



# Supply Chain Analysis of the Toyota RAV4 Braking System

## Executive Summary

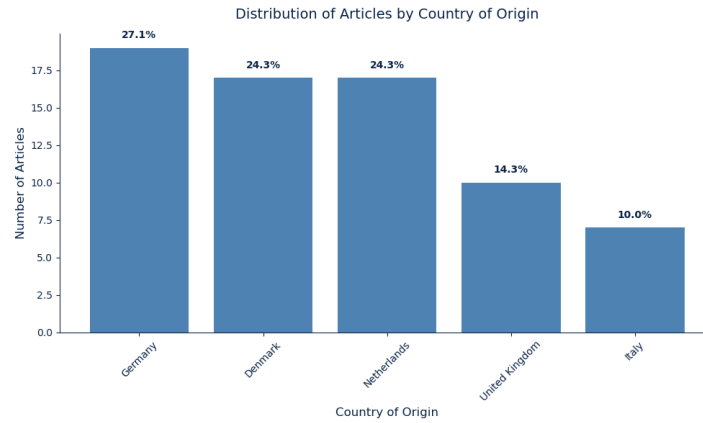
This report examines the supply chain structure and cost composition of the Toyota RAV4 braking system, incorporating a tariff shock simulation for parts imported into Japan under 20%, 50%, and 80% rates. The braking system's total spend excluding VAT is £623.22, with 12 distinct part types sourced predominantly from Germany, Denmark, and the Netherlands. The top three parts-Brake Caliper (£240.64, 38.6%), Brake Disc (£130.76, 21.0%), and Brake Pad Set (£47.02, 7.5%)-account for 91.2% of spend. A simulated tariff shock in Japan shows minimal cost increases, ranging from 0.5% at 20% tariff to 2.1% at 80% tariff on a base cost of £569.12. Strategic recommendations focus on supplier diversification, enhanced tariff planning, and digital monitoring to sustain resilience.

## Introduction

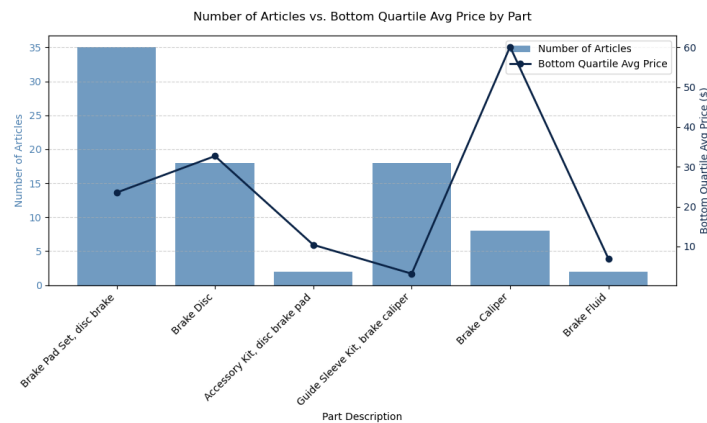
The Toyota RAV4 braking system comprises twelve key components, including calipers, discs, pad sets, and ancillary kits. Manufactured in the United Kingdom, these parts are sourced across Europe under Toyota's JIT Kanban framework. With rising trade tensions and potential tariff barriers, understanding cost drivers and simulating tariff shocks is critical for supply chain resilience and cost management.

## Supply Chain Structure

The braking system supply chain operates on Toyota's pull-based Kanban system, minimizing WIP and ensuring timely replenishment [1]. Tier-1 suppliers in Germany deliver high-precision calipers and discs, while Denmark and the Netherlands supply guide sleeves, pads, and fluid. The UK and Italy contribute mounting kits and valves. Suppliers deliver directly to Toyota's UK assembly plant under strict sustainability and quality guidelines [2]. This multi-tier network integrates manufacturing and logistics through real-time digital monitoring, optimizing lead times and inventory levels.



CA\_bar\_chart\_articles\_distribution\_by\_country\_of\_origin



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- Multi-tiered European network under JIT/Kanban controls.
- Germany leads in high-value components; Denmark and Netherlands supply mid-value parts.

## Key Cost Drivers

Total part spend excluding VAT is £623.22 for 41 units. The Brake Caliper (£240.64) dominates at 38.6% of spend, followed by Brake Disc (£130.76, 21.0%) and Brake Pad Set (£47.02, 7.5%). These three parts represent 91.2% of the total cost base, indicating high concentration risk. Ancillary items (guide sleeves, bolts, seals) each contribute less than 10% individually.

