International Journal of Health Technology and Innovation
An Official Journal of **Kalam Institute of Health Technology** | ISSN - **2583-8547**

RESEARCH ARTICLE

Impact on the MedTech Sector in India due to the Iran War

Reeti Basu*, Hema Sundar, Kavita Kachroo, Jitendra Sharma
Kalam Institute of Health Technology, India

Received: 18th May , 2026; Revised: 19th June, 2026; Accepted: 21th July, 2026; Available Online: 14th August, 2026

ABSTRACT

Objective: This study evaluates the potential impact of an Iran-related geopolitical conflict, particularly disruptions to the Strait of Hormuz, on India's medical technology (MedTech) sector by examining its effects on imports, exports, supply chains, logistics costs, and domestic manufacturing.

Methods: Monthly data covering January 2014 to January 2026 (145 observations) were compiled from UN Comtrade, the U.S. Energy Information Administration (EIA), the Reserve Bank of India (RBI), the Ministry of Statistics and Programme Implementation (MoSPI), and the Baltic Exchange. Two Ordinary Least Squares (OLS) regression models were estimated to analyse the relationship between India's MedTech imports and exports and five explanatory variables: global oil prices, USD/INR exchange rate, GDP growth, freight cost index, and geopolitical sanctions. Four conflict-intensity scenarios (Baseline, Low, Medium, and High) were simulated, followed by a 12-month forecast of trade flows under baseline and war conditions.

Results: The regression models demonstrate strong explanatory power ($R^2 = 0.887$ for imports and $R^2 = 0.896$ for exports). Exchange rate depreciation and rising crude oil prices emerge as the dominant transmission channels through which geopolitical conflict affects India's MedTech trade. Under the High-Intensity conflict scenario, projected monthly MedTech import expenditure increases from USD 619.87 million to USD 991.57 million, representing an increase of approximately 60%, primarily due to higher energy, logistics, and freight costs. The 12-month forecast estimates cumulative import losses of approximately USD 797.5 million and export losses of approximately USD 149.8 million relative to the baseline scenario. The study further identifies significant vulnerabilities across seven MedTech HSN categories arising from disruptions in polymers, semiconductors, specialty metals, rare earth elements, and medical textile supply chains.

Conclusion: India's MedTech sector remains highly vulnerable to geopolitical disruptions because of its dependence on imported medical devices, components, and raw materials. Strengthening domestic manufacturing, diversifying supply sources, establishing strategic inventories, improving foreign exchange risk management, and enhancing supply-chain resilience are essential to reducing future geopolitical risks and ensuring uninterrupted access to critical healthcare technologies.

Keywords: Geopolitical Disruptions, Medical Technologies, Global Supply chains, Iran conflict 2026, Strait of Hormuz, Supply-chain resilience, Trade flows

International Journal of Health Technology and Innovation (2026)

How to cite this article: Basu R, Sundar H, Kachroo K, Sharma J. Impact on the MedTech Sector in India due to the Iran War. International Journal of Health Technology and Innovation. 2026;5(2):49-58.

Doi: 10.60142/ijhti.v5i02.08

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

A military conflict involving Iran poses a systemic threat to India's medical device sector, transmitting shocks through multiple economic channels that have historically destabilized Indian markets during prior geopolitical crises. From a theoretical perspective, the supply-side shock framework explains how disruptions to critical inputs elevate production costs and constrict output, while imported inflation theory accounts for the transmission of global price increases into domestic markets through currency depreciation (Blanchard & Gali, 2007). India's medical device sector, currently valued at approximately USD 15.35 billion as of 2023(IBEF Website) and reliant on imports for a percentage of 75-80 of its domestic consumption, is uniquely vulnerable to such shocks. The sector's supply chain is precariously structured, with specialized components, electronic sub-assemblies, and finished high-end devices sourced predominantly from international markets. A war closing the Strait of Hormuz, through which a substantial portion of India's maritime trade transits, would trigger freight and insurance cost escalations mirroring those witnessed during the Russia-Ukraine conflict, when shipping container rates from Asia to Europe surged by

**Author for Correspondence: reeti.basu@kiht.in*

more than 300% and war risk insurance premiums rendered certain routes commercially unviable (Export-Import Bank of India, 2022). Simultaneously, raw material costs would rise sharply; medical devices rely on specialized polymers, electronic components, and semiconductor inputs, the latter already rendered volatile by supply chain disruptions originating from geopolitical tensions. The Israel-Hamas conflict of 2023 demonstrated how Middle East instability can elevate crude oil prices by over 5% within weeks, with cascading effects on transportation costs and petrochemical-based raw materials essential for disposable medical devices (Dr. Sumana B K, 2024). From an import- export perspective, India's medical device trade balance would deteriorate significantly. While India has developed export capabilities in consumables and surgical instruments, with exports to West Asia valued at over USD800 million annually, these markets would contract as regional purchasing power diminishes and healthcare budgets are redirected toward conflict-related exigencies. The decline in the Middle East market is particularly consequential, as Gulf Cooperation Council countries represent one of the fastest-growing destinations for Indian pharmaceutical and medical device exports. The Russia-Ukraine conflict provided a cautionary precedent: sanctions and payment disruptions forced Indian exporters to seek alternative payment mechanisms, including rupee-rouble settlements, while facing prolonged delays in receivables (Export-Import Bank of India, 2022). For Indian medical device manufacturers, a similar scenario with Iran will involve blocked payment channels, disrupted shipping lines, and erosion of established distribution networks. Additionally, the Israel-Hamas war illustrated how conflicts in the region can affect India's defense and technology collaborations; by extension, an Iran war would disrupt partnerships with Israeli medtech firms, key players in areas such as diagnostic imaging, surgical robotics, and digital health, with whom Indian companies have established joint ventures and technology transfer agreements (Dr. Sumana B K, 2024). The cumulative effect, therefore, would be a multi-dimensional squeeze on India's medical device sector: elevated import costs, restricted access to critical components, diminished export markets, and constrained capital availability as foreign investors retreat from emerging market exposures. Thus, while India's broader economy has demonstrated resilience to previous Middle East conflicts, the structural dependencies of the medical device sector render it disproportionately susceptible to the comprehensive disruption that an Iran war would entail.

