
Politecnico di Torino

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Master Degree Thesis:

# Expediting in the Automotive Aftermarket Industry

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# Dedication

To my parents, for having given to me the opportunity of studying. To my brother, for his continuous support. To my cousins, my family, my friends and all the people with whom I have shared good moments of my University's journey and my life so far.

# Abstract

This study is based on a six months internship within an expediting team in the field of automotive aftermarket industry.
One of its purpose is to describe what expediting is and what is its relevance in today's business world. The importance of doing expediting varies from industry to industry: while in some industries like manufacturing and construction it represents a very crucial activity, in others it is not so critical.
The study also addresses the impact of new technologies on procurement and expediting: the increasing automation of routine tasks is shifting the role of expeditors from operational and repetitive duties to more strategic functions.
An analysis of the automotive aftermarket industry follows. It is described how this industry is structured, who are the main actors, how it is expected to evolve and what are the main challenges that industry participants will be facing.
Then it is described the context of the internship experience and how the expediting activity was performed.
Finally, the study evaluates whether doing expediting is a value added activity for the company, given the company and industry characteristics. The conclusion is that a reasonable investment in expediting is beneficial for business operations, but it must be supported by a strong procurement department.

# Contents

# List of Figures

# Chapter 1

# Introduction

As competition intensifies across various industries, businesses must quickly respond to customer needs and, failure to do so, often results in customers shifting to competitors that offer superior service. One crucial support activity that helps companies maintain their competitive edge is expediting. Alongside a robust procurement function, an effective expediting team enables businesses to stay competitive by ensuring that necessary materials are available at the right time, at the right place and in the right quantity.

The content of the thesis is structured in three different blocks, which are described in more details below.

*The first section* provides a comprehensive overview of the procurement function, emphasizing its importance within a company. Then it is provided a description of the expediting activity. It is described how expediting can be done, by explaining the different types of expediting, including field, desk and document expediting. After, it is analysed the relevance of expediting depending on the type of industry. In another subsection it is described how expediting activity can be evaluated providing some key performance indicators (KPIs) that can be used to assess the expediting effort.

*The second section* focuses on the automotive aftermarket industry. After having defined what is the automotive aftermarket industry, it is described who are the main actors and their role within this market. Then it is made a focus on the size of this market and what are the main factors that can fuel or limit market growth. Given its close relationship with the automotive sector, it is also discussed how both the industries are going to evolve in the next years and what will be the challenges they will be facing.

*The third section* presents a real-world example of expediting within the automotive aftermarket industry. By integrating the theoretical concepts discussed in the previous sections with this practical example, this section draws com-

parisons and insights. It concludes with a pros and cons analysis of expediting activity, leading to an evaluation of expediting within the automotive aftermarket industry.

# Chapter 2

# What is expediting

## 2.1 Expediting: a support activity in Procurement

Procurement is a strategic function that involves planning, sourcing, negotiating, and managing goods and services that an organization needs to fulfill its business objectives. It aims to build strong relationships with suppliers, manage risks, and achieve long-term benefits for the organization. Increasingly, procurement plays a central role in firm strategy, as companies today spend more than half of their revenues buying goods and services from suppliers. The relationship between procurement, expediting, purchasing, and planning is essential in managing a company's supply chain and ensuring that the right materials or services are obtained at the right time, cost, and quality. These functions work together to streamline the acquisition and management of resources, making the entire process more efficient and responsive to business needs.
Below is a more detailed description of procurement activities and how they are related.

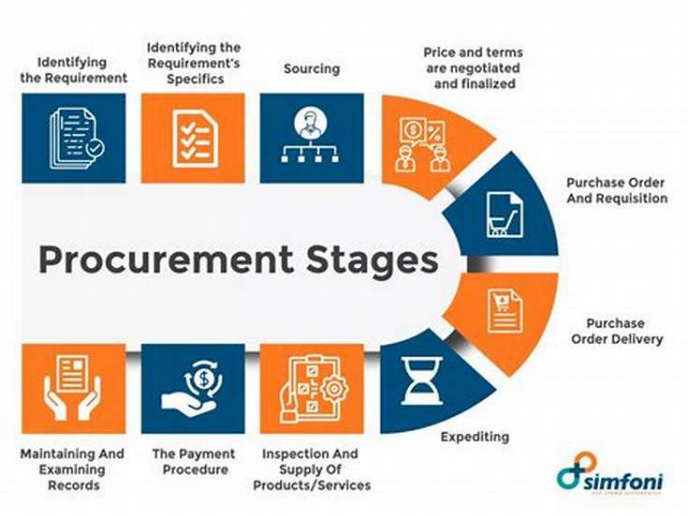


Figure 2.1: Procurement Stages[17]

1. **Procurement**. *Definition*: Procurement is the process of sourcing and acquiring goods, services, or works from external suppliers. It involves identifying needs, sourcing suppliers, negotiating contracts, and ensuring goods or services are delivered.

   *Key Responsibilities*: Supplier identification and evaluation. Negotiating contracts and terms. Managing supplier relationships (SRM). Ensuring compliance with company policies and legal requirements.

   *Relation to Other Functions*: Procurement sets the stage for purchasing by selecting suppliers and establishing the contracts under which goods or services will be purchased. It is strategic and focuses on the long-term relationship with suppliers.

2. **Purchasing**. *Definition*: Purchasing is a subset of procurement and involves the transactional activities associated with buying goods or services. It focuses on executing orders, ensuring correct quantities and specifications, and handling payments.

   *Key Responsibilities*: issuing purchase orders based on needs defined by planning. Ensuring timely delivery of products or services as per contract terms. Processing invoices and payments.

   *Relation to Other Functions*: While procurement is strategic, purchasing is tactical and operational. Purchasing works closely with planning to translate the demand for materials into actual purchase orders and then coordinates with expediting to ensure delivery timelines are met.

3. **Expediting**. *Definition*: Expediting ensures that goods or services are delivered according to the agreed schedule. It involves following up with suppliers to monitor production, shipment, and delivery progress.

   *Key Responsibilities*: Monitoring supplier performance and ensuring timely deliveries. Identifying and resolving delays or disruptions in the supply chain. Coordinating with suppliers and logistics teams to speed up late deliveries when necessary.

   *Relation to Other Functions*: Expediting supports the purchasing and planning processes by ensuring that the materials or services are delivered as needed. It acts as a bridge between purchasing and planning, working to avoid or resolve delays.

4. **Planning**. *Definition*: Planning (often referring to materials or production planning) involves forecasting demand, scheduling production or service needs, and determining the resources required to meet that demand. It provides the foundation for procurement and purchasing decisions.

   *Key Responsibilities*: Forecasting demand for products or materials. Scheduling production runs or service needs. Coordinating with purchasing to ensure materials are available when required.

   *Relation to Other Functions*: Planning initiates the procurement and purchasing processes by defining what, when, and how much is needed. Planning ensures that procurement and purchasing align with production schedules or business needs.

*How They Work Together.*

Planning → Procurement/Purchasing: Planning determines what materials or services are required based on production forecasts or business needs. Procurement then selects suppliers and negotiates contracts, while purchasing places the orders for the required materials.

Procurement → Purchasing: Procurement develops the supplier strategy, manages relationships, and negotiates long-term agreements, ensuring that purchasing can efficiently place orders with pre-approved suppliers under optimal conditions.

Purchasing → Expediting: After placing an order, the purchasing department hands over responsibility to expediting to ensure the supplier fulfills the order on time and within the agreed-upon terms.

Expediting → Planning: Expediting ensures materials are delivered on time

and communicates any delays to the planning team so they can adjust production schedules or revise forecasts accordingly.

The main goal of expediting is to ensure that the goods ordered from the suppliers arrive on time, in the right place, and satisfy quality requirements.
The word expediting means "to make something happen more quickly[10]". Indeed, expediting has to smooth processes when they are blocked due to various issues that could happen in the supply process. It is both a reactive and proactive activity. It is reactive when a disruption has already occurred and the purpose is impact mitigation. It is proactive when the objective is to discover potential delays before they disrupt our projects.

## 2.2 Expediting responsibility and relevance based on industries

The responsibility for expediting varies across organizations, though there are a few common factors influencing responsibility[11]:

- Organizational Structure: Large organizations with dedicated procurement departments might have a team responsible for expediting, whereas smaller companies might integrate it into the core procurement function;
- Order Complexity: Critical or high-value orders, or those with complex technical documents, might require dedicated expediting resources due to their potential impact on project timelines;
- Supplier Relationships: Complex supplier relationships, geographically distant suppliers, or those with intricate approval processes for documents, might necessitate dedicated expediting efforts.

The responsibility for expediting typically falls under one of the following[11]:

- Procurement Team: In smaller organizations, the procurement team might handle expediting tasks themselves. Buyers or procurement specialists monitor orders, communicate with suppliers, and resolve delays for materials, services, and documents;
- Dedicated Expediters: Larger organizations might have dedicated expediters who specialize in proactively managing the expediting process for materials, services, and documents. These expediters work closely with the procurement team and suppliers to ensure on-time deliveries;
- Third-Party Expediting Service providers: Some companies outsource their expediting needs to specialized third-party firms. These firms have expertise in expediting processes and can provide resources and manpower for larger or more complex projects.

Regardless of who holds the main responsibility, successful expediting requires collaboration between different departments[11]:

- Project Management: Understands overall project timelines and communicates the urgency of specific deliveries for materials, services, and documents;
- Engineering: Provides insights into material and document requirements, as well as potential delays due to design changes;
- Document Controls: Establishes procedures for reviewing and approving vendor documents before they are accepted, ensuring accuracy and completeness;
- Procurement: Provides order details, communicates with suppliers, and coordinates expediting efforts for materials, services, and documents.

