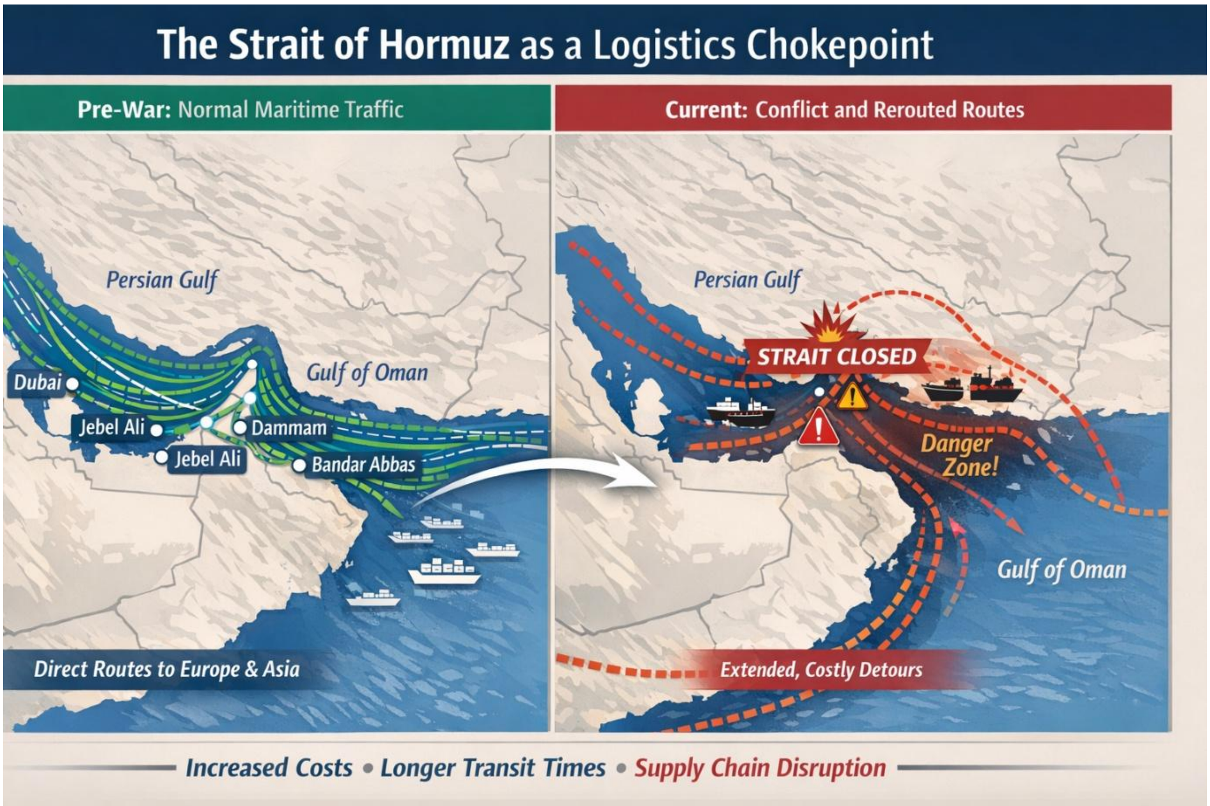
Fashion Logistics in the Shadow of the Iran–US War

The Iran–US war has ruptured one of the world's most sensitive maritime corridors and sent shockwaves through the global fashion industry. What began as a geopolitical escalation has rapidly evolved into a logistics crisis, reshaping freight routes, fibre markets, retail pricing, and the industry's already-fragile sustainability commitments. Fashion, which depends on long, energy-intensive supply chains, is now confronting a new era of volatility.

The Strait of Hormuz: A Chokepoint Becomes a Fault Line



The Strait of Hormuz—historically the narrow but reliable artery linking the Persian Gulf to global markets—has become a site of direct military confrontation. Iranian forces have declared the strait closed, and several commercial vessels have been struck by projectiles. Major carriers have suspended operations or rerouted ships, effectively removing one of the world's most important shipping corridors from the fashion industry's logistics map.

This closure has immediate consequences. Tankers carrying crude oil and petrochemical feedstocks are stranded or forced into long detours. Container ships that once moved raw materials, trims, and finished garments through the Gulf now face unpredictable delays. The chokepoint has transformed from a predictable constraint into a live operational hazard.

Fuel, Freight, and the Cost Cascade

Oil markets reacted instantly. Prices jumped sharply, and jet-fuel premiums surged. Because fashion logistics are deeply energy-dependent, the cost cascade is swift and unforgiving. Every stage of the supply chain—from polymerisation to spinning, dyeing, shipping, warehousing, and last-mile delivery—becomes more expensive.

Freight carriers have rerouted vessels around conflict zones, adding thousands of miles to standard Asia–Europe routes. War-risk insurance premiums have risen. Transit times have lengthened. Retailers already strained by the Red Sea and Suez disruptions now face a second chokepoint crisis, compounding delays and eroding margins.

The result is a logistics environment defined by uncertainty, cost inflation, and operational fragility.