LITERATURE REVIEW

Yoganandham and Kareem (2023) examined the impact of the Israel-Hamas conflict on the Indian economy, identifying rising global crude oil prices as the primary transmission mechanism. As a net importer of oil, India faces elevated import costs, a widening current account deficit, inflationary pressures, and a weakening rupee, with government subsidies potentially expanding the fiscal deficit. The study identifies several industrial sectors as particularly vulnerable: oil-import-dependent industries such as chemicals, paints, tires, and aviation face import-led inflation due to their reliance on crude oil derivatives; the agricultural sector encounters logistical challenges at key ports while potentially gaining opportunities for oilseeds and cereal exports; and financial markets experience investor anxiety, stock market declines, and capital outflows, prompting consideration of technology-driven trade finance solutions. In summary, the Israel-Hamas war acts as an external shock to India's economy, primarily through volatile oil prices, with pronounced effects on import-dependent sectors and financial markets.[1]

(Yoganandham & Kareem, 2023). Smyrnov *et al.* (2025) examine how geopolitical risks, including international conflicts, economic sanctions, political instability, and trade wars, disrupt global supply chains, causing significant operational and strategic challenges for multinational corporations. The study identifies several key drivers of disruption: the Russia-Ukraine war has disrupted energy markets and agricultural exports, leading to increased logistics costs and threatening global food security; US-China trade tensions have resulted in tariffs and technological decoupling, forcing companies to restructure electronics and technology supply chains; and climate change has increased the frequency of extreme weather events that damage infrastructure and disrupt production. The authors note that these geopolitical events create immediate disruptions such as delivery delays, production shutdowns, and rising transportation costs, while in the long term they compel structural changes in the geography and configuration of international trade, prompting firms to diversify suppliers and seek alternative logistics routes. To address these challenges, Smyrnov *et al.* (2025) emphasize the need for flexible, adaptive, and resilient supply chain management strategies, including investment in automation, digitalization, and real-time risk monitoring, a trend reflected in the rapidly growing supply chain management software market. The authors conclude that geopolitical risks are likely to intensify, requiring companies and governments to prioritize diversification, infrastructure investment, and sustainable practices to enhance long-term resilience in an increasingly uncertain global environment.

Complementing this,[3] Ohikhuare (2023) empirically identifies strong spillover connectedness between oil and foreign exchange markets, showing that war- related volatility in oil markets amplifies exchange rate instability, particularly for oil-importing nations such as India. Taghizadeh-Hesary and Yoshino (2020) further establish that monetary policy shocks and elevated oil prices jointly drive rupee depreciation, an insight corroborated by the Reserve Bank of India's (2024) Report on Currency and Finance, which notes that a USD10/bbl oil increase typically worsens India's current account deficit by about 0.4% of GDP.[4-5] The interplay between geopolitical conflict and global supply chains has been extensively examined in maritime economics literature. Georgiou (2023) provides a detailed analysis of how the Russia-Ukraine war disrupted tanker freight markets, offering a framework for understanding how conflicts affecting strategic maritime regions can impact trade-dependent sectors such as India's medical devices industry.[6]

Georgiou (2023) demonstrates that war conflicts fundamentally alter shipping economics through multiple channels. Analyzing Baltic Exchange indices for routes involving Russian ports (TD6 from Novorossiysk and TD17 from Primorsk), the study reveals that freight rates experienced unprecedented volatility following the February 2022 invasion. For instance, the TD6 route (Black Sea to Mediterranean) saw Worldscale percentages surge from 97.78 on February 24, 2022, to 229.44 on February 25, 2022, with Time Charter Equivalent (TCE) values increasing more than eightfold within a single day (Georgiou, 2023, pp. 68–69). Similarly, the TD17 route (Baltic to UK-Continent) recorded a tenfold increase in TCE values between February and March 2022. These spikes were attributed not only to supply-demand imbalances but also to risk premiums embedded in freight rates.

Crucially, Georgiou (2023) identifies that routes not directly involving Russian or Ukrainian ports, such as the TD20 route from West Africa to UK- Continent also experienced significant freight rate increases, with average World- scale % rising from 57.92 in 2021 to 122.50 in 2022. This indicates a contagion effect, whereby regional conflicts elevate shipping costs globally as vessels are rerouted, insurance premiums rise, and supply chains undergo structural reconfiguration.

Insurance and Risk Premiums

A critical insight from Georgiou's (2023) analysis pertains to the role of war risk insurance in escalating transportation costs. The study documents that following the Joint War Committee's designation of Black Sea waters as listed areas, additional war risk premiums for calling at Russian ports such as Novorossiysk reached approximately USD 650,000 per voyage for a Suezmax tanker. By contrast, premiums for ports outside conflict zones remained substantially lower. This disparity in insurance costs creates a tiered freight market where cargoes originating from or transiting through conflict- adjacent regions bear significantly higher logistics expenses. The strategic importance of the Strait of Hormuz is well established in maritime geography. As documented by Georgiou (2023) in the context of the Black Sea, the Joint War Committee periodically updates and disseminates Listed Areas, regions designated as high-risk where vessel calling requires notification to underwriters and attracts additional war risk premiums. The Strait of Hormuz, through which a substantial proportion of global seaborne oil trade transits, represents a critical maritime chokepoint. Historical precedents, including tanker attacks and vessel seizures in the region, have previously prompted insurance market responses and elevated risk assessments.[6]

Drawing on Georgiou's (2023) analysis of how the Joint War Committee responded to the Russia-Ukraine conflict by designating Black Sea and Sea of Azov waters as listed areas, it is possible that any escalation affecting the Strait of Hormuz would likely result in similar designation. The author's documentation of premium differentials between high-risk and low-risk ports provides a framework for understanding the magnitude of cost escalation that could arise if such designation occurred.[6]

Implications for the Indian Medical Devices Market.

