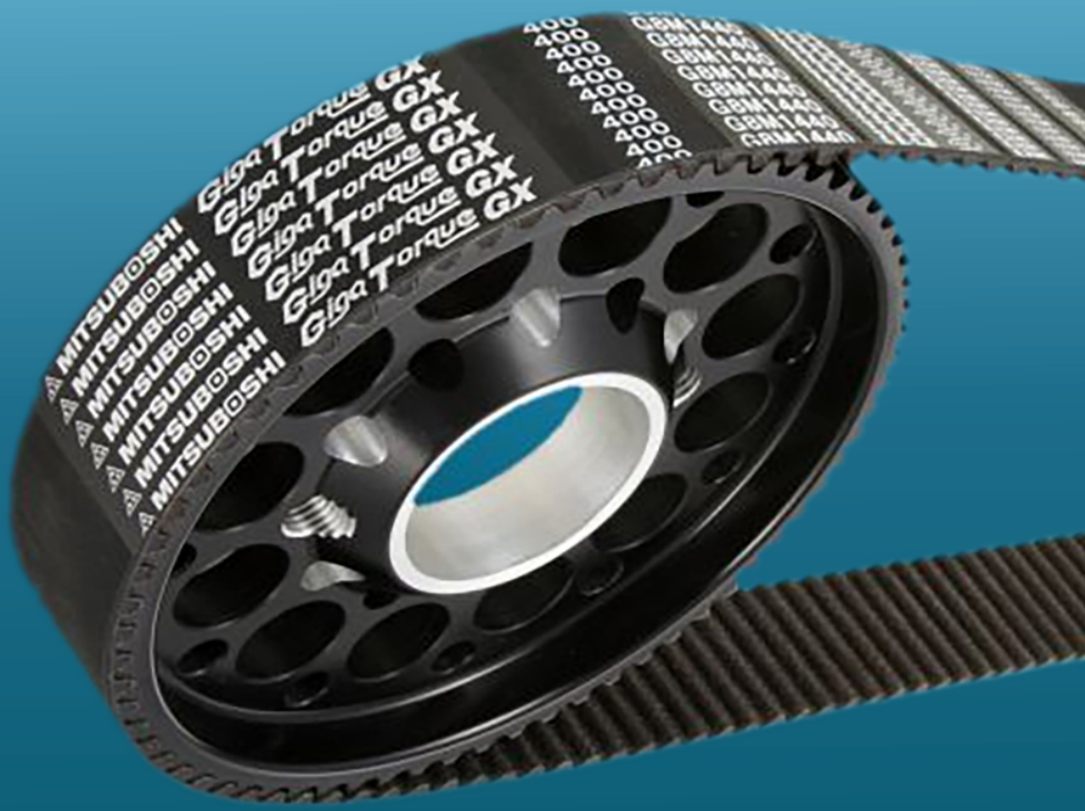
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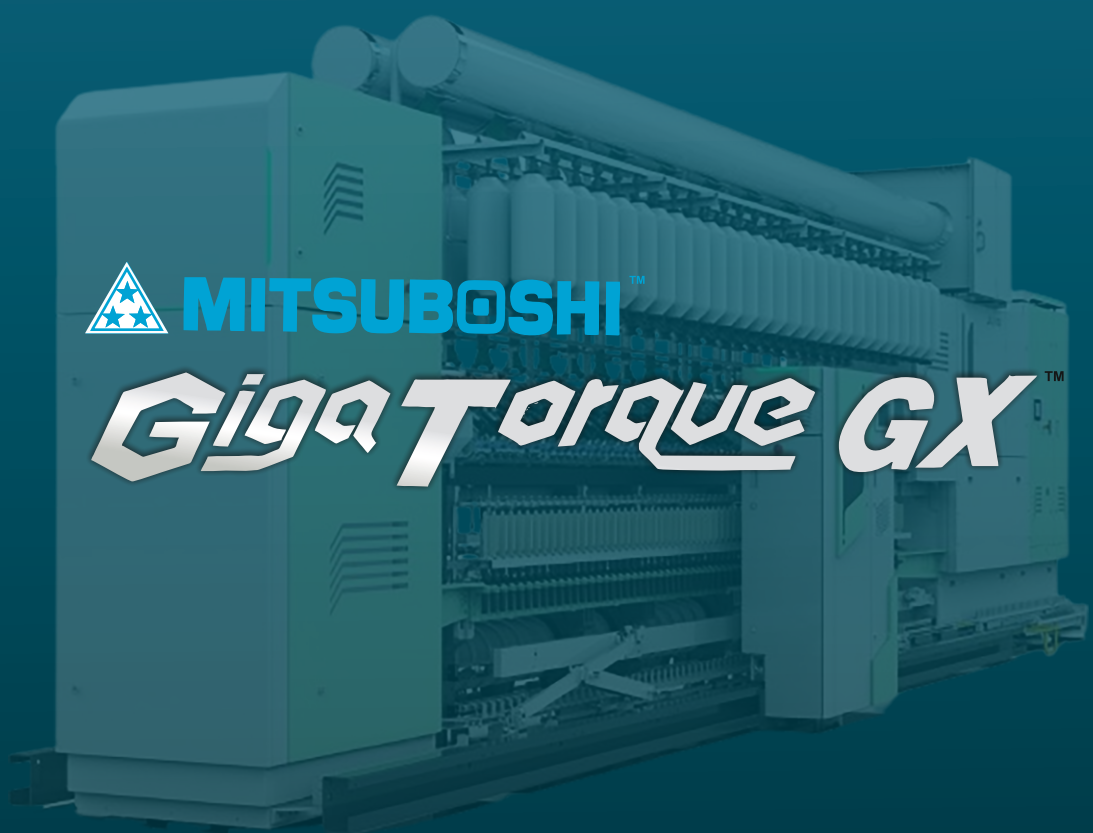
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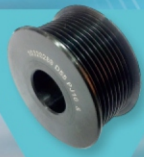






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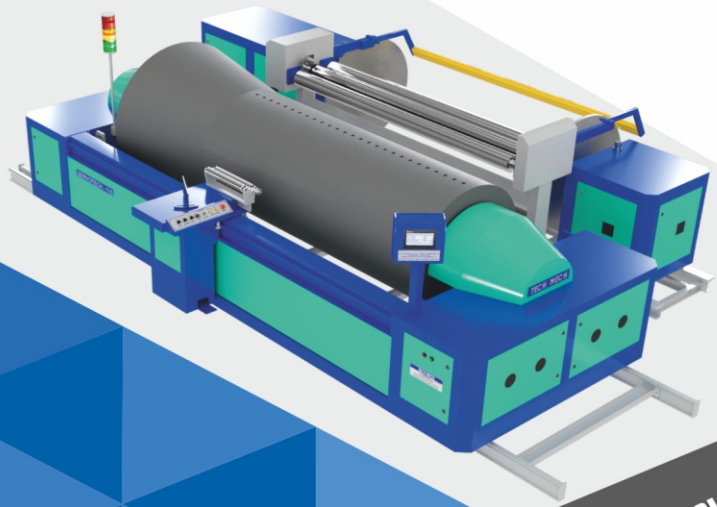
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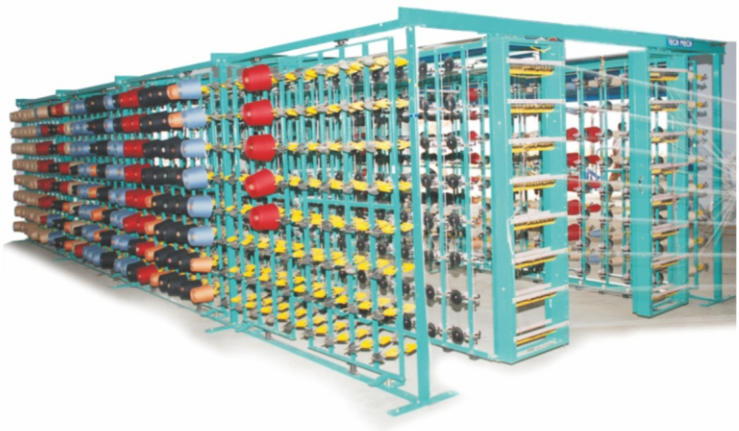
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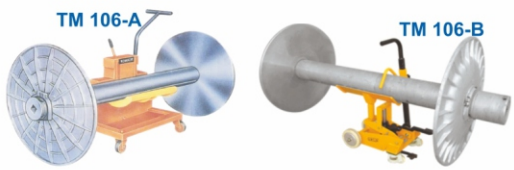
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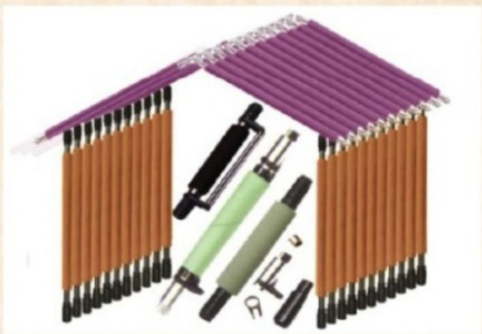
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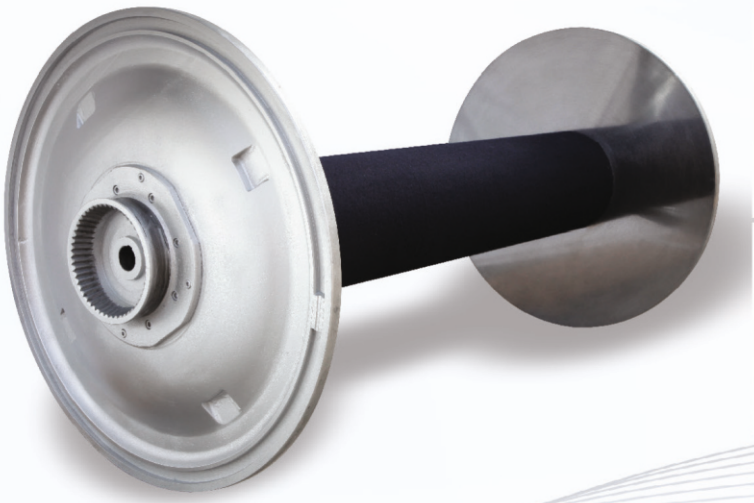
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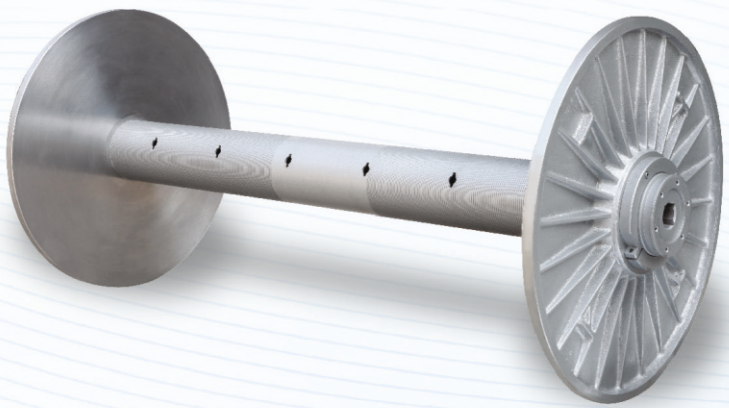


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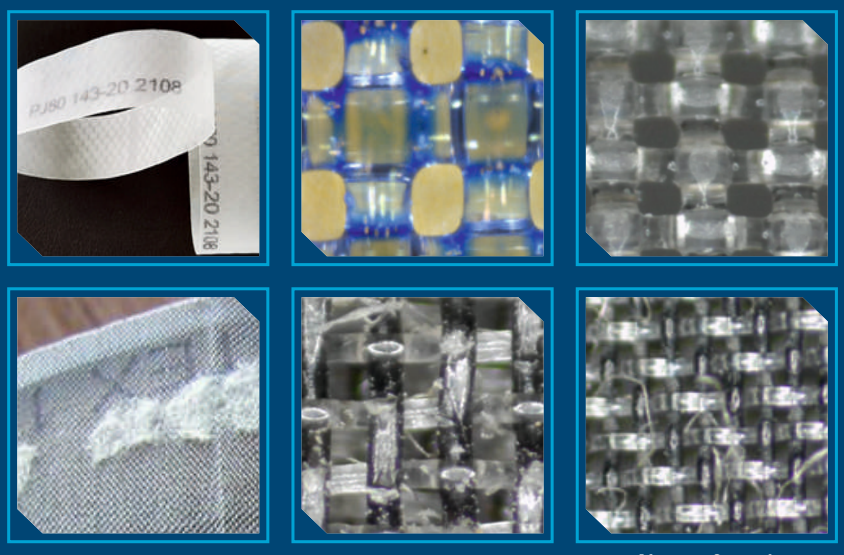
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EDITORIAL

India's textile adopting AI-generated technology to meet demand for international companies

India's skill in textile is very ancient; date back to the Indus valley civilization with the evidence of early cultivation and use of cotton. In the era of civilization through evolution still today this ancient industry holds dominance of small enterprises. It is very known discourse that micro, small and medium enterprises are very slow in adopting modern technology like AI, but Tiruppur in Tamilnadu holds exceptional example with evidence of using AI in every stage of manufacturing—from designing and sewing to sorting—as part of concept called Industry 4.0. With adoption of AI Tiruppur has increased production capacity by at least 10% what in turn it accounts 50% of the country's total knitwear exports.

Favourable international events like FTA with UK, political turmoil in Bangladesh and China +1 strategy boost export order of textile products made in Tiruppur. Owners of enterprises of Tiruppur are installing modern machines and setting up new factories. All machines newly installed are being operated by AI. AI-enabled machines have features like precision stitching and predictive maintenance for improving production. AI-generated monitor on the top of a production line gives signal of defects and helps in early detection. This technology transition is happening in the textile hubs like Tiruppur and in turn it boosts up demand for international textile companies like Deathlon, Marks & Spencer, Tommy Hilfiger etc. Even cottage-like textile units are adopting AI generated technology, such small companies are resorting to Canva and Chat GPT to adopt fresh designs so that most modern global trend can be captured locally.

Japan is one of the countries that introduced sewing robots to stich fabric quickly and precisely, such machines use advance censored computer vision and robotics arms to guide needles and thread through textile with a higher accuracy level. Indian textile companies are likely to launch stitch bots in near future. In terms of stitch bots labour will get replaced. Our AI use should be such that labour can also be upgraded and we can optimally use existing trained labour.

No discussion took place on a common currency in BRICS summit

BRICS countries are not discussing a common currency 'as of now', the External Affairs Ministry said recently. But BRICS Payment Task Force will continue exploring ways for cross-border payment among member countries. "There is no proposal for a BRICS currency as of now," Sudkakar Dalela, Secretary (Economic Relations), MEA, said in a press conference in New Delhi. In fact, the Joint Declaration did not mention such a common currency or a formal call for replacement of the US dollar. Rather the document sticks to the more incremental, technocratic language the block has used since Rio and Kazan: interoperable payment systems, local-currency settlement and voluntary cooperation among members who 'respect national priorities.' Dalela said that discussion on trade settlement in local currency has been underway for some time. "We believe local currency settlement is a practical mechanism to reduce transaction cost to in bilateral trade, and this has been encouraged as a complementary to global payment settlement system, improving overall global trade across nations," he said. Earlier, the joint declaration acknowledged the efforts of the BPTF towards exploring pragmatic solutions. ❐

Chinese factory activity improves, but services struggle

China's factory activity improved in August on stronger demand but remained in contraction, while services activity stayed weak, underscoring deepening imbalances in the economy and fuelling calls for policy measures to boost the economy. The divergence between manufacturing and services sectors suggests that China will continue to rely on manufacturing and exports to drive growth as momentum remains under pressure from lacklustre domestic consumption and investment. The official manufacturing purchasing managers' index (PMI) picked up to 49.8 from 49.2 in July, remaining below the 50-mark separating growth from contraction, a survey by the National Bureau of Statistics showed. It beats the median forecast of 49.6 in a Reuters poll. NBS data showed both demand and output improved in August, with sub-indexes for new orders and production returning to expansioin territory above 50. "Domestic demand seems to be coming back, although it's more likely to have been driven by AI and exports than by policy expansion," said Xu Tianchen, senior economist at the Economist intelligence Unit. The non-manufacturing purchasing manager's index (PMI), which covers services and construction, remained unchanged at 49.0, matching July's reading, the weakest since December 2022. The August PMIs for equipment manufacturing and high-tech manufacturing both came in above 51, while consumer goods and high-energy-consuming industries stayed in contraction, according to data released by the NBS. ❐

WTO barometer signals global trade continues to grow despite W Asia tensions

Global goods trade continued to strengthen in mid-2026 despite persistent geopolitical and policy-related uncertainties, according to the WTO Goods Trade Barometer released recently. "The negative impact of the conflict in the Middle East continues to be partly offset by strong demand for electronic components and other goods linked to investment in artificial intelligence," the WTO noted in a statement. The latest barometer reading of 102.0 is above both the baseline value of 100 and its previous reading of 101.7 from last June, indicating that merchandise trade is above trend and continues to gain momentum, it underlined. The Goods Trade Barometer is a composite indicator for merchandise trade, offering an early signal of where world trade is headed relative to recent trends. Readings above 100 point to above-trend trade volumes, while readings below 100 signal that trade has slipped under trend. "The strongest reading was for the electronic components index (104.9), reflecting robust

demand for AI-enabling goods. The highly predictive export orders index (103.5) has also strengthened, pointing to continued growth in merchandise trade in the months ahead. The indices representing international air freight (102.8) and agricultural raw materials trade (102.6) have risen firmly above trend while the automotive products index (101.5) has risen slightly above trend," the statement highlighted. Only the container shipping index, at 99.6, eased a bit. "Taken together, the component indicses suggest that merchandise trade growth has remaind resilent despite elevated uncertainty surrounding trade policies and ongoing geopolitical tensions," the WTO said. The reading comes against the backdrop of the WTO Secretariat's most recent global trade outlook and statistics report, issued in March, which forecast growth in world merchandise trade volume of 1.9 per cent for the year under a baseline scenario, or 1.4 per cent under a high-energy-price scenario reflecting headwinds from the West Asia conflict. The report also noted that sustained AI investment could add half a percentage point to merchandise trade growth this year. Year-on-year growth in the volume of world merchandise trade remained positive in the first quarter of 2026, the WTO said, though trade disruptions in the Strait of Hormuz are expected to show up more fully in second-quarter data once those figures become available. ❐

BRICS Finance Ministers and Central Bank Governors raise concerns over unilateral imposition of tariff

The Finance Ministers and Central Bank Governors (FMCBG) of the BRICS nations collectively voiced their concerns about the "unilateral imposition" of tariffs and non-tariff measures that distort trade, in a joint statement issued on 11.9.2026. The FMCBG also called for "practical solutions" to enhance cross-border payments in local currencies. However, they acknowledged the primacy of national priorities in such matters and that there can be no "one-size-fits-all approach". The first FMCBG meeting under India's chairmanship of BRICS was held on August 12 in Jaipur, and the second was held on September 9-10 in Mumbai, following which the joint statement was issued. "We continue to have serious concerns with the unilateral imposition of trade and finance-related actions, including the raising of tariffs and non-tariff measures, which distort trade and are inconsistent with World Trade Organization (WTO) rules," the joint statement said. "These pressures weigh most heavily on Emerging Markets and Developing Economies (EMDEs)." While the joint statement did not mention the U.S., it is the only country that is actively engaged in levying extraordinary tariffs on its trade partners. The FMCBG reiterated their support for an "open, transparent, inclusive, non-discriminatory, and rules-based" multilateral trading system with the WTO at its core. It acknowledged the efforts of the BRICS Payment Task Force (BPTF) in exploring "pragmatic solutions" for efficient cross-border payment mechanisms. "In this regard, we acknowledge the work done to study the cross-border interoperability of payment and messaging channels, and the discussions on promoting trade settlements and investments using BRICS local currencies, while respecting national priorities and acknowledging that there is no one-size-fits-all approach," the statement said. The FMCBG encouraged the payments task force to continue discussions to facilitate "practical solutions for cross-border payments among BRICS countries, which are fast, low-cost, more accessible, efficient, transparent, and safe". India used its chairship to establish a BRICS Task Force on Growth and Development as a dedicated platform to address shared growth and development challenges of relevance to BRICS and other emerging markets and developing economies. The Task Force is structured into two workstreams covering the Resilience, Innovation and Cooperation pillars, and the Sustainability pillar. "We recognise the Task Force on Growth and Development as a platform that provides BRICS countries a space to discuss growth models suited to their own national contexts and development priorities, and encourage

the continuation of its work, in alignment with the workstreams of Ministries of Finance and Central Banks," the joint statement said. The joint statement also covered other areas of discussion between the BRICS countries, including the reform of multilateral lending institutions such as the World Bank and the International Monetary Fund. ❐

Beijing asks for more Forex hedging to aid exporters

China's foreign exchange regulator has instructed banks to encourage more corporate clients to hedge currency risks, people with knowledge of the matter said, stepping up efforts to shield exporters from the yuan's steady appreciation. The informal instructions, known as window guidance, were issued in recent months, the people said, underscoring the authorities' concerns about foreign exchange losses among exporters, one of the few bright spots in an otherwise sluggish economy. Chinai's yuan inched higher to a fresh multi-year peak against the U.S. dollar after the country's central bank set a stronger daily guidance, while investors awaited policy decisions from the Federal Reserve and the Bank of Japan. The yuan strengthened to a high of 6.7039 per dollar in early trade, its strongest level since February 2, 2023, before easing to 6.7074. The offshore yuan traded at 6.7074 yuan per dollar, up about 0.03% in Asian trading. The regulator's move also suggests policymakers want companies prepared for further gains, or greater volatility, in the yuan, which has risen 4.3% this year. Bloomberg News first reported the extension of the hedging drive. Financial regulators did not immediately respond to a Reuters request for comment. The message was conveyed to banks by local branches of SAFE, the people said, urging lenders to raise foreign exchange hedging ratios, or the proportion of clients' currency exposure that is protected. Some SAFE branches provided subsidies to companies that stepped up their hedging, including covering part or all of their currency options premiums, one of the sources said. Some banks in provinces with relatively weaker trade activity were asked to raise hedging ratios to the national average level, while lenders in export-oriented coastal provinces were encouraged to push ratios to around 40% or higher, the sources added. All of the sources requested anonymity because they were not authorised to discuss the matter publicly. Chinese companies have rushed to derivatives for protection from currency exposure as a rising yuan has hurt some exporters for months and, more recently, as the war in Iran has ramped up volatility. The total value fo foreign exchange derivative contracts signed by corporates reached close to $1.4 trillion in the first half of this year, up about 40% from a year earlier, while the nationwide FX hedging ratio hit 35.3%, up 5.3 percentage points from the end of 2025, SAFE data showed. China's vast export sector is humming, buoyed by strong appetite for high-tech and AI-related products and providing vital support for an economy weighed down by sluggish domestic demand. Market participants expect yuan gains to slow, but they have hurt exporters, with analysts at Goldman Sachs finding foreign exchange losses in the first half of this year hit their highest in a decade at around 70 billion yuan or 4% of total earnings. ❐

China & US focus on $30 billion tariff cuts

China and the US hope to reach an agreement on lowering import taxes soon, a Chinese government spokesperson said recently. Negotiators are striving to implement reciprocal tariff reductions on $30 billion worth of goods "at an early date", commerce ministry spokesperson Huang Ling said at a weekly briefing. The $30 billion will be from each side, China's official Xinhua News Agency said. US President Donald Trump and Chinese leader Xi Jinping are expected to meet in Washington on September 24 for what will be their third face-to-face talks in the past year. Both governments characterise the meetings as a way to stabilise relations in an era of competing interests between the world's two largest economies. ■

'India may not achieve target of achieving $1 trillion exports during 2026-27'

India may miss its ambitious target of achieving exports worth $1 trillion during 2026-27 due to the global uncertainties, in general, and the tariff war, in particular, according to NITI Aayog Vice-Chairman Ashok Kumar Lahiri. Lahiri pointed out that the country needs to diversify its export basket, "States of origin" and export destinations in order to grow its shipments amid geopolitical uncertainties. "India's exports are heavily concentrated in a small group of product categories, led by engineering goods, refined petroleum, electronics, gems and jewellery and pharmaceuticals. Moreover, just five States, Maharashtra, Gujarat, Tamil Nadu, Karnataka and Uttar Pradesh, account for nearly 70 per cent of the country's total shipments. We need to diversify both our export basket as well as our States of origin and export destinations," Lahiri said during an event of Bandhan Bank in Kolkata recently. The NITI Aayog Vice-Chairman said rising exports will help India modernise its technology and product quality, and also help the country in integrating with the global value chain and attract foreign investment. Notably, Union Minister of Commerce and Industry Piyush Goyal in May said India had set a target of achieving exports worth $1 trillion this year and $2 trillion over the next five years. Due to geopolitical risks and uncertainties, Indian exports were affected, and its trade gap widened in July as imports grew faster than exports, with the combined merchandise and services deficit rising 31.5 per cent y-o-y to slightly over $15 billion, Lahiri said. He further said the disruption in world supply of oil, gas and fertilizer had led to significant stiffening of their prices. "Times are hard and not conducive, but the Indian economy has held up well. Reforms have not stopped and neither should they. As the saying goes, every crisis is an oppotunity —to mend our ways, improve ourselves as well as the system," he added. On its 11th anniversary day on 23rd August, Bandhan Bank marked a major milestone in its growth journey with the launch of its 2,000th branch in Chennai' Egmore. With this, the private sector lender's total banking outlets across the country touched 6,400. The bank also unveiled Bandhan Lite, a mobile banking application designed for microfinance customers to make digital banking accessible and inclusive. ❐

7.8% Q1 GDP rise exceeds the expectation

Outpacing expectations by most forcasters, India's economy grew at a robust 7.8 per cent in the June quarter of FY27, compared with 8.6 percent in the preceding March quarter of FY26, despite geopolitical headwinds arising from the West Asia crisis, according to data released by the National Statistical Office recently. Powered by strong manufacturing and services sector growth, India remained one of the fastest growing major economies, with China expanding 4.3 per cent and Indonesia growing 5.3 per cent in the June quarter. India's economy had grown 6.9 per cent in the June quarter of last financial year. The gross value added (GVA) growth print at 8.2 per cent for Q1 was higher than real gross domestic product (GDP) growth, signalling subsidies outstripped indirect taxes during the quarter. Nominal GDP grew at 10.3 per cent in the June quarter against 9.1 per cent in the preceding March quarter of FY26, Indicating towards built up in inflationary pressure. Forecasts by agencies for June quarter GDP growth had ranged between 6.9 per cent by India Ratings & Research (Ind-Ra) and 8 per cent by the State Bank of India (SBI). The Reserve Bank of India had estimated growth at 7 per cent for the same quarter. The statistics ministry also revised quarterly and annual national accounts data for FY23, FY24 and FY26, factoring in the new output producer price index (PPI), Index of Industrial Production (IIP) with base year 2022-23. For Example, the Q4 FY26 GDP

growth was revised upward to 8.6 per cent from the earlier estimate of 7.8 per cent. This led overall GDP growth of FY26 to 7.8 per cent from 7.7 per cent estimated earlier. Prime Minister Narendra Modi said India's exemplary GDP growth during Q1 of FY 27 is a herculean feat. "The collective strength of our people ensured India delivered such growth despite oil price shocks and supply chain issues in the midst of global uncertainties. Doomsayers were doomed and India bloomed...yet again!, he posted on X. ❐

Industrial Output surges 6.7% in July

India's Industrial output grew 6.7% in July following a contraction in the mining seector, official data showed. It had grown by an upwardly revised 8.8% in June. This is the fourth monthly Index of Industrial Production (IIP) data under the new series. Industrial output in April-July grew 6.3% compared with an increase of 4% a year earlier. The IIP growth in July 2025 was 5.4%. Economists say growth is expected to outperform in next quarter." Despite challenges stemming from the West Asia crisis, high-freequency indicators suggest that growth, which exceeded expectations in the first quarter of this fiscal, is likely to outperform expectations in the second quarter as well." said D K Joshi, chief economist, Crisil. The data showed that the mining and quarrying contracted 0.9% in July against 10.7% growth a year ago. Manufacturing output grew 7.3% year-on-year in July against a revised growth of 9.5% in June. In the manufacturing sector, 19 out of 23 industry groups recorded a positive year-on-year growth in July 2026. Electricity generation rose 8.7% year-on-year in July against a revised increase of 11.3% a month earlier. As per use based classification, primary goods grew by 4.1%, intermediate by 10.0% and construction and infra goods by 6.9%. Consumer durables were a key driver of IIP growth, surging to an eight-month high of 10.5% from 10.3% in June. Auto sales data had already pointed to healthy demand across both rural and urban markets. Passenger vehicles sales, an indicator of urban demand, grew 34.3% on year compared with 24.1% in June while tractor sales, a proxy for rual demand, rose 20.5% versus 11.9%. Output of consumer durables, including cars and phones, grew 10.5% year-on-year in July against a revised 10.3% increase a month earlier. Output of consumer non-durables, such as food items and toiletries, fell 1% year-on-year in July against a revised 5.6% rise in the previous month. Capital goods output rose 16.1% year-on-year in July against a revised 17.9% increased in June. ❐

Forex reserves climb record high

Foreign exchange reserves surged by $12.4 billion to a record $729.32 billion for the week ended August 21, supported by inflows through the special deposit window, according to RBI data released recently. The previous record high was $728.5 billion hit at the end of February. Within the reserves, foreign currency assets increased by $9.4 billion to $591.3 billion, while gold reserves rose by $2.8 billion to $114.2 billion in the week ended August 21, the RBI data showed. Inflows through FCNR(B) deposits were a key contributor to the RBI's reserve buildup, said market participants. Banks had mobilised $65.4 billion through FCNR(B) deposits as of August 21, the latest RBI data showed. Including external commercial borrowings and overseas foreign currency borrowings, total inflows stood at $72.8 billion. Since the RBI measures came into effect on June 8, reserves have risen by $47.7 billion, while the rupee has strengthened 1.5% from its record low in May. "The reserve accumulation materially strengthens India's external shock absorber. It gives the RBI capacity to smooth disorderly rupee depreciation, finance essential imports during oil-price or geopolitical shocks, and reassure foreign investors about external-payment resilience. However, the quality and durability of the increase matter," said Manoranjan Sharma, chief economist, Infomerics Ratings. ■

India's versatile unstiched national garment, saree has survived millenia

The saree is undoubtedly the only national attire in the world that has survived the era of 'convenience' clothing with panache. It remains the defining sartorial feature of Indian women although there are many other extant traditional habiliments too. Women across ages, contours, regions and social strata continue to wear the saree, even though the current default style of draping is not as old as this unstitched quintessentially Indian garment itself.