While any industry that relies on timely deliveries can benefit from expediting, some sectors utilize it more heavily due to the nature of their work. Here are some prominent examples[11]:

- **Project-Based Manufacturing**: Aerospace, defense, and automotive industries often have tight project timelines with specific deadlines for component deliveries. Expediting ensures critical parts arrive on schedule, keeping production lines running smoothly;
- **Oil and Gas**: Timely delivery of essential equipment, services, and permits is crucial for avoiding costly project delays in oil and gas exploration. Expediting in large scale projects helps minimize disruptions and ensures timely completion of drilling projects;
- **Construction**: Construction projects have strict deadlines and rely on a constant flow of materials and permits. Expediting in construction helps address delays in material deliveries and permit approvals, preventing disruptions and keeping construction on track;
- **High-Tech**: The fast-paced tech industry demands rapid innovation and product releases. Expediting ensures timely delivery of critical electronic components and technical documentation, keeping production cycles moving and new products on schedule;
- **Healthcare**: Timely delivery of medical equipment, supplies, and regulatory approvals is vital for patient care. Expediting helps ensure hospitals and clinics receive essential equipment and documents on time, avoiding critical shortages and delays in treatment;

- **Shipbuilding**: Building complex ships involves a multitude of components with specific delivery timelines and technical specifications. Expediting plays a crucial role in ensuring timely arrival of these components and documents, preventing delays in ship construction and launch schedules.

## 2.3 Types of Expediting

There are different types of expediting. According to the first classification, we can distinguish between:

- **Production Expediting**: Focuses on speeding up the production of goods in a manufacturing environment, ensuring that products are made and shipped as quickly as possible;
- **Logistics Expediting**: Involves speeding up the shipping and transportation of goods, either by air, land, or sea, to ensure timely delivery;
- **Project Expediting**: In construction, engineering, or other project-based work, expediting ensures that materials, equipment, and labor are available when needed to keep the project on schedule.

According to a different classification, we can distinguish instead between field, desk, and document expediting:

- **Field expediting**: The expeditor works on supplier site. He can see in which stage of production the product is and has total visibility of the production process. In case of delays, the expeditor can inform his company immediately that the supplier might be in delay. Field expediting means the inspection and control of the expeditor at supplier site;
- **Desk expediting**: This type of expediting is not performed on the supplier site but remotely, using phone calls, meetings (via Teams, Skype, etc.), and emails. Unlike field expediting, there is much less transparency. As a consequence, the company does not know the stage of production in which the product is; in this typology of expediting is crucial to build trust in the relationship with the supplier the can lead to a faster supplier's response time;
- **Document expediting**: It ensures that suppliers have all the required documents to proceed with the delivery without problems. Compliance with the documentation is critical especially in international trade, as different countries can have different regulations.

## 2.4 Expediting KPIs

The effectiveness of expediting in procurement is measured using a combination of quantitative and qualitative metrics[11].

**Quantitative Metrics**:

- On-Time Delivery (OTD): This is the most crucial expediting KPI, reflecting the percentage of orders delivered on or before the agreed-upon date, considering a given time frame. Improved OTD directly translates to the success of your expediting efforts; the OTD rate, while significant, should be considered with caution. An order that ships late but arrives on time due to the company expediting the shipping is still a red flag. Even though it was technically "on time," it could be considered a failed delivery since the company had to pay extra to expedite the order and make the delivery date[14].

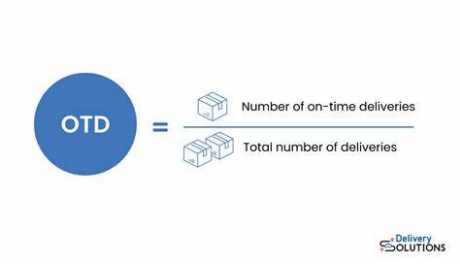


Figure 2.2: OTD KPI[14].

- Number of Expedited Orders: Tracks the overall volume of orders requiring expediting intervention. A high number might indicate underlying supply chain issues or a need for better planning;
- Expediting Lead Time: Measures the average time it takes to resolve a delay through expediting efforts. A lower lead time signifies quicker issue resolution;
- Cost of Expediting: Tracks the expenses associated with expediting activities, such as travel costs for field expediting or expediting software subscriptions.

**Qualitative Metrics**:

- Supplier Responsiveness: Measures the timeliness and effectiveness of supplier communication during expediting efforts;
- Strength of Supplier Relationships: Evaluates the overall health and trust between your organization and key suppliers;

- Process Efficiency: assesses the effectiveness of your expediting procedures and identifies areas for improvement;
- Risk Mitigation: evaluates the success of expediting in preventing major project delays or disruptions.

## 2.5 Examples of expediting

Below are some examples taken from three different industries, that show, in a very simple way, the positive impact that expediting can have on business operations.

1) An automotive company, AutoTech, produces 500 cars per day. A critical component, the transmission system, is supplied by an external vendor, and any delay in its delivery halts production.

**Scenario 1:** Without Expediting (Delays in Supply). Production was halted for 3 days due to delayed shipment of transmissions. Daily loss in production: 500 cars.
Profit per car: \$1,500.
Total lost revenue in 3 days: 500 cars/day $\times$ 3 days $\times$\$1,500 profit/car=\$2,250,000.

**Scenario 2:** With Expediting (Avoiding Delay). The procurement team recognizes potential delays and initiates expediting. By working with the supplier, they reduce shipping time by 2 days, preventing the plant shutdown.
Cost of expediting: \$50,000 (including air freight, overtime, etc.).

Outcome Without expediting, the company loses \$2,250,000 in revenue.
With expediting, the company incurs a cost of \$50,000, but avoids the massive production halt, saving \$2,200,000 in lost revenue.

2) Construction Industry: Large Building Project. A construction company, BuildCo, is constructing a skyscraper. The project has a tight schedule, and a critical shipment of steel beams, which are necessary for the foundation, is delayed.

**Scenario 1:** Without Expediting (Delay in Steel Delivery). The steel beams are delayed by 10 days, preventing the foundation from being completed. The delay pushes back the entire project, as subsequent work (electrical, plumbing, etc.) depends on the foundation.
Daily cost of delay (contract penalties, idle labor, equipment rental, etc.): \$100,000.
Total cost of delay over 10 days: 10days$\times$\$100,000=\$1,000,000.

**Scenario 2:** With Expediting (Avoiding Delay). The project manager opts for expedited shipping of the steel beams via air freight and arranges overtime labor to make up for lost time.
Cost of expediting: $150,000 (air freight, extra labor, etc.). The project is back on track within 2 days.

Outcome Without expediting, the company incurs a $1,000,000 loss in delays. With expediting, they spend $150,000 but save $850,000 by avoiding project delays.

3) Retail Industry: Electronics Manufacturer. A consumer electronics company, ElectroTech, is preparing to launch its new flagship smartphone during the holiday season, a critical sales period.

**Scenario 1:** Without Expediting (Component Shortage). A supplier of critical semiconductors experiences a two-week delay in delivery due to customs issues. The delay causes the launch of the smartphone to be pushed back by 2 weeks, missing the Black Friday and Cyber Monday sales.
Estimated lost revenue due to missing peak sales period: $5,000,000.

**Scenario 2:** With Expediting (Fast-Track Supply Chain). The company expedites the shipment by using an express international shipping service and pays customs fees upfront to avoid further delays. Cost of expediting: $200,000. The smartphone launches on time, capitalizing on holiday sales.

Outcome Without expediting, the company loses $5,000,000 in sales.
With expediting, they spend $200,000 but secure the peak sales window, saving $4,800,000.

## 2.6 Expediting challenges

While expediting offers significant benefits, there are many hurdles you might encounter in the expediting process. Here below some examples of these challenges and strategies to address them.

**Limited Visibility**.

*Challenge*: Obtaining accurate and timely information from suppliers can be difficult. They might lack standardized reporting or hesitate to share detailed production data. This hinders effective progress monitoring and early delay identification.

*Strategy*: Establish clear communication protocols during contract negotiation. Explore supplier portals or data-sharing platforms to improve transparency.

**Inconsistent Communication**.

*Challenge*: Communication breakdowns are common due to multiple contact points within supplier organizations, reliance on various communication channels (email, phone calls), and language barriers. This can lead to misunderstandings and delays.

*Strategy*: Designate a single point of contact within both your organization and the supplier's. Utilize standardized communication templates and preferred channels (e.g., project management software) to ensure clarity and reduce misinterpretations.

**Prioritization Overload**:

*Challenge*: Buyers may overwhelm suppliers with expediting requests, making it difficult for them to prioritize truly critical items. This can strain relationships and reduce expediting effectiveness.

*Strategy*: Implement a clear prioritization system based on factors like lead time, material criticality, and project impact. Clearly communicate priorities to suppliers and explain the rationale behind them.

**Resource Constraints**:

*Challenge*: Expediting can be time-consuming, requiring dedicated personnel to monitor progress, communicate with suppliers, and document efforts. Procurement teams might not have the resources for a robust expediting program.

*Strategy*: Explore technology solutions like expediting software to automate tasks and streamline communication. Consider outsourcing expediting for complex projects or high-volume situations.

**Strained Supplier Relationships**:

*Challenge*: Overly aggressive expediting tactics can damage supplier relationships. Building trust and maintaining a collaborative approach is crucial, but pressure to expedite can lead to frustration and conflict.