The findings of Georgiou (2023), when examined alongside the established vulnerability of maritime chokepoints, reveal multiple channels through which India's medical devices sector could be affected.[6]

Maritime Transit Routes

India imports a substantial proportion of its high- end medical devices, including diagnostic equipment, petrochemical substances such as polyvinyl chloride, polypropylene, polyethylene, and polycarbonate for manufacturing surgical instruments, and hospital infrastructure components, from Europe, the United States, and Israel. Many of these imports traverse maritime routes that navigate the Strait of Hormuz when transiting from the Mediterranean or European ports to India via the Suez Canal and the Red Sea. Similarly, vessels from East Asian or Southeast Asian suppliers utilizing the Strait of Malacca also transit the Strait of Hormuz to reach Persian Gulf ports. Georgiou's (2023) analysis of the TD20 route demonstrates that even shipping routes not directly involving conflict zones experienced significant freight rate increases due to market contagion, suggesting that disruptions in a major chokepoint would have far-reaching effects on freight costs across interconnected maritime routes.[6]

Supply Chain Rerouting and Transit Times

Georgiou (2023) notes that the Russia-Ukraine conflict forced shipping companies to reroute vessels away from the Black Sea, leading to longer transit times and increased operational costs. In the context of the Strait of Hormuz, any event prompting designation as a listed area would similarly compel carriers to assess risk exposure. Unlike the Black Sea, however, the Strait of Hormuz represents a chokepoint with limited commercially viable alternatives. Vessels avoiding the Strait would be required to undertake substantially longer routes, such as circumnavigating the Cape of Good Hope, adding considerable transit time. Such rerouting would extend shipping times for medical device imports to India, with potential implications for just-in-time inventory systems that hospitals and medical device distributors rely upon.[6]

Import Costs and Healthcare Expenditure: The cascading effect of elevated freight rates and insurance premiums on import costs is well-illustrated by Georgiou's (2023) freight calculations. The author demonstrates that a voyage from Primorsk to Wilhelmshaven generated significant profit increases due to rate spikes following the conflict, which simultaneously increased the landed cost of cargo. For India's medical devices sector, which depends on imports for a significant proportion of high-technology medical equipment, increases in maritime logistics costs would translate into higher procurement expenses for hospitals, diagnostic centers, and healthcare providers. Georgiou's analysis of the TD20 route (West Africa to UK-Continent) demonstrates that even routes not directly involving conflict zones experienced significant cost increases due to market contagion, indicating that importers may face elevated logistics costs regardless of whether their specific supply chains directly transit a conflict-affected area. Supply Chain Diversification Considerations: Georgiou (2023) observes that the Russia-Ukraine war led European importers to diversify crude oil sources away from Russia, increasing demand for West African and Middle Eastern crude. This structural shift in trade patterns reflects the broader principle that geopolitical disruptions accelerate supply chain diversification. India maintains bilateral trade linkages with Israel in the medical technology sector, with Israeli companies active in digital health, surgical robotics, diagnostic imaging, and cardiovascular devices. Any significant disruption to maritime routes connecting these trade partners would necessitate consideration of alternative sourcing arrangements, process that would entail switching costs, regulatory considerations, and supply chain reconfiguration.[6]

Currency and Cost Interactions

Georgiou's (2023) analysis, while focused on freight indices, operates within a framework where maritime freight is denominated in US dollars. The author's documentation of freight rate spikes highlights that importers in countries with floating exchange rates face compounded cost pressures when freight rates rise. For India, elevated maritime logistics costs intersect with currency dynamics, as increased import bills can influence exchange rate movements, further affecting the landed cost of dollar-denominated medical device imports.[6]

METHODOLOGY

This study quantifies the potential impact of an Iran-related geopolitical conflict on India's medical technology (medtech) trade. Using monthly data from January 2014 to January 2026, the model estimates the sensitivity of India's medtech imports and exports to key macroeconomic and geopolitical variables, simulates four scenarios of war intensity (Table 1), and provides a 12-month forecast with confidence intervals (Table 3).

Data Source And Samples

The dataset comprises 145 monthly observations from January 2014 to January 2026. The following HSN Code was considered from UN Comtrade:

- HSN Code- 9018: Instruments and appliances for medical, surgical, dental use
- HSN Code- 9019: Mechano-therapy appliances, massage apparatus, respiratory equipment
- HSN Code- 9020: Breathing appliances and gas masks
- HSN Code- 9021: Orthopaedic appliances, surgical implants, hearing aids
- HSN Code- 9022: X-ray, CT scan, radiation apparatus
- HSN Code- 3005: Wadding, gauze, bandages and medical consumables
- HSN Code- 3006: Pharmaceutical goods (catheters, diagnostics, etc.)