Then why is there such a compulsion to constantly present 'reimagined' or 'contemporary' versions of the saree, especially at marquee events such as film festivals, fashion weeks and 'red carpet' occasions"? This urge persists even though there are countless ways to drape the saree, offering amazing variety. It is almost as if a section of well-heeled Indians and designers harbour secret doubts about the saree's timelessness and ability to hold its own internationally.

Many also resort to getting the imprimatur of foreign fashion brands for the saree, presumably to gain validity for it. But do sarees need endorsement from Gucci, Chanel, Hermes or for that matter, Elsa Schiapanrelli, Christian Dior or Jean Paul Gaultier? At the turn of the 20-th century the glamour and wealth of our Indian royals so bedazzled top European designers that they sought customer from the stylish maharanis for their validation, not the other way round.

Today, the state of the saree is quite different. The celebrities of today and their stylists mostly steer clear of India's vast repertoire of intricate traditional weaves, prints and drapes and instead opt for sarees 'reimagined' by desi designers or foreign ones. The weavers, dyers and printers who create our magical traditional sarees are too marginalised to scream "cultural appropriation" and potential loss of high-end custom, but they deserve our respect and patronage.

Sadly, Indian airlines, that did so much to take sarees to the world through their cabin crews in the 20th century, copped out in the 21th century. The stewardesses had to problems doing their job in sarees back then, much like their south-east Asian aiarlines' counterparts who opted for traditional attire as uniforms. The latter persist with sarong-kabaya variants but Indian carriers have abandoned sarees for copycat western wear or badly designed, blended fabric hybrids.

Recently Air India has begun reintroducing sarees for its cabin crews, albeit with zip fastenings. It is heartening to see them re-affirm faith in the saree though adding zippers removes its most important attribute—the ability to adjust to all body shapes an sizes without alternations; the original sarong has the same advantage. The excuse for zippers is convenience, but think about it : how much of the garment industry hinges on customers' changing sizes?

However, zipper-necessitated sizes for sarees is not an unacceptable price to pay for the revival of India's age-old six-yard drape as work and leisure wear. Saree groups are doing their bit to keep the communities that depend on this wrap in business, but the more numerous non-saree-wearers (or saree-abjurers) need to be brought into the fold to make this segment viable again. This is imperative to prevent younger generations from abandoning saree production.

'Remarketing' sarees again to Indians and in all income brackets is more important than 'reimagining' them for a few elite ones as handloom and powerloom sarees (the latter an inevitabillity as well as a danger to handweaving) directly employs millions. More India couturiers must consciously contribute to this social and cultural mission. Our unique unstitched multipurpose national garment has survived millennia. We must ensure it survives many more. ■

Higher cotton acreage in Southern states, Gujarat, MP offset decline in Maharashtra and Rajasthan

As the kharif sowing season nears closure, cotton acreage is largely on par with last year at 108.45 lakh hectares (lh) as of August 21. against 108.73 lh a year ago.

Higher acreage in Telangana, Andhra Pradesh, Karnataka, Gujarat and Madhya Pradesh have offset declines in Maharashtra and Rajasthan. However, stake holders, said rain in September will be crucial for boosting yields.

Maharashtra, the largest cotton-growing State, saw acreage marginally delcine to 38.22 in from 38.37 lh a year ago. In Rajashtan, the area fell nearly 6 percent to 5.38 lh from 5.71 lh.

The decline was offset by gains elsewhere. Telangana's cotton area rose 7.28 percent to 19.5 lh from 18.18 lh, while Karnataka recorded a 1.84 per cent increase to 7.76 lh from 7.62 lh.

In Andhra Pradesh, acreage increased 2.26 per cent to 3.85 lh from 3.78 lh. Madhya Pradesh recorded a 2.28 percent rise to 5.84 lh from 5.71 lh, while Gujarat's area increased 3.23 percent to 21.35 lh from 20.68 lh.

Condition Excellent

"Crop condition is excellent as a date," said Atul S Ganatra, Chairman, Crop committee, Cotton Association of India (CAI), the apex trade body.

The next 30 days will be crucial for the crop, and a cleaner assessament of the crop size-will have to wait until the end of September, he said.

Ganatra said the crop in the northern States was also in good condition, while continuous rain in Maharashtra, Madhya Pradesh and Telangana had benefited the crop.

"Overall. the crop conditions are good. There's a need for another round of rain in the next 10-15 days especially in Gujarat, Karnataka and Andhra Pradesh, to get very good yeilds," he said.

Ramanuj Das Boob, a sourcing agent in Raichur, said the overall crop appeared better than last year. However, Karnakata needs some more rain to support the crop, he said.

Sowing is almost complete, through some areas may see resowing, Das Boob said. ■

Organised apparel retail sector expects 13% growth this fiscal

With consumers increasingly diversifying discretionary spending, India's organised apparel retail sector's revenue growth is expected to be at 12-13 per cent this fiscal, slightly lower than 15 per cent recorded last fiscal.

Strong traction in value fashion, the expansion of organised retail beyond large cities and sustained demand for branded apparel should support growth, a report by Crisil Ratings said.

However, operating margins are likely to compress by about 100 basis points to about 14 per cent due to rising cotton prices and elevated operating costs, which will be passed on to consumers only partially.

"The festive season, which has recently commenced, will be crucial to the sector's growth outlook because festive spending typically accounts for nearly 35 per cent of annual apparel sales. Revenue growth has been broadly steady so far, in the high single digits between April and August 2026, but has largely been driven by the value-fashion segment," it added.

Anuj Sethi, Senior Director, Crisil Ratings, said, "Value fashion has emerged as the key growth driver for organised retailers, growing more than twice as fast as the other segments over the past three fiscals and increasing its shares of revenue to 46 per cent from 39 per cent.

The shift reflects increasing shares of aspirational consumption by price-conscious consumers, wider choice at lower price points and increasing penetration into smaller cities.

While value fashion will continue to support volume growth, the rising share of lower-prices apparel is expected to moderate organised apparel retail revenue growth to 12-13 per cent this fiscal."

Major Contributor

The ratings agency said these estimates are based on an annalysis of 41 organised apparel retailers, accounting for around 28 per cent of the organised apparel market, indicates as much. The value-fashion or fast-fashion and mid-premium segments, which are largely priced below ₹2,500, account for around two-thirds of sector revenue.

Changing consumer shopping patterns are also increasing the importance of omnichannel strategies. Although online sales account for only about 10 per cent of total retail sales, the growing influence of e-commerce platforms is making a strong digital presence increasingly important. Retailers are therefore expanding their footprint in underpenetrated tier-II and tier-III cities, with value-fashion players leading store additions, the report noted.

Sales growth

Poonam Upadhyay, Director, Crisil Ratings, "Revenue per square foot has remained largely flat at around ₹11,000 over the past three fiscals and is unlikely to improve meaningfully this fiscal because same-store sales growth remains subdued. Growth continues to be driven primarily by new store additions and the increasing share of the value-fashion segment."

Capital expenditure is expected to remain around ₹2,500 crore this fiscal, broadly in line with last fiscal, as retailers expand into newer and smaller cities, the ratings agency added. Lower store set-up costs and operating expenses in these markets should help keep debt levels in control. ■

Apparel industry optimistic about upcoming festival season: CMAI

The apparel industry is optimistic about strong sales in the upcoming festival season with Indian ethnic wear expected to lead the demand.

The Clothing Manufacturers Association of India recently said that while the festive outlook for the apparel industry remained positive, with stronger demand and consumer confidence expected to drive growth, rising input-costs could limit margin expansion.

Optimistic Responses

Per the findings of a survey released by the Clothing Manufacturers Association of India, nearly 52 per cent of its members are expecting higher sales than last year, while another 30 per cent expected to match last year's performance.

Less than 20 per cent of respondents anticipate a decline in sales, the industry body noted. The optimism is supported by improving macro-economic conditions, a reasonable monsoon and positive consumer sentiment, among others.

"Strong order bookings by retailers at CMAI's recently concluded National Garment Fairs (NGFs) have further reinforced industry confidence. However, rising raw material costs remain a concern. Around 54 per cent of respondents are absorbing higher costs by reducing margins, while only about 35 per cent have increased prices. This indicates that higher festive sales could come with continued pressure on profitability," the industry body noted.

Apparel Sales

Indian wear is expected to lead the festive season growth with 45 per cent of respondents identifying categories such as salwar suits, churidars and kurtas as the strongest performers, followed by western casual wear such as T-shirts and denims.

At the same time, online apparel sales are also expected to be strong.

"With online currently accounting for around 12 per cent of apparel sales, its anticipated growth challenges the traditional assumption that festive apparel shopping will remain predominantly offline," the industry body stated. ■

Sarees uses YouTube live commerce to take customers through details

What does an IT career have to do with a saree business?

For Chennai-based Ramya Devanathan, quite a lot. After 18 years at Tata Consultancy Services, she turned an attire that has been a part of her life since her teenagar years into a business.

The Covid-19 pandemic, which pushed consumers to buy everything — from groceries to medicines—online, gave her an opportunity. Devanathan decided to take the saree online too, via Madras Sarees—choosing a D2C model instead of investing in physical retail, and paying homage to her city through the brand name.

Festivals and occasions have long driven saree purchases, but Devanathan saw few options for affordable sarees meant for work and everyday wear. That was the space Madras Sarees chose to explore, retailing cotton and silk sarees. There are linen-cotton sarees at ₹999 aimed at those who wear sarees regularly to work.

But a saree is not a simple product to sell. Devananthan points to the variables involved—fabric, weave, construction, regional identity, colour, drape and price. The way a saree is made can also vary, from handloom and powerloom weaving to techniques such as jacquard and printing.

That breadth makes it challenging to position the category, says Jermina Menon, Brand and Marketing Strategist at Bhartiya Urban. Handlooms, she notes is a "beautiful" word, but can make a saree more expensive. A brand, therefore, needs to be clear about the customer and price point it is addressing, she says.

The challenge becomes more pronounced online, as consumers cannot touch or feel the fabric. Madras Sarees uses YouTube Live commerce to take customers through details such as the sarees's fabric, construction, regional identity and authenticity, says Devanathan.

The format also allows them to view the flow and weave of the saree, while covering measurement, wash care and styling details. She recalls a doctor who had to suddenly rush to surgery when she was watching a live session and had spotted a saree colour she liked. Unable to make the payment immediately, she sent a WhatApp meassage asking the team to block the saree until she could return to complete the purchase.

Getting a customer to make the first purchase in only part of the equation. Menon says a brand should also give customers a reason to comeback. Performance marketing can help generate the initial sale, she says, but the product must do the talking after that.

Madras Sarees is also looking beyond conventional retail touchpoints. Devanathan says a saree kiosk has been set up in the city's Abhiramapuram area, with the broader idea of locating such outlets in spaces where consumers are usually waiting for some other service — such as a salon, where a client waiting for a hairstylist's appointment, or an electric vehicle recharge point, where a customer charging her car can browse the sarees, place an order and have it delivered to a destination.

The idea, she says, is to create an alternative point of brand visibility and sales.

What began as a D2C approach to selling sarees now raises a larger question: How and where do consumer discover them?

Devanathan's vision is to become a trusted pan-Indian saree brand that is proudly rooted in Madras.

But would the name Madras Sarees limit its reach by giving a wrong impression that it retails only South Indian weaves?

"The name Madras Sarees is our foundation, not our boundary", she says, pointing to several global brands named after cities or regions. "While we deeply celebrate South Indian weaves, we also curate beautiful sarees from across India. Madras Sarees uses the city as brand anchor, not a geographic restriction," she concludes. ■

Cotton Prices ruling firm in several states

Amidst a volatile global trend, the prices of cotton (raw or *kapas*) from the current kharif crop are ruling firm in several States where early arrivals have begun.

Arrivals have started in parts of Karnataka, Andhra Pradesh, Rajasthan, Haryana, Telangana, Madhya Pradesh and Gujarat, among others. "Raw cotton prices are ruling above minimum support price (MSP) levels in the range of ₹9,200-9,500 per quintal, depending on the moisture content, in markets such as Raichur, Bellary, Adoni and Yemmiganur, among others," said Ramanuj Das Boob, a sourcing agent in Raichur.

May Rule Above MSP

The Centre has announced MSP of ₹8,267 per quintal for medium staple and ₹8,667 for long staple cotton for the 2026-27 marketing season. "Looking to the current trend in international prices, the prices of raw cotton are likely to stay above the MSP levels," Das Boob added.

ICE cotton futures are hovering in around 87 cents per pound, down from around 93 cents per pound recently. The dip in ICE has forced MNCs in India to lower their quotes by ₹2,000 per candy (356 kg), while CCI has maintained its price.

"Even at reduced price offered by MNCs there are no takers," Das Boob said.

Arrivals Delayed

"Buyers are not coming because of low demand in yarn. The yarn market is dull as there are no buyers at higher prices. Buyers, especially mills, who have stocks, are preferring to wait and watch," he said.

Arrivals in small quantities have also started in parts of Gujarat and prices are hovering in the range of ₹1,900-2,000 per *maund* (20 kgs), said Anand Popat of CotYarn TradeLink in Rajkot. As sowing is delayed, the arrivals are delayed by over a month and expected to pick up from early November, Popat said.

Weekly cotton arrivals from the new crop are around 50,000 bales of 170 kg each. In another two weeks, the arrivals may touch about 1 lakh bales per week. Papat said.

Rain, Acreage

Further, Popat said the cotton crop requires some rains now. Another one or two rounds of rains will boost the yields, he said. Per the Agriculture Ministry's data on September 4, cotton has been planted on 109.17 lakh hectares, marginally lower than corresponding last year's 109.87 lh. ■

Raymond plans for diversification beyond suits

Raymond Lifestyle is increasingly looking beyond the suit by reshaping its House of Brands around two trends that it sees as increasingly difficult to ignore casualisation and premiumisation.

"Formals are no longer the most important part of the business," Satyaki Ghosh, CEO, Raymond Lifestyle told reporters.

Casual wear currently accounts for about 47 per cent of the company's House of Brands, and Raymond Life style wants to take that to 50 per cent as its portfolio evolves. But the shift will not mean abandoning the formal wear franchise that built the company.

For Raymond and Park Avenue, the plan is to add more casual products while pushing the brands further up the premium ladder. ColorPlus, already positioned as a casual brand, will move towards higher price points, while Parx will be used to target a more mass segment.

K-Shaped Recovery

"The brands need casualisation," Ghosh said, pointing to changing fits and preferences among younger consumers. T-shirts, stretch trousers, shorter and looser silhouettes are becoming more relevant.

The strategy also reflects what Ghosh described as a "K-shaped" recovery, with premium consumers continuing to spend while the mass market finds new demand from rising incomes. The pressure, he said, is concentrated in the middle.

Raymond Lifestyle, therefore, does not intend to chase the rapidly expanding value-fashion market. Instead, it wants to remain in the premium, super premium and bridge-to-luxury segments, Ghosh said.

That positioning is also shaping its approach to Ethnix, its ethnic wear brand. Raymond plans to use its manufacturing capabilities to offer higher-ticket, customised occasion wear.

Modest Growth

The broader reset comes as the company's branded apparel business showed only modest growth in the June quarter. Apparel revenue rose 4 per cent year-on-year to ₹349 crore, even as casual brands grew in double digits. Raymond's own e-commerce contribution is about 10 per cent of branded apparel revenue, with an amibition to take it towards 15-20 per cent.

The company is simultaneously trying to diversify its export business towards Europe, although Ghosh expects the transition to take time. ■

Onam festive faces a subdued start but garment retailers still optimistic

Onam, Kerala's 10-day harvest festival that is the key economic bellwether for India's lucrative festive season, faces a subdued start due to a shorter calendar window, recent rain and floods, and liquidity constraints from global tensions. While white goods struggle and ad spends drop a steep 35 per cent, garment retailers like Kalyan Silks project strong late growth.

Gopu Nandilath, Chairman of Nandilath, GMart, rued that the expected festive surge in sales had not happened. "The business will be vibrant only when Onam is lengthy and falls across August and September. This year, the season is too short, with sales taking place mainly in just one month till August 26," he told reporters. However, he expects demand to pick up during the final 10 days of the season. "We are expecting a revival in the market in the final 10 days of Onam, with business expected to surge by 15-20 per cent compared with last year," he said.

The market for white goods and other home appliances in Kerala during the festival seaosn is estimated around ₹3,000 crore.

Glimmer of Hope

The garment sector, meanwhile, is more optimistic, banking on the strong tradition of gifting clothes during Onam, EP George of Kerala Textiles and Garments Association said demand had been encouraging since the beginning of the season and is expected to sustain in the coming weeks. Onam, related garment sales in Kerala are estimated at ₹5,000-7,000 crore, with the sector expecting 5-10 per cent growth over last year.

However, the recent floods in Kottayam and Pathanamthitta districts affected sales and caused losses for several traders, George said.

With the crucial final days of Onam approaching, retailers and brands are hoping that a late revival in consumer spending will help offset the subdued start.

Prakash Pattabhiraman, MD of Kalyan Silks, said his company is witnessing good sales, supported by the introduction of new brands across menswear, womenswear and kidswear segments.

"Strong brand identity and competitive pricing have helped us perform well in the market. Considering the current trends, we expect to close the Onam specific sales period with a growth of around 20-25 percent," he said.

Considerable Shift

Dominic Savio, a Kochi-based brand strategist, said Kerala's Onam economy has seen a considerable shift in recent years, largely due to consumer offers being rolled out throughout the year. As a result, spending that was once concentrated in a few weeks around Onam is increasingly being distributed throughout the year. This has shifted consumer purchase cycles from occasions to opportunities.

The recent floods in several districts have also affected consumer purchasing power, further dampening spending during the festive season, he said.

Quoting industry estimates, Savio said brands collectively spent between ₹1,100 crores and ₹1,400 crores on media in Kerala during the last Onam season. This year, market expectations are considerably more subdued, with total ad spending unlikely to cross ₹1,000 crore.

This represents a significant contraction in what has traditionally been Kerala's most lucrative advertising window.

If spending settles closer to ₹850-900 crore, as some expect, the decline could be as steep as 35-40 per cent from last year's upper estimate.

For media companies grappling with fragmented audiences and advertising budgets shifting towards digital platforms and influencers, a weak Onam season is more-than just a festive blip. It could translate into a significant hit to advertising revenues, Savio said. ■

ELECTRO SPINNING AND APPLICATIONS OF ELECTRO-SPUN NANO FIBRE — A REVIEW

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Abstract

There are many methods available to produce nanofibres. But electro spinning technique is the most user friendly process. Various materials such as ceramic, polymer, composites and metal nanofibres have been fabricated by using electrospinning processes. However, the nano scale fibre formation technique makes it unique among all nano fibre manufacturing techniques. Nanoscale fibers are an attractive material for their huge surface area-to-volume ratio which ultimately improves the performance of products prepared from nanofibres. These fibers are widely used in industry such as filtration, composite materials, medical, membrane, etc. so in this research paper, an attempt has been made to understand the fundamentals of electro spinning techniques and applications of electro spun fibres in various emerging areas like filtration, medical and composite materials etc.

Keywords: Electro spinning, nano fibre, filtration, composite material, medical, membrane.

1. Introduction

Electro spinning of nano fibre is considered one of the most promising technologies for the 21st century. Also this technique is the economical impact from new and optimized products. On the other hand one expects a strong contribution of electro spinning in decreasing the uses of toxic chemicals and consumption of natural polymers. Electro spinning has the potential to improve the effectiveness of a number of existing consumer and industrial products and is expected to have a substantial impact on the development of new fibrous assembly for diversified applications.

The "nano" prefix normally denotes the diameter of materials is in the range of 1-100 nanometers. A nanometer (nm) is defined as billionth of a meter, which is about 1/80000 of the diameter of a human hair, or 10 times the diameter of a hydrogen atom.

Research and development in nanotechnology is directed toward understanding and creating improved materials, devices, and systems that exploit these new properties. At nanoscale, the physical, chemical, and biological properties of materials differ in fundamental and valuable ways from the properties of individual atoms and molecules as well as bulk matter. For instance, ceramics, which normally are brittle, can easily be made deformable if the grain size is reduced to the nanometer range and thin films or fibres are produced. Another example is the fact that for nano-scaled particles the colour of the material becomes dependent on the particle size instead of its intrinsic properties, e.g. gold having a particle size of 1 nm shows a red colour. The ability to customize physical properties of materials gives nanotechnology a potential impact across a wide variety of disciplines.

1.1 Electro-spinning techniques in textiles

The wave of nanotechnology has shown a huge potential in the textile and clothing industry which is normally very traditional. The future success of nanotechnology in textile applications lies in areas where new functionalities are combined into durable, multifunctional textile systems without compromising the inherent favourable textile properties, including processability, flexibility, washability and softness.

A whole variety of novel nanotech textiles are already on the market at this moment. Examples of industries where nanotech enhanced textiles are already seeing some applications include skincare, space technology and clothing as well as materials technology for better protection in extreme environments. The use of nanotechnology allows textiles to become multifunctional and produce fabrics with special functions, including antibacterial, UV protection, easy-clean, water- and stain repellent and anti-odour. In many cases also smaller amounts of the additive are required, saving on resources.

One of the applications of nanotechnology in the textile industry is in polymeric materials for producing conventional fibres such as polyester, polyamide and polypropylene in nanoscale. Nanofibres have good properties such as high surface area, a small fibre diameter, good filtration properties and high permeability. Common production methods are electrospinning or bicomponent extrusion (islands in the sea technique).

There is a significant potential for profitable applications of nanotechnology in textiles. Several applications of nanotechnology can be extended to attain the performance enhancement

of textile manufacturing machines & processes. Nanotechnology overcomes the limitations of applying conventional methods to impart certain properties to textile materials. There is no doubt that in the next few years nanotechnology will penetrate into every area of the textile industry. However, there are still a lot of items to be taken in consideration before industrial commercialization of the nano-products. Generally, the state of research into the health and environmental issues can be summed up as suggesting that the current results of studies on the impact are limited. In future, interdisciplinary research collaborations will lead to significant advancements in the desirable attributes of textile applications.

1.2 Fundamentals of Electro spinning

Electrospinning is a modest and versatile technique that depends on the electrostatic repulsion between surface charges to continuously draw ultrathin nanofibers from a viscoelastic fluid [1]. This technique has been developed and rediscovered by various researchers [2-9] and now this technique is widely used to produce fibres with nano scale diameters ,also it has the advantage of being simple and useful compared with traditional fiber forming procedures. Nanofibres and nano wires having the potential to significantly improve existing technology with their huge surface area to volume ratio about a thousand times higher than that of a human hair and find application in novel areas [10]electrospinning is perhaps the most versatile process. Materials such as polymer, composites, ceramic and metal nanofibres have been fabricated using electrospinning directly or through post-spinning processes. However, what makes electrospinning different from other nanofibre fabrication processes is its ability to form various fibre assemblies. This will certainly enhance the performance of products made from nanofibres and allow application specific modifications. It is therefore vital for us to understand the various parameters and processes that allow us to fabricate the desired fibre assemblies. Fibre assemblies that can be fabricated include nonwoven fibre mesh, aligned fibre mesh, patterned fibre mesh, random three-dimensional structures and sub-micron spring and convoluted fibres. Nevertheless, more studies are required to understand and precisely control the actual mechanics in the formation of various electrospun fibrous assemblies.",”author”:[{“dropping-particle”:””,”family”:”Teo”,”given”:”W. E.”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Ramakrishna”,”given”:”S.”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””}],”container-title”:”Nanotechnology”,”id”:”ITEM-1”,”issue”:”14”,”issued”:{“date-parts”:[[“2006”]]},”title”:”A review on electrospinning design and nanofibre assemblies”,”type”:”article-journal”,”volume”:”17”},”uris”:[“http://www.mendeley.com/documents/?uuid=43d14060-17b1-4ef5-8048-ad6ac350c536”]}],”mendeley”:{“formattedCitation”:”[10]”,”manualFormatting”:”[10]”,”plainTextFormattedCitation”:”[10]”,”previouslyFormattedCitation”:”[10]”},”properties”:{“noteIndex”:0},”schema”:”https://github.com/citation-style-language/schema/raw/master/csl-citation.json”}.

This process of electrospinning has gained much attention in the last decade researchers started to realize the huge potential of electrospinning in the process of nanofibre production. Although there are various methods available to fabricate nanofibres but among all of them electrospinning is best in terms of its versatility, flexibility and easiness of fibre production. [11-14]

Electrospun fibers have been successfully applied in various fields, such as air and water filtration, drug delivery, tissue engineering scaffolds, biomedical, protective clothing, filtration, biomedical, pharmaceutical, photonics or electronics, healthcare, biotechnology, environmental engineering and defense and security [15-19]. Overall, this technology is relatively simplerobust and robust to produce nanofibers from extensive variety of polymers.

Over the years, for numerous applications more than 200 [20, 25] polymers have been electrospun and the number is still increasing repeatedly with time. With these in outlooks, we aim to present an overview of the working principle of electrospinning technique with its promising potential applications in various areasthis review.

1.3 Working Principles of Electro spinning

Fibers with diameters from micrometer to nanometerscale range to can be produces by electro spinning under the electic field. Typical electro spinning setup consists of three major components as shown in figure 1. A high voltage power supply (usually in the kV range), a syringe with a metallic

needle and a grounded collector (solid substrate or liquid media) [21,30,31]. In a usual electrospinning process, on solutions or melts high voltage is applied .Subsequently, a pendant droplet starts to form when the electrostatic repulsion starts to overcome the surface tension of the fluid.At the tip of the needle the pendant droplet will deform into a conical droplet form known as the Taylor cone. [32,33].As thesurface tension of the conical droplet overcome by electrostatic force the, a fine charged jet of polymer solution is driven out from the tip of the needle. The interaction between the electric field and the surface tension of the fluid stretches the jet stream and makes it undergo a whipping motion leading to the evaporation of the solvent. Thiscausesthe Jet stream tobecontinuouslydrawn-out as a long and thin filament and then this filament solidifies and is ultimately deposited on a grounded collector, causingthe formation of a uniform fiber.[1]

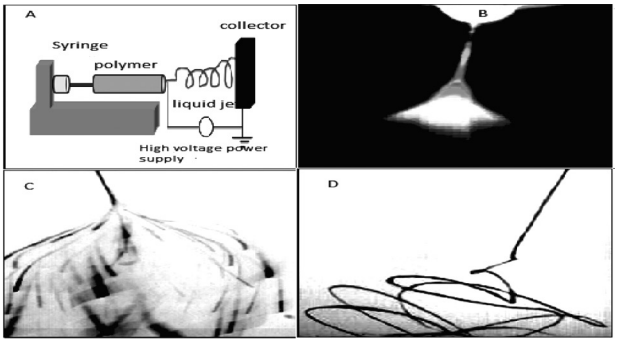


Fig1. (A) Schematic diagram of electrospinning assembly, (B) a digital video camera using the interference color technique, (C) a standard camera exposure time of 33 ms, and (D) a high-speed camera at an exposure time of 0.1 ms. Adapted with permission from (B) ref [34] and (C, D) ref [33].

2. Applications of Electrospun Fibre

Electrospun fibres have received much attention due to its unique characteristics and diversified applications in the area of technical textiles such as filtration, medicals etc. The potential products of nano fiber are of interest in applications such as semi-permeable membranes, filters, protective clothing, and tissue engineering. Some of the more dynamic areas of application are also discussed in this paper. A schematic in figure 2 is interpolated to explore the applications of electrospun nano fibres.