*Strategy*: Foster open communication and focus on problem-solving with suppliers. Acknowledge their challenges and work together to find solutions. Regular communication and a collaborative approach will strengthen supplier relationships in the long run.

**Data Overload**:

*Challenge*: Managing a large volume of expediting requests and data can be overwhelming. Without proper systems in place, it's difficult to track progress, analyze trends, and identify areas for improvement.

*Strategy*: Implement an expediting management system to track requests, communication, and resolutions. Utilize data analytics to identify trends in delays and supplier performance. This will allow for continuous improvement of your expediting processes.

## 2.7 Technology in Procurement and Expediting

What follows are few consideration on the future of procurement and expediting, driven by technology advancements.

- Rise of Automation and AI: Tasks like data analysis and communication can be automated using artificial intelligence (AI). This frees up procurement professionals to focus on strategic expediting activities like supplier relationship management, exception handling, and crafting targeted intervention plans.

- Real-Time Visibility: Advancements in data sharing and integration will allow for real-time visibility into supplier production processes. Cloud-based platforms and Internet of Things (IoT) sensors can provide continuous data streams on material availability, service delivery status, and document completion progress. This enables proactive identification and mitigation of potential delays for materials, services, and documents.

- Predictive Analytics: By leveraging historical data and machine learning, procurement teams can leverage predictive analytics to anticipate potential delays before they occur. This allows for preventive measures like buffer inventory adjustments or alternative sourcing strategies, leading to more targeted and efficient expediting efforts.

- Collaborative Expediting Platforms: Cloud-based platforms can revolutionize communication and collaboration between procurement teams and suppliers. These platforms can streamline information sharing, track progress, and manage expediting workflows more efficiently. This fosters transparency, builds trust, and streamlines the entire expediting process.

- Focus on Risk Management: As supply chains become increasingly complex and global, risk management is paramount. Expediting will likely evolve to be more integrated with broader supply chain risk management strategies. This might involve considering factors like geographic diversification of suppliers, dual sourcing for critical materials, and incorporating sustainability practices into expediting decisions.

- Sustainability Considerations: Sustainability will undoubtedly become a bigger factor in expediting decisions. Expediting efforts may prioritize suppliers with environmentally friendly practices or those located closer to reduce transportation emissions. Additionally, expediting software solutions might be designed to optimize delivery routes and minimize environmental impact.

Overall, expediting is moving away from a reactive firefighting approach towards a more proactive and collaborative strategy. Technology will play a key role in streamlining processes, providing real-time data, and enabling better decision-making. The focus will shift towards risk mitigation, supplier collaboration, and ensuring a sustainable supply chain.

Below are some risk mitigation strategies that can be considered to increase supply chain resilience.

*Dual Sourcing Strategy in Procurement.* Dual sourcing is a supply chain management strategy that involves engaging two suppliers to provide a specific component, material, product, or service. The idea behind this approach is to reduce the risk associated with depending solely on one supplier. Unexpected factors like adverse weather, material shortages, recalls, natural disasters and geopolitical issues can disrupt supply chains. Introducing a secondary supplier stimulates healthy competition among suppliers. This encourages suppliers to provide competitive prices, enhanced quality, and innovative solutions, ultimately benefiting businesses by improving supplier value. Dual sourcing enables companies to pivot to different sources, reducing vulnerability to geopolitical disruptions and ensuring business continuity.
Dual sourcing strength lies in enhancing supply chain resilience. By embracing this strategy, companies create adaptable networks capable of overcoming different challenges. This resilience extends across the entire business ecosystem, safeguarding operations, customer satisfaction and market standing.
Depending on the product and selected supplier, businesses may find dual sourcing necessary to accommodate increased capacity. When faced with a substantial demand for their product that a single supplier cannot meet, dual sourcing becomes a viable solution. In some cases, fulfilling this demand might even require more than two sources.
But dual sourcing faces also some challenges, for instance, more negotiation,

as you need to negotiate contracts with two different suppliers. Also, quality control can be challenging, as products supplied by different suppliers can be somehow different.
The dual-sourcing strategy is used mainly for critical items and components.

*Global vs regional networks.* A regional procurement network focuses on sourcing goods and services from suppliers located within a specific geographic region, such as within a country or neighboring countries.
A global procurement network sources goods and services from suppliers across the world, often from multiple regions to take advantage of cost efficiencies or specialized expertise.
There are pros and cons for each of the strategies. A reasonable solution can be a hybrid solution.
Also, there is no wrong or right choice in absolute terms between global and regional networks. The choice of which network to build depends on the specific case. In the below table, there are some general pros and cons related to each network.

| Aspect | Regional Network | Global Network |
|---|---|---|
| **Lead time** | Shorter | Longer |
| **Transportation costs** | Lower | Higher |
| **Supplier pool** | Limited | Broader |
| **Production costs** | Potentially higher | Lower |
| **Risk** | Reduced global risk, but regional vulnerability | More Exposure to global disruptions |
| **Complexity** | Easier to manage and communicate | Complex logistics, time zones and compliance |
| **Economies of scale** | Limited | Larger potential savings |
| **Flexibility** | Higher responsiveness | Less flexibility |
| **Sustainability** | Typically lower carbon footprint | Potentially higher footprint due to long-distance shipping |

Figure 2.3: Global and regional networks

# Chapter 3

# Automotive aftermarket industry

## 3.1 Industry Definition

The automotive aftermarket industry is part of the broader automotive industry. It is the secondary market of the automotive industry, concerned with the manufacturing, remanufacturing, distribution, retailing, and installation of all vehicle parts, chemicals, equipment, and accessories, after the sale of the automobile by the original equipment manufacturer (OEM) to the consumer.[4].

Figure 3.1: Car maintenance

The phrase "automotive parts aftermarket" refers to the components and pieces of vehicles that are added after that the vehicle has been shipped from the manufacturer. This industry includes the selling of aftermarket components such as replacement tires, equipment, car parts, service repairs, accident repairs, and accessories for vehicles that have already been purchased. Companies that engage in the production, distribution, retailing, installation, and remanufacturing of a variety of automobile components and accessories are part of this industry[16].

## 3.2 Distribution network and main actors

Here below is a description of the main actors within the automotive aftermarket industry and their role and relevance.

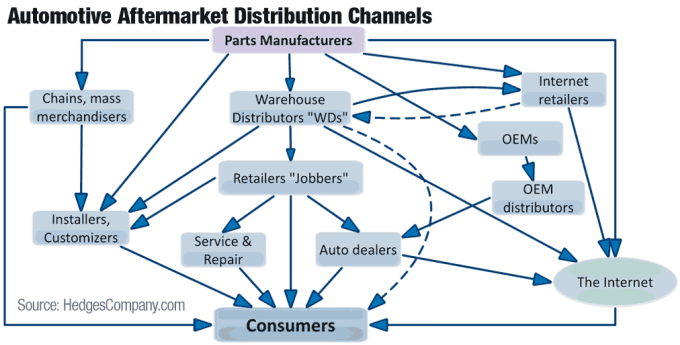


Figure 3.2: Parts distribution and actors[7].

***1. Parts Manufacturers (OEMs and OESs).***

a) OEM (Original Equipment Manufacturer or car manufacturer): these are the companies that design and assemble vehicles. They also produce or source parts that are sold as genuine OEM parts in the aftermarket (genuine means that they are the same parts that have been used in the assembly of the vehicle). OEMs mostly play a role in the early stages, supplying parts under their brand for authorized dealerships.

*Example:* Ford manufactures genuine parts like alternators or brake pads, which are distributed through their dealership network.

b) OES (Original Equipment Supplier): OES companies supply parts both to OEMs and directly to the aftermarket. These parts are either sold as genuine parts through OEM channels or as branded OES parts in the aftermarket. OES suppliers can market their products under their own brand or under the OEM's

brand.

*Example:* Bosch or Denso, who supply car components like electronics or braking systems to automakers, also sell those same parts in the aftermarket through various distribution channels.

***2. Aftermarket Parts Manufacturers.***

a) Non-OEM or Independent Aftermarket Parts Manufacturers: these companies produce parts that are compatible with OEM and OES's parts, but they are not produced by the OEMs or OESs (these parts are called generic or non-genuine parts). These parts often come at a lower price, but quality may vary. Many of these companies produce generic or branded aftermarket parts that are sold to wholesalers, retailers, or repair shops.

*Example:* Companies like Monroe (suspension), MagnaFlow (exhaust systems), or ACDelco produce a wide range of aftermarket parts not necessarily identical to the original equipment, but that meet industry standards for replacement.

***3. Wholesalers and Distributors.***

a) Wholesalers play an important role in the aftermarket by purchasing large quantities of parts from manufacturers (OEMs, OESs and aftermarket) and distributing them to retailers, repair shops, or smaller wholesalers. Their large-scale purchasing allows them to negotiate better prices and stock a wide variety of parts, making them a critical link in the supply chain. We can distinguish among different types of wholesalers, for instance between national and regional wholesalers and specialty wholesalers.

aa) National and Regional Wholesalers are large distribution networks that cover wide geographic areas, supplying parts to local retailers, repair shops, and smaller wholesalers. They typically have large inventories and provide quick delivery times.

*Example:* Companies like LKQ Corporation and Genuine Parts Company (GPC) are examples of large national distributors. They stock parts from various manufacturers and supply them to service providers across the country.

bb) Specialty Distributors focus on a specific category of parts (e.g., performance parts, tires, or electrical components) and supply niche markets or specific industries.

*Example:* Tire Rack is a specialized distributor focused on tires and wheels

for consumers and service shops, while Summit Racing specializes in performance and custom car parts.