Data Sources Include

- India Medtech Imports (Y1) and Exports (Y2) [Data collected from IBED/UN Comtrade]- (USD million/month)- Dependent variable for Import model (Model A) and Export Model (Model B)
- Global Oil Price (X1) [Data collected from U.S Energy Information Administration (EIA)] - Proxy for war-related supply shocks
- USD/INR Exchange Rate (X2) [Reserve Bank of India (RBI)] - Currency Transmission Channel
- India GDP Growth (X3) [Data Collected from Ministry of Statistics and Programme Implementation (MoSPI)/World Bank]- Domestic Demand Driver
- Freight Cost Index (X4) [Data Collected from Baltic Exchange]- Logistics Cost Pressure
- Sanctions Dummy (X5): X5= 0 [No Sanctions, 1= Sanctions active], Geopolitical Shock indicator

Econometric Approach

Two separate ordinary least squares (OLS) regression models were estimated:

- Model A: Y1 (Imports) as a function of X_1-X_5
- Model B: Y2 (Exports) as a function of X_1-X_5 The regression equations are:
- $Y_t = \beta_0+\beta_1(X_1t)+\beta_2(X_2t)+\beta_3(X_3t)+\beta_4(X_4t)+\beta_5(X_5t)+\epsilon(1)$

Diagnostic Testing

To validate model assumptions, the following diagnostic tests were conducted:

- Variance Inflation Factor (VIF)- The purpose of VIF is to detect multi- collinearity. VIF of less than 5 indicates low multicollinearity
- Durbin- Watson Test- The purpose of DW Test is to detect serial Auto- correlation. Values near 2.0 indicates no autocorrelation
- Breusch-Pagan- The purpose is to detect heteroskedasticity. $p > 0.05$ suggests homoskedasticity
- Jarque-Bera Test- This is a test to understand the normality of residual. $p > 0.05$ indicates normal distribution
- While residuals are normally distributed, the presence of heteroskedasticity and autocorrelation is noted, suggesting that while coefficients remain unbiased, standard errors may be affected. Robust standard errors are recommended for formal inference.

Additional robustness tests were conducted to address potential time-series issues identified. Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit-root tests were performed to assess the stationarity of all variables. Where variables were found to be **integrated of order one**, Johansen cointegration tests were undertaken to examine the existence of long-run equilibrium relationships. To account for heteroskedasticity and autocorrelation, the regression models were re-estimated using Newey–West heteroskedasticity and autocorrelation consistent (HAC) standard errors. These

Table 1: Scenario Framework

Metric	*Baseline*	*Low Intensity*	*Medium Intensity*	*High Intensity*
Medtech Imports (USD mn/month)	619.87	671.86	777.95	991.57
Medtech Exports (USD mn/month)	282.12	311.00	369.26	485.65
Δ Imports vs Baseline (USD mn)	–	+51.99	+158.08	+371.70
Δ Exports vs Baseline (USD mn)	–	+28.89	+87.14	+203.53
% Change — Imports	–	8.4%	25.5%	60.0%
% Change — Exports	–	10.2%	30.9%	72.1%

robustness checks improve the reliability of statistical inference while preserving the original model specification.

Scenario Analysis

Four war intensity scenarios are defined based on assumptions about how each independent variable would change uner escalating conflict (Table 1). These assumptions are applied to the OLS coefficients to compute projected monthly import and export values for each scenario (Table 2). Changes relative to the baseline are expressed in absolute and percentage terms.

Forecasting Method

The Forecast projects medtech trade for the 12 months from February 2026 to January 2027 using a trend-based growth model with scenario adjustments (Table 3).

- Baseline forecast: $Forecast_t$ = Base Value x (1 + MonthlyGrowthRate)^t
- War Scenario Forecast: $Forecast_t$= Base Value x (1+Monthly Growth Rate+ Scenario Shock)$_t$
- Confidence intervals: CI= Forecast (+/-)1.96 x RMSE
- Where: Base values are January 2026 actuals (USD 678.8 mn imports, USD 304.1 mn exports)
- Monthly growth rates (0.8% for imports, 1.0% for exports) are derived from historical averages
- Scenario shocks (-1.5% for imports, -0.6% for exports) represent estimated monthly erosion due to war
- RMSE values (39.38 for imports, 20.04 for exports) are taken from the regression models
- Total 12-month trade under both baseline and war scenarios is calculated, along with the estimated war-induced loss.

Note

The baseline value of USD 619.87 million reported in the scenario analysis represents the model-estimated monthly import level under normal (no-war) conditions obtained from the regression model. By contrast, the forecasting exercise uses the actual observed January 2026 import value of USD 678.8 million as the starting point for projecting future trade flows. Thus, the two baseline values serve different analytical purposes and are not directly comparable.

Limitations

Although the principal findings remain robust under HAC-corrected estimation, the regression framework should not be interpreted as establishing strict causal relationships. Oil prices, exchange rates, and freight costs are jointly determined in global markets, giving rise to potential endogeneity and simultaneity. While the present study employs robustness checks to improve statistical inference, future research may adopt Vector Autoregressive (VAR), Structural VAR (SVAR), or Autoregressive Distributed Lag (ARDL) models to examine dynamic interactions more comprehensively.

RESULT AND FINDINGS

Stationarity And Cointegration Diagnostics

To assess the validity of the level-based regression models, Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests were performed on all variables. The results indicate that MedTech imports, exports, the USD/INR exchange rate, GDP growth, and the freight index are non-stationary in levels but become stationary after first differencing, indicating integration of order one (I(1)). Oil prices exhibited mixed evidence in levels but were clearly stationary after first differencing. Johansen cointegration analysis suggests the existence of a long-run equilibrium relationship among the variables, supporting the use of long-run modelling while acknowledging the limitations of level-based OLS estimation.

Ols Regression Results

Both models achieve strong explanatory power (R^2 = 0.8873 for imports and R^2 = 0.8963 for exports), indicating that the five macro-geopolitical variables collectively explain approximately 89% of the monthly variation in India's MedTech trade across the study period. The regression provides the empirical backbone for assessing how the Iran war and specifically a closure of the Strait of Hormuz, would transmit into India's medtech supply chain costs (Table 2).

USD/INR is the dominant driver. A one-unit rupee depreciation adds USD 13.49 mn/month to the import bill and USD 7.2362 mn to exports. This is the primary channel through which an Iran conflict transmits into India's medtech costs, a war-driven oil shock triggers capital outflows, weakens the rupee, and inflates the landed price of every imported device.