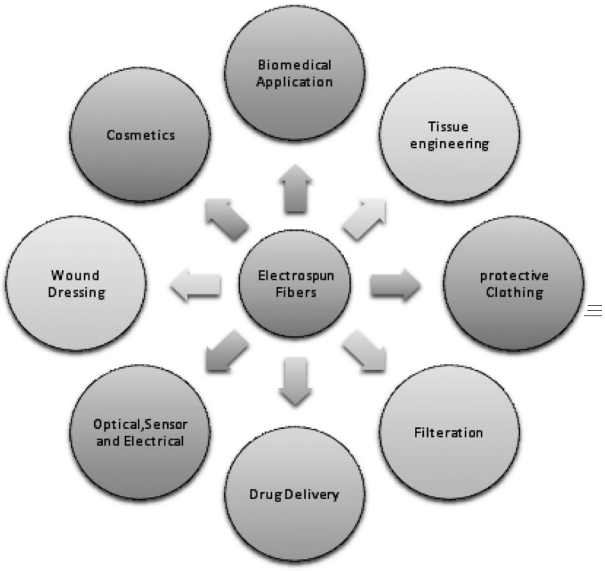


Fig 2. Applications of electrospun fibers in various sectors sectors

2.1 Filtration application

Filtration is one of the most applicable areas in engineering. Membranes composed of electro spun fibres have a great potential in membrane filtration technology due to its attractive characteristics, such as a highly porous structure, pore sizes in submicron, and a large surface area to volume ratio due to which specific properties become high. These characteristics permit the filter media to be extremely permeable and become great filtration efficiency. [35]

Filtration efficiency, which is associated with the fiber fineness, it is one of the most important factor for the filter performance. Nano-fibers are used for more mainstream application in the separation technology as a potential membrane for pre-treatment of water prior to reverse osmosis or as pre-filters to minimize fouling and contamination prior to ultra- or nano-filtration.Various researchers have developed many electrospun products to be used for filtration applications. One group of researchers has developed electrospun membranes to separate polystyrene particles of 1, 5 and 10 μm and observed that electrospun membranes were effective in rejecting more than 90% of the micro-particles from solution.[36]

Metal and metal oxide nano particles to be released to natural waters creating a potential risk to human health electrospun carbon nano fiber Membranes Fabricated membranes could efficiently

reject nano particles of different types (Au, Ag, and TiO2) and sie (from 10 to 100nm in diameter) from aqueous solutions [37]. A mechanical robust and thermal tolerant nano fibrous membrane with high hydrophilicity was effectively prepared by one step approach based on PMIA solution via electro-spinning [38]. A ceramic separation membrane with nanoporous filters was prepared by Xue Bin Keet. al by using larger titanate and smaller boehmite (AlOOH) nano fibers.[39] A new type of free-standing filtration membrane made of carbonaceous nanofibers (CNFs), which has a very narrow pore size distribution and can effectively filter out nanometer-scale particles rapidly from solution [40].

In many of the industry, electrospun nano fibers membranes are studied for effective air filtration. Air filtration using electrospun fibers that seize volatile organic gases, bacterium, fine particles, is a relatively novel, but very promising, technique. electrospun fibers are becoming a promising versatile platform for air filtration applications owing to their unique nano scale porous structure, very high specific surface areas, ultrafine diameters, as well as their ability to integratedactive chemistry on a nano scale surface [41].

2.2 Cosmetics

The current skin care masks use as topical creams, ointments or lotions may be in form of liquid sprays or dust which may be more likely than fibrous materials to go through into sensitive areas of the body such as the nose and eyes area where the skin mask is being applied to the face. Electrospun polymer nanofibers have been tried to be used in the treatment of skin. For skin healing, skin cleansing, or other therapeutically or medical properties with or without adding various additivesas a cosmetic skin care mask .[42]

In cosmetics, the electro spinning is used to produce facial masks or cosmetic patches, which comprise active combinations of various compounds for skin treatment. Moreover, electrospun fibers can increase a stability of herbal extracts. Furthermore, the production of the electrospun fibers leads to industrial manufacturing by using electro spinning technology. Therefore, the electro spinning technology is an inventive platform for pharmaceutical and cosmetic area, and electrospun fibers will be used as novel commercial dosage form in the near future [43].

2.3 Biomedical application

From a biological perspective, almost all of the human tissues and organs are deposited in nano fibrous forms or structures. Examples include: bone, dentin, collagen, cartilage, and skin. Current research in electrospun polymer nanofibers has focused one of their major applications on bioengineering. Electrospun nano fibers prepared from polymers are used to releasevarious antibiotic and proteins .anticancer agents, DNA, RNA, and growth factors. We can simply find their promising potential in various biomedical areas.[44]

2.3.1 Drug delivery

Topical drug delivery opens up a number of opportunities with regard to efficient drug therapy for skin and wound-related conditions.[45]

Controlled drug release at a defined rate over a definite period of time is possible with biocompatible delivery matrices of biodegradable polymers are therefore usually used as drug delivery system.

Nano fiber mats have been applied as drug carriers in the drug delivery system because of their high functional characteristics and because the drug delivery system relies on the principle that rate of dissolution a particulate drug rises with increasing surface area of both the drug and the corresponding carrier and electro spinning provides a great platform for increasing surface area. Emulsion-electro spinning is used to prepare Doxorubicin hydrochloride (Dox)a water-soluble anticancer agent based nano fibers. Fig 3 shows morphology of fibres prepared by electro spinning.[46]

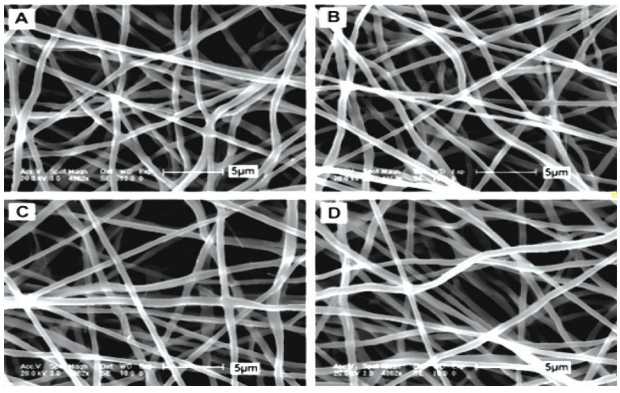


Fig 3: FESEM photographs of PEG–PLA fibers at different position of microscope

Piraset al. developed the multifunctional e-spun bio erodible nano materials for applications

in regenerative medicine by using human serum albumin (HSA) as the biopharmaceutical model protein and diclofenac sodium (DS) as a conventional hydrophobic drug model and observed that the introduction of protein molecules in the polymeric fibrous structure, would affect release and potency of the main drug [47].

Stack et al. reviewed various release mechanisms of different drugs and highlighting the effectiveness of such drug eluting fibrous matrices for rejuvenation of various tissues, such as, vascular, cardiac, neural, skin, and bone.[48]

2.3.2. Tissue engineering

For the treatment of tissues or organs failure in a human body, one of the challengesis in the field of tissue engineering or biomaterials. It includes the design of 3d scaffolds to maintain cellular in-growth. Different natural and synthetic polymers have been used for electro spinning fibers, such as PCL, collagen, and gelatin, and these electrospun fibers efficiently mimic the ECM in morphology.

2.3.2.1 Vascular tissue engineering applications

Tissue engineering of small-diameter blood vessels is quiet challenging because of restenosis and burst. Because of thrombosis and low long-term potency electro spinning offers the prospect of construction of tubular scaffolds by rotational and translational motion. In these applications, electro spinning natural polymers (e.g., collagen and elastin) blended with synthetic polymers delivers additional mechanical properties while maintaining a great level of bioactivity. Recent research mainly focuses on the surface modification of electrospun nano fibers to increase the endothelialization process via component release.

Zhang et al. developed coaxial electro spinning techniques to incorporate VEGF and PDGF, which adjust the proliferation of vascular endothelial cells (VECs) and vascular smooth muscle cells (VSMCs). Chitosan hydrogel and PEG-b-P(LLA-co-CL) (PELCL) were used to electro spin the inner layer and for loading VEGF, and a methoxy-PEG-b-PLGA (PELGA) emulsion and PELCL were used for the outer layer and for loading PDGF.[49]

In another study, Zhou et al. (2016) developed an efficient delivery system composed of electrospun fibrous membranes with REDV (Arg-Glu-Asp-Val) peptide, modified trimethyl chitosan, which allowed for the intracellular delivery of micro RNA (miRNA)-126 to VECs in the local specific vascular environment. MiRNA-126 regulates gene expression in VECs locally for cardiovascular disease treatment. Specifically, Zhou et al. built a bilayer vascular scaffold through emulsion electro spinning, in which the inner layer was PELCL loaded with complexes of miRNA-126 in REDV peptide-modified trimethyl chitosan-g-PEG, and the outer layer comprised PCL and gelatin to lend mechanical stability. This scaffold exhibited a sustained release profile of miRNA for 56 days, with significant down regulation of SPRED-1 gene expression in VECs detected on day 3 and accelerated VEC proliferation observed in the first 9 days. Overall, Zhou et al. demonstrated the potential of this approach as a new and more effective system for local delivery of miRNAs to facilitate blood vessel regeneration[50].

2.3.2.2 Neural tissue engineering

Intrinsic healing of nerve injuries is nearly always partial, causing poor recovery of function. Thus, several types of artificial nerve guidance conduits have been observed for nerve regeneration in recent years. The key point of neural tissue engineering is to enable axon and neuritis out growth and linkage to neighboring cells to bridge the gap and to prevent cell migration either into or out of the graft. Additionally, substrate topographic and trophic information is also necessary for guidance of the cells, since these affect growth, survival, and differentiation. Among the various available methods for the fabrication of nerve conduits, electro spinning has great potential due to its unique 3D assembly that can be prepared from the micro- to nano sized fibers with precise properties to help in cell differentiation and neuritis outgrowth Modification of electrospun fibrous matrices for drugrelease purposes has also been studied. Again Wittmer et al. [51] selected silk for their study due to its biocompatibility and its capability to be electrospun for the formation of aligned biofunctional nano fibers. The addition of brain-derived neuro trophic factor (BDNF), ciliary neuro trophic factor (CNTF) or both to the electrospun fibers enables enhanced function without impact to the structure or the surface morphology.

2.3.2.3 Skin tissue engineering

The skin is the largest organ in vertebrates and plays a crucial role in many purposes, such as sensory of external stimuli, protection against external injury and self-healing. Researchers

developed to generate a chitosan / polycaprolactone (CS/PCL) non- woven mat. combining an electro spinning technique and a modified drop-casting method with great anti-bacterial, anti-adhesive, and anti-inflammatory abilities[52]. Another group of researchers has developed silk mats, made of electro spun nano scale silk fibers containing epidermal growth factor (EGF), for the promotion of wound healing processes.[53]

2.3.2.4 Cartilage tissue engineering

Cartilage tissue shows poor self-repair ability due to its vascularity and the low division rate of its comprising cells, chondrocytes. The healing rate of cartilage in the human body is also relatively slow due to the lack of collagen production.In the field of cartilage tissue engineering, stem cells were traditionally utilized to produce cartilage tissue by mimicking the complex intricacies of the ECM, including 3D configurations and aligned fibrous structures. In one study, fetal bovine serum-loaded liposomes were immobilized onto cross linked poly(2-hydroxyethyl methacrylate) micro fibers Rampichova et al.[54] This system enhanced both adhesion and proliferation of chondrocytes, showing its potential in cartilage tissue engineering.

2.3.2.5 Bone tissue engineering

To mimic the ECM of bone tissue, strategies for constructing drug-loaded composite nano fibrous scaffolds have been developed in many studies. These strategies include the integration of calcium phosphate minerals and bioactive molecules as well as the implementation of highly ordered fiber topography for the regulation of bone stem cells. Recent advancements have led to the development of electro spun fibers with encapsulated drugs and growth factors.

Yan Su et al. [55] have developed PLLACL/ collagen based nanofibers encapsulating two drugs and/or proteins have great potential in bone tissue engineering.

2.3.3 Wound dressing

Polymer nano fibers made through electro spinning can also be used for the treatment of wounds or burns of a human skin, as well as designed for hemostatic devices with certain unique features. With the help of electric field nano fibers has been developed by electro spinning with huge porosity, excellent humidity absorption, a better oxygen exchange rate and some antibacterial activities these fine fibers of bio-degradable polymers can be directly sprayed or spun on the injured location of skin to form a fibrous mat dressing materials. Various researches has developed various products by using electro spinning. Wound membranes based on natural polymers such as of polyvinyl alcohol and recombinant spider silk protein (pNSR16) was prepared by electro spinning by Zhao et al.[56]. Fibrous wound dressing polymeric patches are also used to produce by electro spinning by using artifical polymer that can release the antibiotic drug amoxicillin in an orderly manner for e.g. by using Poly(D,L-lactide-co-glycolide) acid (PLGA) fibrous dressings with entrapped amoxicillin. [57]. Moreover, the employment of natural polymers, although challenging can combine the biological properties of these materials with nano structural architecture, resembling the extracellular matrix and there for stimulating cell migration and proliferation, accelerating wound closure, controlling the inflammatory response, and in some cases, preventing biofilm formation [58].

3. Protective clothing application

In military the protective clothingis vastly used in orderto increase the survivability, sustainability, and combat efficiency of the individual soldier system against extreme weather conditions, ballistics etc. Current protective clothing containing charcoal absorbents has its limitations in terms of water permeability, extra weight-imposed to the article of clothing. For Protective clothing a breathable and light weight fabric is desirable which is permeable to both air and water vapor, insoluble in all solvents and highly reactive with deadly chemical agents and nerve gases.

4. Optical Sensor and Electrical Applications

Recently, new nano structured materials with extremely high specific surface area have been developed by using nanotechnology. A good alternative to fabricate materials with a high specific surface area is the electro spinning method. By means of this technique, continuous polymeric nanofibers can be fabricated by applying a high voltage field to a polymeric solution [62]. Typical applications include pressure sensing, gas sensing, photoelectric sensing, and temperature sensing. In addition, nano-self powered systems have been mentioned to emphasize the good performance of smart nano systems that do not require external power. In addition, we have summarized some existing methods and suggestions for increasing the specific surface area and presented constructive

ideas for the future development of these devices [63]. Figure 4 gives an insight idea regarding formation of sensing material and its design.

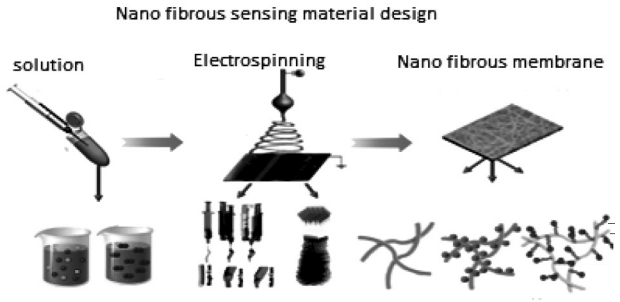


Fig 4. Schematic illustration of the measures to provide NMs with sensing properties throughout the electro spinning process [64].

5. Conclusion

Electrospinning is a simple method to produce nanoscale fibers both in laboratory and industrially. Because of its wide application such as medicine, filtration, textile etc. this technique has become one of the most acceptable methods for producing nanofibers. In the last decade the number of researches about this method and its applications has increased and this demonstrates the importance of electro spinning.

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Gross FDI rose to 15-year high of $30.7 billion in April-June 2026

India attracted a total of $30.7 billion as gross foreign direct investment in the April-June 2026 quarter, the highest level in at least 15 years. This strong inward flow overshadowed outflows, resulting in net FDI in the quarter rising to its highest level since June 2022.

An analysis of the latest data released by the Reserve Bank of India (RBI) shows that net FDI turned positive again in June 2026, with inflows exceeding outflows by $1.3 billion that month, driven by an increase in investment entering the country and a fall in outward investment by Indian companies.

A longer-term analysis also shows that inflows are starting to outpace outflows on a more regular basis. For instance, while net FDI was negative in six out of the last 12 months, it was negative in only one of the last six months.

Strong inflows

Gross inflows in June 2026, or the total amount of direct investment that entered the country that month, stood at $9.3 billion. This was 53% higher than in May, but just a little lower than the $9.6 billion that entered the country in June last year. According to the RBI, Singapore, the Netherlands, the U.S., and Canada accounted for around 74% of the inflows. The manufacturing sector received the highest share of inflows, followed by electricity generation, computer, and communication services.

On a quarterly basis, gross inflows stood at $30.7 billion in April-June 2026, which was nearly 46% higher than in the quarter ended March 2026 and about 15% higher than June 2025 quarter.

This was also the highest inflow recorded in the accessible data, which goes back 60 quarters or 15 years to the September 2011 quarter. According to the RBI, this underscores the "continued interest of global investors in India".

Total outflows of direct investment stood at $7.9 billion in June 2026, which was nearly 30% higher than in May, and 8.6% higher than in June of last year. On a quarterly basis, total outflows stood at $22.8 billion. As a result, net FDI stood at $1.3 billion in June 2026 and $7.8 billion in the April-June 2026 quarter. Within outflows, repatriation and disinvestment by foreign companies operating in India grew to $5.8 billion in June 2026, 57% higher than in May, and 36% higher than in June last year.

Outward FDI by Indian firms, on the other hand, fell to $2.1 billion during this period, down 13% over May 2026 and 30% lower than in June 2025. ■

REPURPOSING PRINTED CIRCUIT BOARDS FOR SUSTAINABLE FASHION: FROM ELECTRONIC WASTE TO WEARABLE ART

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Abstract

The rapid proliferation of electronic devices has generated unprecedented volumes of electronic waste (e-waste), presenting severe ecological challenges due to the systemic release of heavy metals and halogenated organic compounds during conventional disposal. This study presents an innovative strategy to address that impact by upcycling rigid, post-consumer printed circuit board components derived from discarded computer peripherals into structural surface embellishments for high-fashion apparel. Electronic components (printed circuit board chips) were sourced from obsolete keyboards and mice collected through institutional organizations, friends, and relatives. After careful cleaning and sorting, they were manually cut into defined geometric configurations. These rigid planar components were integrated onto flexible textile substrates utilizing carefully planned placement, optimizing colour contrast, structural symmetry, and wearability and wearer safety. A multi-phase experimental design approach was adopted: first, an analysis of global e-waste environmental risks established the urgency of sustainable interventions; second, practical experimentation demonstrated how electronic components can be safely incorporated into wearable fashion by material preparation and design-based safety considerations. The resulting garments were evaluated by designers, students, and industry professionals for creativity, aesthetic appeal, wearability, and sustainability. Feedback revealed strong appreciation for the futuristic look, craftsmanship, and environmental message embodied in the designs. Findings confirm that integrating e-waste into fashion apparel not only diverts hazardous materials from landfills but also broadens the boundaries of design practice. By combining technological remnants with traditional fabrics, the research highlights opportunities for collaboration between fashion and technology sectors, reinforces circular-economy principles, and points toward future trends in sustainable design where e-waste is reimagined as a source of beauty and value.

Keywords: e-waste, upcycling, sustainability, circular fashion, electronic chips, printed circuit boards.

Introduction

The rapid expansion of electronic gadgets has resulted in an alarming surge in electronic waste (e-waste). E-waste contaminates soil and water, creating long-term consequences for human health and ecosystems. Consequently, developing stable, high-value material diversion methods is vital for global circular manufacturing frameworks. The demand for sustainable waste management solutions has never been greater. Sustainability in fashion has emerged as a significant focus, with designers increasingly seeking ways to reduce environmental impact through innovative business models, circular production systems, and resource-efficient design practices [9]. Upcycling, the process of transforming discarded materials into higher-value products, has gained significant popularity in the fashion industry. The growing worry over electronic trash (e-waste) is a major global issue, with millions of tons of electronic equipment wasted each year, adding to pollution. Traditional disposal methods, such as landfills and incineration, emit harmful compounds including heavy metals, endangering both ecosystems and human health [7]. In response, upcycling has emerged as a critical strategy for decreasing environmental consequences, while circular economy approaches emphasize systematic recovery, reuse, and recycling of electronic waste to maximize resource efficiency [5,10].

Sustainable fashion aims to reduce the environmental impact of garment manufacture by reducing waste, encouraging recycling, and using eco-friendly materials [2,8]. While there has been a significant focus on textile recycling, incorporating non-traditional materials such as e-waste into fashion is a novel and unique technique [1]. Designers like Marina DeBris and Hussein Chalayan have pioneered the use of unorthodox materials, such as plastics and electronics, in high-fashion collections, pushing the frontiers of fashion aesthetics [3].

This study draws upon the work of these designers and explores the upcycling of electronic chips from discarded electronics such as keyboards and mice into fashion embellishments. The novelty of using electronic components as decorations in garments offers a fresh intersection of technology

and fashion, merging visual appeal with a message of environmental responsibility [6]. By repurposing the leftover components from discarded electronic devices, this research aligns with the principles of a circular economy, which emphasizes material reuse, waste reduction, resource efficiency, and the use of appropriate performance indicators to evaluate environmental sustainability [2,11].

Technical textiles are designed primarily for their functional performance rather than aesthetic appeal and have expanded rapidly due to advances in material science and smart textile technologies [14]. One of the fastest-growing areas is electronic textiles (e-textiles), which integrate sensing, communication, energy storage, and computational capabilities into textile structures while maintaining flexibility and comfort [13]. However, current e-textile research predominantly focuses on functional wearable electronics rather than the creative reuse of discarded electronic components.

Alongside the growth of wearable technology, increasing concern over electronic waste (e-waste) has stimulated research into the reuse and upcycling of discarded electronic components. Previous studies have explored the artistic and aesthetic potential of recycled materials in fashion, while others have investigated circuit-board jewellery and accessories created from discarded printed circuit boards. However, these applications are generally limited to accessories or decorative objects rather than wearable garments designed for repeated use [12].

Similarly, research on e-textiles has primarily focused on incorporating functional electrically active components into fabrics for sensing, monitoring, communication, or energy-related applications. In contrast, studies involving e-waste in fashion have largely emphasized artistic expression through jewellery or accessories without evaluating their suitability for wearable, washable garments [4]. Recent studies have emphasized the importance of circular economy principles in textile production through material recovery, waste valorisation, and product life extension. The Global E-waste Monitor 2024 reported record levels of e-waste generation, highlighting the urgent need for innovative recycling and upcycling strategies [18]. Similarly, recent research has advocated circular approaches for recovering valuable materials from end-of-life electronic products and integrating them into new manufacturing systems [19]. Although recycled electronic materials have occasionally been used in jewellery and fashion accessories, their application as decorative embellishments in wearable garments has received very limited scientific attention [12].

To address this gap, the present study investigates the feasibility of incorporating discarded printed circuit board (PCB) components as non-functional decorative textile embellishments within a circular fashion framework. Unlike conventional e-textiles, the PCB components used in this study perform no electronic function; instead, they serve exclusively as aesthetic surface embellishments. The research develops a systematic methodology for selecting, cleaning, shaping, and mechanically attaching reclaimed PCB components to apparel fabrics while considering structural stability, wearability, safety, and consumer acceptance.

The design concept was inspired by the reflective metallic appearance of discarded PCB components, which resembles gemstones and traditional embellishments used in fashion. Satin fabric was selected as the base material because of its smooth surface, structural stability, and ability to support localized loads while maintaining garment drape. The developed garments were evaluated by an expert panel using a structured assessment of aesthetic appeal, creativity, wearability, sustainability, and overall acceptance.

This exploratory study demonstrates the potential of repurposing electronic waste as decorative textile embellishments, thereby extending material life, reducing waste generation, and promoting circular fashion practices. Although detailed engineering evaluations such as wash durability, attachment strength, and long-term performance were beyond the scope of this investigation, the findings establish a foundation for future research on the technical validation and commercialization of e-waste-based textile embellishments.

Material and Methods

A mixed-methods approach assessed the potential of upcycling e-waste in fashion design through four phases:

Phase 1: Environmental Analysis: Secondary data from global e-waste repositories were quantified to map the baseline chemical compositions of legacy peripheral PCBs components. To address

the presence of restricted substances, a systematic visual inspection, cleaning, and material selection was established prior to human contact or physical fabrication.

Phase 2: Material Acquisition and processing: Electronic chips were sourced from discarded keyboards and mice collected from institutional organizations, friends, and relatives. Components were cleaned, carefully removed manually, and sorted. The flat laminates were mechanically sectioned using specialized appropriate hand tools into precise geometric configurations (squares, diamonds, and drops) with surface areas ranging from 1.5 cm^2 to 4.0cm^2. To eliminate abrasion risks from exposed fiberglass edges, the cut chips were mechanically sanded along the perimeter and edges were manually smoothed. Component placement was further optimized to distribute weight evenly and preserve garment flexibility; standardized laboratory evaluation of attachment strength, laundering performance, and long-term durability was beyond the scope of this study and is recommended for future research.

Phase 3: Substrate Characterization and Structural Assembly: Satin fabric was used as the base material; the sustainability of the developed garment was achieved through the creative reuse of discarded electronic chips as decorative embellishments. Satin was selected because its smooth, lustrous surface and excellent drape provided an appropriate foundation for showcasing the intricate geometry and metallic appearance of the reclaimed electronic components. The satin-weave polyester fabric provided a flexible substrate that was expected to provide adequate structural support and low shear deformation under the localized mass load of the rigid chips. The fabric had adequate structural stability for securely attaching the rigid embellishments while maintaining the garment's aesthetic appeal and wearability [15]. By incorporating electronic waste into a fashion product, the study demonstrates an innovative approach to extending the useful life of discarded materials, reducing e-waste disposal, and promoting circular design practices within the fashion industry [16,17].

A total of 20 distinct layout configurations were rendered digitally, with 5 configurations finalized for physical prototyping based on balanced weight distribution, structural symmetry, and minimized localized fabric strain. The treated chips were mechanically affixed to the textile material using a dual-stabilization technique: primary mechanical anchorage via micro-drilled perimeter stitch holes using bonded core-spun polyester thread, supplemented by an interfacial layer of flexible hot-melt adhesive film to prevent rotational shifting during body movement. Components were attached using conventional stitching techniques supplemented where necessary by adhesive for positioning over adhesive-only bonding because stitching redistributes shear load away from the adhesive interface, which is expected to improve resistance to delamination during wear and laundering. A medium-weight cotton fabric was used as the inner reinforcement. This localized reinforcement supports the weight of the electronic components while preserving the elegant drape of the rest of the satin garment.

Phase 4: Validation and Acceptability Analysis: To evaluate the commercial and performance viability of the e-waste embedded garments, a structured quantitative evaluation was conducted. A standardized feedback instrument was administered to an expert cohort (n=50) comprising 20 textile engineers, 10 fashion designers, 10 researchers, and 10 design students. The criteria for attributes included visual appeal, creativity/ innovation, colour, wearability, overall impression, and sustainability, which were evaluated using a 5-point Likert scale (5: Excellent, 4: Very Good, 3: Good, 2: Average, 1: Poor). Mean values and standard deviations were calculated using descriptive statistical analysis in Microsoft Excel.

Results and Discussion

Phase 1: Environmental Analysis: The study began with a comprehensive analysis of the environmental impact of e-waste using secondary data, including statistics on global e-waste generation and the presence of toxic components. This formed a foundation for understanding the urgency of upcycling and the possible environmental benefits of this practice. The e-waste material was collected from various resources so that innovative designs and products could be created.



Plate 1: E-waste Collection from various resources

Phase 2: Material Acquisition and processing: The study examined the harmful compounds found in e-waste, the difficulties connected with its disposal, and the possible benefits of upcycling. This phase established a framework for understanding the environmental benefits of reusing electronic materials. Garment construction followed the chip preparation and attachment procedure described in Methods (Phase 2–3); this phase confirmed that the geometric chip units could be consistently positioned across all five finalized designs while preserving fabric drape.



Plate 2: Design development using reclaimed electronic waste components

Phase 3: Substrate Characterization and Structural Assembly: A total of 20 design ideas were conceptualized, from which 5 designs were finalized based on their creative merit and practical feasibility. The design process involved experimentation with the placement of chips on fabrics, exploring symmetry, colour contrast, and surface manipulation techniques to enhance visual interest. Chips were seated with the component face against the fabric substrate rather than against the skin, a lining was inserted between the chip and the skin, and cut edges were sealed with lacquer to keep sharp fiberglass edges from being the outermost surface. The integration of the e-waste elements was carefully balanced to ensure the garments remained wearable, functional, and safe. The garments were designed with a focus on merging technology with fashion, using the chips as embellishments to create visually striking designs. The chips were arranged in different patterns to enhance the aesthetic appeal of the garments.

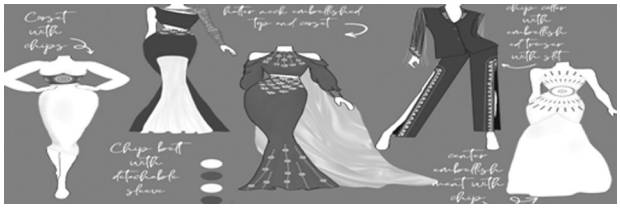


Plate 3: Developing Design through Collected E-waste

Phase 4: Validation and Acceptability Analysis: The survey data collected from the expert panel (n=50) were analyzed to evaluate market acceptability of the high-fashion garments.