***4. Jobbers.***

Jobbers refer to middlemen or wholesalers who play a critical role in the distribution of automotive parts and accessories. They serve as intermediaries between manufacturers and retailers or repair shops, ensuring that products reach their intended markets efficiently. Jobbers typically purchase parts in bulk from manufacturers or suppliers and then sell them to local automotive repair shops, dealerships, or retail stores. They often handle a wide variety of parts, including aftermarket components, tools, and accessories. They are crucial for maintaining inventory levels and providing quick access to parts for repair shops, which is essential for timely service and repairs.

***5. Retailers.***

Retailers sell parts directly to consumers and service shops. There are different types of retailers, including brick-and-mortar stores, online retailers, and hybrid models that combine both. Retailers usually source parts from wholesalers, distributors, or directly from manufacturers, depending on their size and business model.

a) Traditional Brick-and-Mortar Auto Parts Stores: these stores sell parts and accessories directly to consumers and repair shops. They often serve both the DIY (Do It Yourself) market and professional mechanics, offering a wide range of products.

*Example:* Companies like AutoZone, Advance Auto Parts, and O'Reilly Auto Parts have large chains of stores across the U.S., offering everything from batteries to engine components.

b) Online Retailers: The rise of e-commerce has created a large market for online retailers who sell automotive parts directly to consumers. These retailers often have a wide selection and can ship products globally. Many online platforms also offer direct-to-consumer (D2C) sales with the convenience of home delivery.

*Example:* RockAuto, Amazon Automotive, and CarParts.com are examples of online retailers where consumers and mechanics can buy a wide variety of parts.

c) Dealer-Owned Networks: Some car manufacturers run their own parts distribution networks through their authorized dealerships. These networks sell genuine parts and accessories, primarily to maintain vehicles under warranty.

*Example:* A Toyota or Ford dealership sells parts like timing belts or brake pads directly to customers who want genuine OEM parts for repairs or maintenance.

***6. Repair and Service Providers.***

Repair and service providers are a crucial part of the distribution chain. They obtain parts from wholesalers, distributors, or directly from retailers to perform maintenance and repairs. These service providers can be divided into Independent Repair Shops, Franchised Service Centers and Dealership Service Centers.

a) Independent Repair Shops (DIFM Market): These are locally owned businesses that provide repair services using aftermarket parts. They often purchase parts from wholesalers, local retailers, or specialty distributors.

*Example:* An independent mechanic shop might source parts like spark plugs or suspension components from a local store to fix a customer's car.

b) Franchised Service Centers: Chains of repair shops that are part of larger networks, offering standardized services and parts across multiple locations. They often have agreements with parts manufacturers and wholesalers to ensure a steady supply of specific parts.

*Example:* Service centers like Midas, Pep Boys, and Firestone have numerous locations and tend to source parts in bulk from large distributors.

c) Dealership Service Centers: These are affiliated with OEMs and focus on providing maintenance and repairs using genuine parts. Customers who prefer to have their vehicle serviced by the manufacturer often go to these centers for warranty-covered repairs or to maintain vehicle reliability with OEM parts.

*Example:* A BMW dealership service center sources parts directly from BMW or their OES suppliers like ZF (transmission) or Bosch (electronics).

***7. Consumers (End Users).***

At the end of the distribution network are the consumers, who buy parts for DIY repairs or hire mechanics to perform the work (DIFM).

a) DIY Consumers: These are car owners who perform their own repairs and maintenance, buying parts directly from retailers (in-store or online) and using them for personal vehicle upkeep.

*Example:* A car owner might buy a battery or set of brake pads from AutoZone to replace on their own vehicle.

b) DIFM Consumers: These consumers prefer to hire professionals to handle repairs. They take their cars to service shops, dealerships, or repair centers that source the necessary parts.

*Example:* A customer might take their vehicle to Firestone Complete Auto Care, where the shop sources the replacement parts and performs the service.

***8. Car insurance company.***

Under many regulations, a car must be insured to be allowed to circulate. The tole of car insurance companies consist of offering protection to the customers, for instance in case of car accidents or car theft. When a car is damaged, it must be repaired and insurance companies do it, fueling the automotive aftermarket industry.

In terms of market size, the retail segment dominated the market with a share of 55.5% in 2023 and is expected to remain dominant throughout the forecast years. The wholesale and distribution segment is expected to witness relatively fast growth in terms of revenue from 2024 to 2030. Automotive aftermarket economies are important parts of the overall automotive manufacturing and maintenance scheme as automotive components need to be replaced on time to maintain the overall performance of the vehicle.
Factors, such as crash repair and wear and tear, are supporting aftermarket components demand. The consumer preferences for aftermarket parts instead of Original Equipment Manufacturer (OEM) parts owing to their cost-saving attributes are likely to boost the key manufacturers' revenue. The generic or aftermarket parts are also more easily available than the original manufacturer's parts, thus saving time and money for both consumers and insurance companies.

## 3.3 Size of the market and expected growth

According to many sources, the automotive aftermarket industry is expected to growth in the next years. Grand View research (a website) states that the global automotive aftermarket industry size was estimated at USD 448.24 billion in 2023 and is expected to grow at a CAGR of 3.9% from 2024 to 2030[6].
The above statement is also supported by another website, Strategic Market Research, which states that the automotive aftermarket industry was worth USD 449.24 billion, and by 2030, it is expected to reach USD 650.56 billion, growing at a 4.2% CAGR during the forecast period[5].
In another survey made by McKinsey & Company in 2023, the market is also expected to grow at CAGR of 3% [8].

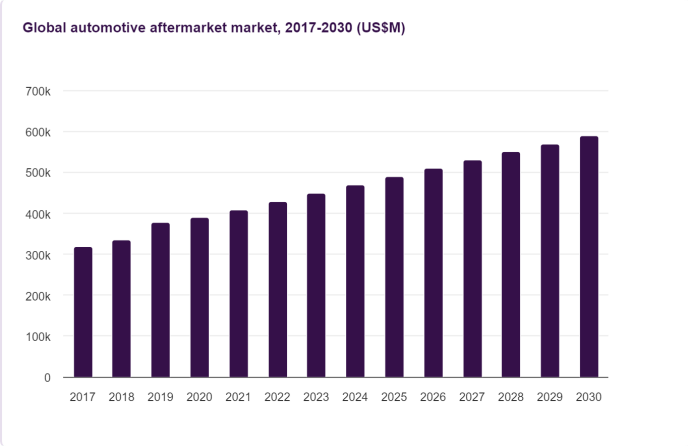


Figure 3.3: Expected market growth[3].

The market growth is majorly driven by the following factors:

- The increasing demand for automobiles from emerging economies is likely to favor automotive aftermarket industry growth. This increase in demand has been supported by the rapid expansion of global players in Asian countries, majorly in China, India, Australia, and Indonesia. As the number of vehicles in operation (or vehicles on the road) is expected to increase, the demand for replacement parts and maintenance services will increase too.

- The increasing average age of vehicles on the road is a significant driving factor for the global automotive aftermarket, creating opportunities for aftermarket suppliers, retailers, and service providers.

- The pursuit of automobile drivers to enhance their vehicle performance in terms of exhaust sound, speed, and appearance parameters fuels industry growth[6]. For instance, especially in certain regions of the world, drivers love to customize their vehicles leading to an increase in the sales of vehicle accessories.

- The increasing awareness of car owners regarding safety standards and emissions is also going to support market growth, as consumers tend to have maintenance more frequently.

However, there are some factors that could limit the expansion of this industry. Below there are two of them:

- Increasing Vehicle Reliability: Advances in automotive technology and manufacturing processes have made vehicles more reliable, reducing the frequency of repairs and maintenance needed over time;

- Autonomous vehicles: the demand for autonomous vehicles is increasing with the rise of automotive sensors these days. These sensors decrease the wear and tear of the components of vehicles and reduce the need for replacement components. This may be detrimental to the expansion of the sector[15].

**Automotive industry trends and their effects on aftermarket industry**. The main trends that are affecting the automotive aftermarket industry are the following:

- *Electrification*: increase in the sales of electric vehicles (EVs). This will have some consequences on the aftermarket industry as there will be an increase in the demand for new types of replacement parts (e.g. EVs' batteries, chargers, ...) whereas there will be a decrease in demand for replacement parts related to internal combustion engine (ICE) vehicles (e.g. exhaust system, ...).

- *Shared Mobility*: this will lead to less people having an individual car as more and more people are going to use shared mobility more frequently. Aftersales should focus on companies that are managing shared mobility services, as these companies will need aftersales services to maintain their fleets of vehicles in operation.

- Connected and autonomous vehicles: the increase in vehicle connectivity and autonomous vehicles will have an impact on the services and replacement parts offered by the aftersales businesses. For instance, new services that could be asked by the customers could be software updates, which can be offered also remotely by the service provider.

- *Online vehicle sales*: a growing number of consumers are bypassing the dealership altogether in favor of one of the D2C digital platforms that has emerged in recent years. Consistent with other product segments that have gone digital, the percentage of vehicles purchased online is expected to continue to expand. The latest EY Mobility Consumer Index (MCI) indicates that up to two-thirds of all car buyers now use digital channels (apps, websites and social media) to gather information about their prospective purchases[2]. The online sales trend is affecting also the automotive aftermarket and the percentage of spare parts purchased online is expected to grow a lot in the next years.

