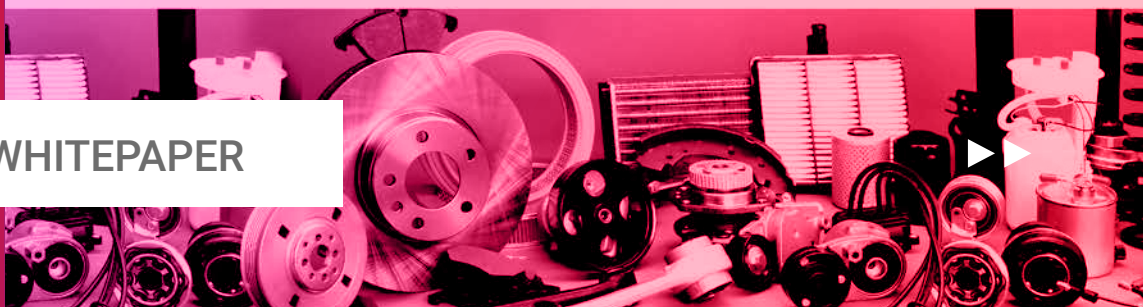


Automotive Parts Management at Dealerships in a Post-pandemic Market



▶ WHITEPAPER



Abstract

Repair and maintenance of a vehicle is a core aftermarket function, and proper management of automotive spare parts is a mandatory ingredient for this function. As vehicles evolve and users become more digital savvy and demanding, automotive dealerships need to start managing this function in a more strategic way by embracing the emerging technologies. The new-normal has enforced digital adoption, but we need prepare for an unpredictable future that brings further disruption.

This whitepaper provides a background on traditional spare parts management at dealerships, and the demerits arising out of that. It presents a different perspective of managing this automotive function.

The innovative approach starts with the digital thread of all BOMs that provides the product information and creates the single source of truth. The core function of supply chain management is made more resilient by using digital levers. A proactive 'parts defect discovery' strategy adds the icing and enables better outcomes. Data collation, analysis, insights, and presentation are the key chromosomes. Downstream business opportunities and benefits realized from the transformation are also mentioned.

Key Takeaways

02

Introduction

04

Downstream benefits derived from various strategies

05

Conclusion

03

Transforming the automotive parts management

- *High-level problem statement*
- *Bringing in the digital thread for bill of materials*
- *Resilient supply chain management*
- *Proactive discovery strategy for vehicle parts defects*
- *The digital art-of-possible to boost parts sales even further*

06

References

Introduction

Going by the traditional workflow, most part replacements for vehicles are triggered when the inspection report generated during a planned maintenance indicates the need. Quite often, the desired spare part is not available in the dealership's inventory, and must be shipped from another dealer or ordered ad-hoc from the supplier.

The supply chain is not able to ensure that right spares are available at the right place and right time. Stock-out scenarios impact timely delivery of the vehicle after completion of servicing and impacts customer experience. On the other hand, over-stock scenarios result in large inventory carrying costs that eat into the profit margins. Absence of a single source of truth, dependency on historical data, and lack of end-to-end supply chain visibility are the key causes.

The multi-featured vehicles being manufactured today have an increased product complexity, with higher number of product configurations and interrelationship between parts. This creates a greater number of variables in the requirement of service parts. The dynamics get further twisted across different parts of the geography due to terrain, traffic conditions and demography. A sizeable portion of end customers today are millennials, who demand timely fulfilment, are digital savvy, and prefer to keep track of vehicle servicing schedule and progress on smart devices.

This brings up the need for a transformation for the traditional way of managing parts. The objective of this whitepaper is to weave together innovation and digital levers and put in place the next-gen automotive parts management strategy.

Transforming the Automotive Parts Management

High-level problem statement

The objective of world-class service parts management is to provide timely vehicle servicing and parts replacement, and maximize returns on the asset investment and profitability, by balancing the unique complexities of dynamic demand and the global service supply chain dependencies, while delivering the highest level of customer service. Knowledge management and end-to-end visibility throughout the entire process is critical. For a seamless spare parts management, a sound operating strategy needs to be formulated.

The key aspects for the strategy need to include the following:



Availability of updated bill of materials



Intelligent ordering and distribution



Reliable supplier identification with backup



Tracking vehicle performance and customer persona



Forecasting based on historical consumption



Establishing a sound knowledge platform



Managing the spares inventory and shelf life



Data analytics with actionable insights

The primary pillars for an effective transformation approach are detailed below.

Bringing in the Digital Thread for Bill of Materials

A framework that enables a connected flow of data as well as an integrated view of the spare parts across its entire lifetime through various functions is important. In the manufacturing world today, the digital thread represents digitization of the product (spare part) data right from design, to prototyping, to manufacturing, and finally to the product in service. The real value of digital thread is in the consistency, traceability, and reusability of the digital product information through the lifecycle.

