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Oil Price Volatility and Geopolitical Disruptions in India's Synthetic Textile Supply Chain: A Qualitative Study

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Abstract

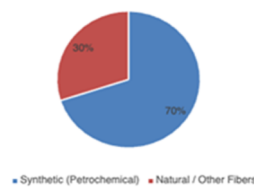
India's synthetic textile industry depends on crude oil to produce the materials such as polyester and synthetic yarn. When prices of oil rise or fall sharply the cost of producing these textiles changes significantly. The study explores how Global oil prices changes and geopolitical tension impacts the India's synthetic textile supply chain between 2000 and 2024. Study used a thematic approach found three key patterns, rising oil prices pushes the raw material cost, global crisis reduce demand and geopolitical conflict disrupts the supply chains. The study concludes that oil prices volatility is not a temporary problem for India's textile sector. It is a permanent challenge that requires long term planning.

Keywords: Synthetic textiles, oil prices, geopolitical risk, India, polyester, supply chain

1. Introduction

"Oil geopolitics today has a disproportionate influence on energy markets" stated by Hardeep Puri, Union Minister for Petroleum, Government of India (Das, 2026). India imports over 80 percent of its oil needs (Macrotrends LLC, n.d.), which shows India's dependency on the world for meeting its energy needs (Gulati, Gupta, Rao, Juneja, & Jain, 2025). Synthetic textiles such as polyester, nylon, and acrylic now constitute 70 percent of World's total fiber consumption (Gulati, Gupta, Rao, Juneja, & Jain, 2025). These are petrochemical products derived from crude oil via PTA (Purified Terephthalic Acid) and MEG (Monoethylene Glycol); whenever global oil prices spike or geopolitical tension rises, it directly impacts the cost of these raw materials. PTA and Polyester yarn heavily impacts the stability of the supply chain for example in China, from June 10, 2022 to July 15, 2022, the price of PTA had a drastic fall in prices from 7,562 yuan per ton to 5,280 yuan per ton in a time frame of less than a month.

Global Fiber Mix in Percentage (%)



2. Literature Review

2.1 Oil Price Volatility and Supply Chain Costs

Oil price fluctuations spills asymmetrically through supply chains - with price surge causes rapid cost increase whereas price declines benefits the downstream actors more slowly (McKinsey & Company, 2015). Further analysis of McKinsey's of 2014 to 2026 oil price collapse found

that apparel supply chains worldwide failed to capture expected cost savings, as upstream producers suck up margin gains rather than passing out to the downstream actors.

Qiu, Mao, and Liu (2024), Developed an empirical framework to forecast the price of polyester value by modelling the shocks along the polyester value chain, from unrefined crude oil to key intermediates and to yarn prices at the end. Focusing on China's warp knitting cluster, it selects 50D/24F which is a fully drawn yarn (FDY) as the representative downstream product and uses daily prices of PTA and MEG. Brent, indicator of upstream production load and downstream operating looms rate as explanatory variables. Combining industry's digitalised data with futures market data, the study includes both supply and cost demand factors, addressing a gap in prior work that relied only on the historical price series. The papers show that PTA and MEG prices are the top positive drivers of polyester yarn prices whereas polyester plat load, loom operating rates and crude oil also had significant influence on short term prices movements through combined cost and supply demand effects. Kumar et al. (2022) used a VAR model with the data from 2010 to 2020 where they found out that 6 out of 10 listed Indian textile companies have statistically significant coefficients with Crude oil futures prices, which shows that future prices help explain current stock prices. CRISIL's 2024 report of Indian market shows a highly fragmented downstream fabric and yarn manufacturing base with a concentrated upstream petrochemicals feedstock and polyester capacity being dominated by a handful of big players including Reliance Industries. This positions small mills in Surat and mills in other hubs like Surat are also rely on the pricing decisions taken by the integrated feedstock suppliers. Geopolitical risk is defined as a threat from risks such as threats from political instability, wars, sanctions, and restrictions on trade that disrupt the supply chain independently of price movements (Aniceto & Masai, 2025; Bednarski et al., 2025). Geopolitical factors like the ongoing one the Russia-Ukraine war surged Brent crude oil prices above 120 dollars per barrel through production constraints and risked supply chain reconfigurations similar to those India experienced with Iran sanctions disrupting MEG imports (Aniceto & Masai, 2025). Similarly, Bednarski et al (2025) provide a joint review of 50 papers they identified, supply chain redesign options- regionalisation and back shoring, technology adoption such as blockchain and AI as primary responses.