## 3.4 Spare parts categorizations

**Classification by certification.**

Based on certification, we can distinguish between:

- *Genuine parts*: they are manufactured by car manufacturers or by OESs. Genuine replacement parts have greater assurance of quality and include a warranty. The downside of these parts is that they are expensive and require to be purchased from dealers;
- *Certified parts*: these parts are tested and inspected by certified organizations. The Certified Automotive Parts Association (CAPA) is a non-profit organization, which was incorporated in 1987. CAPA offers test programs to verify and guarantee the quality and suitability of automotive replacement parts. It was the brainchild of automotive insurance companies and was formed to ensure the quality of replacement parts used by collision repair shops;
- *Uncertified parts*: uncertified parts can be used instead of the original automotive parts but they are not approved by the car maker. However, the low cost of uncertified parts creates significant growth opportunities for the segment; they are not always illegal, but they may lack the reliability and quality control of certified or OEM components;
- *Counterfeit parts*: they are illegal products designed to imitate genuine branded or OEM parts; they are dangerous because they are made to deceive consumers, with little regard for safety or performance.

In terms of market size, the genuine parts segment dominated the market with a share of 51.6% in 2023. The genuine parts segment is anticipated to dominate the aftermarket arena, in terms of size, by 2030. The uncertified parts segment is expected to witness relatively fast growth in terms of revenue from 2024 to 2030[6].
The certified automotive parts market is expected to see significant growth, driven by evolving consumer preferences for quality, safety, and compliance with regulatory standards and because they are cost-effective alternatives to costly genuine parts.
Counterfeit parts market share is not included in the table below.

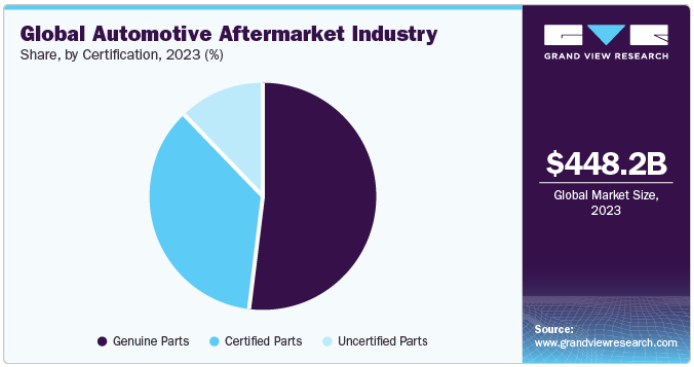


Figure 3.4: Spare parts based on certification.

**Classification by replacement part type.**

Figure 3.5: Vehicle spare parts.

Based on replacement part type, the market is segmented into various subsegments, namely battery, brake pads, filters, gaskets and seals, lighting components, body parts, wheels and tires, and others. The *wheels and tires* segment held the largest market share in 2022. The *body part* segment held the second-largest share of the market in 2022. The most significant driver for the segment is the need for repairs following accidents or collisions. Cracked bumpers, dented doors, and other body damage often require replacement parts, leading to a continuous demand for body components[7].

The table below illustrates the market share of automotive spare parts by replacement part type.

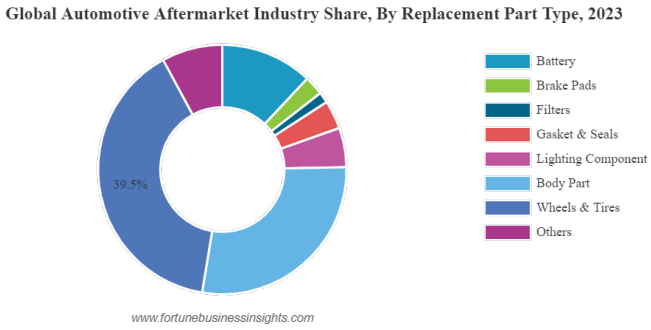


Figure 3.6: Replacement part types based on part type.

**Classification by vehicle type.**

Based on vehicle type, the market can be divided into two sub-segments:

- *Passenger vehicles*: designed primarily for transporting individuals or small groups (e.g., sedans, SUVs);
- *Commercial vehicles*: designed for transporting goods or larger groups of people (e.g., trucks, buses).

The passenger segment held the largest market share in 2022. As urbanization increases, the reliance on passenger cars for daily commuting also rises. This leads to higher wear and tear of various components, necessitating more frequent replacements and repairs. For instance, as per data published by the World Economic Forum in May 2022, the predominant mode of transportation for commuting between home and work in the U.S. is private car usage, with 76% of American commuters opting for their vehicles.

**Classification of the market by region.**

By region, the market is analyzed across North America, Europe, Asia Pacific, and the rest of the world[7].
*North America* held the largest share in 2022. North American consumers often have a strong preference for customizing and personalizing their vehicles. This inclination toward vehicle modification drives the demand for aftermarket accessories and performance-enhancing products.

*Europe* held a significant share of the global market in 2022. Europe has a significant number of vehicles on the road, and the average age of vehicles is relatively high. As vehicles age, the demand for aftermarket products and services, including replacement parts and repairs, increases. For instance, in 2023, according to ACEA (The European Automobile Manufacturers' Association), Trucks in the European Union have an average age of 14.2 years. Greece holds the record for the oldest truck fleet, with an average age of around 22.7 years.

*Asia Pacific* held a decent market share in 2022. The region has witnessed a significant increase in the number of vehicles on the road, driven by economic growth, rising incomes, and urbanization. As the vehicle fleet expands, the demand for aftermarket parts for maintenance and repairs rises.

*The rest of the world* held a considerable market share in 2022.

## 3.5 Market structure and trends

The automotive aftermarket industry is quite fragmented and highly competitive. Some of the major players are large companies like Bridgestone Corporation, Continental AG, Magna International, Inc., Robert Bosch GmbH, Toyota

Motor Corporation, and ZF Friedrichshafen AG.
The automotive aftermarket experiences a moderate to high level of merger and acquisition (M&A) activities as companies seek strategic partnerships and acquisitions to enhance their product portfolios, expand market reach, and achieve operational synergies. Mergers and acquisitions contribute to the consolidation of the aftermarket industry, fostering competitive advantages for participants and addressing the evolving needs of customers[6].
Despite this consolidation trend, which has also a geographical difference, the market remains always fragmented and competitive, as it includes still many different players. Competitive pricing is a detrimental factor affecting the success of the brand in the global market. This fierce competition leads companies to work on reducing production costs. The cost optimization initiatives adopted by manufacturers include continuously optimizing and upgrading their products, expanding their distribution network, and conducting trials. The modern-age production technology, such as 3D printing of automotive parts, is extensively being deployed by major companies in the industry to optimize their production costs, with 3D printing enabling efficient fabrication performance and reduction of emission toxicity[6].
The global automotive aftermarket exhibits a notable degree of innovation as technological advancements drive product improvements and service enhancements. Emerging technologies, such as connected vehicles and electric components, are influencing the aftermarket landscape, prompting businesses to adapt and offer innovative solutions to meet evolving consumer demands[6].
Product innovations and portfolio expansion are the key strategies for industry players to enhance their market share. Industry participants are constantly focusing on enhancing their production facilities, upgrading their solutions, and investing in new production plants to enhance their market presence[7].
Regulatory factors significantly impact the global market, with environmental standards, safety regulations, and intellectual property laws shaping the industry landscape. Compliance with stringent regulations influences product development, manufacturing processes, and aftermarket services, compelling businesses to invest in R&D to meet evolving legal requirements and ensure market sustainability[6]. Industry regulations cover diverse areas from emissions to safety. The California Air Resources Board (CARB) and the Environmental Protection Agency (EPA) regulate any part or function that creates emissions. OEMs and their suppliers have to comply with these regulations, as does any replacement aftermarket part that affects emissions[1].
The marketplace is evolving as the aftermarket transitions to the internet. Online stores sell accessories and services. Original Equipment Manufacturers (OEMs), Original Equipment Suppliers (OESs), distributors, insurers, and workshops are just a few of the value chain participants responding to the expanding online aftermarket trend.
Original equipment manufacturers have progressively enhanced their degree of participation and emphasis inside the automotive parts aftermarket value chain. For example, they have created their own networks of repair shops that do not specialize in repairing a particular brand of automobile. In order to compete

with independent aftermarket players and keep customers within their networks for a longer period of time, major market players have introduced second service formats and second brands (such as VW Direkt Express) or remanufactured parts in an effort to keep up with the market's shift toward older vehicles[16].

## 3.6 Leveraging data analytics in the automotive aftermarket

There is an enormous general interest in the automotive sector, and there are many sets of informative data openly available to the public about preferences of the vehicle manufacturer, model, and fuel type, as well as customer buying habits, including color, engine size, transmission type, etc. Data are often mentioned in the news as part of meta stories involving such issues as environmental concerns, the hazards of diesel vehicle emissions, and the resulting reduction in automotive sales because of this or the increase in sales for hybrid and electric cars as an alternative to vehicles that rely solely on fossil fuels.
Not all companies currently involved in the automotive aftermarket sector store their data for posterity, and whilst others may periodically collect data, they are yet to discover the hidden value and financial benefit within the data that statistical analysis, big data analytics, and data science can provide. Datasets compiled from the online vehicle part transactions contain a plethora of information about individual purchases and details of the parts themselves. Valuable insight can be obtained from applying data science techniques to automotive aftermarket sales data like buying habits, preferences, return rates, and product attributes.
Trends and patterns derived from analysis of automotive transactions can be used to inform the industry better, for example about when specific vehicle parts are bought and therefore which parts to keep in stock at different times of the year to anticipate increased sales. Data science techniques, such as association rule mining, cluster analysis, and decision tree analysis, applied to automotive aftersales data give insight that is not obvious from using traditional statistical tools[18].
In all cases, the full benefit of the data science application is realized when the results are clearly visualized and made accessible to customers. Hence, a mixture of technical skills (in analysis and visualization), business domain knowledge, and good communication skills work together to produce results of great value.
Let's consider some examples and let's take first an example based on data from garages buying large numbers of parts for vehicle repairs, and consider the return rates of individual vehicle products. The product return rate represents the percentage of products sold that are subsequently returned by customers. Essentially, it tells us how often buyers change their minds or encounter issues with their purchases. Understanding the nature of product returns is a key factor in running any successful business that supplies goods. When dealing with very large datasets which include hundreds of thousands of products and

millions of units sold, it can be difficult to prioritize the attention to give to which product returns. But by applying specific statistical tools, it is possible to find a method to prioritize attention to those parts whose return rates are exceptional compared with the expected return rate for the industry.
Another example considers predicting when parts need to be replaced on a car. Comparing invoices for the replacement of vehicle parts and the mileage of a vehicle at the time of replacement highlights the potential failure rate of non-serviceable vehicle parts (parts that are not repairable). Inspecting those parts that were replaced (along with the mileage at the point of replacement) and comparing these across different vehicle makes and models also indicate the reliability of different vehicle part manufacturers. By using appropriate statistical tools, it is possible to identify key points in a car's history when replacement is needed and also potentially when failure may occur[18].