The foundation of the digital thread data is present in product lifecycle management [PLM] data model, and comprises of the following Bill of Materials [BOMs]:

- eBOM - Engineering bill of materials - how the product is designed
- mBOM - Manufacturing bill of materials - how the product is manufactured
- sBOM - Service bill of materials - how the product performs in service

The lifeblood of automotive spares is the bill of materials [BOMs]. A single source of truth and traceability of the product data throughout the lifecycle is available in the BOMs. When the parts are in service, usage of sensors/IoT or traditional data capturing methods enable the capture of operational information, which helps in reliability improvements and new service opportunities.

Resilient Supply Chain Management

Today, the future-proofing mantra suggests a proactive construct for robustness. Attaining digital maturity is important across all the major pillars of supply chain operations, which includes demand management, supply planning, ordering, procurement, inventory management, warehousing, logistics, and supplier collaboration. Few suggested interventions are mentioned below.

- Digital planning improves the quality of planning decisions by connecting them to the overall business strategy
- Improved parts ordering system would include automated catalog creation and publishing various formats
- Procurement digitization enables supplier integration, improves sourcing, and helps manage supplier risk
- Multi-echelon inventory optimization would optimize all nodes and tiers concurrently
- Warehouse of the future is low on manual processes and has intelligent activities for just-in-time and just-in-sequence delivery
- Digital logistics monitoring and management with a single source of truth provides last mile visibility
- Supplier collaboration enabling relationship management, appropriate terms, integration, and risk management

New-Age Digital Levers Revolutionizing Supply Chain

Adoption of new age digital levers is critical for various supply chain processes. The prominent ones, along with the value delivered, are mentioned below:



Digital Thread (supply chain) - Digital representation of bill of materials that connect parts lifecycle



Sensors and IoT - Tracking of procurement, inventory, delivery and usage; telematics based vehicle health



Artificial Intelligence and Machine Learning - Demand forecasting, predictive maintenance, end-of-life prediction, decision making



Robotic Process Automation - Automated backend processes like sales and purchase order creation



Autonomous Things - Autonomous vehicles and drones for inventory count and shelf-life checks; robots for picking



Advanced Analytics - Predictive algorithms, prescriptive analytics, optimized logistics, parts forecasting



Augmented / Virtual / Mixed reality - Immersive experience of vehicle post part replacement or accessorizing



3D Printing of parts - For vehicle models that are out of production, or current models having a high lead time



Blockchain - Product tracking, order and return tracking, smart contracts, parts traceability



Cloud and Security - Application migration from premise, enterprise IT and OT security



Visualization and Reporting - What-if simulations, inventory levels, logistics traceability

Proactive discovery strategy for vehicle parts defects

A proactive discovery strategy for vehicle defects and parts problems is a game changer for predictive servicing, planned maintenance and/or parts replacement.

The prominent ingredients of this strategy are provided below:

- Telematics enabled on-board diagnostics
- Digital thread for eBOM / mBOM / sBOM
- Warranty claims and insurance data
- Contact center data across multiple channels
- Historical maintenance records
- Geography, demography, and persona
- Social media discussions and blogs

The parts defect data from the above sources need to be interpreted, captured, and consolidated onto a central platform. Once this is done, the intelligence from the data can be derived using the following methodology:

- Data science algorithms to track, extract, categorize, filter, summarize and cluster defects
- Neural network based 'part failure frequency' estimation against mileage, terrain, seasonality
- Transformed defect data fed into fault analysis engine, to identify concerns and flag defects
- Defect insights used for scheduling servicing and for feeding back into vehicle engineering

The digital art-of-possible to boost parts sales even further

We have discussed a few innovative strategies above that have the potential to evolve the traditional way of managing the demand / inventory / supply chain of vehicle spare parts and vehicle servicing approach. In this section, let us look beyond the obvious, and go ahead with other ways to boost the revenue.

Price management with dynamic and Competitive Pricing Engine

To maximize the revenue from sales of spare parts, the dealership would need to leverage all available information to optimize pricing while maximizing profitability. The pricing engine needs to incorporate critical demand variables, predict demand, adjust to market response to prices, analyze competition, perform what-if analysis, and provide margin and yield analysis.

Spare Parts Sales from Dealerships to their Wholesale Customers

For dealerships, their wholesale customers are a major revenue stream and present a great opportunity to increase parts sales. These wholesale customers could be repair shops, used car dealers, local DIY-ers, etc. It would be important to optimize the buying experience by making a digital platform available to these wholesalers, where they can look up the available inventory and obtain competitive pricing. The dealership can obtain insights from its internal knowledge platform about the demand for parts and accessories from their wholesale customers. An internal 'dynamic pricing engine' helps to maintain optimum price for these parts. At times, the dealership can also partner with local re-sellers and brokers if they are low on resources, via a revenue sharing model that provides a win-win.

Accessories for Dealerships and their Wholesale Customers

Cross-selling for accessories is an awesome business model and can bring in a great deal of revenue if done in a tactical way. Various insights from social media and blogs would help obtain trending data about accessories that customers love, with classification across demography and geography. These details when fed into the knowledge platform and combined with AI-ML can help predict the demand for accessories for the dealership and its wholesale customers.