Fibre Markets Under Pressure

The conflict's impact on fibre markets is particularly acute. Synthetic fibres—polyester, nylon, acrylic—are directly tied to oil prices. As crude becomes more expensive and less accessible, the cost of producing these fibres rises. Mills that rely on petrochemical feedstocks face higher input costs and energy bills, especially in regions where electricity generation is fossil-fuel-intensive.

Natural fibres are not insulated either. Cotton, linen, and wool depend on global shipping networks for ginning, spinning, weaving, and finishing. When freight routes elongate or become unreliable, the entire production cycle slows. Brands that rely on just-in-time manufacturing face the sharpest disruptions.

Retail Geography and the Consumer Price Shock

For UK and EU retailers, the war introduces a new layer of volatility. Goods arriving from South Asia, East Asia, and the Middle East now face longer lead times and higher freight surcharges. Retailers must choose between absorbing these costs—compressing already-thin margins—or passing them on to consumers.

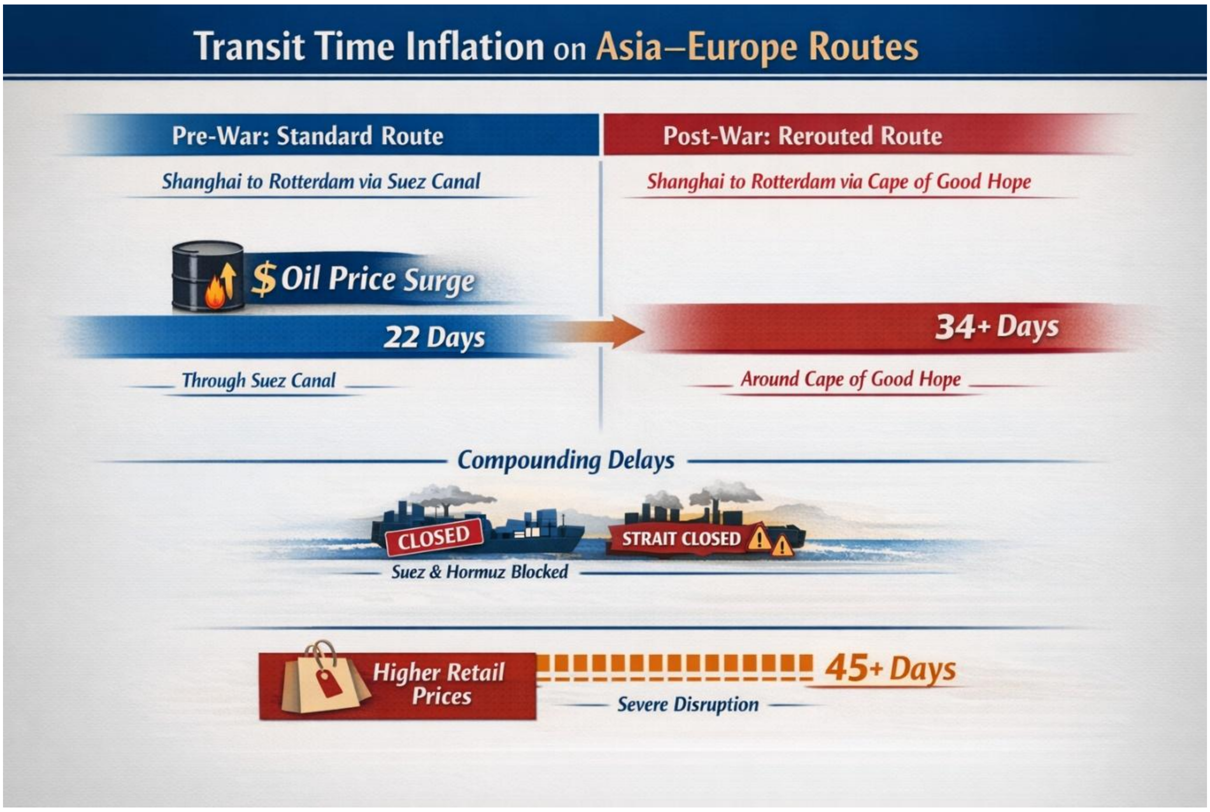
The mid-market and fast-fashion segments are the most exposed. Their business models depend on rapid turnover, low prices, and predictable logistics. When shipping becomes slower and more expensive, the entire model strains. Luxury brands, with higher margins and more flexible production calendars, can absorb shocks more easily, but even they face rising costs for materials and air freight.

Sustainability Setbacks and the Return of High-Emission Logistics

Perhaps the most troubling consequence is the reversal of sustainability progress. Brands that had pledged to reduce emissions now find themselves forced into survival mode. Air freight, once a last resort, is being used to rescue delayed seasonal drops. Mills are relying more heavily on fossil-fuel-based energy to maintain production schedules. Rerouted ships burn more fuel over longer distances.

The war has created what many analysts describe as a climate disaster for the fashion industry: a forced retreat from decarbonisation at the very moment when emissions reductions are most urgent.