## 3.7 Lead time, demand forecasting and inventory strategies

Without an appropriate demand planning process, lead time from customer order to delivery from the OEM in the automotive aftermarket will increase (Andersson and Jonsson, 2018). To reduce the lead time, one of the major inventory strategies adopted in the automotive aftermarket is the make-to-stock (MTS) production approach. MTS approach is a push system of production strategy and produces products based on the expected sales and customer demand. This satisfies customers' demand with stocked inventories of finished products (Peeters and van Ooijen, 2020). The MTS approach allows companies to streamline production based on the potential customer demand by adjusting their resources to optimize production efficiency. Holding inventory to anticipate customer demand reduces the customers' waiting time to receive the ordered spare parts. But in some production settings, the MTS approach is incapable of achieving the requirements imposed by a company or its customers. For example, heavy back orders for MTS spare parts have negative impact on overall customer satisfaction and revenues. Therefore, some companies employ a make-to-order (MTO) production approach, a pull strategy, to produce spare parts after receiving customer orders (Peeters and van Ooijen, 2020).
Key decision factors in the MTS approach include the determination of safety stock, minimum order quantity, reorder points, and replenishment processes, while coordination among supply chain members, order processing, various lead time and horizon planning, as well as costs of production, transport, maintenance, obsolescence and opportunity are major antecedents to inventory management. In the automotive market, a demand planner forecasts potential demand by looking into overstock, service level, and backorders after obtaining market and sales plans. However, supply chain complexity and demand uncertainty decrease the accuracy of demand planning.
Demand forecasting employs historical sales data to create the best estimation

of forecast on customer demand. In the automotive industry, companies experienced difficulties in forecasting and handling the demand changes accurately and effectively (Dharmani et al., 2015). Short-term planning, a forecast planning for less than a year, has become extremely complex for OEMs (Investopedia, 2019). This makes automotive aftermarket companies use self-created forecasting tools. Marketing and promotional activities such as discounts or incentives have also increased the difficulty of using self-created forecast techniques to predict customer demand. This causes difficulties in making accurate order forecasts. Due to globalization, sourcing components from worldwide become common as it is a cheaper option, whereas the supply chain will be lengthened and more inflexible (Dharmani et al., 2015). Accordingly, forecasting plays an important role in supply chains by providing relevant and reliable information about future events. Accurate forecasting supports automotive aftermarket companies in making decisions on reorder points and the quantity of products to purchase, as well as stock availability. Automotive aftermarket companies are incapable of fulfilling customer orders if materials/products are not replenished on time, and companies thus experience stock-out issues.

Companies often look for a hybrid MTS and MTO approach to manage their system (Peeters and van Ooijen, 2020) for a balance between shorter lead time and level of stock availability. Accuracy of demand planning needs support from supplier capacity and supply chain visibility. Companies building supply chain visibility is capable of developing deeper knowledge about the operations of their upstream suppliers, and thus reducing costs. Furthermore, real-time end-to-end supply chain visibility facilitates collaboration between organizations and improves flexibility at various levels[12].

# Chapter 4

# Expediting in the Automotive Aftermarket Industry: a real example

## 4.1 The context

In the following chapter, I am going to describe the activity I made during my internship. But, before doing this, I am going to explain a bit the context in which I worked.

A large car manufacturer company has outsourced expediting services, for his after-sales business, to a third-party expediting service provider, that is Accenture. Accenture should provide the client with expediting service for his after-sales business. The client company has a set of warehouses of spare parts distributed in Europe, and the role of Accenture consists of monitoring the flow of spare parts from the suppliers to these warehouses. The main client's expectations are a decrease in VORs (Vehicle Off Road) cases, improvement in issue resolution time and information sharing and availability, with a consequent improvement in customer satisfaction.
Every company can be seen as a system that interacts, on one side, with a set of suppliers and, on the other side, with a set of customers. From the first group, the company sources the resources it needs while from the second group, it generates its revenues. Thus every company has to deal with and manage these two important groups of stakeholders.


Figure 4.1: Company's main stakeholders.

**Supplier relationships management (SRM) and the inbound process.** Supplier relationship management (SRM) is a systematic approach to evaluating and partnering with vendors that supply goods, materials and services to an organization, determining each supplier's contribution to success, and developing strategies to improve their performance[9]. It is a strategic approach that includes many activities which are made to choose the best suppliers, evaluate and monitor them.
Inbound logistics is the way materials and other goods are brought into a company. This process includes the steps to order, receive, store, transport and manage incoming supplies[13]. Unlike SRM, inbound logistics activities are more operational.

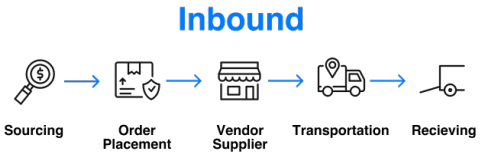


Figure 4.2: Inbound flow

**Outbound process and customer relationship management (CRM).** Customer relationship management (CRM) is a set of integrated technologies used to document, track and manage an organizations relationships and interactions with existing and potential customers[19].
Outbound logistics consists of storing and moving goods to the customer or end user. The steps include order fulfillment, packing, shipping, delivery and customer service related to delivery.
Customers can make requests, orders, complaints or simply ask for information. The ideal scenario is the one in which a company is able to satisfy always cus-

tomer requests on time and is able to provide all the requested information to the customers, providing 100% transparency.

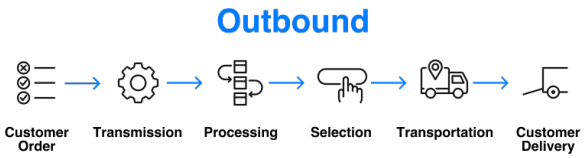


Figure 4.3: Outbound flow

Accenture was providing the client with services in both the CRM and SRM area. The internship experience has been made within the second area, which is SRM and inbound logistics. Within this context, I joined an expediting team and I started learning how to do the expediting activity.
As this activity is based on a constant relationship with a set of suppliers, I am going to give some numbers regarding the dimension of the suppliers set and the number of part numbers (spare parts) expediting teams had to manage. The number of suppliers to manage was around 4.000 while the number of items was around 90.000 (millions of units sold). Each member of the expediting team was assigned a subset of the main supplier's set. Expeditors cannot expedite each day every supplier. For this reason, a prioritization method is in place to establish on which suppliers expeditors should focus first, establishing priorities. The ranking of suppliers can be based on different factors. The prioritization of suppliers is paramount, as it helps expeditors work more efficiently, on the right supplier at the right time.

**Relationship between the company and the suppliers.**
*Relative strength or bargaining power based on spare part type.* If a spare part can be procured from many different suppliers, the supplier has low bargaining power with respect to the company. This context is obviously beneficial for the buyer company, as it can get better terms by threatening the supplier to switch to a different one.
If instead, spare parts are supplied by very few suppliers, suppliers have more bargaining power and they can ask for higher prices.
*Relative strength or bargaining power based on company and suppliers' size.* A large company (buyer) usually benefits from this type of relationship. As it usually buys in large quantities, it represents an important customer for the suppliers, who can make some extra effort to keep the relationship with the company. In addition, the company will buy at a lower price with respect to other customers, as it usually buys in bulk.

## 4.2 VORs, backorders, past dues and suppliers service level

Here below is a classification of orders that a buyer company has with its supplier, that was used in the organization.

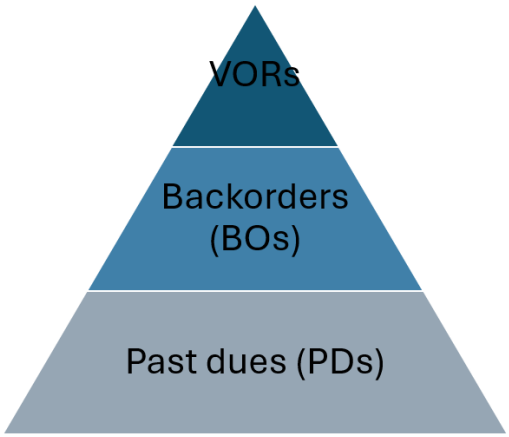


Figure 4.4: Orders' type

**VOR order:** orders with suppliers for spare parts for which there is no stock in the warehouse and a vehicle off-road. They have top priority. Suppliers of these type of spare parts must be addressed before the others. The main objective of the expediting team is to reduce the vehicle downtime. In parallel, an analysis of the occurrence of VORs cases could be conducted by other teams (e.g. planning team), in order to understand what were the reasons that generated these VOR cases. For instance, it could be caused by an inappropriate level of safety stock (VOR reserve). In this case, the team could suggest changing the amount to keep as safety stock, to avoid the emergence of new VORs in the future.
**Backorder:** It has a double meaning; it can refer to open orders with a supplier but also to the orders received from customers. A backorder differs from the concept of VOR order. A backorder (order from a customer) does not indicate that there is a vehicle off-road, but it is simply a normal order that the customer has with the company, for instance, to replenish the level of safety stock in its warehouse. In general, they have a lower priority with respect to VOR orders, but they should be monitored as they could turn into VORs orders. A backorder (order with a supplier) represents an open order that the buyer company has with a supplier that, at the moment, cannot be fulfilled due to lack of stocks by the supplier.