Virtual Parts Inventory for Re-Sellers

This is the concept of a virtual spare parts inventory for the re-sellers like repair shops, used car dealers, etc. The re-sellers are not limited to sell only from their physical inventory. Rather, they can also sell from the dealership's inventory using the 'virtual stock' on the platform. The orders are fulfilled by drop-shipping from the dealer's inventory. The re-sellers benefit from less capital expenses and low overheads while the dealer benefits from revenue share.

Direct Shipment Parts Ordering

In this method, the dealerships order spare parts on behalf of the re-seller which is routed to the appropriate supplier (thanks to the platform intelligence), and the supply chain is configured to deliver it directly to one or more re-sellers. Historical sales and demand forecast are used for the order quantity. Efficiency is achieved through automation and complete traceability exists.

Enhanced Parts Provenance (traceability)

Provenance is the history of ownership and identity of an object. Dealers can employ digital traceability of parts by registering the sensor/IoT enabled data on a central platform and leveraging Blockchain's immutable technology to record parts lineage and provenance. This helps improve product visibility and authenticity across the supply chain, prevents counterfeiting, and helps identify isolated defective parts ahead of arrival.

Downstream Benefits Derived from Various Strategies

Re-vitalization of the spare parts management platform provides robust methodologies and an insightful data repository which can be used for multiple benefits mentioned below.

Enhanced Values from the Next-Gen Parts Management

- | | |
|----------------------------------|-------------------------------|
| ■ Inventory reduction | ■ Reduced warehouse expenses |
| ■ Better parts availability | ■ Better customer experience |
| ■ Reduction in parts back orders | ■ Overall higher ROI |
| ■ Increased asset uptime | ■ Increased aftermarket sales |
| ■ Optimized logistics cost | ■ Downstream value additions |

Research and Engineering Insights from the Data Platform

- Defect data profiled against geography, terrain, mileage, season, and behaviour
- Data summarized against category, severity, count, distribution, and recurrence
- Historical data used for learning by AI-ML-DL algorithms and enables further automation
- Data insights enable further research for improving design and manufacturing

Monetization Opportunities from Innovative Business Models

- Customer details available with the OEMs can be used for providing aftermarket customization
- Insurance companies can work on customized offers based on persona and driving habits
- Dealerships can work on a wholesale business model with re-sellers and downstream entities

Conclusion

Setting up a robust automotive spare parts management framework is clearly not a one-time effort. It requires continuous monitoring of processes and data, connects with suppliers, harvesting of multi-channel data, integration with partner systems, and providing special attention to customer experience. The balancing act for an optimal outcome is enabled by effective utilization of digital pillars and data.

Today, the automotive manufacturing setup has started using digital interventions. For instance, the seat manufacturing plant in Spain uses drones to deliver components from the logistics hub to the assembly line. The digital thread will be a crucial foundation pillar in spare

parts management by providing the integrated view of spare parts throughout their lifespan. Continuous monitoring of the vehicle parts health enabled by sensors / IoT can be used for predictive maintenance and AI-ML based parts replacement forecast and would in turn ensure optimization of inventory.

The day is not too far when digital technologies would be in the DNA of vehicle spare parts management. The automotive industry is looking forward to many more pleasant surprises. Thanks to the 4th industrial revolution that would help us to evolve the recipe continuously.

References

Wikipedia (May 2020) | Inventory Optimization - Single versus Multi-echelon | Retrieved July 12, 2022, from

https://en.wikipedia.org/wiki/Inventory_optimization#:~:text=Multi%2Dechelon%20inventor,y%20optimization%20represents,demands%2C%20to%20be%20accurately%20predicted

Wikipedia (Feb 2019) | Drop Shipping | Retrieved July 12, 2022, from

https://en.wikipedia.org/wiki/Drop_shipping

Wikipedia (undated) | Parts Provenance | Retrieved July 12, 2022, from

<https://en.wikipedia.org/wiki/Provenance>

About the Author



Debashish Mitra

*Principal Consultant at
Tech Mahindra's Digital Transformation Office*

Debashish Mitra is a principal consultant at Tech Mahindra's Digital Transformation Office [DTO] with more than 20 years of experience. He has a B.Tech (Hons.) from IIT-Kharagpur and is a senior management professional certified from IIM-Ahmedabad. He has been a part of various growth programs for focused accounts across the globe on various industry verticals that include payments, retail, distribution, eCommerce, supply chain, manufacturing, travel, transport, logistics, utilities,

healthcare, public services and BFSI. His earlier avatar includes solution architecture, delivery management, consulting, service delivery, and ownership of top-line growth and bottom-line optimization, with engagements on Waterfall and Agile, and account sizes of up to 60MN USD. At times, he loves to put on the 'techy' hat and go that extra mile, which has been aptly demonstrated when he created the Retail Business Insights Leaderboard single-handedly for a customer at Kenya.



**Tech
Mahindra**