Plate 4: Developed Upcycled garments through Collected E-waste

Table 1. Mean evaluation of the Upcycled Garment by Respondents (n = 50)

Attribute	Mean (μ)	Standard Deviation (SD)	Interpretation
Visual Appeal	5.00	0.00	Excellent
Creativity	4.88	0.33	Excellent
Overall Impression	4.88	0.33	Excellent
Sustainability	4.72	0.45	Excellent
Colour Combination	4.60	0.49	Very Good
Wearability	4.60	0.49	Very Good

As shown in Table 1, visual appeal received the highest mean score (μ = 5.00 ± 0.00), indicating the unanimous rating for visual appeal which may be attributed to the metallic reflectance and geometric arrangement of PCB components, which created a futuristic aesthetic distinct from conventional embellishments.

Both creativity and overall impression achieved similar mean scores (μ = 4.88 ± 0.33), reflecting respondents' appreciation of the innovative application of discarded materials and the overall design concept. Sustainability also received a mean score (μ = 4.72 ± 0.45), demonstrating that participants recognized the environmental value of transforming electronic waste into wearable fashion products.

The attributes colour combination and wearability each obtained a mean score of 4.60 ± 0.49, indicating that respondents considered the garment aesthetically balanced while remaining comfortable and functional. The strategic placement of relatively rigid upcycled components preserved the fabric's drape and mobility, suggesting that the design successfully balanced decorative enhancement with practical wearability.

Overall, the consistently high evaluation scores across all attributes demonstrate strong user acceptance of the upcycled garment. The findings

support the potential of textile waste upcycling as a viable design strategy for producing aesthetically appealing, functional, and environmentally responsible fashion products.

Safety and Environmental Considerations

Beyond the environmental benefits of diverting e-waste from landfill, wearable applications of electronic waste require careful consideration of wearer safety. Printed circuit board (PCB) components from discarded keyboards and mice may contain solder alloys and plated contacts comprising lead, tin, and nickel, which can cause skin irritation if direct contact occurs [18]. Previous studies recommend encapsulation or insulating barriers to minimize skin contact and protect components from moisture-induced degradation [12,13].

In this study, potential exposure was minimized by positioning the electronic components on the outer garment surface, inserting a fabric lining between the embellishments and the wearer, and manually smoothing the cut edges before attachment. These measures represent design-based safety precautions rather than experimentally validated solutions, and future studies should evaluate attachment strength, edge safety, and chemical migration using standardized testing methods.

From an environmental perspective, reusing intact PCB components as decorative embellishments extends material life and reduces the need for disposal or energy-intensive recycling processes. However, garments containing embedded electronic components will require appropriate end-of-life management and should ideally be directed to specialized recycling systems rather than conventional textile waste streams.

Delimitations of the Study

- This study is delimited to the use of non-functional, decorative printed-circuit-board fragments, keyboard buttons and mice on five finalized garment prototypes; electrically functional e-textile applications fall outside its scope.
- The study does not include standardized laboratory testing of attachment strength, wash durability, wearability and comfort.
- The safety discussion is based on general literature on wearable electronics and construction.

Conclusion

This exploratory study demonstrates the feasibility of upcycling e-waste into high-fashion garments, offering a creative solution to the environmental challenges posed by electronic waste. The innovative blend of technological components and traditional fashion textiles challenged established design techniques and provided a new perspective on the junction of sustainability and fashion. The expert evaluation demonstrated a high level of acceptance of the developed garments, particularly with respect to creativity, aesthetic appeal, sustainability, and wearability. The final garments showcased at the fashion show received significant attention, highlighting the potential for such practices to influence both the fashion and technology industries. The use of electronic chips, with their reflective and intricate surfaces, added a futuristic element to the designs, creating visual illusions that captivated the audience. The research underscores the potential for collaboration between the fashion and technology sectors, promoting circular economy principles and influencing future trends in sustainable design. By pushing the boundaries of traditional fashion aesthetics, this approach paves the way for innovative practices that can contribute to a more sustainable future.

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Fiscal deficit expands to 42% of annual target in April-Aug

The centre's fiscal deficit widened to 41.9% of the annual target in the first five months of FY27, largely due to weaker revenue growth and an extra monthly tax devolution to the states in August. The fiscal deficit was at 38.1% of the relevant annual target in April-August of FY26.

In August, the Centre released an extra monthly devolution to take it to ₹2.18 lakh crore for the month, to support development spending by the states.

The Centre's own capex declined by 30% year on year to ₹59,314 crore in August, compared with ₹84,653 crore in the same month last year. However, it rose by 18.2% to ₹5 lakh crore during the first five months of the current financial year, aided by high spending in the previous months.

Revenue expenditure grew by 8% during the period, amid a sharp 24% expansion in subsidy releases, even as interest payments declined by around 3%.

On the other hand, the Centre's net tax revenue grew by a modest 3.4% to ₹8.4 lakh crore as against the required rate of 9.3% to meet the FY27 target of ₹28.6 lakh crore.

The gross tax revenues rose by 6.5% in April-August FY27, amid the sharp 23% contraction in excise duty collections, owing to the excise duty cuts on petrol and diesel earlier in the fiscal, even as most other taxes posted a double-digit growth during this period.

Given the trends, the Centre's gross tax revenue needs to expand by 10.9% on year during September-March of FY27, slightly lower than rating agency ICRA's expectation of nominal GDP growth.

"This warrants a 21% growth in income tax collections, albeit on a low base, and a 31% expansion in excise duty collections, both of which are unlikely to materialise, leading to a miss on these accounts," ICRA said.

However, this would be partly offset by higher-than-budgeted collctions on the customs duty front, aided by the duty hikes on gold and silver imports, it said.

Given the revenue shortfall anticipated on the taxes side as well as additional subsidy requirements on the fuel and fertiliser front, ICRA estimates the fiscal deficit to overshoot the FY27 BE by about ₹1.3-1.4 lakh crore. However, this could be absorbed by expenditure savings, which amounted to ₹1.6-1.7 lakh crore in FY26, it said.

Small savings inflows have remained quite strong and are likely to overshoot the budgeted levels for FY27. ■

DESIGN AND DEVELOPMENT OF SHAPEWEAR (CORSET) TO IMPROVE THE FIT AND APPEARANCE OF THE WEARER

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ABSTRACT

For special events in particular, every woman aspires to have the ideal hourglass figure. One needs to have a fantastic body shape in order to look flawless when wearing and displaying particular styles. A easy method for getting the ideal body is donning shapewear and slipping into a lovely, silhouetted dress. Shapewear is a category of undergarments that is manufactured from a material that is both hard and elastic. Shapewear textiles are designed to smooth out the body by nipping and tucking. By flattening bulges, elevating sagging areas, and straightening postures, it helps women shape their bodies. The comfort of shapewear is increasing as demand rises and new technology is created. Many ladies have incorporated shapewear into their everyday wardrobe. In order to establish how well corsets shape, pressure and shaping efficacy are examined. This study looked at the product characteristics of four different designs of posture correction corsets in terms of design, material preference, fit, comfort, freedom of movement, tightness in order to improve the design and comfort of waist protection corsets. This research aids in the development of waist protection corsets that are both comfortable and attractive to wear. The comfort and fit will be determined by the three design advancements from the basic corset and the study has been prepared.

Key words : hourglass, Shapewear, silhouette, corsets.

1. INTRODUCTION

A support garment used to mould and fix the torso in place is called a corset. There are many different styles of shapewear. They are used to make numerous body portions, including the hips, thighs, stomach, belly, waist, and chest, look better. Shapewear for the upper body includes underbust shapers, corsets, camisoles, and shaping vests. These fashions typically tuck the stomach in and lift the busts to accentuate and make the cleavage more prominent. The fitting of the garment is a key draw when thinking about fashion trends. It primarily has two characteristics, namely comfort level and attractiveness. The appearance as a whole is the result of these two. A personal method of expression that may or may not be applicable to everyone is what is typically meant by the term "fashion." A designer always employs a variety of techniques to tailor a garment to the wearer. Draping, pattern making, and other processes fall under this category. Through this procedure, a well-fitting clothing is created. Researchers, retailers, clothes manufacturers, and customers have frequently been concerned about the fit of clothing, but when working with functional clothing, its significance increases significantly. Typically, there are two components to fit: comfort and attractiveness. However, some women always have trouble getting the dress to fit because of changes in their bodies. When wearing a dress, certain ladies will tend to have an hourglass figure. But some people will have a saggy waist and a bulge. Wearing a shaper before a dress is the only way to achieve the ideal body form. It will give a correct fit and compress the waist. Typically, they are tucked into tops and dresses.The present investigation aims to develop to design a shape wear to improve the fit and appearance of the wearer.

2. METHODOLOGY

It's important to observe and research the numerous aspects of clothing design. It matters how an experiment was conducted as well as how a garment is made at each stage of the process. It describes the process utilised in the creation and design of a garment.

2.1 IDENTIFY THE PROBLEMS

This article's goal is to assess the demand for shapewear. Women with a drooping waist and an unflattering form typically have an hourglass figure. Each person has a different viewpoint on shapewear. Many women wore simple corsets. Simple corsets have few drawbacks. Plain corsets fall short in terms of fit and comfort. Therefore, three design improvements from the simple corset have been created in order to address the issues with fabric selection, trim selection, pattern making, garment construction, and finishing surveys. Each design incorporates a pattern modification to address the fitting issue.

2.2 DESIGNING

Clothing allows one to exhibit their unique personalities while also giving them pleasure and comfort. It takes more than just wearing clothes to become gorgeous. It is insufficient to just dress in clothing that reflects one's unique personality. There is something that is more significant than style, appearance, charisma, or any combination of these. Design is a discipline of art that concentrates on producing apparel and other items for daily life. Three corset patterns were created from a basic corset as a result of this article's investigation, specifically to address fitting issues.

2.3 GARMENT DESIGNS

Four garment designs are done. These designs were generated from the basic corset design. Plain corset, V-yoke corset, Side panel corset, Shaper fit corset.

2.4 FABRIC SELECTION

The most crucial aspects to consider while choosing a cloth are length, colour, texture, and style. The type of clothing determines the fabric's length. Although fabric is normally cut lengthwise, the bias grain axis can also be used on occasion. Texture is another element of fabric design. It determines how the fabric feels and looks. Texture is the experience of handling, grasping, and squeezing fabric.

2.5 CHOICE OF MATERIAL

This project uses polyester lycra fabric to design shapewear. The polyester lycra fabric will provide enough stretch, which is a key element in shapewear. A particularly elastic sort of synthetic cloth is called lycra. Polyester and polyurethane, a flexible plastic substance, are combined to make it. Lycra is a widely used fabric in apparel because of its durability and elasticity.

2.6 CHOICE OF COLOR

The shapewear is made with consideration for skin tone. Your clothing and complexion will determine the ideal colour combination. Look for shapewear in black or cocoa if you have darker skin and are wearing a light-colored outfit. Less pigmented skin should wear a bodysuit over a thin garment. With darker outerwear, the black option looks good on people of all skin tones.

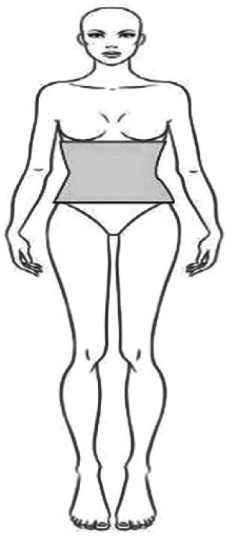
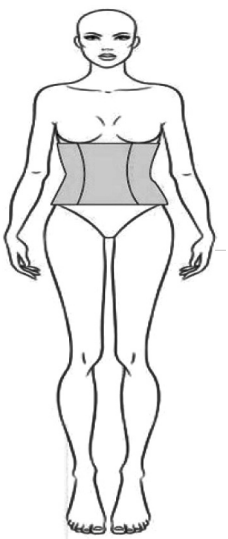
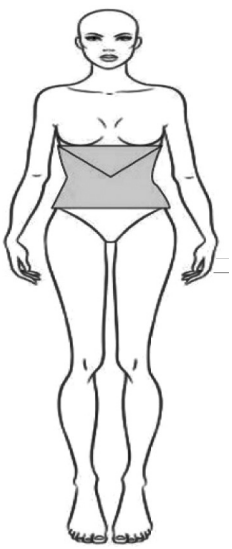
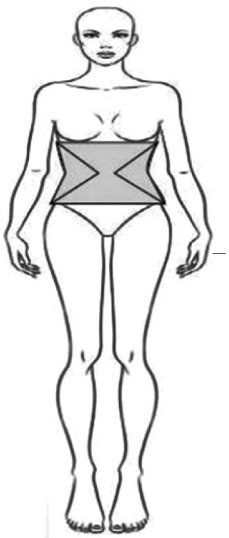
2.7 TRIMS SELECTION

The fabric is built using threads. In addition to the fabric, clothing accessories or fabric trims can also be attached to a garment. In addition to cloth, trims are items that are utilised in the sewing room to make dresses. They work closely with the fabric to create clothing. Nothing can be used on the form wear other than thread. Trims can be used because it is an undergarment.

2.8 THREAD

Polyester threads are displacing rayon threads at a rapid rate. These are the most common threads for embroidery and stitching. Polyester yarn has a high sheen and can withstand threads could be used in woven jackets, hosiery, leather garments,

Table -1 Corset Designs

Design 1	Design 2	Design 3	Design 4
			

and denim, as well as ready-to-wear clothing. Since, we have taken skin color fabric for shapewear the matching thread color is also skin color

2.9 PATTERN MAKING

It takes a lot of talent to create patterns for clothing production. Each pattern's attention to detail and technique ensures that garments are produced to design with a small margin of error. After you've designed your clothes, you'll need to convert your sketches into technical drawings before you can start making patterns.

2.10 PATTERN MAKING – TECHNIQUES

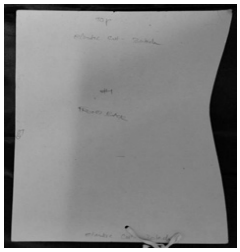
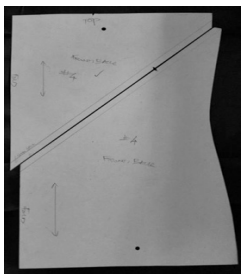
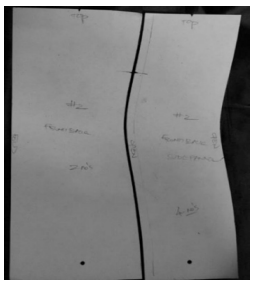
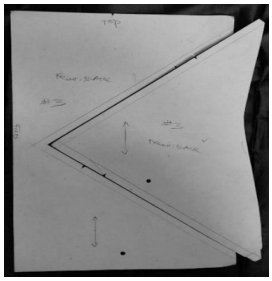
2.10.1 PATTERN DRAWING ON A FLAT SURFACE

This method uses muslin fabric to transform a simple pattern into a three-dimensional form, which is then transferred to paper. Flat patterning helps to illustrate the areas for movement while also enhancing the wearer's comfort.

2.10.2 DRAFTING

It's a patternmaking technique in which body measurements are taken precisely, then ease is added for quick movement. A dress type or a model

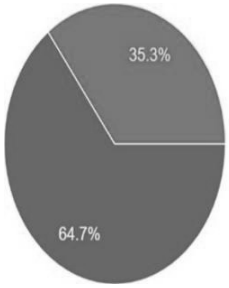
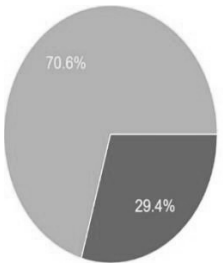
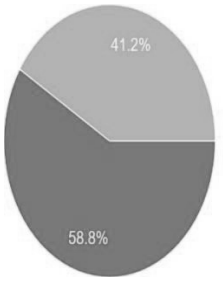
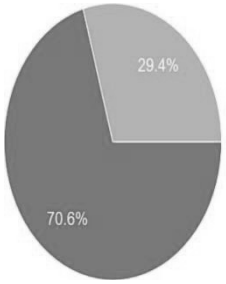
TABLE 2-Design and Finished Corset

DESIGN	PATTERN	FINISHED CORSET	DESCRIPTION
PLAIN CORSET			This shape gives the wearer a perfect fit and comfort. This patten doesn't have any pattern complications.
V- YOKE CORSET			In this pattern a yoke has been given. V yoke has been given in center front and centre back This yoke will give extra compression to the abdominal area and centre back. By this design we can expect the fit for the abdomen area and waist.
SIDE PANEL CORSET			In this pattern side panels has been given. This side panel will give the waist area extra fit and comfort. Panels has been given to both the sides of front and back. Those panels have been attached to centre front and centre back.
SHAPER FIT CROSSER			In this design a side panel from waist to centre front has been given. This will try to compress from waist to abdomen. The pattern change has been given to both front and back.

may be used to draught. Drafting is commonly used in the textile industry, and it can also be performed using a device.

2.11 CUTTING

Fabric cutting procedures follow the development of patterns. If the pattern does not have a seam allowance, add one before cutting. Place the fabric on a smooth surface and smooth out any wrinkles or folds. Only then should the fabric be cut. Fabric shears are widely used, but electronic cutting shears, similar to round knives, are used for industrial purposes.

Sl. no.	Criteria	Customer Response	Percentage	comment
1	Preference 	Yes No	64.7% 35.3%	This reaction is the customers reaction about preferring the shapewear for daily use. Most of the customers agrees to that they preferred to wear shapewear daily. Some of them disagreed to that because of comfortless.
2	Reason for preferring shaper 	Fit Comfort Both	29.4% 0% 29.4%	This is about reasons for preferring shapewear. Whether it is to be wear forfit or comfort. Most of customers preferred both fit and comfort. While the minority of them preferred for its fit only. None of them agreed to its comfort only. So, shapewear is mostly preferred for both fit and comfort.
3	Facing any skin irritation while wearing shapewear 	Yes No May be	0 % 42.2% 58.8%	This is about reasons for preferring shapewear. Whether it is to be wear forfit or comfort. Most of customers preferred both fit and comfort. While the minority of them preferred for its fit only. None of them agreed to its comfort only. So, shapewear is mostly preferred for both fit and comfort.
4	Does the shaper cause any extra skin sensitivity or pain in your skin 	Often Rarely Never	0% 70.6% 29.4%	Most of the customers have rarely experience the skin irritation, because they have been wearing it for very long time and wrong choice of shaper. Someof the customers have never faced suchproblems. So, the customers have to analyses their body type and buy the shapewear

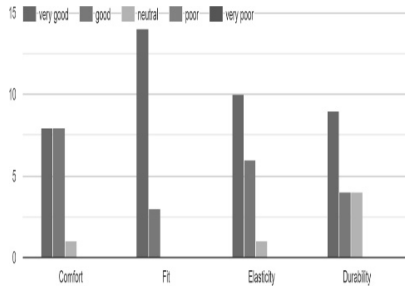
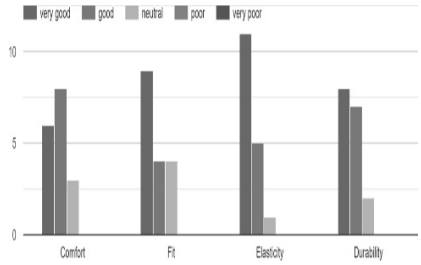
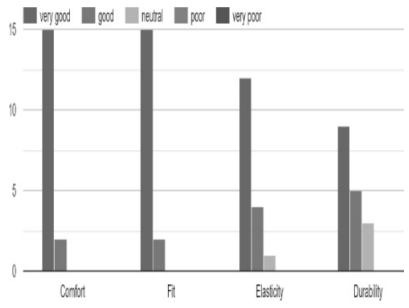
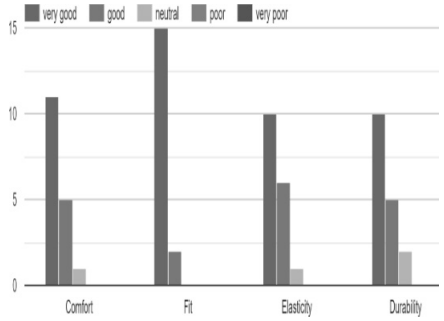
DESIGN AND DEVELOPMENT OF SHAPEWEAR (CORSET) TO IMPROVE THE FIT AND APPEARANCE OF THE WEARER

2.12 FINISHING

In the garment industry, finishing is a critical step. We take the finished goods from the lowing section and keep records in this area, then send them to the iron section after suckering Wham. The ironman then irons these according to the buyer's instructions.

2.13 SURVEY

A survey aids in the collection of data for a new product or conduct among customers. The survey is administered online, making it easier to interpret for all participants and allowing for the registration of responses. The following questions are asked of the designed garments.

Sl. no	Criteria	RATING	COMFORT	FIT	ELASTICITY	DURABLITY
1	Comfort level of wearing shapewear design 1 	Verygood	8	14	10	8
		Good	8	3	6	3
		Neutral	1	0	1	3
		Poor	0	0	0	0
		Verypoor	0	0	0	0
2	Comfort level of wearing shapewear design 2 	Verygood	6	8.75	11	7
		Good	8	3	5	6
		Neutral	3	3	1	1
		Poor	0	0	0	0
		Verypoor	0	0	0	0
3	Comfort level of wearing shapewear design 3 	Verygood	15	15	12	9
		Good	2	2	4	5
		Neutral	0	0	1	3
		Poor	0	0	0	O
		Verypoor	0	0	0	0
4	Comfort level of wearing shapewear design 4 	Verygood	11	15	10	10
		Good	5	2	6	5
		Neutral	1	0	1	2
		Poor	0	0	0	0
		Verypoor	0	0	0	0

Shapewear preference, Total hours of wearing shapewear , Reason for preferring shapewear, Comfort level of shaper for four designs, Skin irritation while wearing shapewear.

2.13.1 IDENTIFYING PROBLEM

The fit and comfort issues occur in women's shapewear are identified and solve by it using design developments.

Designing-The design has been developed from the plain corset and designed according.

Selection Of Fabric - Skin color polyester lycra are selected for the garment. It is comfortable and has good elasticity. It is the most preferable fabric for shapewear.

Trims - The selection trims are done on depend upon the type of the garment. Only threads are used to construct the garment.

Pattern Making -The flat laying technique has been used to draft the pattern for the designs.

Cutting - Fabrics are cut by using the patterns that made for the design.

Garment Construction - The design has been constructed according to the given pattern. FINISHING - Finishing is done after the whole sewing process and removed excess threads

3. RESULT AND DISCUSSION

Total hours of wearing shaper per day

Total no of hours	percentage
4 hours	18.7%
6 hours	43.8%
More than 6 hours	37.5%
Full day	0%

This chat shows the total hour of wearing a shaper. Most of the customers can wear up to 6 hours a day. Some of them can wear it more than 6 hours per day or lesser that it. Whereas no of them have agreed to wear it for full day.Because if shaper is worn for full day it can cause skin irritation problem etc. it's vital to let your body relax. Don't wear them for extremely long periods of time or sleep in them.

4. CONCLUSION

This articles deals with the designing of women's shapewear for fit and comfort. Shapewears are designed for the women's who tends to have the perfect body shape with some design variations. The main advantage of the garment is the pattern changes. Three design developments were made from the plain corset to increase the fit and comfort. This study contributes to the creation of waist supporting corsets that are both comfortable and beautiful to wear. They're designed to make different sections of the body look better. The four designs were analyzed for comfort, fit and shape. It should be alright if you wear the proper size and style of shapewear that allows you to breathe and work comfortably. The fabric also adapts itself so that the user does not feel suffocated while still providing sufficient compression

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A small cluster ; Tiruppur turned into a textile export powerhouse. How it is possible!

A 107-fold rise in exports! That sums up the story of India's knit wear capital Tiruppur over the last 35 years.

From a modest ₹429 crore in calendar year (CY) 1991, its knitwear exports have grown to ₹46,000 crore in financial year 2025-26. This growth makes the city, around 463 kilometres to the west of state capital Chennai, a classic small scale industry cluster success story in the post-liberalisation era, driven by scale, entrepreneurship and resilience.

Well, it is not that liberalisation created Tirupur's textile ecosystem from scaratch, but it connected an existing entrepreneurial and supplier network to the external world.

Today, major brands like Primark, Walmart, Marks & Spencer, Hennes & Mauritz AB (H&M). Tommy Hilfiger, and Target source textiles from Tiruppur. The region also exports to over 50 countries, around 65 percent of its shipments go to countries with which India has free trade agreements (FTAs). This share is expected to increase further once the FTAs with the United Kingdom and the European Union kick in fully.

The ecosystem employs around million people, spread across 1,300 garment units, out of which 75 percent are women and around 200,000 are migrant workers from around 19 states.

How Tiruppur evolved

Located on the banks of the Noyyal River, the region's export prowess is not new. Kodumanal, around 26 km east of Tiruppur, boasts a two millennium-old trade line with Rome that dates back to the era of Julius Caesar.

Despite this rich past, its textile glory went into oblivion for centuries, and for much of its modern history it was an agricultural settlement dependent on the Noyyal, where farmers cultivated cotton and other crops. The first knitwear unit in Tiruppur was set up in 1925, and it emerged as the prominent centre in South India in the 1940s, becoming a hub of white knit innerwear.

Earlier, local manufacturers used to sell their knitwear through middlemen and exporters in Kolkata (then Calcutta) and Mumbai (then Bombay). It was only in 1978 that Italian garment player Verona started directly sourcing while T-shirts from the city. Three years later, in 1981, this European retail chain. C&A, became its second international customer.

The rest, as they say, is history. From the mere exports of ₹37 crores in CY86, liberalisation, fresh investments and entrepreneurial intelligence pushed its export turnover to ₹1,850 crore by CY96, ₹10,250 crores by FY06, ₹23,500 crores in FY16, and ₹46,000 crores by FY26, show historic data from the Apparel Export Promotion Council (AEPC) and media reports. If you add the domestic market as well, the total revenue from Tiruppur would cross ₹75,000 crores new.

"It was a small agrarian town, and we were strong in manufacturing baniyans (vests). We had no speciality till exports came into the picture. Now, it is the fourth-largest city in the state, the administrative capital of Tiruppur district and a municipal corporation," says K.M. Subramanian. president of the Tiruppur Exporters Association (TEA).

Tiruppur's success has been powered by a unique cluster model, where thousands of micro, small and medium enterprises (MSMEs) specialise in different stages of the garment-making process.

It should also be noted that the exchange rate in 1991-92 was a mere 24-27 per US dollar, while in FY 26 it was seen near ₹86 per US dollar.

Waves of change

One of the major advantages that the 1991 reforms threw up for Tiruppur was that it opened up new customer bases like the United States and Europe. Adding to this, the new economic policies made it easier for manufacturers to import modern knitting, dyeing, finishing and garment-making machinery, raising the quality and quantity of production from the region.

The reason people consider Tiruppur an example of smart entrepreneurship is also down to the role played by the TEA, launched in 1990 by leading knitwear exporter A Sakthivel, in its transformation.

"Liberalisation helped bring fresh invesment in infrastructure. In 1990, TEA set a target of achieving ₹1,000 crore of export and we achieved that. Since then, TEA has played a crucial role in turning around the industry in Tiruppur," says Sakthivel, who is the current chairman of AEPC and the chairman of Poppys Group.

According to Ashwin Chandran, chairman of the Confederation of Indian Textile Industry (CITI) and Managing Director of Precot Ltd, the dismantling of the textile quota regime under the World Trade

Ogranization's (WTO's) Agreement on Textiles and Clothing in 2005 was a game changer.

Till then, major importing markets such as the US and Europe had imposed quotas on how much clothing and textiles countries such as Indian could export, under a system called the Multi Fibre Arrangement (MFA).

"During that time, the rise in manufacturing costs forced developed markets to look at countries like China. Bangladesh and India," says Chandran. That meant that companies that had earlier operated with 100 to 200 machines began investing in capacity, setting up 1,000 machines. "The period after 2005 also witnessed another pahse of transformation, led by investment in infrastructure, technology, modernisation and manufacturing capacity," he adds.

TEA also played a crucial role in bringing in fresh investments for worker welfare, include education, healthcare. accommodation, dormitories, play schools and other facilities. The industry body is now further improving the accommodation and educational infrastructure facilities, which attracted more foreign majors.

According to Subramanian, Tiruppur's advantage is its distributed production model, which evolved as a chain of interconnected activities. This ranges from cotton and yarn manufacturing to knitting, processing, embroidery. printing, sewing, accesories and packing. Only 20 percent of units have veritically integrated operations nearly 80 percent and MSMEs that specialise in individual activities and share the business across the cluster.

The model helped Tiruppur bulid scale without requiring every company to invest in the entire manufacturing chain. That is the reason why Commerce and Industry Minister Piyush Goyal said the country wants to create 75 textile hubs like Tiruppur which will not only support textile product exports and ensure inclusion of sustainable technology, but will also generate huge opportunities for employment.

In his Independence Day speech in August, Prime Minister Narendra Modi too specified that the country's textile sector, spread from Ludhiana in Punjab to Tiruppur, has the potential to reach global markets.

"Tiruppur's unique strength is its deeply connected textile ecosystem, where almost everything from raw material to finished garments is available within a short radius. This gives Tiruppur the speed, flexibility, quality and consistency to serve global brands," says Prabhu Dhamodaran, convenor and secretary of the Indian Texpreneurs Federation (ITF).

Resillent looms

The city had its share of roadblocks too, ranging from environmental concerns in the early 2010s to Covid-19 and even geopolitical headwinds.