**Past dues:** An order (order with a supplier) is said to have expired when it has not been delivered yet, and the order deadline is in the past. These orders are called past-due orders. Among past due orders, it is possible to distinguish further between past due orders with BOs (orders from customers) and Past due orders without BOs (orders from customers). The first one has a higher priority with respect to the second one as, in the first case, the orders with suppliers have expired and there is a request from the customer (BOs) which cannot be fulfilled (assuming no stock in the warehouse). In any case, when an order is expired the expeditor has to investigate why this happened (finding a root cause) and share the information with the other departments in the organization so that they can take countermeasures.

**Supplier service level:** It measures the capacity of a supplier to deliver on time its orders to the buyer company. This can be measured, for instance, by looking at the level of expired orders (past dues) that a supplier has. If a supplier is constantly not fulfilling the orders on time, it could be also penalized by the buyer company. However, penalization can work also the other way around, meaning that the supplier could also ask for reimbursement to the buyer. This can happen when, for instance, the buyer company asks the supplier to give priority to its orders while affecting orders received by the supplier from other customers.
The penalty procedure can serve as a tool to encourage suppliers to improve their performance. However, it may also lead to conflicts that could strain the relationship with suppliers and, in worse cases, result in delivery stoppages by the supplier to the company.

*Action plan and Escalation.* There can be two different ways of working: one is working by PN (part number or spare part) and the other one is working by supplier. The former consists in scrolling down a list of part numbers, and expediting suppliers for a single part number. The latter instead consists of grouping part numbers by supplier, and expediting the supplier for a set of part numbers. There are advantages and disadvantages for each of these two ways of working, as shown in the table below. The choice of which method to adopt can depend on the team approach and/or personal preferences.

After having ranked the suppliers or the PNs, it's time to start addressing suppliers. Email contacts and phone numbers can be found in the information system of the company or into specific files created for this purpose, which contain all suppliers' contacts.
It could happen that the supplier does not answer for some days. In this case, usually, a meeting with the supplier is scheduled to see if the supplier shows up. In the negative case, the supplier is escalated from expeditors to their team leaders, who in turn can decide to escalate to a higher level into the organization or do a last try by themselves before escalating further.

| | By PN | By Supplier |
|---|---|---|
| Pros | Faster focus on the most important PNs | Single contact with the supplier |
| Cons | Multiple contacts with the same supplier | Possible delay in addressing critical cases |

Table 4.1: Pros and Cons

It is important to be clear while communicating with suppliers. It is good to analyse well the supplier status before contacting the supplier. In fact, sometimes, doing things in a hurry can be neither efficient nor effective, as for instance, you could forward a request to the wrong supplier or you could ask for the delivery of some parts that actually have already been delivered by the supplier. Committing these types of errors is not good, as the supplier could perceive a low level of attention from expeditors. In turn, suppliers could not visualize future requests from the same agent or could postpone processing them, giving priority to other activities. As a consequence, taking some time before addressing suppliers to understand better the status and the current issue, is for sure beneficial. Also, when writing emails, it is important to add as many details as possible in the email subject, and explain clearly what is requested and from whom it is requested. This is a good practice that later on helps retrieve the email conversation from the email box, by searching for part number or supplier code. Putting in copy colleagues and team leaders is also mandatory as this serves as a way to share information and keep posted every stakeholder. Finally, being patient, nice and comprehensive with suppliers is of course beneficial, as it creates trust between expeditors and suppliers.

## 4.3 VORs and new vehicle models' expediting teams.

Expediting can be made for different typologies of parts. There can be different expediting teams that focus on different types of spare parts. For instance, there can be a VORs' expediting team and a new models' expediting team. Despite the activity of expediting in the two teams is almost identical, some differences can be identified.
VORs spare parts are parts related to vehicles that have been already launched into the market and that could be still in production or not.
On the contrary, new models' spare parts are associated with vehicles that have not been commercialized yet, but their launch could be close. In this case, the objective is to have all the spare parts for the new cars in the warehouse before the new cars are launched into the market. In such a way, the company will be able to provide immediate support to the customers in case of car breakdown or accidents, soon after the vehicle has been purchased by the customer.
Another difference stands in the typology of issues/problems that suppliers can be facing. Within the VORs' team, for instance, common issues can be related to the production capacity of the supplier, shortage of materials, parts' supersession, etc... On the contrary, the nature of problems within the new models' expediting team are more organizational problems, like lack of knowledge in us-

ing the client's management system, EDI (Electronic Data Interchange) setting issues, purchasing issues (price negotiation), wrong cofor, etc...
This difference can be attributed to the fact that, when dealing with new models, there can be suppliers that have never supplied spare parts to the after-sales business. Even though they are going to supply to the same company brand, there are some differences between supplying to production and supplying to after-sales, and these differences can generate issues and difficulties for suppliers. For instance, it often happens that the supply of the spare parts to the OEM's after-sales business must occur under different commercial terms with respect to the delivery to the production plant (Assembly plant). The reason why new terms are needed (e.g. definition of a new price for the same spare part) can be that the volumes purchased by the after-sales business are less than the volumes purchased by the production plant. Also, there can be differences related to the delivery mode (how pick-up occurs), different delivery addresses and/or different customer codes.
Another difference between the two expediting teams stands in the prioritization method used to establish which supplier should be addressed first. In the VORs team, the prioritization is based on a combination of factors like the number of pieces VOR and BOs (Backorders) value. For instance, according to these two factors, expeditors are pushed to work on suppliers that have a lot of pcs VOR, high BOs value or both. In the new models' team, instead, the priorities are defined based on the proximity of the launch of the new model. For instance, if there are two new car models, A and B, that are going to be launched in October and December respectively, the main focus will be on model A rather than model B.

## 4.4 Root causes and issues resolution

When a supplier communicates he is going to fail in delivering the goods according to the deadline, the reason why this is happening should be investigated by the expeditor. This reason that is found is called "Root Cause". Here is a list of the most common issues (root causes) that can be encountered, and procedures to follow to solve them. For the majority of problems that suppliers can be facing, expeditors cannot do much to solve them. Indeed, they usually act as intermediaries between suppliers and the company: based on the type of the issue, they ask for support to other competent departments of the organization like for instance planning, purchasing, transport, etc.

***EDI (Electronic Data Interchange)*:** It refers to the electronic exchange of business information in a standardized format between organizations or trading partners. EDI replaces traditional paper-based documents, such as purchase orders, invoices, and shipping notices, allowing companies to exchange data directly between their computer systems. Often suppliers have problems in receiving and understanding EDI messages. When this happens the problem is escalated to the EDI department and the issue is then followed up.

***MOQ (Minimum order quantity)*:** It occurs when the quantity on order is smaller than the MOQ level or it is not a multiple of it. MOQ is established during the contract definition by the purchasing teams. Based on MOQ, the price per unit is also defined. When there is a misalignment between MOQ and quantity on order, the planning team is involved to adjust the quantity on order. In case the planning team does not agree on the MOQ, the issue can be transferred again to the purchasing team, who will need to negotiate with the supplier's purchasing department a new MOQ and price per unit.

***Price Negotiation*:** This issue occurs when the parties do not agree on something (e.g. price, payment terms, transport, MOQ). When a supplier highlights a price negotiation issue, the responsibility belongs to the purchasing team. However, the expeditor has to follow up the case to get it solved as soon as possible.

***Supplier capacity*:** The supplier is no longer able to fulfill the orders according to the orders' deadline. The reasons why this can happen are different. It could be due to a machine breakdown, an error in production planning, or to a sudden increase in demand by the buyer company. When this type of issue occurs, the expeditor has to inform the planning team while asking the supplier a recovery plan.

***Shortage of components*:** It means that the supplier is facing an issue in procuring the raw materials or sub-components that are needed to produce the spare part. So, the issue is with the sub-supplier. Even in this case, the expeditor has to inform the planning team and ask the supplier for a recovery plan.

***Missing or Expired purchase order (PO)*:** The PO is a document (a contract) that contains the terms under which a good is exchanged between supplier and buyer. It has a validity period under which the terms remain applicable. Often suppliers complain about missing or expired POs, saying that they cannot provide the goods before receiving the PO. In these cases, the expeditor has to ask support to the purchasing team, which is in charge of issuing the purchase orders.