Strategic Reorientation: From Crisis Response to Structural Change



In the short term, brands are shifting to alternative ports, increasing inventory buffers, and prioritising high-margin goods for air transport. In the medium term, sourcing geographies are being reassessed. Nearshoring and reshoring—once aspirational—are gaining strategic weight, though capacity remains limited.

Longer term, the industry may be pushed toward a deeper restructuring of fibre markets, logistics networks, and risk modelling. The war has exposed the fragility of globalised fashion supply chains and accelerated the need for transparency, resilience, and diversification.


Mathematical Logistics Model

1. Core variables

Let:

- P_0= oil price
- D = route distance (sea miles)
- v = average vessel speed (miles per day)
- q = shipment size (TEU or tonnes)
- r_w = war-risk premium per unit distance
- c_f= fuel cost coefficient per unit distance per unit oil price
- c_0 = other operating cost per unit distance
- h = inventory holding cost per unit value per day
- V = value of goods shipped
- α = emissions factor per unit fuel cost

Unit clarification:
Both c_f and c_0 are expressed in USD per mile, ensuring consistent units across all distance-linked cost terms.

We distinguish pre-war and conflict states with superscripts ((0)) (baseline) and ((1)) (conflict).

War-risk premiums:

r_w^0 = 0 (baseline war-risk premium per mile)
r_w^1 = 0.10 (conflict-era war-risk premium per mile)

2. Transit time inflation

Baseline transit time (e.g., via Suez):

$$T_0 = \frac{D_0}{v}$$

Conflict-era transit time (e.g., via Cape of Good Hope):

$$T_1 = \frac{D_1}{v}$$

Transit-time inflation:

$$\Delta T = T_1 - T_0 = \frac{D_1 - D_0}{v}$$

This corresponds to the "Transit Time Inflation on Asia–Europe Routes" figure.

3. Transport cost cascade

Per-shipment transport cost in state s ∈{0,1}:

$$C_s = c_f P_o^s D_s + c_0 D_s + r_w^s D_s$$

Conflict-induced cost increase:

$$\Delta C_{trans} = C_1 - C_0$$

This is the mathematical backbone of "The Cost Cascade Triggered by Oil Price Spikes."

Real-world alignment:
Major carriers such as Maersk and Hapag-Lloyd adjust their BAF (bunker adjustment factor) and WRS (war-risk surcharge) using similar linear structures, making this formulation directly aligned with industry pricing behaviour.

4. Inventory and lead-time cost

Inventory cost in state (s):

$$C_s^{inv} = hVT_s$$

Increase due to disruption:

$$\Delta C_{inv} = \mathrm{hV}(T_1 - T_0) = \mathrm{hV}\Delta\mathrm{T}$$

Total logistics-related cost change:

$$\Delta C_{log} = \Delta C_{trans} + \Delta C_{inv}$$

Captures the "hidden cost of time".

5. Emissions regression under conflict

Assume logistics-related emissions are proportional to fuel-linked cost:

$$E_s = \alpha c_f P_o^s D_s$$

Emissions increase:

$$\Delta E = E_1 - E_0$$

If air freight is used to rescue delayed drops:

$$E_s^{air} = \beta q_s^{air}$$

with β a much larger emissions factor.

6. Retail price passthrough

Let θ∈ [0,1] be the share of logistics cost increases passed into retail prices.

If baseline unit retail price is P_0 and baseline logistics cost per unit is c_{log}^0:

$$P_1 = P_0 + \theta \frac{\Delta C_{log}}{q}$$

Fast fashion typically has θ≈ 1; luxury may choose a lower θ and absorb more of the shock.

Numerical example

Assumptions

- **Pre-war distance: D_0= 11,000 miles**
- **Conflict distance: D_1 = 17,000 miles**
- **Vessel speed: v = 500 miles/day**
- **Oil price: P_0^0 =80, P_0^1 = 100 USD/barrel**
- **Cost coefficients: c_f= 0.02, c_0= 0.50, r_w^1 = 0.10**
- **Shipment/value: q = 1,000 units, V = 1,000,000 USD**
- **Holding cost: h = 0.0005**
- **Emissions factor: α = 0.05**
- **Passthrough: θ= 0.7**
- **Baseline retail price: P_0= 50 USD**

Transit time inflation

$$\Delta T = 34 - 22 = 12 \text{ days}$$

Transport cost increase

$$\Delta C_{trans} = 44{,}200 - 23{,}100 = 21{,}100 \text{ USD}$$

Inventory cost increase

$$\Delta C_{inv} = 17{,}000 - 11{,}000 = 6{,}000 \text{ USD}$$

Total logistics cost increase

$$\Delta C_{log} = 27{,}100 \text{ USD}$$

Emissions increase

$$\Delta E = 820 \text{ tonnes } CO_2$$

Retail price impact

$$\Delta p = 18.97 \text{ USD}$$

$$P_1 \approx 69 \text{ USD}$$

A baseline $50 garment would need to move toward roughly $69 if most of the logistics shock is passed through.