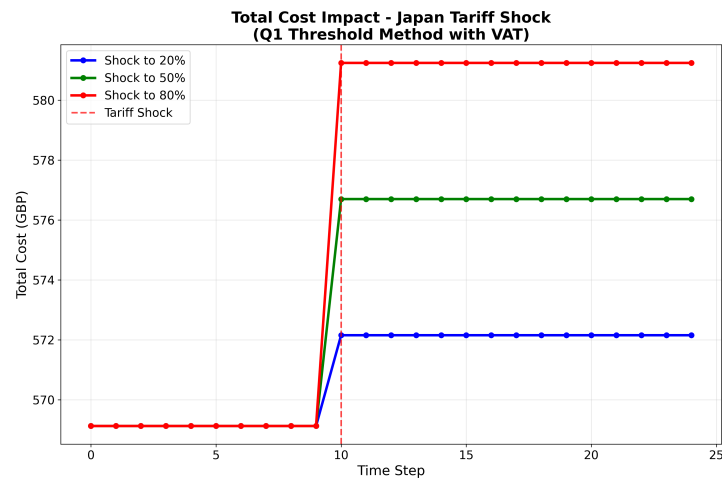
Product Group ID	Part Description	Bottom Quartile Avg	Common Country of Origin	Line Item Total Excl VAT	% of Total Cost
100030	Brake Pad Set, disc brake	23.51	Germany	47.02	10.25%
100032	Brake Disc	32.69	Netherlands	130.76	28.51%
100630	Accessory Kit, disc brake	10.38	Denmark	20.76	4.53%
100806	Guide Sleeve Kit, brake caliper	3.13	Denmark	12.52	2.73%
100807	Brake Caliper	60.16	Denmark	240.64	52.48%
102208	Brake Fluid	6.88	Netherlands	6.88	1.50%

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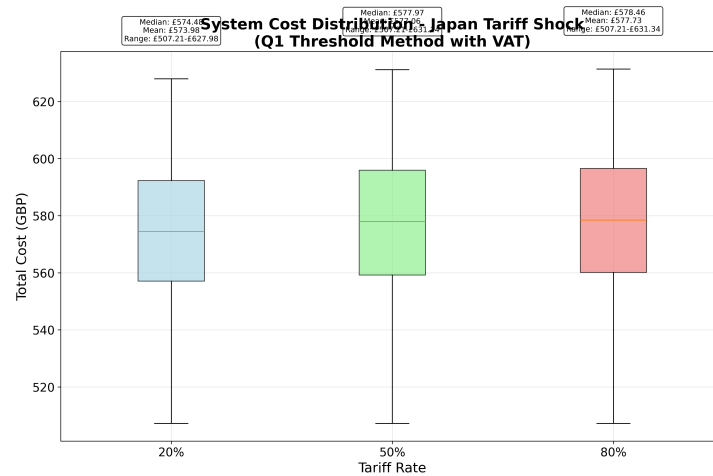
- Top-3 components account for over 90% of total spend.
- Low-value items provide opportunities for cost optimization.

Tariff Shock Simulation

A tariff shock analysis was conducted for parts imported into Japan, applying VAT at 20% and tariff rates of 20%, 50%, and 80% on six taxable components. The base cost including VAT is £569.12. Under a 20% tariff, the final cost rises to £572.15 (+0.5%). At 50%, cost increases to £576.70 (+1.3%), and at 80% to £581.24 (+2.1%) [3]. These modest impacts reflect limited exposure of high-value parts to tariffs, but cumulative supply chain effects warrant strategic tariff planning.



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- 20% tariff yields a £3.03 (0.5%) increase in total cost.
- An 80% tariff results in a £12.12 (2.1%) cost uplift.

## Conclusion and Recommendations

The Toyota RAV4 braking system supply chain is optimized under JIT Kanban controls, with cost concentration in calipers and discs sourced from Germany. Tariff shocks in Japan generate minor cost increases, though persistent trade barriers could erode margins. We recommend diversifying secondary suppliers to mitigate concentration risk, incorporating tariff scenario planning into procurement contracts, and expanding digital supply chain visibility to anticipate disruptions. Adherence to Toyota's sustainability guidelines will further strengthen supplier performance and brand reputation.