Supply Chain Analysis of the Toyota RAV4 Braking System and Tariff Impact Simulation

Executive Summary

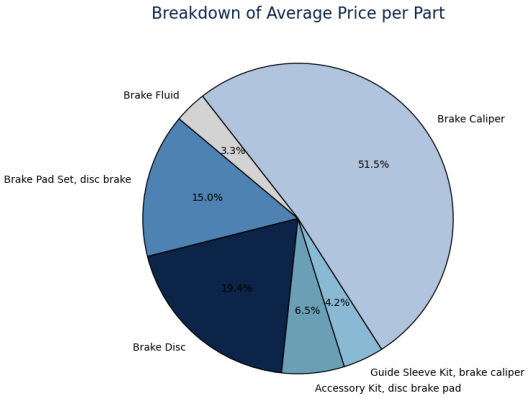
This report provides an in-depth analysis of the supply chain for the Toyota RAV4 braking system, focusing on component costs, supplier origins, and the potential impact of tariff changes. The analysis identifies the most expensive components and their origins, highlighting Germany, Denmark, and the Netherlands as key supplier countries. A tariff shock simulation for Japan, applying rates of 20%, 50%, and 80%, reveals potential cost increases ranging from 0.57% to 2.27%. The report concludes with strategic recommendations to mitigate these impacts, emphasizing VAT optimization and supplier diversification.

Introduction

The braking system of the Toyota RAV4 is a critical component ensuring vehicle safety and performance. This report aims to dissect the supply chain of this system, providing insights into component costs, supplier distribution, and the implications of potential tariff changes. Understanding these elements is crucial for optimizing supply chain management and mitigating risks associated with international trade policies.

Component Analysis

The analysis of the Toyota RAV4 braking system components reveals a heavy reliance on European suppliers, particularly from Germany, Denmark, and the Netherlands. The cost distribution is dominated by the Brake Caliper, which constitutes over half of the total cost. This dependency on high-cost components from specific regions underscores the importance of strategic supplier management.



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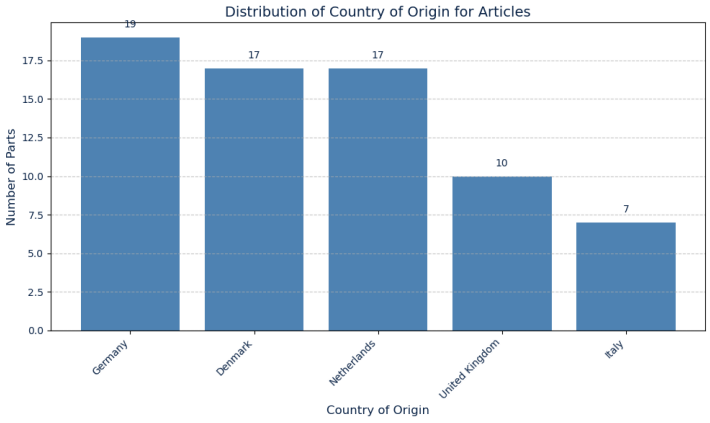

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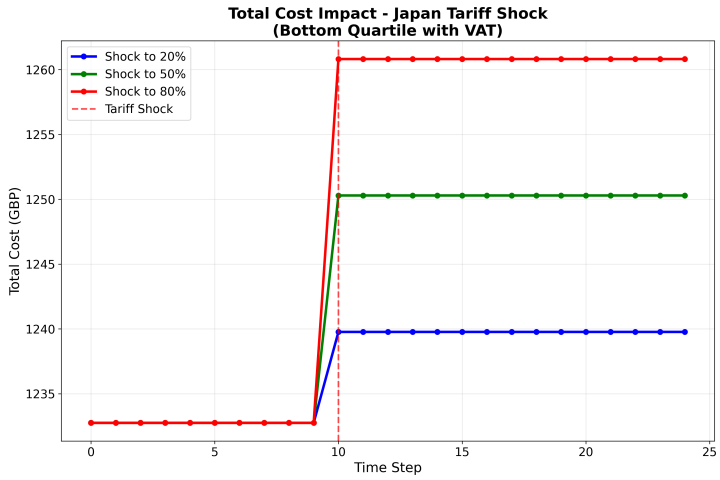
- The total component cost of the Toyota RAV4 braking system is £871.19.
- The Brake Caliper is the most expensive component, accounting for 59.38% of the total cost at £129.34.
- The Brake Disc and Brake Pad Set follow, contributing 22.34% (£48.65) and 8.68% (£37.79) respectively.
- Germany is the leading country of origin with 19 parts, followed by Denmark and the Netherlands with 17 parts each.
- The top three suppliers by article count are from Germany, Denmark, and the Netherlands.
- The percentage of taxable parts is significant, with all parts subject to taxation.