Oil price is the primary war proxy. Every USD 1/bbl rise adds USD 0.3084 mn/month to imports. The Strait of Hormuz handles roughly 20% of global oil trade. An Iranian closure, whether through naval blockade, mining, or direct military action would trigger an immediate and severe oil price spike, driving the USD 150-220/bbl range modelled in the Medium and High Intensity scenarios (Table 1) and delivering the largest single shock to India's medtech import costs

Freight cost amplifies the disruption. A Hormuz closure would force tankers and cargo vessels onto longer alternative routes, sharply pushing up the freight index. Iran has also threatened to activate Houthi capabilities in Yemen to disrupt the Bab-

Table 2: OLS Regression Analysis

Parameter	*Baseline (No War)*	*Low Intensity War*	*Medium Intensity War*	*High Intensity War*
Oil Price (USD/bbl)	82	110	150	220
USD/INR Exchange Rate	86.5	89.0	95.0	108.0
India GDP Growth (% annual)	6.3%	5%	3.5%	1.5%
Freight Cost Index	108	145	195	260
Sanctions Dummy (0 = No, 1 = Yes)	1	1	1	1

Table 3: Monthly Forecast

Month	*Imports Baseline*	*Imports War Scenario*	*Imports Lower 95%*	*Imports Upper 95%*	*Exports Baseline*	*Exports War Scenario*	*Exports Lower 95%*	*Exports Upper 95%*
Feb-2026	684.2	674.0	596.9	751.2	307.1	305.3	266.0	344.6
Mar-2026	689.7	669.3	592.1	746.5	310.2	306.5	267.3	345.8
Apr-2026	695.2	664.6	587.5	741.8	313.3	307.8	268.5	347.0
May-2026	700.8	660.0	582.8	737.2	316.4	309.0	269.7	348.3
Jun-2026	706.4	655.4	578.2	732.6	319.6	310.2	271.0	349.5
Jul-2026	712.0	650.8	573.6	728.0	322.8	311.5	272.2	350.8
Aug-2026	717.7	646.2	569.0	723.4	326.0	312.7	273.4	352.0
Sep-2026	723.5	641.7	564.5	718.9	329.3	314.0	274.7	353.2
Oct-2026	729.3	637.2	560.0	714.4	332.6	315.2	275.9	354.5
Nov-2026	735.1	632.8	555.6	709.9	335.9	316.5	277.2	355.8
Dec-2026	741.0	628.3	551.1	705.5	339.3	317.8	278.5	357.0
Jan-2027	746.9	623.9	546.7	701.1	342.7	319.0	279.7	358.3
TOTAL (12-month sum)	8,581.8	7,784.3	6,858.1	8,710.5	3,895.3	3,745.5	3,274.1	4,216.8
WAR LOSS vs BASELINE	-	-797.5	-	-	-	-149.8	-	-

el-Mandeb strait as a secondary

pressure point, which would compound freight costs further by closing both key Red Sea and Gulf entry routes simultaneously. Combined, these shipping disruptions could push the freight index from 108 to the 195-260 range, adding USD 15-27 mn/month to import costs through this channel alone.

The sanctions dummy is not statistically significant (p = 0.21 for Imports and 0.19), reflecting India's historical tendency to maintain trade continuity through third-country arrangements even during active sanctions regime.

Because the diagnostic tests indicated heteroskedasticity and autocorrelation, the regression models were re-estimated using Newey–West HAC standard errors. The corrected estimates confirm that the principal conclusions of the study remain unchanged. Exchange rate depreciation and freight costs continue to exert statistically significant effects on India's MedTech trade, whereas GDP growth loses statistical significance after correction. The sanctions dummy remains statistically insignificant in both models, indicating that the principal transmission channels continue to be oil prices, exchange rates, and logistics costs.

Scenario Analysis Findings

The projected increase in trade values with escalating conflict does not imply that war boosts trade. It reflects nominal cost inflation: oil and currency depreciation raise the USD price tag on the same or fewer physical units (Table 2). The High Intensity scenario implies India would spend USD 372 mn more per month on medtech imports, a 60% cost premium over baseline, driven almost entirely by oil price and rupee effects.

12-Month Forecast (February 2026 - January 2027)

The twelve-month forward forecast is constructed from the January 2026 anchor values- medtech imports at USD 679 mn/

Table 4: Supply Disruption Risk Matrix by HSN Code (Severity: 1=Negligible, 5=Critical)

HSN	*Product Category*	*Import Dependency*	*Risk Severity (1–5)*	*Est. Cost Impact*	*Mitigation Lever*
9018	Surgical instruments & diagnostic equipment	75–80%	4 / 5 - High	+25-40% unit cost	PLI acceleration; SS import hedging
9019	Mechano-therapy / respiratory devices	60–70%	4 / 5 - High	+20-35% unit cost	Domestic PP sourcing; buffer stock
9020	Breathing apparatus / gas masks	55–65%	3 / 5 - Moderate	+20-30% unit cost	Increase strategic inventory
9021	Orthopaedic implants / hearing aids	80–85%	5 / 5 - Critical	+30-50% unit cost	Diversify titanium sourcing; R&D investment
9022	X-ray / CT / radiation equipment	90%+	5 / 5 - Critical	Severe availability risk	Domestic REE refining policy push
3005	Wound dressings / gauze / bandages	20-30%	2 / 5 - Low	+15–25% unit cost	Domestic cotton advantage; hedge PP non-wovens
3006	Catheters / diagnostics / pharma goods	70-75%	4 / 5 - High	+25–35% unit cost	Long-term polymer contracts

month and exports at USD 304 mn/month- using a compound growth model that applies separate monthly growth rates for the baseline and war scenarios. This section presents the full monthly trajectory, explains the mechanics of the forecast, and justifies the shock assumptions used.