Following a court order directing dyeing and bleaching units to achieve Zero Liquid Discharge (ZLD) and stop discharging effluent into the Noyyal, several units were shut down briefly in 2011, affecting exports. An industry source said around 729 factories were shut at that time.

However, Tiruppur adapted quickly, Now, around 130 million litres of water a day is being recycled and reused, and the majority of the industry has shifted to renewable energy too.

Chandran of CITI says the pandemic also resulted in consolidation, wih smaller operators increasingly giving way to larger companies. Before Covid, there were small operators with 200-300 machines and an annual turnover of around ₹15 crore, which are fading away fast now, he says.

The region is also facing tough competition from states like Odisha, from where it used to source a large share of manpower before, as it looks to ramp up its own textile production chain. That has meant that unlike before when labourers would come to Tiruppur in search of work, factories in the city are now having to go in search of workers.

Even so, the TEA has set an ambitious export target of ₹1 trillion by 2030, and is aiming for domestic business of ₹50,000 crore by then, says Subramanian. More importantly, it is gradually focusing more on man-made fibres (MMF), compared to its stronghold of cotton.

Despite all its challenges, with FTAs expected to take centre stage, exporters see a boom ahead for Tiruppur. ❐

Indian companies can hit $ 200 billion to BRICS by 2030, says Assocham report

Indian companies are set to benefit across engineering, automobile, electronics, pharma, textiles, agriculture, renewables and digital services, as trade with BRICS has grown significantly during the last five years from $203 billion in 2020-21 to $417 billion in 2025-26, said a report recently.

EXPORT PROSPECTS AND MARKETS

According to a research report by industry body Assocham and Global Research and Strategy Centre, titled *The Rise of BRICS Nations: An opportunity to scale Indian Exports to $200 billion to BRICS by 2030*, trade dynamics are influenced by various factors, including the economic performance of the BRICS+ countries, their trade policies and the global economic landscape.

For India, the opportunity is not only to export more to BRICS+ countries, but to strengthen its production, sourcing and value chains, technologies, settlement systems, along with the opportunity to learn from the best practices and ecosystems that have been developed across these economies, the report said.

"BRICS has emerged an important platform for cooperation among major emerging economies and is assuring a growing role in shaping the global economic landscape. The objective of scaling India's exports to BRICS countries to $200 billion by 2030 is, therfore, both timely and ambitions. There is considrable potential to identify emerging areas of demand, address trade barriers, strengthen value-added exports and build stronger business-to-business linkages across BRICS markets," said Piyush Goyal, Commerce and industry Minister, in the report.

Economic Ties

At a time when global trade and investment are undegoing significant transformation, BRICS provides an important avenue for strengthening economic partnerships, deepening trade and investment linkages, promoting resilient supply chains and advancing cooperation across diverse areas of mutual interest, he added.

Among the major emerging economies, India witnesses an average GDP growth of more than 7 percent, during the last five financial years (2021-26). Even in the first quarter of the current fiscal year, Indian economy recorded 7.8 percent growth. As the fastest-growing major economy, India can play a pivotal role in broadening the bloc's horizons and facilitating a coordinated approach to resolving challenges arising from global geopolitical and economic developments.

"The BRICS grouping, representing approximately 40 per cent of global GDP, 26 percent of world trade and nearly 50 percent of the global population, has become an important pivot in the global economy, With its expanded membership and growing influence, it offers new opportunities for trade, investment, technology cooperation and sustainable development. As the global economy continues to evolve, stronger engagement among BRICS nations can support growth, resilience and economic diversification." said Nirmal Kumar Minda, President, Assocham. ❐

Sri Lanka getting viewed an additional manufacturing base for TN apparel makers to scale up capacity

Sri Lanka is emerging as more than an alternative manufacturing destination for Tamil Nadu's apparel Industry, with companies viewing the island nation as a complementary production base that could support growth, mitigate tariff risks and offer customers greater sourcing flexibility.

For Avinashi-based SP Apparels Ltd, Sri Lanka is already becoming an important growth platform.

The manufcturer and exporter of knitted garments for infants and children expects its Sri Lankan operations to contribute ₹150-200 crore in revenue by March 2027, as the factories acquired and intergrated over the past year-and-a-half move towards full operational efficiency. Chairman and managing Director P Sundararajan said delivery performance, productivity and quality had improved, with the factories now operating at near full efficiency.

SP Apparels currently has around 1,650 machines in Sri Lanka, of which about 1,300 are being deployed for exports, he told analysts.

Expansion

The factories receive base orders from India, along with the required raw materials, while shipments have remained on a schedule.

SP Apparels is also exploring ways to expand its Sri Lankan manufacturing footprint without committing substantial fresh capital. It plans to work with customer-approved factories on a job-work basis, allowing it to add capacity. The company expects this model could add another 500-600 machines within a year.

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At the same time, its existing machinery base in Sri Lanka could be expanded to 2,000 machines, providing additional capacity as demand improves, said Sundararanajan.

The strategy effectively creates a dual-country manufacturing network, with Sri Lanka complementing the company's established production base in India, He said.

Chennai-based premium apparel manufacturer Meenakshi India Ltd. entered into a contract manufacturing deal with a Sri Lankan factory last year.

Ashutosh Goenka, Chairman and Managing Director, Meenakshi India, said the company entered into the arrangement when the US imposed 50 percent tariffs on India.

Duty-Free Access

With the tariff situation changing, Sri Lanka's relative advantage has narrowed. Sri Lanka enjoys duty-free access to the European Union for its apparel exports, while Indian apparel faces duties of around 8-12 percent.

Goenka said the India-EU FTA, once operational, could bring India closer to Sri Lanka in terms of market access.

"Organically, Sri Lanka is neither cheaper nor better than India. It is the duties and tariffs that make it preferred over India," he said. ❐

Indian yarn manufacturers eye on China's world - largest textile market

As demand picks up, Indian cotton yarn exporters are eyeing a larger share of China, the world's largest textile market.

Indian yarn manufacturers and exporters are making a strong pitch at the ongoing Yarn and Apparel Expo in Shanghai, showcasing premium 100 per cent cotton, combed and compact yarns, organic-certified cotton and speciality blends.

Indian cotton yarn exports to China is gaining pace over the past two years. Exporters are hoping to build on this trend to expand their market share.

China Key Market

The Texprocial India Pavilion at the Sanghai expo, featuring around 40 exhibitors this year, was inaugurated recently by Pratik Mathur, Consul General of India, and Snehaja, Consul Commercial, along with members of the Texprocil Committee of Administration (GOA).

The Shanghal expo is a major trade platform for the textile value chain, covering everythings from raw fibres and yarns to finished apparel fabrics. "China remains a critical buyer and processing hub for global textile supply chains. The strong presence of Indian exporters at the Shanghai show underlines India's competitive positioning as a reliable supplier of high-quality, traceable and eco-friendly cotton yarns and textile inputs." said Sharad Khemka, MD, SP Group, a manufacturer and exporter of yarns, fabrics and apparel. "A major emphasis is being placed on sustainable, traceable and value-added cotton solutions, including national initiatives such as Kasturi Cotton Bharat," he added.

India's cotton yarn exports to China more than doubled to over $460 million in FY 2025-26 from $217 million the previous year, rising 112 percent on a rebound in demand from the neighbouring market. China accounted for 13.51 percent of India's cotton yarn exports in FY 2025-26.

Yarn Shipments Down

Overall, India's cotton yarn exports fell about 2 percent to $2.887 billion in FY 2025-26 amid weak demand from markets such as Bangladesh, Vietnam, Italy and Portugal.

Khemka said Indian exporters' market share in China is recovering from the sharp slump seen a few years ago. "In the current year 2026-27, we are expecting further growth in market share for Indian cotton yarn in China," he said. ❐

India retains its leading position in global home-textile exports

The global textile industry is undergoing a fundamental shift as brands and retailers reduce their dependence on China and diversify sourcing networks, according to a Nuvama report. The global textile market has expanded steadily and is projected to approach $1.8 trillion by CY27. China's share of global apparel exports has declined steadily, while Vietnam, Bangladesh and other Asian suppliers have gained ground. India, meanwhile, retains a leading position in global home-textile exports. As retailers diversify sourcing beyond China, India's established strengths in bedding and furnishing offer immediate growth opportunities. Future growth, however, will hinge on export competitiveness and the ability to capitalise on the ongoing global supply-chain diversification. ■



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OBITUARY

Dr. C. Bose, President Emeritus & Trustee of TAI Mumbai Unit, passed away on 7th September, 2026

It is with profound grief and a deep sense of loss that The Textile Association (India), Mumbai Unit mourns the sad and sudden demise of Dr. Chidambaram Bose, Trustee and President Emeritus of TAI, Mumbai Unit, who passed away on 7th September 2026 at the age of 76 years.



LATE DR. CHIDAMBARAM BOSE
(08.03.1951 - 07.09.2026)
Trustee & President Emeritus,
The Textile Association (India),
Mumbai Unit

Dr. Bose was one of the foremost pillars and key functionaries of The Textile Association (India), an important organisation of textile professionals. He served TAI, Mumbai Unit, with exceptional dedication, distinction and selfless commitment over several decades. He was a Vice President from 2003 to 2005 and subsequently served as President from 2005 to 2017, steering the Mumbai Unit with remarkable efficiency, vision and commitment. Since 2010, he had also been serving as a Trustee of TAI, Mumbai Unit. In recognition of his meritorious services and outstanding contribution to the Association, Dr. Bose was honoured with the Hon. FTA and Service Gold Medal by TAI. In 2026, he was further honoured with the Distinguished Service Award by TAI, Mumbai Unit, for his exemplary services and outstanding contributions to the Association. His invaluable leadership, guidance and dedication as President helped TAI, Mumbai Unit, reach new heights. His contribution towards the redevelopment of Santosh Building was enormous and will always be remembered with deep gratitude.

Dr. Bose also made a pioneering contribution to the Indian texturising industry. He successfully organised five International Seminars on Texturising at Silvassa, the first of their kind in India. These landmark events provided the Indian texturising industry with valuable global exposure and contributed significantly towards improving quality, productivity and technological awareness. He was widely regarded as a pioneer in texturising.

An accomplished textile technologist and professional, Dr. Bose held B.Tech. (Textiles), M.Tech. (Textiles), F.I.E. and Chartered Engineer (FTA) qualifications. He began his professional career with Hindon River Mills (DCM) as Assistant Spinning Master (Product Development) and subsequently served organisations including Sir Padampat Research Centre, J.K. Synthetics, Kota, Urvi Chemicals and Nirlon Synthetics Limited.

He joined Reliance Industries Limited and served as Senior Vice President from 1995 to 2009. During his distinguished tenure, he played a pivotal role in developing the world's largest, state-of-the-art texturising facility in 1995. As Plant Incharge, he led the Silvassa plant to global recognition for its cost-effective operations, superior yarn quality, high productivity and environmentally responsible practices.

Following Reliance Industries Limited's acquisition of Trevira, Germany, Dr. Bose led its technical operations across Germany, Denmark and Poland for three years. He also successfully led the acquisition and record-time transfer of UNIFI Ireland's complete texturising and polyester facilities to India under Reliance Industries Limited.

Dr. C. Bose pioneered Air Texturising Technology in India in 1976, designing and developing machines and process parameters for improved yarn quality. He developed pilot machines for IIT Delhi, Sir Padampat Research Centre, Kota, and PSG College of Technology, Coimbatore. He also contributed extensively to Industrial Fabric development at Nirlon Ltd. His patents include innovations in Air Texturising Machines, Processes, Air Textured Blended Filament Yarns, and Nylon Coloration during spinning.

Beyond his professional achievements, Dr. Bose will be remembered for his humility, accessibility, kindness and compassion. He was truly a man of the masses, with a special place in the hearts of countless textile professionals. His warmth, wisdom, guidance and willingness to support others earned him immense respect and affection across the textile fraternity.

The Mumbai Unit was privileged to have had such an eminent professional and dedicated leader at the helm of its affairs. His absence will be deeply felt by the Association and by the entire textile community. His demise is an irreparable loss to TAI, Mumbai Unit, which has lost one of its most important pillars of strength.

A Condolence Meeting in memory of Dr. C. Bose was held on 11th September 2026 at the TAI, Mumbai Unit Office, where members and well-wishers paid their heartfelt tributes and remembered his remarkable contributions and enduring legacy.

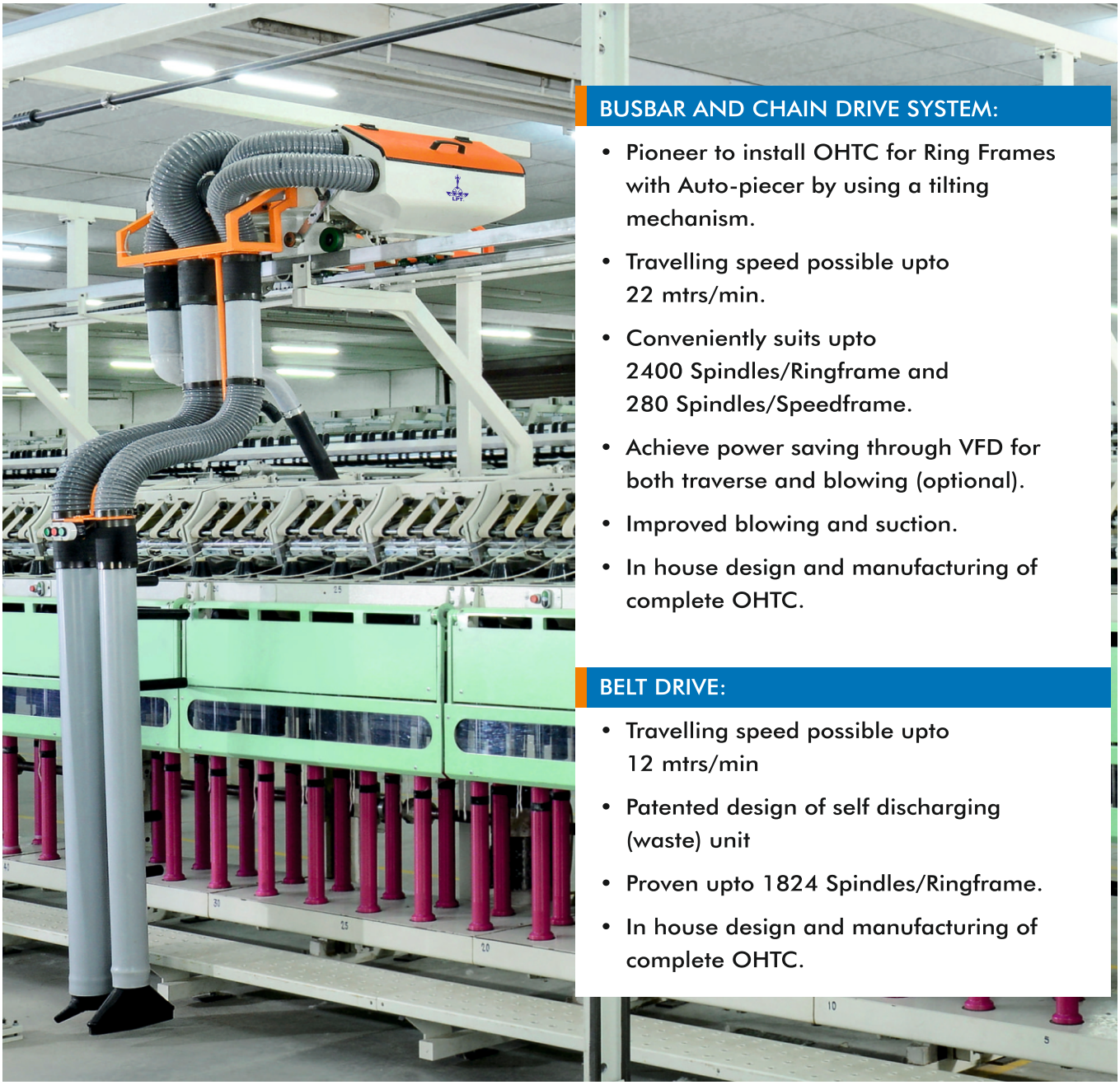
Dr. Chidambaram Bose may no longer be with us, but his ideals, achievements and memories will continue to inspire generations of textile professionals. His immense contribution to the Association and to the textile industry will remain etched in our hearts and will always be remembered with gratitude and respect.

The Textile Association (India), Mumbai Unit, conveys its deepest condolences to the bereaved family and prays to the Almighty to grant everlasting peace to the departed soul and strength to the family and loved ones to bear this irreparable loss. ■

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A Report on the Seminar on
"Future Trends in Technical Textiles"
22nd August 2026, Hotel Fortune Park Galaxy, Vapi (Gujarat)
Organized by the Textile Association (India), Mumbai Unit

The Textile Association (India), Mumbai Unit organized One Day Seminar on "Future Trends in Technical Textiles" on 22nd August 2026 at Vapi (Gujarat). The seminar was inaugurated by the Chief Guest Shri Pramod Khosla, Chairman & Managing Director, Khosla Profil Pvt. Ltd.



Lighting the Lamp: Standing (L to R): Dr. G. S. Nadiger, Vice Chairman, TAI, Mumbai Unit. Mr. Avinash Misar, Director & CEO, Coreshield Industries Pvt. Ltd., Mr. R. K. Vij, President, TAI, Dr. Ing. Mohit Raina, Managing Director, Raina Industries Private Limited, Dr. Gurudas Aras, Seminar Advisor, Mr. R. R. Patil, Vice President, TAI, Mumbai Unit, Mr. Pramod Khosla, Chairman & Managing Director, Khosla Profil Pvt. Ltd., Mr. Haresh B. Parekh, Convenor & Hon. Secretary, TAI, Mumbai Unit.

Inaugural Session

Mr. R. R. Patil, Vice President, TAI, Mumbai Unit delivered welcome address. In his speech, he welcomed the Chief Guest Mr. Pramod Khosla, Chairman & Managing Director, Khosla Profil Pvt. Ltd., Key Note Speaker Dr. Ing. Mohit Raina Managing Director, Raina Industries Pvt.Ltd. He also welcomed, the Lifetime Achievement Awardee, Mr. Vipin Kalra, Chairman, Madura Industrial Textiles Ltd and the Industrial Excellence Awardee – Mr. Chakresh Jain, Group President -Technical, Supreme Nonwovens Industries Pvt Limited, Speakers, Press, Media and delegates.



Welcome Address by Mr. R. R. Patil, Vice President, TAI, Mumbai Unit.

Mr. R. K. Vij, President, The Textile Association (India) while addressing the seminar highlighted the growing importance of technical textiles in sectors such as healthcare, infrastructure, automotive, defence, agriculture and aerospace. He said the future of the sector will be driven by high-performance materials, smart textiles and sustainability. He emphasised the need for greater collaboration among industry, academia, research institutions and government to promote innovation, testing, skill development and commercialisation. Shri Vij said, India, with its strong textile base and large domestic market, has a significant opportunity to emerge as a global hub for technical textiles, innovation and advanced applications. He called upon the industry to convert ideas into partnerships, new products and commercial opportunities, and expressed hope that the seminar would lead to greater collaboration and action.



Address by Mr. R. K. Vij, President, TAI

Dr. Gurudas Aras, Seminar Advisor and Trustee, TAI, Mumbai Unit while giving his address highlighted the growing importance of technical textiles in Indian textile industry. Dr. Aras said technical textiles are transforming textiles from conventional products into high-performance engineering solutions for infrastructure, healthcare, defence, agriculture, automobiles, filtration, sports and other advanced applications. He emphasised that India has significant advantages, including a strong textile manufacturing base, skilled capabilities across the value chain and a large domestic market. He called for greater investment in R&D, indigenous technology, industry-academia collaboration, testing, certification and start-up innovation. Dr. Aras stressed that India's ambition should go beyond import substitution and focus on becoming a global innovation and manufacturing

A Report on the Seminar on "Future Trends in Technical Textiles"

hub for technical textiles. He emphasized that the transition from "textiles as products" to "textiles as solutions" will define the next chapter of the Indian textile industry and urged industry stakeholders to actively contribute to creating this future.



About Seminar by Dr. Gurudas Aras, Seminar Advisor & Trustee, TAI, Mumbai Unit

Mr. Pramod Khosla, Chairman & Managing Director, Khosla Profil Pvt. Ltd., in his inaugural address, highlighted the journey of innovation over the past four decades and brought out the salient features of Indian industry penetrating in to one of the key nations having significant growth in high-performance textiles especially filtration fabrics and allied technical textile sector.



Dr. Ing. Mohit Raina, Managing Director, Raina Industries Pvt. Ltd. delivering the Key Note Address.

Dr. Ing. Mohit Raina, Managing Director, Raina Industries Private Limited in his Keynote address said that the innovation in technical textiles focuses on the performance and interdisciplinary approach to harness the high performance of textiles for specialized application in building material, construction, infrastructure and marine sector. He reiterated that innovation is key factor for developing the raw material and yarn for specialized application especially in textile reinforced concrete Technology in India. His work in the technical textiles in this field is awarded national award.



Mr. Vipan Kalra, Chairman, Madura Industrial Textiles Ltd. receiving The Lifetime Achievement Award by the hands of Chief Guest.

The Textile Association (India), Mumbai Unit felicitated Mr. Vipan Kalra, Chairman, Madura Industrial Textiles Ltd. with "The Lifetime Achievement Award" and Mr. Chakresh Jain, Group President – Technical, Supreme Nonwovens Industries Pvt. Ltd. with "The Industry Excellence Award" for their outstanding contribution in their respective field of technical textiles.



Mr. Chakresh Jain, Group President-Technical, Supreme Nonwovens Industries Pvt. Ltd. receiving The Industrial Excellence Award by the hands of Chief Guest.

Mr. Haresh B. Parekh, Convenor of the seminar and Hon. Secretary, TAI, Mumbai Unit, proposed Vote of Thanks.



Release of Book of Papers: Standing (L to R): Mr. Haresh B. Parekh, Mr. R. R. Patil, Mr. R. K. Vij, Mr. Pramod Khosla, Dr. Gurudas Aras, Dr. Ing. Mohit Raina, Dr. G. S. Nadiger.



Inaugural Address by Chief Guest Mr. Pramod Khosla, Chairman & Managing Director, Khosla Profil Pvt. Ltd.



Vote of Thanks by Mr. Haresh B. Parekh, Convenor & Hon. Secretary, TAI, Mumbai Unit.

TECHNICAL SESSIONS

SESSION – I

During the technical session I, following papers were presented by the eminent speakers.

- Mr. Varqha Bagwan, Scientific Researcher | Country Representative – India, Fabric Production, ITA – Institut für Textiltechnik of RWTH Aachen University, Germany made the presentation on "From Traditional to Technical Textiles: A Transformation Roadmap for Indian Manufacturers".
- Mr. Shridhar Dixit, General Manager - Sales & Marketing, Yamuna Machine Works Pvt. Ltd. presented the paper on "Advanced Coating & Lamination Architectures for Technical Textiles".
- Mr. Manish Mashilkar, Sr. Manager-Sales and Mr. Deepak Karade, Deputy General Manager, Textile Engineering Group – Processing, A. T. E. Enterprises Pvt. Ltd. made the presentation on "Warp Knitting Technical Textiles and Coating Technology for Technical Textiles".
- Mrs. Manjiri Paranjape, Vice President (R&D), Rossari Biotech Ltd. made the presentation on "Elevating Athletic Performance with Textile Finishes".
- Mr. Anish Jiwarajka, Executive Director, Jiwarajka Textile Industries presented the paper on "Technical Textiles — From Yarn to Performance".



Technical Session I: Sitting (L to R): Mr. Deepak Karade, Deputy General Manager, Textile Engineering Group – Processing and Mr. Manish Mashilkar, Sr. Manager-Sales, A. T. E. Enterprises Pvt. Ltd., Mrs. Manjiri Paranjape, Vice President (R&D), Rossari Biotech Ltd., Mr. Anish Jiwarajka, Executive Director, Jiwarajka Textile Industries, Mr. Varqha Bagwan, Scientific Researcher | Country Representative – India, Fabric Production, ITA – Institut für Textiltechnik of RWTH Aachen University, Germany, Mr. Shridhar Dixit, General Manager - Sales & Marketing, Yamuna Machine Works Pvt. Ltd.

The papers were well received by the delegates as witnessed by formal and informal interaction with each speaker.

SESSION – II

During the technical session II, following five papers were presented by the eminent speakers.

- Mr. Avinash Misar, Director & CEO, Coreshield Industries Pvt. Ltd. made the presentation on "Emerging Growth Opportunities - Protective Textiles".
- Mr. Dayal Mehta JAIN, CEO & Business Evangelist, Alliance of Indian Technical Textile Industries & Startups (AiTTiS), Country Head & CGO, AF. Corp., Taiwan presented paper on "Startup Opportunities in Technical Textiles: From Innovation to Commercialisation".
- Mr. Paresh Shah, Business Head, Rabatex Industries Private Limited made the presentation on "Technical Textiles Innovation & Machinery Excellence".

A Report on the Seminar on "Future Trends in Technical Textiles"

- Mr. Abhishek Shankar Kamble, Director, Clean Globe India Pvt. Ltd. made the presentation on "Sustainability in Fashion / Textile & Certification".
- Mr. Sudipto Mandal, Regional Sales Director, Barmag India Pvt. Ltd. and Leading Nonwoven Technology Innovation engineered for Performance and Mr. Shridhar Dhumal - Regional Sales Director, Barmag India Pvt. Ltd. made the presentation on "Focus on Advance Machinery for Activewear/Sportswear | Bico-Component Yarn Demand, Fiber Architectures, Market Insights | Barmag Bico Spinning Technology & Concepts".



Technical Session II: Sitting (L to R): Mr. Avinash Misar, Director & CEO, Coreshield Industries Pvt. Ltd., Mr. Paresh Shah, Business Head, Rabatex Industries Pvt. Ltd., Mr. Sudipto Mandal, Regional Sales Director and Mr. Shridhar Dhumal - Regional Sales Director, Barmag India Pvt. Ltd., Mr. Dayal Mehta JAIN, CEO & Business Evangelist, Alliance of Indian Technical Textile Industries & Startups (AiTTiS), Country Head & CGO, AF.Corp., Taiwan, Mr. Abhishek Shankar Kamble, Director, Clean Globe India Pvt. Ltd.

At the end of presentations by all the speakers, delegates got an opportunity to exchange ideas with the speakers on their respective areas of presentation.

SESSION III- PANEL DISCUSSION

A Panel Discussion on the topic '"Future of Technical Textiles: Innovation, Sustainability & Market Readiness' was featured as one of the important events of the seminar. The discussions were moderated by Mr. Avinash Mayekar, Managing Director, Suvin Expo LLP and the panel was comprised of senior leaders from the technical textile industry. The panel members came up with some radical thoughts which could be helpful for the growth of Technical Textile industry.

- Mr. Mahesh Bapat, Founder & CEO, Threads Technology India
- Mr. Chandrashekhar V. Kanade, Chief Operating Officer-Technical Textiles, Strata Geosystems (India) Pvt. Ltd.
- Mr. Tejas Mashruwala, CEO/President, Fiberglass Division, SKAPS Industries
- Mr. Avinash Misar, Director & CEO, Coreshield Industries Pvt. Ltd.



Technical Session III: Panel Discussion: Sitting (L to R): Mr. Avinash Misar, Director & CEO, Coreshield Industries Pvt. Ltd., Mr. Tejas Mashruwala, CEO/ President, Fiberglass Division, SKAPS Industries, Mr. Avinash Mayekar, Managing Director, Suvin Expo LLP, Mr. Chandrashekhar V. Kanade, Chief Operating Officer-Technical Textiles, Strata Geosystems (India) Pvt. Ltd., Mr. Mahesh Bapat, Founder & CEO, Threads Technology India.

The panel discussions were followed by a very good question & answer session with thoughtful exchange of notes by panel members and delegates on the prospects of development of Technical Textiles in India.



The Distinguished Audience

The TAI Mumbai Unit's Seminar organised at Vapi was a grand success and was attended by over 200 participants.

For further information, please contact :
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05. Launder-O-Meter Washing Fastness Tester.
06. MBTL Light Fastness Tester (Texlab Make)
07. Sublimation Fastness Tester.
08. Digital Crock Meter (Rubbing Fastness Tester) Motor Operated.
09. Spectro photo Meter. Japan Make & Indian Make.
10. Auto-Dispensing System. (Computerized Color Kitchens).
11. Color Matching Cabinet.
12. Leather Color Matching Machine.
13. Hot Air Oven.
14. Pneumatic Padding Mangle Motor Operated.
15. Laboratory Steamer with Super Heater.
16. Perspiro Meter.
17. Water Bath Machine with Dye Pot.
18. Lab Stirrer / Magnetic Stirrer with Hot Plate.
19. GSM Round Cutter. GCM Cutter without Blade & Pad.
20. Digital Balance. Min. Cap. 100 gram. 0.0001, 0.001 & 0.01 mg. Accuracy.
21. GSM Scale.
22. Shrinkage Scale.
23. Grey Scale AATCC & ISO
24. Borosil Glass Ware / Lab. Testing Chemicals. All ranges of Reactive Dyes, Direct Dyes, Acid Dyes and Vet Dyes, Also Pigment Dye.
25. Vacuum Pump.
26. All type of consumables and spares supplied for the textile laboratory requirements. GSM Cutting Pads, Round Cutter Blades, Crocking Cloth, Multi Fiber Fabrics, Adjacent Fabrics. ASTM, AATCC, USA, SDC-UK

Instruments for Cotton Testing ♦ Instruments for Yarn Testing ♦ Instruments for Cloth/Fabric Testing

TEXLAB Industries

Manufacturers of Textile, Dyes & Chemical Laboratory Testing Instruments.