Tariff Simulation

A simulation was conducted to assess the impact of potential tariff increases on the Toyota RAV4 braking system, with Japan applying tariffs of 20%, 50%, and 80%. The current VAT rate in Japan is 20%, which significantly affects the overall cost structure. The simulation results indicate that the total cost increase due to tariffs and VAT ranges from 0.57% at a 20% tariff to 2.27% at an 80% tariff. This highlights the compounded effect of tariffs and VAT on the supply chain.



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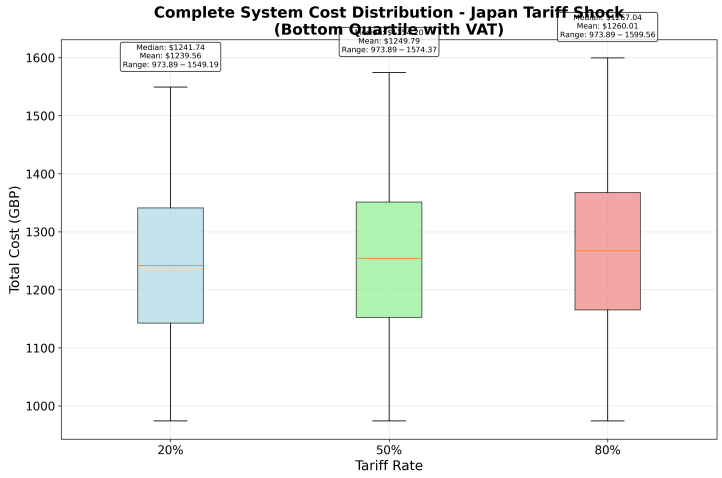

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Web Research

Recent developments in the Toyota RAV4 braking system supply chain emphasize the importance of lean manufacturing and supply chain optimization. The Toyota Production System (TPS) continues to be a benchmark for efficiency, utilizing pull-type controls to minimize work-in-process inventory [1]. However, challenges such as software issues in braking systems have been reported, necessitating continuous monitoring and improvement [2]. The global automotive supply chain is also facing disruptions due to tariff changes, which could lead to increased production costs and shifts in supplier strategies [3].

Conclusion and Recommendations

The analysis of the Toyota RAV4 braking system supply chain reveals significant cost dependencies on European suppliers and highlights the potential impact of tariff changes. To mitigate these risks, it is

recommended that Toyota explore VAT optimization strategies and diversify its supplier base to reduce exposure to high-cost regions. Additionally, leveraging digital supply chain monitoring can enhance resilience against geopolitical and economic disruptions. By implementing these strategies, Toyota can better manage costs and maintain competitive advantage in the global automotive market.

References

- [1] Toyota Production System & Supply Chain by Macharia Brown: https://ctl.mit.edu/sites/default/files/Mac_TPS_thesis.pdf
- [2] Reddit Discussion on RAV4 Prime Braking Software Issue: https://www.reddit.com/r/rav4prime/comments/v73rtn/rav4_prime_braking_software_issue/
- [3] Auto Parts Tariff Effect on US-Japan Supply Chains: https://www.wcshipping.com/blog/auto-parts-tariff-effect-us-japan-supply-chains-2025

Appendices

- Parts Summary Table: A detailed table summarizing all parts of the braking system, their suppliers, countries of origin, and costs.