2.1 Research Gap and Objectives

Despite substantial work on oil textile price correlation and geopolitical supply chain disruption separately, no qualitative study examines how these forces specifically affect India's synthetic textile supply chain across the full 2000 to 2024 period, accounting for India's unique structural vulnerabilities. Objectives of this study are (i). Mapping the structure of India's synthetic textile supply chain and identify vulnerability nodes. (ii). Analyse the pattern of oil price transmission across major oil shock episodes (2000–Present). (iii) Examine geopolitical tensions as an independent supply chain disruptor beyond price movements.

3. India's Synthetic Textile Supply Chain: A Structural Overview

India's synthetic textile supply chain starts with the basic material, crude oil, and ends at the piece of garment, a fully petrochemical value chain with no natural fibre input. The chain follows this sequence: crude oil → naphtha/paraxylene (PX) → purified terephthalic acid (PTA) + monoethylene glycol (MEG) → polyester chips → partially oriented yarn (POY)/fully drawn yarn (FDY)/polyester staple fibre (PSF) → woven or knitted fabric → finished garments (Qiu et al., 2024). Each successive step adds value but also multiplies the exposure to upstream movements.

The synthetic textile supply chain of India has a few structural characteristics that separate it from the other major producers. First Indian imports approximately 85 percent of its crude requirement, RIL dominates the PTA and MEG production and revises its prices fortnightly in response to global crude oil benchmarks and petrochemical pricing, acting as the primary transmission node between global oil markets and India's textile mills (CRISIL MI&A, 2022). Gujarat serves as manufacturing hub for this industry and it caters many manufacturing hub, MSMEs these units are primarily dependent on polyester yarn sourced through this concentrat-

ed upstream supply structure (Textile Trade Buddy, 2024).

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4. Research Methodology

This study employs a **qualitative research design** grounded in an interpretivist epistemological stance, seeking to understand and interpret patterns of meaning within secondary textual data rather than measure causal relationships quantitatively. Specifically, the study adopts **reflexive thematic analysis** as outlined by Braun and Clarke (2006, 2021) a flexible yet rigorous method widely used across social science disciplines including management, economics, and business research to systematically analyse secondary data sources covering India's synthetic textile supply chain and its relationship with global oil price movements and geopolitical tensions over the period 2000 – Present (March, 2026). Data was drawn from peer-reviewed academic journals, industry reports which were read, coded, and organised into recurring themes following Braun and Clarke's six-phase process familiarisation, initial coding, theme generation, theme review, theme definition, and write up. The geographic scope is confined to India due to its unique structural vulnerabilities.

5. Thematic Analysis & Findings

Theme 1: Rapid Upstream Transmission of Price

A pattern from 2000 to Present periods shows that prices surge above critical thresholds transmits rapidly and directly into India's synthetic textile feedstocks costs. RIL as mentioned earlier it tracks the global crude oil prices and adjust its prices fortnightly of the raw material. As the market follows RIL's pricing, "the market takes cue from the price of RIL, which review global market conditions, price trend in China and fluctuation in crude oil prices to determine prices of polyester raw materials (Alchempro, 2022). This structural transmission mechanism means that any crude oil movement is rapidly felt at the mill level particularly in Surat's synthetic weaving units before downstream fabric prices can adjust.