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ITME NEXT INDIA ITME 2026

Hall No. 16
Stall No. A14

Marzoli Innovation Portfolio

Welcome to the Marzoli **Technology Accelerator Center (TAC)**, our new hub dedicated to technological and process innovation for the textile industry. Developed through significant R&D activities and investments, the TAC supports textile manufacturers in transforming innovation into measurable industrial value, with a strong focus on advanced recycling and next-generation fiber technologies.

Our focus is on **High-quality recycled fibers**, enabling circularity without compromising performance and **Yarn functionalization** through nanofiber technologies, adding new properties while preserving natural characteristics.



Our services are through the TAC Marzoli, which offers industrial services for fiber regeneration and yarn functionalization services based on proprietary technologies and processes, that allow our clients to enhance materials with new functionalities while maintaining their intrinsic qualities.

17 Uzbekistan Textile Companies Experience Innovation at Marzoli TAC

- Marzoli recently welcomed a delegation representing 17 textile companies from Uzbekistan to its headquarters and Technology Accelerator Center (TAC).
- The visitors had the opportunity to experience Marzoli technologies in operation and explore a wide range of processed materials, including recycled fibres, gaining insights into Marzoli's approach to innovation and circularity.
- The programme also included an overview of Marzoli's expertise in spinning technologies, nonwoven solutions and retrofitting, highlighting how these solutions can support textile manufacturers in improving productivity, efficiency and sustainability.
- The visit provided a valuable platform for exchanging ideas, strengthening relationships and building new connections across the global textile industry. The initiative was organized with the support of ACIMIT.

Textile India Market:

THE TEXTILE INDUSTRY AT A TURNING POINT

Indian Cotton Market Became More Competitive Internationally

An interesting development during August was the narrowing gap between Indian and international cotton prices. According to the Gujcot report:

- Indian cotton prices increased
- However, international futures increased even faster
- The Indian cotton basis narrowed significantly

As a result, India became more competitive for raw-cotton export enquiries and orders. At the same time, the report indicated that:

- CCI continued releasing cotton stocks
- Mills were purchasing CCI cotton
- Some mills also booked imported cotton earlier in the period
- At higher price levels, fresh buying became more cautious



This shows how quickly the cotton sourcing environment changed during August.

Cotton Textile Exports Showed Positive Momentum

The latest export data available around this period showed encouraging growth for India's cotton-textile sector. According to TEXPROCIL's update:

Cotton Yarn, Fabrics, Made-ups & Handloom Products

- July 2026: +8.40% year-on-year
- April–July 2026: +4.94% year-on-year

This is important because it indicates that cotton textiles continued to perform positively, despite challenges relating to raw-material prices and international trade conditions. However, the broader textiles-and-apparel picture remained more mixed, with apparel exports under pressure.



Indian Textile Companies Focused on Market Diversification

Indian exporters continued looking beyond traditional markets. A notable trend was the increasing focus on:

- United Kingdom
- Europe
- Australia
- Russia
- China
- Other emerging export markets

The industry was clearly focusing on market diversification and new export opportunities.

Sustainability and Traceability Continued to Influence the Market

Another important market trend was the growing demand for:

- Renewable fibres
- Sustainable cotton
- Certified materials
- Recycled fibres
- Transparent sourcing
- Value-added yarns

At Yarn Expo Autumn 2026 in Shanghai, natural fibres and sustainable sourcing were highlighted as important market themes. The India Pavilion was also expanded significantly, with more than 40 exhibitors participating.

What Does All This Mean for the Spinning Industry?

Message for spinning mills is very clear:

RAW MATERIAL VOLATILITY IS INCREASING

Cotton prices are becoming more sensitive to:

- Weather
- Crop conditions
- Global stocks
- International demand
- Speculative activity

PRODUCTIVITY IS BECOMING MORE IMPORTANT

When raw material costs increase, mills need to focus even more on:

- Higher machine productivity
- Reduced waste
- Better efficiency
- Lower energy consumption
- Reduced downtime



PRODUCT DIFFERENTIATION IS ESSENTIAL

Instead of competing only on commodity yarn prices, mills increasingly need opportunities in:

- Fancy yarns
- Value-added yarns

- Sustainable yarns
- Recycled materials
- Specialty products

DIGITALIZATION CAN CREATE A COMPETITIVE ADVANTAGE

Better machines and production visibility can support:

- Faster decisions
- Reduced downtime
- Improved maintenance
- Energy management
- Improved productivity

Rising cotton prices and weather uncertainty are increasing pressure on spinning mills, while global demand continues to create opportunities for efficient and innovative manufacturers.

The future competitive advantage will increasingly belong to spinning mills that can combine:

- PRODUCTIVITY - Produce more efficiently.
- INTELLIGENCE - Use data to make better decisions.
- SUSTAINABILITY - Reduce resources, waste and environmental impact.
- DIFFERENTIATION - Create higher-value and innovative yarn products.

Camozzi Group Update

CONNECTING TECHNOLOGIES. ENABLING THE FUTURE

WHERE PASSION FOR RESEARCH BECOMES INDUSTRIAL INNOVATION

Research is the beginning. Innovation is the journey. Industrial solutions are the result.

For Camozzi Group, research and innovation are not simply activities, they are part of a long-standing commitment to shaping the future of industry. This passion comes to life through the Camozzi Research Center (CRC), an advanced knowledge hub that brings together the expertise of the Group's divisions with universities, centres of excellence and technology partners.

FROM KNOWLEDGE TO INDUSTRIAL VALUE

The objective is clear:

- Identify emerging technologies. Explore their potential. Transform them into tangible industrial solutions.
- Through applied research and open innovation, the CRC helps bridge the gap between scientific knowledge and real-world manufacturing applications.



EXPLORING THE TECHNOLOGIES OF TOMORROW

The Camozzi Research Center is actively involved in advanced technological fields including:

- ADVANCED MANUFACTURING & 3D PRINTING
- ADVANCED MATERIALS
- ROBOTICS & AUTOMATION
- PREDICTIVE MAINTENANCE
- INTELLIGENT PROCESS CONTROL

These technologies represent important building blocks for the evolution towards smarter, more connected and more efficient manufacturing.

THE POWER OF COLLABORATION

- Innovation becomes stronger when knowledge is shared.
- The CRC works alongside research teams across the Camozzi Group and collaborates with leading academic and institutional partners, including the Politecnico di Milano and the Istituto Italiano di Tecnologia (IIT).

This integrated ecosystem brings together:

- BUSINESS + RESEARCH + TECHNOLOGY + ACADEMIA

Creating new opportunities to accelerate the development of future industrial solutions.

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ONE GROUP. SHARED EXPERTISE.

The Camozzi Research Center represents more than a research facility. It is where the knowledge, experience and technological capabilities developed across the Camozzi Group can come together to explore new possibilities.

FROM RESEARCH...TO INNOVATION...TO TANGIBLE INDUSTRIAL SOLUTIONS.

Camozzi Group continues its journey towards a smarter and more connected industrial future.

The Camozzi world continued to highlight developments around advanced automation, digital technologies and intelligent industrial solutions.Camozzi's approach brings together expertise across different technologies to develop solutions capable of addressing increasingly complex industrial requirements.

The Group's broader technological ecosystem combines capabilities in:

- CONNECT - Connecting technologies, systems and industrial processes.
- CONTROL - Improving precision and intelligence through automation and advanced control.
- MOVE - Developing technologies that enable efficient and reliable industrial motion.
- INTEGRATE - Combining mechanical, pneumatic, electronic and digital capabilities into integrated solutions.

This integrated approach reflects the Group's continuing focus on innovation, digitalisation and industrial efficiency.

ONE GROUP. SHARED EXPERTISE.

For Marzoli, being part of the Camozzi Group provides access to a broader ecosystem of engineering, automation and digital capabilities, supporting the development of the next generation of textile manufacturing solutions.

Our Corporate Video: Camozzi Group

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Portuguese Textile Specialist ramps up Premium Fashion Manufacturing Capabilities with Kornit Digital

Meamstyle Selects Kornit Atlas MAX PLUS to Support Agile Fashion Manufacturing, Premium Digital Garment Production, and Faster Response to Evolving European Market Demands

Kornit Digital Ltd. (NASDAQ: KRNT) ("Kornit"), a global pioneer in sustainable, on-demand digital fashion and textile production technologies, today announced that Portuguese fashion manufacturer Meamstyle has expanded its digital textile production capabilities with the installation of two Kornit Atlas MAX PLUS systems. With this, Meamstyle is now able to better support premium-quality garment manufacturing, agile fashion production, and scalable digital printing services for European fashion brands.



Based in Portugal, Meamstyle is a second-generation family textile business founded nearly 28 years ago. Originally focused on jersey products such as T-shirts and sweatshirts, the company has evolved into a highly diversified apparel manufacturer serving customers across fashion, haute couture, swimwear, shirts, dresses, and premium garment categories. The company operates both a full-package garment manufacturing business and a dedicated digital printing division supporting internal production as well as external customers.

Evolving with the Changing Global Fashion Industry

Meamstyle evolved alongside major shifts in the global textile industry as fashion brands increasingly demanded greater flexibility, shorter production cycles, and higher-value manufacturing capabilities closer to European markets.



To meet these changing demands, Meamstyle expanded into specialized product categories and premium manufacturing services. "Today, customers come to us for quality, flexibility, and technical capability," said Pedro Mendes, Chief Commercial Officer of Meamstyle. "For me personally, Kornit is the benchmark for digital textile printing. We have years of experience with digital printing, and the quality, hand feel, color performance, and durability from Kornit are unmatched."

The adoption of Kornit technology allows the company to respond more efficiently to evolving customer expectations while supporting agile premium-fashion manufacturing workflows that would be significantly more complex using traditional production methods alone.

Meamstyle selected Kornit's Atlas MAX PLUS platform based on its print quality, production speed, flexibility, and advanced print capabilities.

"Meamstyle represents a new generation of agile European fashion manufacturers leveraging digital production to support premium-quality apparel manufacturing and responsive supply chain models," said Guy Yaniv, President of Kornit Digital Europe. "Their commitment to innovation, craftsmanship, and high-value fashion production demonstrates the important role digital textile technology plays in the future of European apparel manufacturing."

Meamstyle expects the new production environment to support faster turnaround Emes, greater manufacturing flexibility, and broader application opportunities across fashion and premium textile segments.

For more information about Meamstyle, visit https://www.meamstyle.com/.

About Kornit Digital

Kornit Digital (NASDAQ: KRNT) is a worldwide market leader in sustainable, on-demand, digital fashion and textile production technologies. The Company offers end-to-end solutions including digital printing systems, inks, consumables, software, and fulfillment services through its global fulfillment network. Headquartered in Israel with offices in the USA, Europe, and Asia Pacific, Kornit Digital serves customers in more than 100 countries. To learn more, visit www.kornit.com.

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Jeanologia shows that sustainability and business can propel progress together

- **The company presents its Sustainability Report 2025, highlighting the impact of its technologies across the global textile industry: their use prevented 21.52 million m³ of water from being polluted and 103.53 million kg of CO_2 from being emitted.**
- **More than 96% of its turnover is associated with activities aligned with the EU Taxonomy.**
- **Jeanologia also reduced its own carbon footprint by 13.64% and has set new priorities to continue measuring and reducing its impact.**

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At Jeanologia, sustainability and business are part of the same strategy. For more than 30 years, the company has been developing technologies to reduce the environmental impact of the textile industry while progressively embedding environmental and social criteria into the way it operates. Its Sustainability Report 2025 sets out the results of these efforts and the priorities that will shape the company's next steps.

"Sustainability is not a destination or a department. It is a way of thinking, creating and acting. Real transformation only happens when sustainability and business progress together," says Enrique Silla, founder and CEO of Jeanologia.



People and planet come first

This approach is built around a principle that the company sums up as "People and planet come first". From an environmental perspective, this means taking on a dual responsibility: reducing the impact of its own operations while using innovation to help transform a resource-intensive textile industry.

In 2025, Jeanologia reduced its carbon footprint by 13.64%, bringing it down to 773.57 tonnes of CO_2 equivalent, compared with 895.79 tonnes the previous year. But its contribution extends far beyond its own operations. The use of Jeanologia technologies in factories around the world prevented 21.52 million m^3 of water from being polluted and 103.53 million kg of CO_2 from being emitted compared with traditional textile finishing processes.

The link between sustainability and business is also reflected in Jeanologia's first voluntary assessment of its activities against the EU Taxonomy. A total of 96.37% of its turnover, 84.43% of its CapEx and 34.96% of its OpEx are associated with activities aligned with this framework, primarily through their contribution to climate change mitigation and adaptation, as well as the transition to a circular economy.

Jeanologia's social responsibility also extends to people and the communities where it operates. Rather than focusing on one-off initiatives, the company supports social projects over the long term, building lasting relationships with the organisations it works with and applying the same philosophy of creating positive, lasting impact.

This vision is also reflected in Jeanologia's commitment to the United Nations Global Compact, which it joined in 2019, and its principles on human rights, labour, the environment and anti-corruption, alongside its contribution to the Sustainable Development Goals.

Measuring to keep improving

Measurement is another key part of Jeanologia's strategy: what cannot be measured cannot be improved.

In 2017, the company published its first Sustainability Report and pioneered an Environmental Profit and Loss Account to quantify the water savings and reductions in CO_2 emissions achieved using its technologies. In 2019, it created a cross-functional Sustainability Committee and, in 2022, professionalised its reporting process in line with United Nations principles and GRI Standards.

The Sustainability Report 2025 marks another step in this journey, setting out priorities to improve the quality, consistency and traceability of emissions measurement, further reduce the company's operational impact, progressively increase visibility across its value chain and strengthen its resilience to climate change.

Jeanologia also aims to extend this same culture of measurement across the textile industry through EIM (Environmental Impact Measuring), the methodology it developed to measure the impact of textile processes objectively and consistently, giving brands and manufacturers a common framework to measure, compare and improve their performance.

In 2025, Jeanologia published its second EIM report, based on more than 100,000 real-world processes from 359 manufacturers across more than 40 countries. The scale of the sample provides a data-driven picture of the environmental impact of the global denim industry. Jeanologia continues to strengthen EIM as an independent unit, allocating more resources to the development of what has become a global benchmark for measuring the industry's environmental impact.

The Sustainability Report 2025 is therefore more than a review of what has been achieved. It also sets out a roadmap for the future, reflecting an approach to business in which commercial success, people and the planet are part of the same commitment: to measure, improve and create positive impact.

Jeanologia: more than 30 years leading the transformation of the textile industry

Since its founding, Jeanologia has been on a mission to transform the textile industry into a more ethical, sustainable, and efficient model. The company works closely with brands, retailers, and suppliers on this transformative journey, offering disruptive technologies, innovative software, and a new operational model. Their groundbreaking solutions, including laser technology, G2 ozone, Dancing Box, e-flow, H2Zero, and ColorBox, have redefined garment design and finishing standards, eliminating polluting processes and significantly reducing the use of water, energy, and chemicals. Thanks to these advancements, Jeanologia has saved millions of liters of water and eliminated harmful substances, turning its vision of a truly sustainable textile industry into reality.

From the introduction of its laser technology in 1999, which revolutionized denim finishing, to its sustainable dyeing process, and most recently its AI applied to finishing design, the Spanish company has consistently pioneered solutions that not only benefit the environment but also optimize operational costs. Looking ahead, Jeanologia remains committed to creating an eco-efficient and ethical textile future, encouraging all industry stakeholders to join its Mission Zero initiative: dehydrate and detoxify the textile industry. No more water and toxic chemicals used in garment finishing around the world.

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VIRGIO gears up 'VIRGIO Thursday' campaign with new film, turning weekly fashion drops into a recurring consumer ritual

VIRGIO, the sustainable fashion-tech brand redefining the way consumers experience contemporary fashion, has expanded its ongoing 'VIRGIO MOD Thursday' campaign with a new film, building further anticipation around its weekly fashion drops. With new collections and products arriving every Thursday, the initiative aims to turn a regular day of the week into a recurring fashion moment that consumers can anticipate and look forward to.



Built around VIRGIO's consistent Thursday drop cadence, VIRGIO Thursday brings together the brand's focus on trend-led fashion, newness and a demand-led approach to product drops. Rather than positioning every Thursday drop as an individual launch, the brand is building a recognisable consumer ritual

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around the day, creating a consistent reason for shoppers to return and discover what's new.

The campaign draws on a familiar cultural observation: Thursday can often feel like the longest stretch of the working week, positioned between the start of the week and the anticipation of the weekend. VIRGIO Thursday flips this sentiment by giving consumers another reason to look forward to the day, here is always something new to discover at VIRGIO.

The latest film brings the VIRGIO Thursday thought to life through relatable situations, humour and digital-first storytelling, using unexpected reactions to Thursday to build excitement around the brand's weekly fashion drops. As fashion discovery becomes more frequent and trends move faster, the weekly cadence gives consumers a consistent moment to discover new styles beyond traditional seasonal cycles.

Designed as a top-of-funnel brand-building platform, VIRGIO Thursday aims to drive reach, recall, and engagement while creating a recurring reason for consumers to return to VIRGIO every Thursday. Through this ongoing platform, the brand is building Thursday into a distinctive property associated with newness and fashion discovery.

Reflecting on the campaign, Amar Nagaram, Founder & CEO, VIRGIO, said, "With VIRGIO Thursday, we wanted to turn something that is already part of our business rhythm into a distinctive brand experience. Every Thursday gives our consumers a reason to come back and discover what's new, and the campaign is about building that anticipation in a way that feels entertaining, relatable and uniquely VIRGIO. Our ambition is to make Thursday synonymous with newness at VIRGIO and build a brand property that consumers recognise and look forward to."

The new film marks the next chapter in the ongoing VIRGIO Thursday platform, as the brand continues to explore relatable situations, characters and cultural observations to make the Thursday ritual increasingly familiar to consumers.

Through VIRGIO Thursday, VIRGIO aims to build a distinctive association around the day: Thursday means something new at VIRGIO.

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Bluesign launching its first-ever consumer-facing advertising campaign

We are proud to announce that we are launching our full campaign on September 20 (around New York Climate Week), bluesign's "THE UNSEEN PROCESS" - takes something that has historically been bluesign's greatest - challenge: that consumers rarely see the chemical management, manufacturing standards and verification systems behind the products they buy - and turns that invisibility into the campaign's central creative idea. The timing is particularly relevant.

As regulators place greater scrutiny on environmental marketing claims and brands become increasingly cautious about using broad terms such as "sustainable" and "eco-friendly," bluesign believes the next era of sustainability marketing will need to move beyond claims toward substantiation, traceability and recognizable third-party verification.

For bluesign, that also means fundamentally changing how it communicates.

For most of its 25-year history, the organization has operated primarily B2B, working behind the scenes across the textile and apparel supply chain with brands, manufacturers and chemical suppliers. UNSEEN represents a strategic shift toward building awareness among the people actually purchasing those products.

With the bluesign UNSEEN campaign (see more here: www.bluesign.com/unseen-partners) is timed around New York Climate Week, coinciding with the implementation of the EU's Empowering Consumers for the Green Transition (ECGT) regulations and the introduction of bluepass, bluesign's new consumer-facing designation intended to make the verified

work happening upstream more visible and understandable at the point where consumers encounter a product.

I thought this could be an interesting story for you regarding the changing rules of sustainability marketing: How do brands communicate environmental progress in an era when consumers and regulators increasingly demand proof behind the claim? And can verification systems themselves become consumer brands?

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Textile machinery order index, 2nd quarter 2026

In the period between April and June 2026, order intake for Italian textile machinery manufacturers showed mixed but encouraging signals for the second half of the year. The order index at constant prices stood at 46.6 points (taking 2021=100 as the base year), showing a slight decrease of 3% compared to the same quarter of 2025. This trend was largely due to the contraction recorded in the domestic market, which fell by 25% compared to the corresponding period of the previous year. Looking at the overall balance sheet for the first six months of 2026, total orders posted a 4% decline compared to the first half of 2025, split between -11% in Italy and -3% abroad.

While the year-on-year comparison suffers from particularly challenging baselines, the quarter-on-quarter perspective offers a picture of strong recovery. Compared to the first quarter of 2026 (January–March), total order intake surged by 25%, driven by a lively rebound in both domestic (+39%) and international (+23%) demand.

On the operational front, the total backlog accumulated by companies currently guarantees about 3.5 months of assured production, while the capacity utilization rate stood at 79.7%.

Analyzing the dynamics of individual production sectors compared to the first quarter of the year, order trends in the domestic market were growing or stationary across all segments, with sharp increases in spinning and weaving. In international markets, positive growth prevailed particularly in the weaving, knitting, and finishing sectors. Regarding sales forecasts for the third quarter of 2026, company expectations point to substantial stability in volumes compared to the previous period; caution prevails in the domestic market, while expectations on foreign markets are balanced between increases and decreases, reflecting cautious optimism.

Marco Salvadè, president of ACIMIT, commented: "Despite the international uncertainty, it is comforting that the indicator, albeit slightly, is positive in the foreign market, given that about 80% of our order intake comes from international countries. The context of the domestic market is different, as it suffers both from comparison with a positive second quarter of 2025 and from the new 2026-2028 hyper-depreciation incentive launched.

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Kornit Digital shares the story of IVO Textiles

IVO Textiles Preserves Six Decades of Textile Craftsmanship with Kornit Digital

Family-owned UK/London textile specialist invests in Kornit Presto MAX S to combine traditional screen-print quality with digital speed, colour capability and production flexibility.

Kornit Digital (NASDAQ: KRNT), a global leader in sustainable, on-demand digital fashion and textile production technologies, today shared the story of IVO Textiles, a family-owned textile manufacturer specialising in premium printed fabrics that recently invested in the Kornit Presto MAX S roll-to-roll digital textile printing system.

The investment enables IVO Textiles to reproduce the quality of traditional screen printing while significantly increasing production speed, expanding the range of fabrics it can print and delivering a broader colour gamut for its premium interior textile customers.

A Heritage Built on Craftsmanship

Founded in the early 1960s, IVO Textiles established its reputation during London's vibrant fashion era, producing fabrics for iconic

designers including Celia Birtwell, Ossie Clark and Zandra Rhodes, as well as the legendary fashion retailer Biba. As manufacturing trends evolved, the family-owned company successfully transitioned from fashion textiles into premium furnishing fabrics, wallpapers and interior décor, while maintaining its commitment to exceptional craftsmanship and quality.

Finding Digital Technology that Matches Traditional Quality

When the time came to replace its previous digital textile printer, IVO Textiles conducted an extensive evaluation of the market's leading digital printing technologies. Identical fabrics and production files were tested across multiple platforms to determine which system could most closely reproduce the appearance and quality of traditional screen printing.

Kornit Presto MAX S consistently delivered the closest match while outperforming competing systems in colour accuracy, durability and fastness testing. Demonstrations at Kornit's Customer Experience Center in Düsseldorf further confirmed the platform's production capabilities and reliability, making it the clear choice for the company's next stage of growth.

Michael Haas, CEO, IVO Textiles said: "IVO Textiles has always built its reputation on craftsmanship, quality and innovation. When we evaluated the market, we weren't simply looking for another digital printer. We were looking for a platform capable of matching the quality of traditional screen printing while giving us the flexibility to meet today's customer expectations. Kornit delivered exactly that and gives us the confidence to continue growing our business."

Delivering Immediate Business Benefits

The Kornit Presto MAX S is already delivering measurable improvements in productivity and production efficiency.

The company cites the platform's expanded colour gamut, broader fabric compatibility and intelligent self-centering technology as key advantages. In addition, the availability of white ink and XDi capabilities opens new creative opportunities for premium interior textile applications as customer demand evolves.

The most immediate impact, however, has been production speed. A typical 200-metre order that previously required approximately a day and a half to print, followed by baking in a separate finishing department, can now be completed in under two hours, including printing and curing. The dramatic reduction in production time increases manufacturing capacity while enabling much faster response to customer demand.

"The colour gamut and the range of fabrics we can now print on are tremendous advantages for our business. But the biggest benefit is the speed. We're now able to respond to our customers much faster while maintaining the quality they've always expected from IVO Textiles," added Michael Haas.

Building for the Next Generation

IVO Textiles also highlighted Kornit's customer support as an important factor in the partnership, citing the responsiveness of Kornit's engineering and service teams throughout installation and commissioning.

"IVO Textiles demonstrates that heritage manufacturers don't have to choose between craftsmanship and digital innovation," said Guy Yaniv, President, Kornit Digital Europe. "By combining traditional screen-printing expertise with Kornit's digital technology, IVO Textiles has preserved the quality that built its reputation while achieving the speed, flexibility and efficiency required to compete in today's premium textile market."

With the Kornit Presto MAX S now in production, IVO Textiles is well positioned to build on its reputation for quality while expanding into new applications and supporting the evolving needs of customers across the premium interior textiles market.

About IVO Textiles

Founded in 1963, IVO Textiles is an independent, family-owned textile printing company specialising in premium printed fabrics for the interiors, fashion, hospitality, and commercial markets. Combining over 60 years of craftsmanship with modern production capabilities, the company produces bespoke and stock textile collections, wallpapers, and large-format prints for designers, brands, and manufacturers worldwide. Operating from its 37,000-square-foot facility in West London, IVO

Textiles serves customers across the UK and internationally with a commitment to quality, innovation, and exceptional service.

About Kornit Digital

Kornit Digital (NASDAQ: KRNT) is a worldwide market leader in sustainable, on-demand, digital fashion and textile production technologies. The Company offers end-to-end solutions including digital printing systems, inks, consumables, software, and fulfillment services through its global fulfillment network. Headquartered in Israel with offices in the USA, Europe, and Asia Pacific, Kornit Digital serves customers in more than 100 countries.

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Italian Textile Machinery participated at TITAS 2026: Strategic Partnership and Tailor-made solutions for the Taiwanese Market

The excellence and innovative capabilities of Italian textile machinery technology are coming to Taipei for TITAS 2026 (Taiwan International Textile & Garment Machinery Show), the leading event for the island's textile industry and the wider Asian region, took place from 6 to 8 October 2026. Italy's presence at this key event reflects its commitment to strengthening a long-standing and strategic relationship with a local manufacturing industry that has always placed great emphasis on quality and technological research.

The Taiwanese market is undergoing a period of profound transformation and evolution. Following a period of global adjustment, the beginning of 2026 saw an extraordinary and vigorous turnaround in exports by Italian machinery manufacturers to the island. This strong sign of renewed momentum confirms that Taiwan's textile industry is actively seeking reliable technology partners to support its plans for recovery and modernization.

The strength of Italian technologies lies in their ability to adapt with exceptional flexibility to the most sophisticated requirements. In Taiwan, where production has historically been concentrated in the upstream stages of the textile supply chain, Italian spinning solutions continue to account for by far the largest share of local interest, alongside solid demand for finishing machinery and related accessories. This concentration confirms that the flexibility and high degree of customization offered by Italian technology are among the differentiating factors most highly valued by Taiwanese manufacturers, who need to diversify their production and develop high value-added market niches.

"The strong increase in Taiwanese demand recorded at the beginning of this year demonstrates the central role played by our technological solutions. In a landscape where operational flexibility and environmental sustainability have become essential requirements for competitiveness, Italian companies are coming to TITAS not merely as machinery suppliers, but as genuine technology partners. We are ready to support Taiwanese manufacturers with highly customized technologies capable of combining maximum resource efficiency with outstanding quality in the final product." — Marco Salvadè, President of ACIMIT.

ACIMIT (Association of Italian Textile Machinery Manufacturers) was founded in 1945 with the primary aim of promoting the Italian textile machinery industry and supporting its activities both in Italy and abroad. ACIMIT represents an industrial sector comprising approximately 300 companies (employing nearly 13,000 people) and producing machinery worth a total of approximately €2.1 billion, around 86% of which is exported. Creativity, sustainable technology, reliability and quality are the characteristics that have made Italian textile machinery a worldwide leader.

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ITMA ASIA + CITME 2026

Asia's Leading Business Platform for Textile Machinery

20 to 24 November 2026
National Exhibition and Convention Center
Shanghai, China

ITMA ASIA + CITME 2026 will be held from 20 to 24 November at the National Exhibition and Convention Center (Shanghai). Visitor pre-registration is open. From now until 24:00 on 19 November, professional visitors may register via the official exhibition website at www.itmaasiacom to enjoy the early-bird admission discount.

As Asia's leading business platform for textile machinery, this edition will further focus on new drivers of productivity in textiles, presenting cutting-edge technologies and development trends in digitalisation, smart manufacturing and sustainable production. Newly added emerging sectors, including machinery for textile reinforcement structures for composites, textile recycling and regeneration technologies and systems, industrial digital platforms and full-process automation solutions, as well as product lifecycle traceability systems, will further expand the exhibition's value chain coverage, offering trade visitors more diverse sourcing choices and industry insights.