Baseline trajectory

The baseline assumes India's medtech trade continues its long-run secular growth trend in the absence of conflict. Based on the trajectory observed across January 2014 –January 2026 period in the dataset, a monthly import growth rate of 0.8% and a monthly export growth rate of 1.0% are applied. These are conservative estimates consistent with India's expanding healthcare infrastructure, rising domestic demand for medical devices, and the growing export competitiveness of Indian medtech manufacturers. Over twelve months, these rates compound to approximately 10% annual import growth and 12.7% annual export growth, both within the range observed in the historical data.

War scenario shock

The war scenario applies a net monthly shock of 1.5% to imports and 0.6% to exports, on top of the baseline growth rate. These shocks represent the combined effect of the macroeconomic disruptions modelled in the scenario analysis (Table 1). a Hormuz- driven oil price spike inflating landed costs, a weakening rupee raising the rupee cost of all USD-denominated procurement, and rising freight indices from route diversions. The result is a net monthly growth rate of 0.7% for imports (0.8% baseline 1.5% war shock) and +0.4% for exports (1.0% 0.6%), meaning imports actively contract month-on-month under war conditions while exports continue to grow but at a significantly reduced pace. Confidence intervals. The 95% confidence bands are constructed as ±1.96 × RMSE around the war scenario trajectory, using the model RMSE of USD 39.38 mn for imports and USD 20.04 mn for exports. These bands reflect the residual uncertainty in the OLS model. In practice, the true uncertainty over a twelve- month conflict horizon would be wider than these bands suggest, as the shock parameters themselves are subject to revision.

Monthly Forecast Table

Divergence is gradual but compounds rapidly. In February 2026 the import gap is only USD 10.2 mn (1.49%). By July 2026 it has widened to USD 61.0 mn (8.5%), and by January 2027 it reaches USD 123 mn, a 16.5% shortfall against baseline. This compounding pattern is one of the most important findings of the forecast: the longer a Hormuz disruption persists, the more damaging the cumulative cost, and the harder it becomes for procurement pipelines to absorb the shortfall.

Cumulative import loss of USD 797.5 mn over 12 months. Across all twelve months, the war scenario projects total medtech imports of USD 7,784.3 mn(Table 3). against a baseline of USD 8,581.8 mn. This represents foregone procurement capacity equivalent to roughly 1.2 months of India's current monthly import baseline. Critically, this is not merely an accounting shortfall, it translates into real gaps in the availability of diagnostic equipment, surgical instruments, and critical care devices at a time when a conflict scenario may simultaneously generate increased healthcare demand and further disrupt regional supply networks. Export suppression is smaller but strategically significant. The war scenario projects cumulative exports of USD 3745.5 mn against a baseline of USD 3,895.3 mn, a loss of USD 149.8 mn over twelve months. India's medtech exports have grown at close to 10% annually over the past decade, and export relationships in markets like Southeast Asia, Africa, and the Middle East depend on supply reliability. A sustained period of disrupted logistics and compressed margins could erode market share that takes years to rebuild. By January 2027, the monthly export gap reaches USD 20.5 mn.

The confidence bands reveal material downside risk. The 95% lower bound for January 2027 imports is USD 546.7 mn, representing a scenario 20% below the January 2026 anchor of USD 678.8 mn. This is not a tail event; it sits within the normal confidence range of the OLS residuals. It underscores the structural vulnerability of India's medtech supply chain to a prolonged Hormuz closure, particularly if the shock proves more severe than the modelled 1.5% monthly parameter. Why do exports remain positive under war conditions? A notable feature is that exports continue to grow under the war scenario, albeit more slowly (+0.4% per month vs +1.0% baseline). Indian medtech exports, largely lower-cost devices and consumables sold to developing markets, face relatively inelastic demand. Moreover, rupee depreciation associated with the conflict may temporarily boost price competitiveness for rupee-priced exports, partially offsetting the logistics cost headwind. However, this effect would likely reverse if the conflict prolonged and global growth deteriorated significantly.

Real (Volume) Trade Analysis

Since conflict-driven increases in oil prices and freight costs inflate the nominal USD value of imports, an additional volume-adjusted trade index was estimated using a landed-cost deflator constructed from oil and freight indices. The analysis indicates that although nominal import expenditure increases substantially under conflict scenarios, the estimated real volume of imported medical devices declines progressively as conflict intensity rises. This suggests that India would spend considerably more financial resources while procuring the same or even fewer physical units of medical equipment, reinforcing the economic burden imposed by prolonged geopolitical disruptions.

Raw Material Supply Chain Impact

Beyond the macroeconomic transmission channels identified in the regression analysis, the Iran conflict activates a distinct set of supply-side vulnerabilities rooted in India's dependence on imported raw materials for MedTech manufacturing. The following analysis, structured across five critical input channels and seven HSN product categories, quantifies how a Hormuz closure and associated geopolitical escalation would propagate through India's MedTech production ecosystem.

Critical Raw Material Channels And Conflict Exposure

Five raw material channels account for the majority of Iran-war exposure in India's MedTech supply chain. Petrochemical polymers (PVC, PP, PE, PC, ABS) sourced primarily from Saudi Arabia, the UAE, South Korea, and China face the most direct Hormuz exposure: a closure would disrupt naphtha and ethylene feedstock flows from Gulf petrochemical exporters, pushing polymer benchmark prices from a baseline of USD 1,200/MT to USD 1,440–1,980/MT under Low-to-High conflict scenarios. These polymers are critical inputs for HSN codes 9018, 9020, 3005, and 3006. **Semiconductors and electronics** (microcontrollers, PCBs, ASICs) sourced from Taiwan, South Korea, Japan, and China are exposed to freight disruptions and compounding US-China tensions, with unit costs projected to rise 30–50%. Stainless steel and titanium (medical-grade 316L SS and Ti-6Al-4V) sourced from the EU, Japan, and the USA are exposed through energy cost inflation, with prices projected to rise from a USD 2,800/MT baseline to USD 3,080–3,640/MT. Rare earth elements (gadolinium, neodymium, dysprosium), with over 85% of global refining concentrated in China, represent a severe availability risk for HSN 9022 (imaging equipment), particularly if the Iran conflict triggers US-China escalation and Chinese export curbs. Finally, medical textiles and absorbents (non-woven PP fabric, cotton, rayon) used in HSN 3005 face indirect exposure through the polymer channel, with non-woven PP fabric prices projected to rise from USD 1,800/MT to USD 1,980–2,520/MT.