First major instance covers the 2003 to 2008 crude oil boom, during which the Brent crude rose from approx. \$25 per barrel in 2003 to an all time high of \$147 per barrel in July 2008 which was driven by surging demand of China and Middle East geopolitical tensions and speculative investment in commodity markets (Dallas Federal Reserve, 2024). India's synthetic textile sector experienced a sustained cost surge across the entire chain of feedstock. Polypropylene fibre cost nearly four times, polyester raw material cost more than doubled, and Surat mills faced severe margin compression as yarn input costs rose much faster than fabric selling prices could adjust (Advanced Textile Association, 2008). This period confirmed a key structural feature of India's supply chain with no crude domestic crude production buffer and RIL as the sole large-scale PTA and MEG supplier, upstream cost rose had no absorptive structure and was passed directly downstream. In India PSF prices, which averaged at Rupees 91.5 per kg over the period reflected this sustained feedstock cost pressure with price reaching at rupees 155 kg at peak 2013 following the post 2008 crude oil recovery (CEIC, 2018).

Another evidence episode of 2021 - 2022 Russia and Ukraine war crisis provides the most well documented granular prove of rapid upstream shock transmission in India's synthetic supply chain. Brent crude surged from \$40 per barrel in early 2021 to \$120 per barrel in March 2022, RIL revised PTA and MEG price in continually. Paraxylene prices surge 75 percent year on year in Q1 FY22 and PTA rose to 74 percent YoY (Textile Value chain, 2021). By October 2022, Reliance fixed PTA at the Rupees 87.80 per kg up rupees 3.70 in a single revision with new pricing effective within days (Alchempro, 2022). Fiber2Fashion (2022) confirms: "Crude

oil, the source material of the product, had seen a slant rise after the Russian invasion of Ukraine”, causing consecutive PSF price increase at Surat based mills. Both episode confirms that the synthetic supply chain of India function as a close to or near-direct price relay for global crude oil movements. Three structural factors drive this: i). India’s near total crude import dependency eliminates any domestic buffer. ii). RIL’s dominant PTA or MEG position enables rapid industry-wide pass-through. iii). Fragmented weaving units of Surat have no pricing power to resist upstream cost increases (Qiu et al; CRISIL MI&A, 2022).

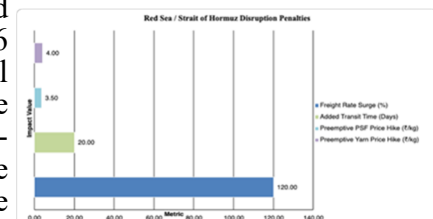
Theme 2: Asymmetric Downward Pass-Through

Whenever global crude oil prices fall, cost relief does not equally reach to the downstream. Unlike theme 1, downstream adjustments are absorbed by upstream producers through retention of margin, import duties and concentrated market structure that leaves very small and limited benefits to small weavers. Brent crude prices collapsed from \$100 per barrel in 2014 to \$28 per barrel, yet India’s synthetic textile manufacturer received very minimal relief. Industry sources noted that “*While crude oil prices have been falling, it is not getting translated into fall in polyester raw material and yarn prices. There is a disparity in the prices of crude oil and polyester raw materials like PTA and MEG*” (Yarns and Fibers, 2014). Domestic PTA/MEGH prices stayed surged reason being RIL’s pricing discretion and government import duties, which created a protective floor regardless of global crude levels (Appreal Resources India, 2014). McKinsey & Co (2015) confirms that this as a global pattern upstream producers absorbed saving rather than passing it to the downstream. In 2020 Brent crude averaged to the \$40 per barrel, briefly pivoted negative in April 2020. India’s MMF sector output declined 18.2 percent year on year in April to December of 2020, polyester filament yarn exports took a hit 29.1 % to 329,000 tonnes (Textile Value chain, 2020). In markets, crude was cheaper but Surat production halted entirely under lockdown, which eliminated any benefit. Further in late 2020, polyester raw material cost rose 12 to 18 percent in December alone, wiping out the brief low cost window before mills could recover (Wazir Advisors, 2020). Episodes above confirm that structural asymmetry- price spikes transmit fully and rapidly to the downstream actors, whereas price down transmits slowly and partially. RIL’s pricing discretion duty on imports of PTA/MEG and demand side collapses create a chronic one way bias that advantages Surat’s small weavers regardless of oil price direction (CRISIL MI&A, 2022).