Sector Allocation Plan

- Weaving
- Garment & Textile Processing
- Nonwovens
- Knitting & Hosiery
- Embroidery
- Dyeing & Finishing
- Spinning & Man-made Fibre Production
- Braiding
- Printing & Inks
- Winding, Texturing & Twisting
- Narrow Fabrics Weaving Machines
- Research & Innovation
- Testing
- Colourants & Chemicals

The following sectors can be found in all halls: Software and Equipment for Plant Operations. Composites can be found in Hall 7.1. Recycling can be found in Halls 5.1, 7.1 and 8.1. Logistics is not located in Halls 4.1 and 8.2. Services for Textile Industry is not located in Hall 3.

The sector plan is for reference only. Please refer to the floor plan for booth locations.

NECC Station, Metro Line 2.

Visitor Information

- 20-23 November 2026 — 09.00-17.30
- 24 November 2026 — 09.00-16.30

Visitor Pre-Registration Open Enjoy 40% Savings with the Early Bird Rate

From now until 19 Novembr, overseas visitors can pre-register through the official website at www.itmaasia.com to enjoy 40% savings on visitor badges.

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Registering Your Visit

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Visitors are required to register their legal name as per travel document/identity card, and to provide their travel document/identity card number and valid mobile number.

Expanded Scale, Bringing Together Leading Textile Machinery Companies

With both exhibitor numbers and sold exhibition space surpassing previous editions for the same period, ITMA ASIA + CITME 2026 will bring together leading textile machinery companies from China and overseas to showcase cutting-edge technologies and system solutions in digitalisation, smart manufacturing and automation.

Focusing on Future-Ready Productivity, Expanding the Textile Value Chain

Exhibits will cover the entire textile value chain, including textile manufacturing, testing, packaging and recycling, with new emerging sectors such as textile-reinforced composites, recycling technologies and industrial digital platforms.

Supporting Regional Trade Enhancing Platform Value

The previous edition attracted about 90,000 visitorship from 111 countries and regions. This edition will continue to strengthen its overseas promotion efforts to attract more trade visitors.

For further information, please contact:
itmaasiacitme@bjitme.com
www.itmaasia.com, www.citme.com.cn ❐

HanoiTex 2026

Vietnam Hanoi Textile & Garment Industry Expo 2026

October 21 - 23, 2026, ICE, Hanoi, Vietnam

You are cordinaly invited to participate in the HanoiTex 2026. Driven by strong global demand, Vietnam's textile supply chain is booming, Vietnam's textile and garment industry has set its sights on an ambitious US$50 billion target for 2027.

Why Northern Vietnam is the Ultimate Hub:

1. **Unbeatable Cost Savings:** Benefit from 20% lower land rents and 15% lower labor costs compared to the southern provinces.
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3. **Massive Tax Holidays:** Take advantage of up to a 70% land-tax waiver for five years and corporate tax exemptions for high-tech textile projects.
4. **Rapid Infrastructure Growth:** Aggressive government investments mean modernized roads, ports, and power grids for production lines.

Over 98% of exhibiton space sold

The organizers have expanded the expo to 3 full halls to accommodate over 200 premier exhibitors from 8 countries and regions. Over 98% of available space is gone.

Please register ASAP to secure your participation and to avoid being wait-listed! For details and registration, please visit www.vhanoitex.com or contact Mr Jason Chow in Hong Kong (Tel: +852 25117427, Fax: +852 25119692, Email: jason@cpexh.com, cpexh@yahoo.com, Wechat: cpexhibition) or our representative in your region.

Other events in Vietnam:

SaigonTex 2027 - Vietnam Saigon Textile & Garment Industry Expo

April 7 - 10, 2027, SECC, Hochiminh City, Vietnam

For further information, please contact:
jason@cpexh.com ❐

ITMA 2027, an International platforms brings in together technology providers from across the textile and garment manufacturing value chain in automation era

Walk into one of today's large apparel factories and you'll witness autonomous vehicles, intelligent transport systems, automated warehouses, machine vision, AI-driven production planning and thousands of networked sewing machines.

Yet at the centre of all this technology remains a surprisingly familiar sight – banks of operators guiding fabrics through sewing machines.

Joining two pieces of textile together continues to be one of manufacturing's hardest automation challenges. Unlike steel, plastic or other rigid materials, fabrics stretch, wrinkle, distort and behave differently depending on their construction, weight and finish. Humans instinctively compensate for these variations. Robots still struggle.

As a result, sewing remains the most labour-intensive stage of garment production and depending on the complexity of the products being made, typically accounts for between 30-50% of the workforce within a vertically integrated garment factory, according to industry studies by Better Work, the International Labour Organization (ILO) and apparel manufacturing researchers.

Rather than attempting to replace sewing operators, however, manufacturers have spent the past two decades systematically eliminating almost every other task surrounding them.

Engineering At Scale

The scale at which this challenge is being addressed is notable. A factory producing 8-12 million T-shirts each year may operate between 600 and 1,000 sewing machines, while the world's largest apparel manufacturers increasingly develop campuses containing several factories, with 2-4,000 machines installed during a single phase of expansion.

Coordinating thousands of operators, millions of garment components and hundreds of production orders has become an engineering challenge almost as complex as manufacturing the garments themselves.

Fabric preparation is now highly automated, and rolls are identified by barcode or RFID, stored in automated warehouses and delivered directly to spreading equipment as required. Computer-controlled spreading systems lay multiple fabric plies under carefully regulated tension before CNC knife or laser cutters produce precisely nested pattern pieces with minimal operator intervention.

Modern automatic cutting systems routinely achieve fabric utilisation of 80-90%, such as Bullmer, Lectra and other CAD/CAM equipment suppliers, while integrated vision systems can identify defects before cutting begins. With a high fabric utilisation rate, there is minimal waste.

TEXTILE EVENTS

Automation increasingly extends throughout the movement of materials within the factory itself. Instead of workers pushing trolleys between departments, autonomous guided vehicles, overhead transport systems, automated conveyors and intelligent storage systems now move cut components, work-in-progress and finished garments wherever they are required. Production planning software continuously dispatches materials to the correct sewing line, ensuring operators spend less time waiting and more time on value-added sewing operations.

Together, these technologies illustrate how garment manufacturing increasingly depends on connected production systems rather than individual machines operating in isolation.

Intelligent production flow

One of the most significant advances has been the widespread adoption of unit production systems.

Instead of building piles of work beside individual machines, garments travel independently through the factory on overhead carriers. Each carrier carries its own digital identity, recording the order, garment size, colour, production stage, operator history and quality data.

As soon as one operation is completed, the system automatically routes the garment to the next available operator with the appropriate skills.

The result is a factory that behaves less like a conventional production line and more like an intelligent transport network, continuously balancing work between hundreds or even thousands of operators.

Work-in-progress can be dramatically reduced, while productivity rises because operators spend almost all of their time sewing rather than handling garments. In one shirt-production example, Eton Systems reports that installation of its unit production technology reduced throughput time from 14 days to less than one day, while doubling production.

Smarter Sewing

Modern equipment can automatically trim threads, lift the presser foot, backtack, position the needle, cut tape or elastic, detect broken threads, count stitches, recognise variations in material thickness, adjust thread tension electronically and communicate production data directly to the factory network.

Individually, these functions may appear modest, but collectively they remove hundreds of small interruptions from every working day, allowing experienced operators to concentrate almost exclusively on guiding fabric accurately through the machine.

Many repetitive sewing operations have meanwhile become almost fully automated. Dedicated sewing automats routinely perform shirt pocket setting, pocket welting, belt-loop attachment, button sewing, buttonhole stitching, collar assembly, cuff construction, waistband attachment and automatic hemming. Instead of requiring continuous manual manipulation, operators simply load the components, initiate the cycle and remove the completed assembly.

Although such specialised machines have existed for decades, they continue to become faster, more flexible and capable of handling an increasingly wide range of garment styles.

Garment Decoration

Decoration has also become an increasingly integrated part of automated garment production. Computer-controlled embroidery systems can now produce intricate logos, badges and branding with minimal operator intervention, automatically changing thread colours, trimming threads and monitoring stitch quality throughout the process.

Multiple embroidery heads operating simultaneously allow identical designs to be reproduced consistently across thousands of garments while digital production files eliminate much of the manual set-up once required.

Digital textile printing has undergone a similar transformation. High-speed inkjet systems from companies including EFI Reggiani and Kornit Digital increasingly complement conventional screen printing for short production runs, customised garments and technically demanding designs.

Automated pre-treatment, colour management and curing systems enable photographic-quality graphics to be applied directly onto finished garments or cut panels with excellent repeatability while reducing water consumption, chemical use and inventory requirements.

As brands continue to demand shorter lead times and greater product personalisation, both embroidery and digital printing have become

increasingly important components of connected apparel manufacturing systems.

Seeing Every Stitch

Machine vision is also becoming increasingly prevalent in many advanced garment factories.

Cameras continuously monitor seam position, identify skipped stitches, verify thread colours, check label placement, inspect embroidery, confirm print alignment and measure dimensional accuracy.

Quality inspection is therefore no longer confined to the end of the production line but increasingly takes place throughout the manufacturing process. Defects can be identified almost immediately, reducing expensive rework while providing immediate feedback to operators and production managers.

The Connected Factory

Perhaps the least visible but most transformative development has been the integration of every machine into digital factory management systems.

Individual sewing machines now operate as industrial sensors, continuously reporting what is being sewn, by whom, how quickly and with what quality outcome. Manufacturing Execution Systems (MES) provide managers with realtime information on line efficiency, operator productivity, bottlenecks, downtime, machine utilisation, quality rates and energy consumption.

Large digital dashboards update every few seconds, enabling supervisors to rebalance production before minor issues become significant disruptions. Increasingly, artificial intelligence is also being applied to analyse production data, predict maintenance requirements and optimise workflow across connected manufacturing operations.

These developments illustrate how garment manufacturing has evolved beyond individual machines towards connected production systems, where productivity increasingly depends on how technologies work together across the manufacturing process.

For established sewing technology manufacturers such as Brother, the focus has increasingly shifted towards labour-saving and flexible automation, helping manufacturers address workforce challenges while improving productivity.

"We have advanced connected factory solutions through increased machine connectivity and data utilisation, while continuing to improve energy efficiency to support both sustainability goals and lower operating costs. These priorities reflect our commitment to smarter, more efficient and sustainable manufacturing", says Folker Stachetzki, Head of Marketing at Brother Industrial EMEA.

Bringing The Garment Manufacturing Ecosystem Together

Today's factories increasingly integrate cutting, sewing, embroidery, finishing, machine vision, software, automation and digital factory management into connected manufacturing systems designed to improve productivity, quality, flexibility and sustainability.

As manufacturers invest in more connected production environments, they are looking beyond individual technologies to understand how different solutions fit into their overall manufacturing strategy. This is creating new opportunities not only for garment technology suppliers, but also for software developers, automation specialists, robotics companies, machine vision providers and other digital manufacturing innovators.

ITMA 2027 reflects this evolution by bringing together technology providers from across the textile and garment manufacturing value chain on one international platform. Here, manufacturers can compare solutions, engage directly with innovators, build partnerships and make informed investment decisions as they plan future production capabilities.

As garment manufacturing continues to evolve, success will depend not simply on smarter machines, but on how technologies work together to create smarter manufacturing systems.

Sources: Better Work, Brother Industrial EMEA, Eton Systems, Gerber Technology, International Labour Organization (ILO), Lectra, and leading apparel machinery manufacturers.

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Engineering Versatile Operations: Shreedhar Spinners Scales with LMW

Shreedhar Spinners Ltd. which is headquartered in Mumbai, with its plant in Amaravathi, Maharashtra has buit its growth on two decades of technical partnership with LMW. Running an integrated LMW line from blow room to ring frame, the company today posts benchmark productivity across a wide count band from coarse 10 s Ne to 30s Ne within both carded and combed compact yarn.

The Bet: One Lean Plant, a Whole Market's Range

Promoted by a team with three decades in yarn trading, Shreedhar Spinners entered manufacturing with a capital-efficient objective: build a single first phase capable of serving a wide count range, rather than a single-product line. Managing Director Dharmendra Goyal and Director Vishal Agrawal of Shreedhar Spinners, whose association with LMW stretches back more than twenty years, have led project execution and manufacturing.

The Amravati plant opened with 18,000 spindles, but the brief was ambitious from day one. The aim, in Goyal's words, was to "encompass as much as we can into the first unit," the broadest possible product basket in a single phase.

One Partner, Blow Room to Ring Frame

When Shreedhar Spinners envisaged its first unit, the automatic choice was LMW as it could deliver a complete spinning line from blow room through ring frame, under advanced, continuously updated technology, giving the company a single point of accountability across a sequential process. The approach has carried through every phase of expansion.

LMW delivered the second unit on a three-month timeline from shipment to commercial production, a commitment that Shreedhar Spinners cites as central to its confidence in expanding further.

Table 1: LMW machinery build-out at Shreedhar Spinners, Amravati (by unit and phase)

Make	Machine	Models (Unit 1 & 2)
LMW	Blowroom Line	Bale Plucker Line
LMW	Card	LC363/361 and LC9S
LMW	Draw frame (Breaker)	LDB3
LMW	Lap former	LH20 S
LMW	Comber	LK69 M/S
LMW	Draw frame (Finisher)	LDF3 S
LMW	Speed frame	LF4280/A
LMW	Compact Ring frame	LRJ 9/SXL

Unit 1 and Unit 2 Phase-1 are commissioned and in production; Unit 2 Phase-2 is the planned 2026 expansion. Benchmark productivity (Table 2) is achieved on the commissioned base.

The Hard Part: Compact Yarn at Coarse Counts

Compact yarn, which is valued for its smoothness, strength and low hairiness, is usually spun at medium and fine counts. Shreedhar Spinners set out to make it at some of the coarsest counts in the market. A coarser yarn means a heavier fibre strand to draft evenly and much more for the compacting zone to condense.



The bolder move was to run that carded compact plant at scale in a single step, without the comber fallback most would insist on. Shreedhar Spinners chose, in Agrawal's words, to "take this risk" and

keeping provision to add combers if it needed them, though it never did. The result is a mill running coarse compact counts that only a few Indian spinners have built at this scale.

Versatility in Operations



The Customer's Verdict

The data is borne out in how the leadership describes the partnership. For Managing Director Dharmendra Goyal, the LMW line gave the company the confidence to commit to an ambitious product basket from the outset.

"What you need more is the handholding, and that is required on a continual basis. The sales & service teams, the technique that is required; that backup was available from LMW, which really gave us the confidence to dare, and so we did, and we did achieve."



Dharmendra Goyal, Managing Director
Shreedhar Spinners Limited

Director Vishal Agrawal points to that same handholding as the differentiator behind the company's coarse-count and dyedfibre breakthroughs:

"The partnership and understanding, which is there, and which allows you to get results, is more important than the initial technology… sometimes the industry is not geared up to use the technology which is available with the machine."



Vishal Agrawal, Director
Shreedhar Spinners Limited

Both trace the 2021–22 carded compact plant, one of India's first at that scale to the same combination: LMW's technical guidance and support, Universal's engineering support during ramp-up, and the company's own willingness, backed by that support, to take on a project it calls a considered risk rather than a routine one.

CFO Varesh Goyal puts the result plainly:

"Consistent machine performance, backed by reliable technical support, has helped us achieve benchmark productivity and produce superior-quality yarn, while keeping our overall cost of ownership highly competitive."



Varesh Goyal, CFO
Shreedhar Spinners Limited

Proof in the Productivity

The clearest measure of the outcome is productivity, in grams per spindle per shift (GPSS), the standard yardstick of ring-spinning output. For the mill, the goal is never output alone but "productivity with quality brings down your cost of operation," as Director Vishal Agrawal frames it. On LMW's carded and combed compact platforms, the mill posts benchmark GPSS from coarse 10s through to 30s.

The performance has translated into commercial capacity. Shreedhar Spinners has grown its ring-frame base from 10 machines at Unit 1 (2022) to 16 after Unit 2 Phase-1 (2025), with Phase-2, a further four frames.

An Anchor for the Next Phase of Growth

From its first 18,000-spindle Unit 1 to the subsequent expansion of Unit 2, with 28,600 spindles currently installed and another 7,296 spindles in the pipeline, the growth journey of publicly listed Shreedhar Spinners has closely tracked its long-standing partnership with LMW. The integrated LMW solution has enabled the company to commission capacities within committed timelines and confidently undertake ambitious projects, including its carded compact spinning plant; an initiative that few Indian spinners had ventured into at the time.

As Managing Director Dharmendra Goyal frames it, a public shareholder base means the company must "perform every day, every month, every quarter, every year," a standard that rests on a technology partner delivering not once but consistently, which LMW has backed with two decades of continuous collaboration.

SHREEDHAR

About Shreedhar Spinners Limited

Shreedhar Spinners Limited is a modern cotton yarn manufacturer in India, operating from a Amravati MIDC Textile Park in Maharashtra. As a subsidiary of Shreedhar Cotsyn Private Limited, star export house, the company's promoters combine decades of textile experience with advanced spinning technology to deliver consistent, export-quality yarns for knitting and weaving applications.

LMW®

About LMW

LMW Limited (formerly Lakshmi Machine Works Limited), established in 1962 and headquartered in Coimbatore, India, is a premier global manufacturer of textile spinning machinery.

It offers a complete, integrated range of innovative spinning solutions across domestic and global markets.

For further information, please contact
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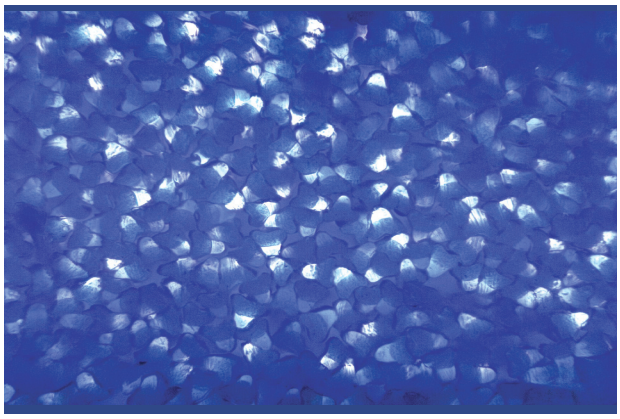
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Barmag

BICO BCF yarn shows impressive performance in field testing

In a joint development project with other partners, Barmag and Object Carpet have successfully tested BICO BCF yarn in the carpet manufacturing process. The results show that this innovative yarn technology offers significant performance advantages and opens up new possibilities for recycling-oriented carpet constructions.

These trials marked an important developmental milestone for the carpet industry. For the first time, the bicomponent technology—already known from other synthetic fiber applications—was successfully transferred to the BCF process and validated across the entire carpet value chain. The trials demonstrate the potential of a new class of yarn that combines improved performance characteristics with new possibilities for modern carpet constructions.



Filament cross-section of BICO BCF 70% PET / 30% PBT

More volume, elasticity, and performance

"The tests show that a BICO BCF carpet offers more volume, high elasticity, and proven heavy-duty performance compared to standard carpet yarn. The PET-based material combination also enables recyclable carpet concepts," says Product Manager Markus Reichwein, summarizing the test results.

Proven technology meets new applications

The yarn was manufactured on a Neumag S8 BCF line equipped with a BICO spinning beam. The principle of bicomponent yarn is already well-established in other synthetic fiber spinning processes—what is new, however, is its successful integration into the BCF process. Due to the differing shrinkage and elongation properties of the polymers used, the unique material combination causes the yarn to self-crimp, thereby creating its characteristic voluminous structure.

The successful trials on a Neumag S8 BCF system now demonstrate that this approach can also be implemented on an industrial scale for the carpet industry. Likewise, all subsequent process steps—from cabling and heat setting to tufting and coating—consistently yielded good results.



The yarn was produced on a Neumag S8 BCF system with a BICO spinning beam.

Impressive results throughout the entire process chain

After heat setting, the yarn exhibited pronounced bulk combined with high elasticity. The material also performed well in the tufting process: despite the increased titer, the yarn could be processed without any problems. Thanks to the yarn's elasticity, it was also possible to produce more running meters of raw fabric than initially anticipated.

Furthermore, the yarn is characterized by its good coverage of the substrate. Process reliability was further confirmed during the coating process—both woven and knitted fabrics could be processed.

Successful quality testing for continuous use

The developed carpet constructions were extensively tested, including chair-castor and Vettermann tests in accordance with DIN EN 1307. Result: All constructions are suitable for continuous use in commercial settings and achieved a wear class of up to Class 33, depending on the carpet construction. "The results impressively demonstrate that BICO BCF technology can not only be reliably integrated into existing production processes but also offers significant advantages in product performance," said Markus Reichwein.

A future-proof solution for a wide range of applications

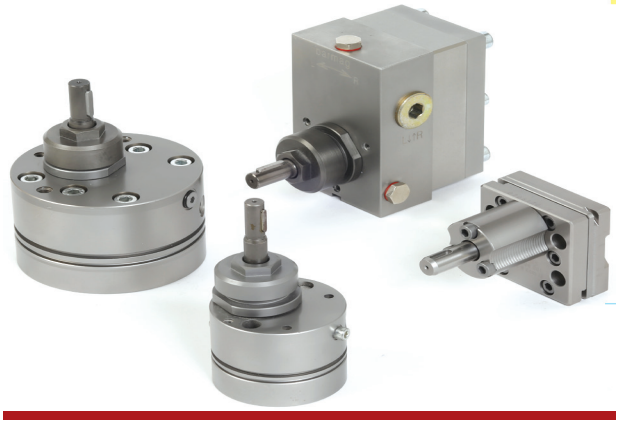
The overall conclusion of the tests is clear: BICO BCF yarn impresses with its high opacity, excellent processing properties, and strong performance. The technology thus offers a promising solution with new options for developing high-performance and differentiated products for carpet manufacturers—

in both the residential and commercial sectors. The successful industrial validation demonstrates that BICO BCF is not only technically feasible but also has the potential to shape future carpet constructions in a sustainable way.

Barmag showcases metering pump solutions at ASE China

From September 15 to 17, 2026, Barmag's Pumps Division will present its solutions for the precise delivery and metering of adhesives, sealants, and other highviscosity media at ASE China at the Shanghai New International Expo Centre. The focus of the exhibition will be on high-precision gear metering pumps that help plant managers sustainably optimize material usage, process stability, and product quality. (Booth E4235)

The demands placed on modern adhesive and sealant applications are constantly increasing. Manufacturers expect reproducible dosing results, minimal material loss, and reliable processing in increasingly demanding processes. This is precisely where Barmag's product portfolio comes into play.



Focus on rising raw material costs: At ASE, Barmag presents material-efficient pump technology for adhesive and sealant applications

Material efficiency as a competitive advantage

At ASE China, Barmag is focusing in particular on its solutions for hot-melt adhesives, PUR systems, silicones, resins, and two-component adhesives and sealants. The pumps in the GA/GX series, in particular, enable uniform, low-pulsation delivery of these media, thereby contributing to consistently high product quality and reduced material consumption. "Rising raw material costs and increasing quality requirements make precise metering more important today than ever before. With our pumps, we help users make their processes more efficient, sustainable, and cost-effective," explains Andreas Heitzer, Key Account Manager of the Pumps Division.

In addition, with the GA series, Barmag offers metering pump solutions for shear-sensitive media where product properties must be preserved during pumping. This is particularly important for certain reactive adhesives, silicones, or filled sealants. Gentle pumping minimizes product changes and ensures uniform material application. This increases process reliability and ensures consistently high quality of the end product.

Partner for demanding metering applications

With decades of experience in metering technology, Barmag is one of the leading suppliers of highprecision gear metering pumps for industrial applications. These solutions are used worldwide in adhesive, sealant, coating, laminating, and hot-melt systems, as well as in plastics processing. At ASE China, Barmag invites trade visitors to discuss the latest developments in metering and conveying technology and to learn about customized solutions for future adhesive and sealant applications.

About Barmag

Since 2026, the Swiss Rieter Group has been operating its man-made fibers business as subsidiary under the traditional name Barmag. This includes the established product brands Barmag and Neumag. As a future-oriented company, the research and development of Barmag is driven by energyefficiency and sustainable technologies (e-save).

Barmag is one of the leading providers of manmade fibers filament spinning systems, texturing machines, BCF systems, staple fibers systems and solutions for the production of nonwovens. Together with its range of polycondensation and extrusion systems and their key components, Barmag caters to the entire manufacturing process – from the monomer all the way through to the textured yarn – and supports it with customer-oriented engineering services. The product portfolio is rounded off with automation and digital solutions. In addition, Barmag offers high-precision gear metering pumps for the textile industry and other sectors, including the automotive, chemical and paint industries.

The main markets for the Barmag product portfolio are in Asia, particularly in China, India, Türkiye and the USA. Worldwide, Barmag – with round about 2,500 employees – has a presence in 120 countries with production, sales and distribution and service organizations. At the

Research and Development centers in Remscheid, Neumünster (Germany), and Suzhou (China), highly qualified engineers, technologists and technicians develop innovative and technologically leading products for tomorrow's world.

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Bangladesh, Chad, the U.K., Ethiopia, Mexico, Iran, Indonesia, Nigeria, Tanzania, Mauritius, the Philippines, Sri Lanka, Peru, Uruguay, Kenya, Costa Rica, and Zimbabwe.



Know about Krsna Group

Krsna Group Textile Machinery Manufacturing Is First Generation Family Enterprises Made A Humble Beginning In Mumbai Apartment, By Technocrat Turned Entrepreneur VJTT Mumbai Graduate Mr. M.D. Shah (Fellow Institute Manchester UK) Krsna Engineering Works Move In 1990 To Present Location Of 2000 Square Yard Plot 45, GIDC Naroda, and Ahmadabad India. Well Response From Market For Krsna " Younger Brother P.D. Shah Joined At Initial Stage Followed With Young Techno Savy Family Members Helped Krsna Expanded Its Activities & Form New Venture Under Leadership Of Mr. Chandresh Shah (Managing Director President Of The Indian Textile Accessories & Machinery Manufacture Association) Business & Law Graduate With Help Of Uncle Mr. H.D. Shah Electrical Engineer Krsna Engimech Pvt. Ltd. B4, GIDC Phase2, Naroda, Ahmedabad-328330.

Krsna As Group Completed 35 Years of Services to Textile Industries

At present rsna operates on 2000 square yard plot has 20000 square feet fully mechanized work shop & 5000 square feet office blocks & 1500 fully mechanized workshop a t new site.

The company is being managed by Mr. Chandresh shah with help of younger brother Priyank Shah Management graduate Australia return under guidance of u ncle H.D. Shah & P.D. Shah.

Krsna group being make in India Company equip with excellent design AutoCAD software with 2 full time design engineers.

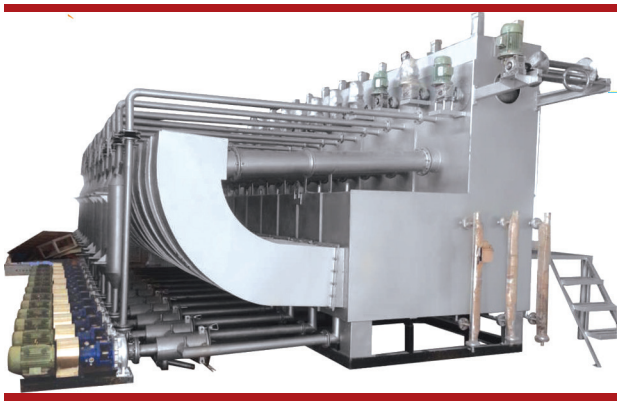
- The work force of 8 qualified engineers
- 10 skills & 15 semi skill & 5 unskilled workers

Under the new venture at Krsna Engimech Private Limited Intent to develop energy saving environ friendly continuous tensionless washing ranges bleaching ranges for hosiery /terry towel woven fabric 1st time in India.

Water Consumption On Normal Washing Range Is 50 To 601iter Per Kgs of Fabric Krsna Design Bring It Down To 20 To 25 Liter Per Kg of Fabric & While Is In Multipurpose Rope Cbr Krsflow Water Consumption Will Be 10 To 15 Liter Water/Kilo Of Fabric From Gray To White.

MANUFACTURING PROGRAMME OF KRSNA GROUP

- Krsna An Innovator Of Dyeing Technology Introduced 1st Time In India Soft/over Flow Dyeing Machines.
- 5 To7 Soft Flow Dyeing Machines Fully Automatic Month Krsna Krantz Soft -flow Dyeing Machine.
- Krsna Continuous Open Width Washing Ranges For Knit Fabric & Woven
- Krsna Open Cum Rope Washing Range.
- Krsflow Continuous Rope Washing & Bleaching Range 1st Time In India
- Tumble Dryers For Woven & Knit Terry Towel
- Merceriser Mini & Regular



KRSNA GROUP CONCEPT TO REALITY

- Krsna With Its Zeal To Protect Environment Always Tried To Design Machineries To Save Water Chemical Energy.
- Krsna Range Of Soft-flo W & Other Textile Processing Machineries Fundamental Are Accuracy In Manufacturing Using Top Quality Materials. Krsna Ranges Of Machines Are Well Known For Reliability, Robust Construction & Ease In Operation.
- Krsna Gets 90% Repeat Order
- Krsna With Reinvent Obsession Could
- Introduce First Time In India
- Krsna Soft-flow Dyeing
- Krsflow Multipurpose Washing Cum Bleaching CBR
- Krsna Open Width Tensionless Vibro Drum Washer For Bio Wash & After Print Wash Of Knit Fabric

At Krsna We Adopted

Lean manufacturing completeness system & 5s +

- Safety Rules ,
- Sort
- Straightens
- Shine
- Standardisation

SCIENCE IN INDUSTRY

This system adoption helped in

- Mfg. Best Performing Machines
- Consistency In Quality
- Repeat Performance With Excellent Quality.
- Produce User Friendly Machines.
- Get 90% Repeat Order

Today Krsna is name to reckon with Krsna Operating All Over India & 23 Countries worldwide.