Supply Disruption Risk Matrix By Hsn Code

Risk severity across the seven HSN codes studied is highly differentiated(Table 4). HSN 9022 (X-ray and CT equipment) carries the highest risk score (5/5): over 90% import dependent, reliant on rare earth elements with China-concentrated supply and semiconductors already under geopolitical pressure. Orthopaedic implants and hearing aids (HSN 9021) are rated equally critical (5/5), driven by titanium alloy and rare earth element dependencies, with projected unit cost increases of 30–50%. Surgical instruments and diagnostic equipment (HSN 9018), respiratory devices (HSN 9019), and catheters and pharmaceutical goods (HSN 3006) each carry a risk score of 4/5, reflecting combined polymer, semiconductor, and freight exposure with projected unit cost increases of 20–40%. Breathing apparatus (HSN 9020) is rated 3/5, with polymer and freight cost spikes expected to raise unit costs by 20–30%. Medical textiles and wound dressings (HSN 3005) present the lowest risk (2/5) owing to India's domestic cotton advantage, though PP non-woven fabric exposure remains a vulnerability, with unit cost increases of 15–25% projected. The table below summarizes risk severity and estimated cost impacts.

Polymer Price Scenario Assumptions

The polymer price projections for each war intensity scenario are derived using directional benchmarks from the Russia-Ukraine conflict (2022) and IEA commodity outlooks. The five key polymers used in MedTech manufacturing, with their January 2026 baselines, India's approximate annual import volumes, and scenario price projections are as follows: Medical-grade PVC (baseline USD 1,350/MT; India imports ~180,000 MT/yr), which is critical for IV bags, catheters, and tubing covered under HSN 3006, is projected to reach USD 1,485/MT under Low Intensity (+10%), USD 1,620/MT under Medium (+20%), and USD 1,890/MT under High Intensity (+40%). Polypropylene (PP; baseline USD 1,100/MT; ~220,000 MT/yr), the largest import volume polymer used in syringes and non-woven fabric, would reach USD 1,210–1,540/MT across scenarios. Polyethylene (PE; baseline USD 1,050/MT; ~150,000 MT/yr) for disposable gloves and packaging would reach USD 1,155–1,470/MT. High-value polycarbonate (PC;

baseline USD 3,200/MT; ~40,000 MT/yr) used in device housings and optical components would reach USD 3,520–4,480/MT. Finally, ABS (baseline USD 1,800/MT; ~25,000 MT/yr) for device casings would reach USD 1,980–2,520/MT. Taken together, the polymer cost shock would impose a structural inflationary burden across all MedTech segments that rely on disposable or polymer-intensive components.

India MedTech Production Impact and Internal Structural Factors

Beyond input cost escalation, the Iran conflict activates a set of internal structural vulnerabilities within India's domestic MedTech manufacturing ecosystem. Production cost increases vary considerably across manufacturer segments. Disposable consumables (IV bags, syringes) produced in Haridwar, Baddi, and Pune face cost increases of 15-20% under Low Intensity and 30-40% under High Intensity, with high margin squeeze risk given price-controlled products and SME-dominated supply chains. Surgical instrument manufacturers in Rajkot, Jalandhar, and the Sialkot-border corridor face 10-15% to 20-30% cost increases, compounded by GCC export market contraction. Diagnostic imaging equipment producers in Pune, Bengaluru, and Hyderabad face the most severe cost increases (20-30% to 40–60%), driven by 90%+ import dependence and the absence of domestic semiconductor supply. Orthopaedic implant manufacturers in Pune, Chennai, and Ahmedabad face 15–25% to 35–50% cost increases due to specialty metal import dependency.

Eight internal structural factors amplify these cost pressures. Manufacturing capacity built under the PLI scheme currently covers only 20-25% of domestic value, and import cost inflation combined with SME working capital stress could trigger output rationalisation within 0-3 months (severity 4/5), addressable through accelerated PLI disbursements and emergency credit lines. Industrial energy costs, stable under current conditions, would spike within 3-6 months as oil at USD 150-220/bbl feeds through to power tariffs for autoclave, cleanroom, and moulding operations (severity 4/5). NPPA price controls on stents, implants, and diagnostics create a margin trap: input costs rise while revenue ceilings are fixed, potentially diverting production toward export markets and creating domestic shortages within 1–3 months (severity 4/5). Working capital and credit conditions would tighten within 1–2 months as risk-off sentiment and rupee depreciation raise import letter-of-credit costs, squeezing small MedTech firms (severity 3/5). Israel technology partnerships in diagnostics, robotics, and digital health would be disrupted within 6–12 months as Iran's conflict draws in Israel, slowing R&D and tech transfer (severity 3/5). GCC workforce and remittance disruptions could create distribution network gaps within 1–3 months (severity 3/5). CDSCO regulatory bottlenecks for new domestic substitutes could delay approvals, though an emergency use authorisation pathway exists (severity 2/5). The most critical factor is strategic buffer stocks: CMSS currently holds only 30–45 days of inventory, and demand surges combined with supply disruptions could produce critical device shortages in government hospitals within 0–3 months, requiring an immediate mandate for 90-day strategic reserves (severity 5/5).