Theme 3: Geopolitical Uncertainty as an Independent Disruptor

Geopolitical conflicts disrupt India’s synthetic textile supply chain through behavioural changes in procurement. The threat of supply interruption from sanctions, war, maritime blockades) alters the sourcing patterns, shortens the contracts and changes inventory behaviour even before the prices changes its position in the markets (Bednarski et al., 2025). Iran used to supply approx 12 percent of India’s crude oil imports before the US and EU sanctions escalated in 2011-2012. Indian refiners immediately redirected procurement toward other states of Arab, Kuwait and Saudi Arabia not because that price spiked but because supply certainty collapsed overnight (E-International Relations, 2012). MRPL cut the earlier decided and planned imports by 44 percent whereas the BPCL choose to increase its Saudi imports by 27 percent in the same year. Restructuring was driven solely by geopolitical uncertainty. For India’s MEG dependent polyester industry. Change added logistics cost due to difference between the proximity of alternatives and IRAN.

Houthi Rebels are terrorists group based in Yemen. Attacked shipping routes surged the freight rates over 120 percent and increased 15 to 20 days to Europe-India transit times (Moneycontrol, 2026). Ongoing US - Israel - Iran conflict and its closure of the Strait of Hormuz since late February 2026 represent the most recent materialisation of the geopolitical uncertainty as a supply chain disruptor. Nearly a quarter of the world’s oil trade passes through this narrow 33 km length area. For India’s synthetic textile supply chain specifically, the crisis triggered third consecutive weekly PTA/MEG price



hikes, with PSF rising INR 3.50/kg and polyester yarn rising INR 4/kg confirming that geopolitical uncertainty, even absent formal supply collapse, independently drives procurement costs and supply chain instability (Fibre2Fashion, 2026). Both episodes confirm geopolitical uncertainty as an **independent disruptor** - precautionary sourcing shifts, contract shortening, and freight cost inflation occur as risk responses before prices formally move. As India's Petroleum Minister stated: "*oil geopolitics is no longer episodic; India must plan for permanent volatility*" (Down to Earth, 2026). For India's synthetic textile sector, this uncertainty premium is a **permanent structural cost**, not an episodic event.

6. Discussion

The literature gathered across three thematic layer offers a very direct answer. This also implies that industries are very connected to each other, the oil especially impacts the day to day life of human being in this 21st century. Here in the case of textile industry of India the surge in price impacts the manufacturers down the stream very fast but when there is fall in prices it doesn't much benefit passed on to them. India's exposure here particularly is the convergence of import dependence on the gulf oil, depreciating rupee during the crisis period and an structure of the industry where the feedstock comprises the dominant share of the expenses incurred in production it eventually leaves firm with the limited capacity to absorb shocks. Episodes like Russia-Ukraine and Iran war shows the uncertainty itself. For policymakers and industry stakeholders, the central takeaway is unambiguous: oil price volatility and geopolitical risk are no longer episodic concerns or a single event to be managed reactively, but permanent structural features of India's synthetic textile sector that require long-term strategic planning.

7. Conclusion

This paper confirms that crude oil price volatility and it actually act as primary and compounding disruptor. The original contribution of this study lies in identifying geopolitical uncertainty as independent structural disruptor that triggers the supply chain even *before* crude prices formally move a mechanism previously underexplored in the context of India's synthetic textile sector. The study is limited by its qualitative methodology, providing a interpretive rather than statistically generalisable findings. Future research can consider the quantitative econometric modelling to measure the lag between geopolitical risk indices and polyester yarn price movements in India and also extend the analysis to natural fibre supply chains to examine whether the same vulnerability channels operate across the broader textile sector.

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