Special Features

Krsna group's tradition of solid design excellent manufacturing tradition help us to built this new concept of continuous washing/bleaching of all kind of textile in rope form like woven/ terry towel/knits—hosiery/loosely woven (woolly georgette chiffon).

Krsflow with unique features help to save water/save chemical/ save energy & help to protect environment.

Krsflow continuous rope washing & bleaching range krsna pioneer manufacturer of soft flow in India, with constant synergetic relation customer helped us to introduce the unique design, special purpose continuous rope bleaching range.

Krsflow continuous rope bleaching / scouring washing range

Krsflow continuous washing range encompasses all the principles of efficient washing. This range has an intelligent combination multi tube (few) soft flows running in tandem.

The fabric is being process in rope form with use of highly acclaimed krsflow (over flow) system the 8 to 16 soft flows process the fabric together to accelerate the process of after print fabric washing or scouting bleaching.

Actual working of krsflow processing on krsflow fabric enters 1st train (soft flow) through squeezer enters soft over flow section & being gently carried at rear side through transport tube on return path fabric is being squeezed in squeezer of next train (soft flow tube) & enters soft over flow section of next train & then gently pushes to rear side likewise cycle continue...

Fabric enters 1st soft flow section then enters second section of soft flow then continue to exit in last soft flow at working speed of 20 to 30 meters/minutes depends on quality of fabric. Water consumption: 1 kg of fabric needs 10 to 15 liter from gray to bleach.

SAMPLE SOFT FLOW FOR ALL TYPES OF FABRICS

Technical Specification

- Robust Reliable Construction of SS 316 L Material. High Volume Low Pressure Pump (With AC Variable Inverter Drive).
- Variable Driven inside Reel with Silicon Strip to avoid Abrasion Mark.
- Liquor Ration 1:4 With 100% Moist Fabric.
- Teflon Sheet at rear Side for Entangle Free Fabric Movement.
- Water Flow Meter (Optional).
- Fully Auto Operation (Optional).
- Seam Detector (Optional).



SOFT FLOW FOR ALL TYPES OF FABRICS

Technical Specification

- Adaptive variable nozzle system
- Dual circulation system
- Intelligent circulation tracking & synchronizing system
- 1-8 fabric chambers per machine
- Chamber capacity - 150 / 200 / 250 / 300 /350 kg depends on fabric

Optional Features

- Second preparation tank
- 100% water storage tank
- Automatic self cleaning filter for fast dosing.
- Auto measurement & liquor ratio

SOFT FLOW FOR KNITS TERRY TOWEL & Technical Textile (Low liquor dyeing machine)

Technical Specification

- Adaptive variable nozzle system
- Dual circulation system
- Intelligent circulation tracking & synchronizing system
- 1-8 fabric chambers per machine
- Chamber capacity - 200 / 250 / 300 /350 kg depends on fabric

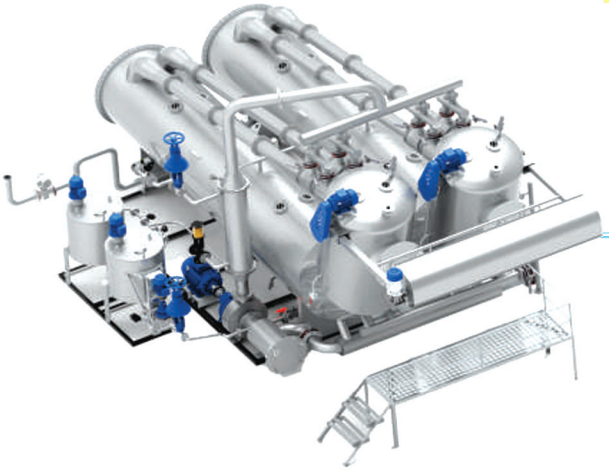
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- 100% water storage tank
- Automatic self cleaning filter for fast dosing.
- Auto measurement & liquor ratio



MULTI PURPOSE LONG TUBE DYEING MACHINE (TWIN DUAL NOZZLE)

For Knit / Woven & 100% Polyester Lycra / Poly Viscose & Surface Sensitive Fabrics (low Liquor Dyeing Machine)



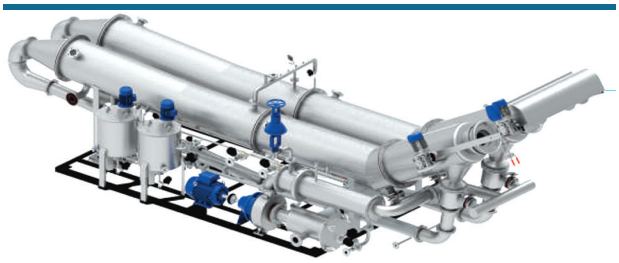
Technical Specification

Scientifically Design Unique Machine Specially For Knits, Micro, Lycra, Nylon, Wooly, Rayon, Silk & Polyester, Blends & Surface Sensitive Fabrics.

- Low bath ratio, bath ratio can be as low 1:4~1:8 depends on the fabric.
- Flexible water flow so that the high-grade fabric is subjected to the lowest surface impact to ensure no lint, and the structure of fabric is not twisted.
- Unique elbow design at rear end ideal to achieve flow-less dyeing result at minimum tension.
- Adaptable to a wide range of products from general knit fabrics to the latest developments im elastic fabrics.

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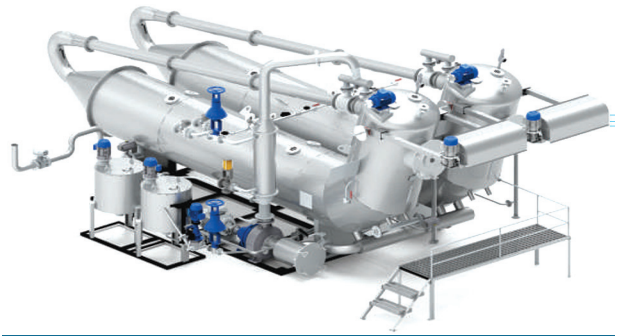
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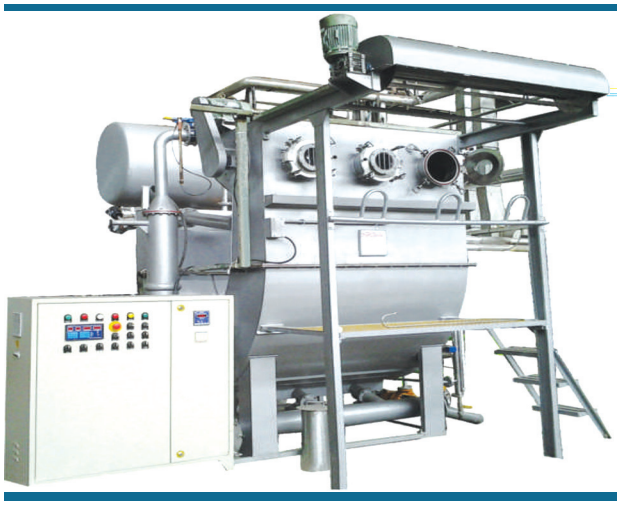
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SCIENCE IN INDUSTRY

- Adaptable to a wide range of products from general knit fabrics to the latest developments im elastic fabrics.



Weight Reduction Soft Flow (SOFLINA)



Special Features

- Scientific Design Krsna Soft / Over Flow Nozzle
- Easy & Smooth Fabric Passage ensures tangle Free Fabric Movement.
- Equip with Caustic Storage Tank with Concentration Monitoring Control System.
- Caustic Recovery/Complete Auto PLC Control is (Optional).
- Easily Removable Filter & Heat Exchanger.
- Low Temperature -95°C (Maximum).
- Vessel Made by SS 316 L.

For further information, please contact :
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Mob : +91 98250 96234/93777 33484/90999 30017
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Uster Technologies AG

Ustar has developed the Recycled Fiber Matrix

The two-way street for assessing mechanically recycled materials

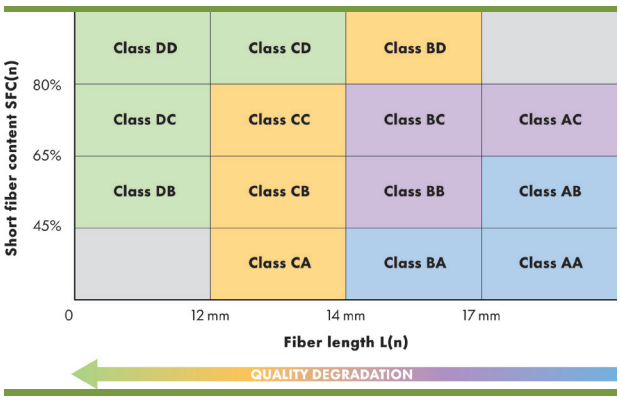
The textile industry's commitment to circularity continues to accelerate, and mechanical recycling is viewed as a targeted approach to cutting textile waste and its environmental impact.At the forefront of this drive, Uster has developed the Recycled Fiber Matrix, a two-dimensional assessment of mechanically recycled fibers to guide optimum processing and end-uses.

Recycled cotton fibers are difficult to categorize because of their inconsistency and variability. How can the industry evaluate mechanically recycled material accurately – and match it to the most suitable spinning methods and product end-uses? Help is at hand from Uster, in the form of the Recycled Fiber Matrix. It provides an objective assessment of recycled cotton, so that recyclers,



spinners and brands are guided towards what can be made from it, and how.

The concept fits perfectly with the industry's need for greater circularity and transparency in recycling.



Uster Recycled Fiber Matrix for mechanically recycled cotton based on L(n) and SFC(n)

The facts that matter

Precise data about the physical characteristics of recycled fibers is essential to understand how they will behave in spinning and their end-use. The Uster Recycled Fiber Matrix focuses on the essential numbers – such as length of fibers (L(n)), of the longest 5% fibers (5% L(n)), and short fiber content (SFC(n)).

The background to the development of the Recycled Fiber Matrix involved testing of a significant number of 100% mechanically recycled cotton fiber samples from key recycling regions, including China, India and Europe. Samples included greigematerials, as well as colored and bleached recycled fibers. Sources were categorizedas post-industrial, pre-consumer or post-consumer waste, as evenly distributed as possible.

Measurements of the recycled samples with Uster AFIS 6 were the basis of trends used in the Recycled Fiber Matrix. From this, Uster developed its application report on the Recycled Fiber Matrix. It evaluates the current state and potential challenges of using differenttypes of mechanically recycled cotton fibers in spinning.

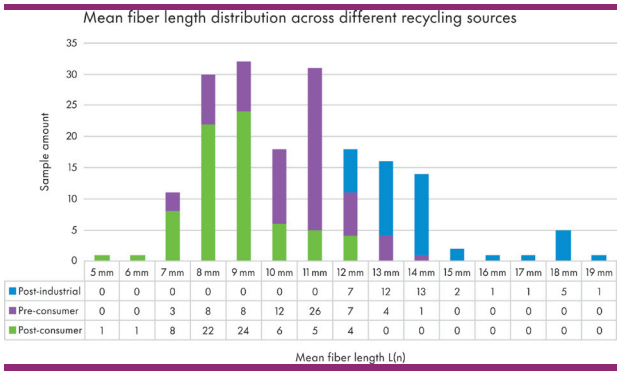
The Uster Recycled Fiber Matrix is an ongoing and dynamic process, with more samples being collected and analyzed from global recycling hubs, to reflect variability as source materials and processing conditions evolve.

How it works

Measured Uster AFIS 6 values are presented as clear andeasy-to-understand quality levels, from A to D, color-coded for intuitive practical application. The color-coded regions correlate fiber parameters with their typical raw material sources, to provide a strategic guide for optimized yarn production.

Mechanically recycled cotton cannot be accurately classified by a single fiber parameter. So the Recycled Fiber Matrix uses two-dimensional evaluation. Only a combination of these two parameters can properly determine processing behavior and yarn quality.

For example, the x-axis might represent a length parameter, such as mean fiber length, while the y-axis could be a quality-limiting factor like short fiber content ornep count. Each position in the matrix thus reflects two interacting fiber properties simultaneously. In practice, this means that two fiber lots with the same mean fiber length could behave differently in spinning if one had high short fiber content and the other low. The two-dimensional matrix makes this visible and comparable.



	5 mm	6 mm	7 mm	8 mm	9 mm	10 mm	11 mm	12 mm	13 mm	14 mm	15 mm	16 mm	17 mm	18 mm	19 mm
Post-industrial	0	0	0	0	0	0	0	7	12	13	2	1	1	5	1
Pre-consumer	0	0	3	8	8	12	26	7	4	1	0	0	0	0	0
Post-consumer	1	1	8	22	24	6	5	4	0	0	0	0	0	0	0

Mean fiber length distribution based on L(n) for different recycling waste types

Benefits in industrial application

The Recycled Fiber Matrix lets customers directly translate AFIS measurements into clear quality categories. This makes the quality level and the limitations of a lot transparent.

Based on Recycled Fiber Matrix, the class can be applied to bale management and machine settings. For optimum yarn performance, the class is useful to estimate the expected short-fiber load, and to define suitable blending ratios.

Uster experts generally advise users to enhance fiber sorting by separating bales according to length, source, and color, thus reducing variability. Effective bale management helps maintain consistency inkey parameters, ensuring uniform quality throughout production. It's also recommended to enhance the spinning process

by adjusting draft settings, twist, and spinning speed to suit the specific quality of recycled fibers. Increasing maintenance and cleaning frequency would also help.

Mixing recycled cotton with virgin cotton or synthetic fibers is still regarded as the best blending strategyto compensate for quality deficiencies. Uster is currently working in this field to provide benchmarks for blendlevels and their subsequent influence on yarn quality.



The Recycled Fiber Matrix is based on measured Uster AFIS 6 values

Free application report

The Uster Recycled Fiber Matrix provides a data-driven framework for objective classification of recycled fiber lots. The application report on the Recycled Fiber Matrix is a valuable educational document, with several graphs and illustrations. It is available as a free download under www.uster.com/recycled fiber matrix. It contains shared insights empowering spinning mills, recyclers, and brands to make informed decisions about fiber suitability. It helps expand the use of recycled cotton in textile products, while optimizing processing parameters.

As recycling technologies and fiber preparation methods continue to evolve, Uster is convinced that ongoing datacollection and matrix updates play an important part, refining classification accuracy and supporting sustainable circularity goals in the textile industry.

About Uster Technologies

Uster Technologies is the world's leading provider of quality management solutions from fiber to fabric.

High-technology instruments, systems and services cover quality control, prediction, certification and optimization. The portfolio comprises quality management, laboratory testing and in-line process control instruments for fibers, staple fiber, and filament yarns, fabrics and nonwovens.

Uster Statistics, the unique global benchmarks for textile trading, complement a portfolio of value-added services that includes training, consultancy and worldwide after-sales.

The Uster philosophy aims to drive innovation forward by meeting market needs – always with 'quality in mind'.

Uster Technologies is headquartered in Uster, Switzerland and operates worldwide. The company has a global network of 7 subsidiaries, with 50 sales agents and local service stations around the world.

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Marzoli Textile Machinery Manufacturers Pvt. Ltd.

Marzoli monthly Magazine, September 2026

MARZOLI SUPER SLUB - CREATE. CONTROL. DIFFERENTIATE

The future of fancy yarn begins with unlimited possibilities

The market for fashion and denim continues to demand fabrics with distinctive appearances, innovative textures and unique visual effects.

- For spinning mills, this represents an important opportunity, but creating

differentiated fancy yarns requires much more than simply producing a slub.

- It requires creativity, precision, flexibility and performance.
- Marzoli Super Slub (MSS) brings these possibilities together - A fully integrated technology designed to give spinning mills greater freedom in creating fancy yarn effects—while maintaining precise control over the drafting process and delivering high performance.



CREATE - AN UNLIMITED RANGE OF DESIGNS

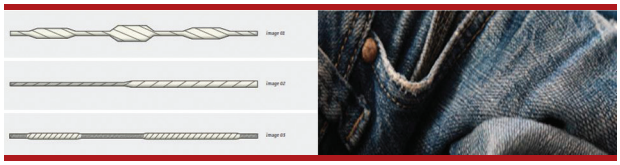
Why limit creativity?

With Marzoli Super Slub, spinning mills can explore a wide range of yarn effects and develop products that respond to changing fashion and market requirements.

Create distinctive effects such as:

- SLUB EFFECT - Create variations in yarn thickness, with controlled length, intensity and spacing.
- MULTI-TWIST EFFECT - Develop yarn effects through controlled twist variations, creating attractive visual shades and fabric characteristics.
- MULTI-COUNT EFFECT - Combine different yarn effects and characteristics to create interesting and differentiated fabric appearances.
- REVERSE EFFECT - Create variations in the main draft to generate reverse effects with reduced yarn thickness.
- MULTI-EFFECT POSSIBILITIES - Combine different effects to create increasingly sophisticated and unique yarn designs.

From subtle elegance to bold creativity, your yarn can become your signature.



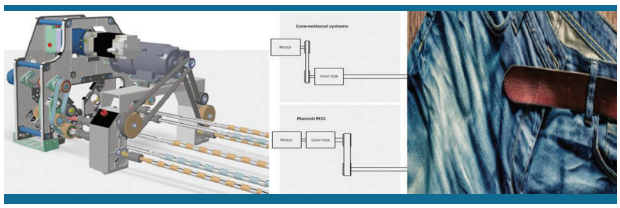
CONTROL - PRECISION MAKES THE DIFFERENCE

Creating a fancy yarn is not only about generating an effect - It is about controlling that effect. Marzoli MSS is based on a highly responsive drafting system designed to independently manage the acceleration and deceleration of the drafting rollers. This provides greater control over the development of yarn effects and their shape.

The result?

- More precise and repeatable effects
- Greater flexibility in yarn design
- Independent adjustment of acceleration and deceleration curves
- Better control of the drafting process
- Consistent reproduction of the desired yarn effect

CREATIVE FREEDOM WITH ENGINEERING PRECISION.

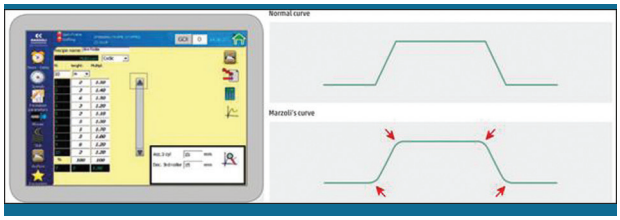


PROTECT THE QUALITY - NO THIN OR WEAK POINTS

One of the critical challenges in fancy yarn production is controlling the transition at the beginning and end of the slub. Conventional systems can create thin or weak points, particularly during acceleration and deceleration. Marzoli MSS is designed to provide improved control of these phases.

By independently managing acceleration and deceleration ramps, the system helps create smoother transitions and avoid undesirable weak or thin points at the end of the effect.

CREATE THE EFFECT YOU WANT—WITHOUT COMPROMISING YARN PERFORMANCE



SCIENCE IN INDUSTRY

PERFORM - HIGH PERFORMANCE ON SLUB YARNS

- Innovation should not mean sacrificing productivity. Marzoli Super Slub combines creative flexibility with a high-performance drafting system.
- The independently driven drafting rollers provide a technological advantage over conventional mechanical systems, allowing faster and more controlled responses during the creation of yarn effects.
- This enables spinning mills to pursue:
  - Creative flexibility
  - Precise effect control
  - High production performance

MORE POSSIBILITIES. WITHOUT COMPROMISING PERFORMANCE

DRAW YOUR SLUB - TURN YOUR IDEA INTO YARN

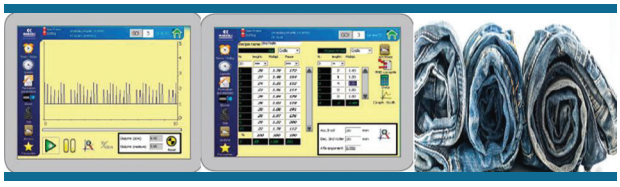
Sometimes the best way to create a yarn effect is simply to draw it.

The patented "Draw Your Slub" system gives users an intuitive way to define and edit yarn effects.

The desired yarn shape can be created through a dedicated graphical interface, making it easier to visualize and develop the required slub profile. Users can define parameters such as:

- Slub shape
- Slub length
- Yarn thickness
- Effect sequence
- Identification and length parameters

FROM IMAGINATION TO YARN DESIGN



SIMPLIFY - USER-FRIENDLY. FLEXIBLE. CONNECTED.

Creating sophisticated yarn effects should not mean complicated machine operation.

MSS features a user-friendly interface designed to make recipe creation and editing simple and intuitive.

Recipes can be created and managed efficiently and transferred between compatible machines, helping spinning mills reproduce desired effects across production.

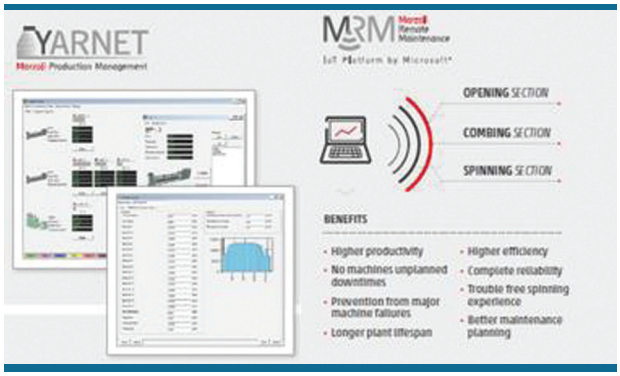
MAKE THE DESIGN. SAVE THE RECIPE. REPEAT THE RESULT



CONNECT - FROM MACHINE PERFORMANCE TO DIGITAL MANAGEMENT

MSS can also be integrated into Marzoli's software platforms, supporting a more connected approach to production and machine management.

- YARNET – Production Management - Supporting the monitoring of production, efficiency and operational performance.
- MRM – Marzoli Remote Monitoring - Supporting machine-condition monitoring and maintenance-oriented management through machine operating data.



This brings greater visibility to the production process and supports more informed operational decisions.

YOUR FANCY YARN PRODUCTION—CONNECTED TO A SMARTER FACTORY APPROACH.

DON'T JUST PRODUCE YARN - CREATE A DIFFERENCE.

In a market where differentiation creates value, the ability to develop distinctive yarns can open new opportunities. With Marzoli Super Slub, spinning mills can combine:

- CREATIVITY - An extensive range of fancy yarn possibilities.
- CONTROL - Precise management of the yarn effect.
- PERFORMANCE - High-performance technology for fancy yarn production.
- SIMPLICITY - Intuitive recipe creation and management.

- CONNECTIVITY - Integration with digital production and machine-management platforms.

MARZOLI SUPER SLUB - CREATE. CONTROL. DIFFERENTIATE.

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www.marzoli.it

Mimaki Europe BV

Where Every Detail Counts: Experiential Applications of DTF and UV-DTF Printing

Businesses can respond to this demand by adopting Mimaki's textile & UV DTF combination

Personalisation has moved far beyond the traditional logo on a t-shirt. Today, brands want to create complete experiences, where every detail – from clothing and accessories to décor and packaging – feels distinctive and reflective of their identity.



Textile DTF technology has quickly become one of the most effective ways to produce vibrant, flexible textile applications.

This shift is opening new opportunities for print service providers, promotional product companies and event specialists, as customers look to buy cohesive branded items, rather than one off pieces. By combining Mimaki's textileand UV DTF technologies, businesses can respond to this demand with a flexible production ecosystem, encompassing textile decoration and object personalisation with very high quality and definition, consistent standards of colour, detail and reliability.

From textile applications to branded objects

Textile DTF technology has quickly become one of the most effective ways to produce vibrant, flexible textile applications. With Mimaki's TxF Series, users can print, customise and embellish high-quality t-shirts, caps, bags, sportswear, uniforms and a wide range of textile-based promotional items. But in many cases, the customer does not stop at apparel.



UV-DTF technology extends personalisation beyond textiles, enabling eye-catching decoration on curved, oversized, uneven or complex objects.

An event may require branded tote bags and t-shirts, but also water bottles, badges, notebooks, phone accessories, table decorations or packaging. A hospitality project may include personalised cushions, slippers, menus, room accessories or welcome gifts. A lifestyle brand may want to extend its visual identity into everyday objects that customers can use, keep and enjoy.

This is where UV-DTF becomes the natural extension of textile DTF printing. With Mimaki's UJV300DTF-75, users can create eye-catching objects and embellish surfaces, including curved, very big or uneven items. This makes it possible to personalise products that may be too large, too irregularly shaped or too complex to place on a flatbed printer.

Together, textile DTF and UV-DTF allow print providers to expand from textile decoration into a much broader world of branded applications.

Quality that matches premium expectations

As personalisation becomes more central to brand andluxury experience, quality becomes non-negotiable.

A promotional object may be a small aspect of the campaign, but it still represents the brand. For a fashion label, a design studio, a hospitality group or a premium corporate customer, every

personalised item must look vibrant and up to standard. Visible banding, weak colours, poor white opacity, inaccurate details or decoration that does not adhere properly will degrade the result.

This is particularly important when working with dark fabrics, coloured materials, textured surfaces or objects that will be handled regularly. The final result must not only look good when it is produced; it must continue to reflect the quality of the brand over time.

This is one of the key strengths of Mimaki's approach. Across both textile DTF and UV-DTF, the focus is on bringing something new, something different, delivering consistent quality, strong colour performance, fine detail and reliable adhesion. For print providers, this means being able to offer creative freedom without compromising on the standard required by premium applications.



From branded textile items to full event concepts, DTF and UV-DTF technologies help event agencies and brand experience specialists deliver immersive, coordinated and highly customised environments.

Creating complete brand experiences

The combination of textile DTF and UV-DTF is especially impactful for events, exhibitions, retail activations and hospitality environments.

A brand launch can range from customised garments and accessories totake-home gifts. A corporate event can combine wearable items with personalised water bottles, notebooks, badges and meeting table décor. A retailer may request limited-edition packaging, display items and lifestyle products.

In each case, personalisation becomes more than decoration. It becomes part of the experience. For brands, this means creating stronger connections with customers, guests and communities. For print businesses, it means moving beyond individual products and offering more complete, higher-value application packages.

A new opportunity for print providers

For companies already producing textile applications with textile DTF, UV-DTF offers a clear route to business expansion. They can build on their existing customer base and propose additional applications beyond apparel.

For promotional product companies, the combination of both technologies makes it possible to offer a wider and more versatile catalogue of personalised goods. For event agencies and brand experience specialists, it creates new opportunities to deliver immersive, coordinated and highly customised environments.

Most importantly, it allows businesses to say yes to more projects, from a textile branded item all the way to the full event concept.

Personalisation without compromise

The future of personalisation is not about one technology replacing another. It is about using the right technology for the right application and combining them to create more value. Textile DTF enables vibrant, flexible textile decoration, while UV-DTF extends personalisation to objects and surfaces that consequently become very easy to decorate. Together, they give print providers the tools to produce complete, creative and premium-quality branded solutions.

From events and exhibitions to interiors, hospitality, retail, promotional goods and lifestyle accessories, personalisation is becoming more experiential, more connected to everyday life and more demanding in terms of quality. For print businesses, this creates a clear opportunity: to turn creative ideas into applications that are not only distinctive, but also consistent, durable and ready to meet the expectations of today's most demanding brands.

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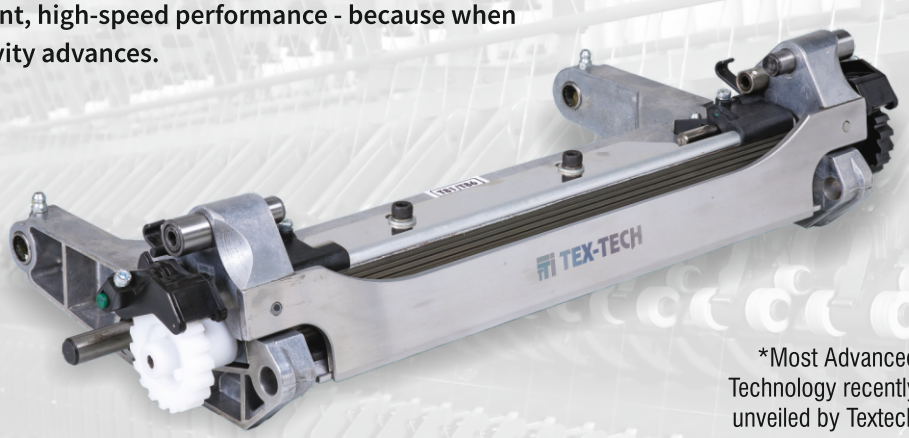
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