Domestic Production Output Scenario Projections

Domestic production output projections, expressed as percentage changes versus baseline, reveal a strongly differentiated picture by product segment. Imaging equipment (HSN 9022, baseline output USD 30 mn/month) faces the steepest contraction: -10% under Low Intensity, -22% under Medium, and -38% under High Intensity, with a recovery timeline of 18–36 months post-conflict. Orthopaedic implants (HSN 9021, USD 60 mn/month) are similarly vulnerable: -8% to -30%, with a 12–24 month recovery horizon driven by titanium price escalation and NPPA price caps. Respiratory and mechano-therapy devices (HSN 9019, USD 40 mn/month) face -6% to -25% output declines over a 9–18 month recovery period. Catheters and pharmaceutical goods (HSN 3006, USD 70 mn/month) face -6% to -26% declines with a 6–12 month recovery. Surgical instruments (HSN 9018, USD 85 mn/month) face -5% to -22% declines over 6–12 months. Breathing apparatus (HSN 9020, USD 15 mn/month) face -4% to -18% declines over 6–12 months. Medical consumables (HSN 3005, the largest segment at USD 120 mn/month) are most resilient, with declines of only -3% to -15% and a rapid 3–6 month recovery period due to India's domestic cotton supply advantage. These production output projections represent a compounding of the raw material cost pressures identified in Sections 6.1–6.3 with the internal structural vulnerabilities documented in Section 6.4, and should be read alongside the aggregate trade-flow projections in Section 5 to understand the full scope of the Iran conflict's impact on India's MedTech sector.

CONCLUSION

This study demonstrates that an Iran war, operating primarily through a Strait of Hormuz closure, would impose a measurable and escalating cost on India's medtech trade. The OLS model, estimated on 145 monthly observations, identifies oil price and rupee depreciation as the two dominant transmission channels, together accounting for the bulk of the projected import cost increase across all war intensity scenarios. Iran's secondary threat of disrupting the Bab-el-Mandeb strait via Houthi forces would compound the freight burden further, though it remains a supporting shock rather than the primary driver. The scenario analysis projects a monthly medtech import cost of USD 991.57 mn under High Intensity conditions, a 60% premium over the USD 619.87 mn base- line, while the 12-month forecast implies a cumulative import loss of USD 797.5 mn and an export loss of USD 149.8 mn relative to a no-war trajectory. These figures represent real procurement shortfalls, not accounting abstractions, and would directly affect the availability of medical devices in India's healthcare system at a time of heightened regional instability. The findings point to a clear preparedness imperative: strategic stockpiling of import-critical devices, foreign exchange hedging by procurement agencies, freight route diversification away from Hormuz-dependent corridors, and accelerated domestic manufacturing ca- pacity under Make in India. The cost of advance preparation is small relative to the USD 5.8 bn annualised exposure that a full-scale conflict scenario implies.

REFERENCES

1. Yoganandham G, Kareem AA. Impact of the Israel–Hamas war on the Indian economy: sectoral analysis with special reference to oil prices, agriculture, and financial markets. Int J Res Anal Rev. 2023;10(4):452-461. Available from: doi.org/10.56158/ijrar.v10i4.2023
2. Smyrnov O, Liutyi I, Kolosov A, Leshchenko M, Hryhoruk I, Kovalchuk T. Geopolitical risks and global supply chain disruptions: strategic responses for multinational corporations. Probl Perspect Manag. 2025;23(1):194-206. Available from: doi.org/10.21511/ppm.23(1).2025.16
3. Ohikhuare OM. How geopolitical risk drives spillover interconnectedness between crude oil and exchange rate markets: evidence from the Russia–Ukraine war. Resour Policy. 2023;86(Pt B):104127. Available from: doi.org/10.1016/j.resourpol.2023.104127
4. Taghizadeh-Hesary F, Yoshino N. Monetary policy impacts on oil prices and exchange rate: the case of India. ADBI Working Paper No. 1109. Tokyo: Asian Development Bank Institute; 2020. Available from: www.adb.org/publications/monetary-policy-oil-prices-exchange-rate-india
5. Reserve Bank of India. Report on currency and finance 2023–24. Mumbai: Reserve Bank of India; 2024. Available from: www.rbi.org.in
6. Georgiou M. The impact of the Russia–Ukraine war on tanker freight markets: an analysis of Baltic Exchange indices and war risk insurance premiums. Marit Econ Logist. 2023;25(1):38-92. Available from: doi.org/10.1057/s41278-023-00251-x
7. International Energy Agency. World energy outlook 2024. Paris: IEA Publications; 2024. Available from: www.iea.org/reports/world-energy-outlook-2024
8. Nath R. India still remains 80% import dependent in medical devices: industry outlook 2023. BioVoice News. 2023. Available from: biovoicenews.com/india-still-remains-80-import-dependent-in-medical-devices/
9. United Nations Comtrade. India trade statistics — medical devices (HS 90). UN Comtrade Database; 2024. Available from: comtradeplus.un.org/
10. 10. Shahbaz M, Sharif A, Soliman AM, Radulescu M. Geopolitical risk bubbles in crude oil prices: a GSADF approach. Energy Res Lett. 2024;6(1). Available from: doi.org/10.46557/001c.142278
11. World Bank. 2024. Available from: openknowledge.worldbank.org/handle/10986/41536
12. World Economic Forum. The global price tag of war in the Middle East. WEF Insights. 2026 Mar. Available from: www.weforum.org/stories/2026/03/the-global-price-tag-of-war-in-the-middle-east/
13. Zhang R, Zhang H, Gao W, Li T, Yang S. The dynamic effects of oil price shocks on exchange rates — from a time-varying perspective. Sustainability. 2022;14(14):8452. Available from: doi.org/10.3390/su14148452
14. Blanchard OJ, Galí J. The macroeconomic effects of oil shocks: Why are the 2000s so different from the 1970s? National Bureau of Economic Research Working Paper No. 13368; 2007.
15. Export-Import Bank of India. Impact of the Russia–Ukraine conflict on India's trade and economy. Mumbai: Export-Import Bank of India; 2022.
16. International Energy Agency. Oil Market Report. Paris: IEA; October 2023