***Transport/logistics issues and vouchers' creation*:** the delivery of parts from the supplier site to the company/customer's warehouse could occur mainly in two different ways, according to what has been stated in the commercial terms (Incoterms). The supplier can be in charge of delivering the goods, or the buyer company could be in charge of picking up the goods from the supplier's warehouse.
Also, it happens frequently that the supplier, for some reason, does not know the delivery address or knows a wrong delivery address. To avoid the possibility that the parts will be shipped to the wrong address, the delivery address should always be specified when requesting the spare parts to the supplier. In addi-

tion, when a supplier is in charge of delivering, it can be requested by the buyer company to the supplier to show an unloading appointment (voucher) at the arrival at the warehouse. This practice has the purpose of avoiding congestion at the warehouse, and at the same time, it allows for a better distribution of deliveries within the entire week.
When is the company in charge of picking up the parts, usually the company needs information regarding the dimensions and weight of the boxes/pallets that are going to be picked up. Explaining in advance to the supplier that it is important to receive this necessary information to schedule the pickup can speed up the process, without the need to ask back to the supplier to provide this information.
***Wrong cofor issue*:** each supplier is identified by a supplier code; in almost all the cases, orders are sent to the supplier via EDI and it is important to send the requests for the spare parts to the right supplier by using the right supplier ID/code. Let's do an example: a supplier has two different production plants, one in city A and the other one in city B. Each of these plant must be associated with a unique supplier. To do so, two supplier codes could be used: one which represents the company group and the second one which represents the specific production plant in which a given spare part is produced. For instance, 100 can represent the group code and 101 and 102 the plant in city A and city B, respectively. To identify the production plant located in city A it is then used the following couple of codes: 100/101.
Another option to identify the two different production plants could simply consist of having two different codes for each plant, by using a single code for each production plant. However, in this way (by using a single code instead of a couple of codes) it is possible to miss the information that the two production plants located in cities A and B belong to the same company group.
Anyway, in general, it could happen that an error in supplier code association has been made. In that case, the role of expeditor consists in understanding what's the right supplier code, and asking the competent person (the buyers) to modify the supplier code in the company's database, so that orders can be released to the correct supplier.

When a given issue is going on for a long time, the expeditor has to inform his team leaders, who can then decide whether to escalate to a higher level in the organization.
Reporting and updating the information received from suppliers on the management systems/databases of the client company is mandatory and allows every stakeholder to have clear visibility on each supplier and part number.

## 4.5 Other general considerations

What follows are various considerations taken from this real example experience.

***Relevance of expediting in the automotive aftermarket industry.***
As the automotive aftermarket industry is becoming more and more competitive and customers' expectations are always increasing, businesses in this industry need to keep a high service level and high customer care. Expediting, along with an advanced procurement team (planning, inventory management teams), can help businesses to achieve these results.
This industry is a time-sensitive one, as providing on time what is requested by the supplier represents a source of competitive advantage.

***Outsourcing and knowledge transfer.***
When a company outsources an activity, there are some advantages and disadvantages. The main advantage is that the company that outsources can focus more on its core business activities while leveraging the greater expertise of the service provider. However, especially in the first phase of the outsourcing process, there is a phase in which the industry knowledge and guidelines/requirements of the client's company needs to be communicated to the service provider. Because of this transfer which can take some time, the impact of the service provider on the business could occur with a lag.

***Information asymmetry between suppliers and expeditors.***
This challenge is mainly common in desk expediting activity, that is the expediting type made during the internship. As desk expediting consists of getting information from suppliers via email or phone calls, it can happen that some issues cannot be detected or hidden by the supplier. Suppliers could hide some information for some specific reasons or because they think is not something important to share with the expeditors.

***Language barriers.***
It occurs when the supplier and buyer speak different languages and they do not share a common language. However, as of today, this issue is becoming less and less important, as English is spoken by an increasing number of people and it is used in many companies as the main communication language. Also, with the use of a translator, it is possible to share information, even though suppliers and expeditors do not speak the same language. Another possible communication issue could occur when the supplier and buyer use different words/expressions to identify the same thing. To overcome also this issue two things can be done: 1) find a common way to name things; 2) ask questions when it is not clear what an expression or word means.

***Lack of adequate expeditors' training.***
An important obstacle that prevents expeditors from being efficient and effective in their job is the lack of adequate knowledge about internal processes. It is obvious that when an expeditor knows well all the internal processes within an organization, he can do his job faster and be more efficient and effective. To achieve this status, a good training program for expeditors could, for sure, help and contribute to expediting success.

Being expediting an operative activity, learning by doing is the approach used to learn how to do this job, after a small period of training. So internal processes and procedures are learned while working.

# Chapter 5

# Conclusion

## 5.1 Are humans still needed in expediting?

Yes, humans are still needed to perform expediting activities, although technology and automation are increasingly enhancing efficiency in this area. While certain aspects of expediting can be automated or optimized using advanced technologies, human involvement remains crucial for several reasons:

- Problem-solving and complex decision-making: When delays occur due to unforeseen circumstances (e.g., supplier issues, transportation problems, or natural disasters), human intervention is needed to assess the situation, make quick decisions, and find alternative solutions. Humans often need to negotiate with suppliers or logistics providers to accelerate deliveries or manage conflicts that arise;
- Relationship Management: expediting often involves managing relationships with multiple stakeholders, such as suppliers, customers, and internal teams. Humans are key to maintaining these relationships, especially in situations requiring diplomacy and trust-building, which are hard to fully automate;
- Judgment and Contextual Understanding: humans can understand context beyond raw data. For example, understanding cultural differences, logistical challenges in specific regions, or particular nuances in contracts are areas where human judgment and experience are critical;
- Collaboration and Communication: Human expediters act as intermediaries between different departments and external partners. Clear communication across various teams, explaining the reasons for delays, or coordinating resources to expedite a solution still benefits from human oversight and engagement;

*Role of Technology.*
Many expediting tasks are now supported by technology such as:

- Real-time tracking systems: These allow humans to monitor shipments more effectively and act only when there's an issue;
- Automation in routine tasks: Sending reminders, tracking deadlines, and even basic communication can be automated;
- AI-based predictive tools: These can analyze data and suggest potential delays, but humans typically oversee how to act on these predictions.

While automation can handle more straightforward and routine aspects of expediting, the need for human expertise in more complex, unpredictable situations ensures that humans remain an integral part of the process.
I think that the increasing adoption of the technology into companies will limit the number of expeditors needed in the future. However, the introduction of new processes and methods within companies takes time, especially in large and complex businesses. So, in the near future, the figure of the expeditor will remain quite important. Also when the technology is completely and widely adopted in every company, there will be always the need to have some human expeditors, even though I expect that the number of expeditors will decrease in the future.

## 5.2 Expediting in the automotive aftermarket industry

To evaluate whether expediting is a value-added activity or not, a cost-benefit analysis can be performed. When the benefits exceed the costs, expediting represents a valuable investment. The following costs/benefits analysis is the result of a qualitative analysis based on the previous chapters of this thesis (chapter 2 on Expediting, chapter 3 on the automotive aftermarket industry and chapter 4 on the real experience as an expediting in this industry).
One important factor that influences these final considerations on whether expediting is a value-added activity or not, is represented by the characteristics of the client company to which expediting service has been offered. The client company, in fact, is large, complex and multinational. This fact augments the importance of expediting. In addition, the client company is the aftersales business of a large car manufacturer company. As a consequence, the car manufacturer must keep a high level of aftersales service, to increase customers' satisfaction and customer retention. Another factor that influences this result stands in the characteristics of the specific industry. In the automotive aftermarket industry demand forecasting is not an easy task, as the automotive industry is always evolving, customers' buying habits are changing and local and global regulations are also changing over time, affecting the industry. This unpredictability confers to expediting more relevance with respect to other industries, which could be considered more stable.

**Costs/benefits analysis with a focus on the automotive aftermarket industry**.

*Costs:*

- Investments in new resources who will provide expediting service: companies have to pay for the salaries of employees who do expediting, whether they are internal employees or employees from a third-party service provider;
- Extra costs due to urgent shipments: expedited deliveries like air shipments are more expensive than traditional shipments (for instance sea shipments in case of international trade). However, they can be valuable as they speed up the receipt of critical parts that are urgently requested.

*Benefits:*

- Mitigation of disruptions: expediting can help increase supply chain resilience by mitigating disruptions that occur in the supply chain. By proactively monitoring suppliers, issues can be addressed before they occur and mitigation strategies can be adopted to limit the impact on the business;
- Lower lead time: let's assume that an urgent request for a given spare part arrives. There is no stock for this part but there is an order placed on the supplier for this part. The order deadline is not acceptable for the supplier so we need to expedite the order. If this is possible, the product will be delivered by the supplier before the deadline and, in turn, to the customer according to his request, by increasing customer satisfaction;
- Reduction of lost revenues: a lost revenue occurs when, for instance, a customer shifts from one company to another one to buy the same product. The reason why a customer could do it may be a much longer lead time for the first company with respect to the lead time for the second one. By doing expediting, a company can reduce lead time and retain the customer;
- Increase in transparency and data consistency: expeditors are there to give clarifications on delivery status to all the stakeholders involved; they are in charge of updating daily the information received from the suppliers in the company's information system and databases to increase transparency; when diverse databases are in place, expeditors should assure that information among them is aligned, assuring data consistency;
- Intermediary role of expeditors: one important agent's role is to give support to suppliers and put in contact the suppliers with the right persons in the company, to have a faster issue resolution. By doing so, expeditors can discover issues before they occur;
- Data cleaning and data alignment between various information systems: this is also another precious activity that expeditors do, according to my

point of view. Indeed, thanks to this activity there is an improvement in data consistency and transparency. Thanks to this activity, it is more likely that different persons who are searching for information on a given spare part will obtain the same information from the databases they consult.

While expediting is crucial, to be successful, it also requires an effective procurement team. Otherwise, there is the risk of overspending in this activity while not having the desired benefits. A constant monitoring of performance can help avoid overspending and lack of effectiveness.

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