How smart pricing analytics help OEMs compete in the spare parts business
The automobile spare parts industry is a roughly $30 billion business in the United States alone, representing 40 to 48 percent of car dealer revenue. Given the lucrative market, competition has increased astronomically in recent years, with original equipment manufacturers (OEMs) going head-to-head with aftermarket parts suppliers.

While vehicles under warranty typically use OEM parts, owners tend to lean toward aftermarket parts as the age of their vehicle increases. To stay competitive with other suppliers as vehicles age, OEMs must have efficient systems to support pricing, marketing, inventory management, and supply chain and logistics. But the key to driving a profitable spare parts business is being able to leverage those systems to realize smart pricing.

The anatomy of the spare parts market

Spare parts that are specific to an OEM’s own vehicles are referred to as “monopolistic products” and tend to be in less demand (low sales volume); more common products, on the other hand, are “non-monopolistic,” tend to sell at higher volumes and are available from more suppliers (see Figure 1).

For every OEM spare part in the non-monopolistic bin, there are 2 to 50 aftermarket spare parts available — and massive competition. Since 60 to 80 percent of OEM spare parts are non-monopolistic, OEMs have to up their game to be competitive.

Figure 1. The spare parts market defined: Spare parts that are specific to an OEM’s vehicles are “monopolistic products” and tend to be in less demand. More common products are “non-monopolistic,” tend to sell at higher volumes and are available from more suppliers.

That’s easier said than done, given that large OEMs typically have 100,000-plus spare parts in inventory and a high number of competitors, which complicates pricing in the following ways:

1. **Large part count.** Many OEMs lack IT systems to price their parts inventories, which results in a huge manual challenge for the pricing team. Manual pricing limits reviews to a small pool of parts and involves instinct-based reasoning. Pricing for a single spare part can take a pricing analyst 8 to 16 hours, and each outcome has to be reviewed by a pricing manager. That means pricing teams typically price only 500 to 1,000 spare parts per month, so most products are not reviewed and the need to revise specific prices might go unnoticed.

2. **Huge amounts of data from many sources.** As the cost of data collection has plummeted, OEMs tend to collect massive amounts of data from multiple sources. But when pricing a spare part, it is not possible to manually consider 10-plus data sources, such as inventory, invoice, competitors, pricing catalogues, new car sales, existing cars on the road, etc.

3. **Varied competitor information.** Given the number of competitors, it simply isn’t possible to manually incorporate pricing information from a wide range of suppliers.

4. **Changing economic factors.** Macro- and microeconomic factors keep changing dynamically in every country and market, making it hard to keep manual pricing systems up to date.

5. **Operationalizing a digital pricing system.** Even when an OEM creates a digitized pricing system, the organization often lacks experience and expertise in operationalizing the solution. For example, if the system doesn’t take real-time data into account, the benefits of using an automated system are severely limited.

**DXC analytics solution — smart pricing system for spare parts**

Understanding the benefits of a smart pricing system is perhaps best achieved by looking at a system that DXC Technology operationalized for a major European OEM. Due to its global scale of operations and use of manual processes, this OEM was ceding market share to competitors and losing revenue. The answer, it concluded, was to adopt a real-time, smart pricing system that was powered by machine learning to track every spare part and to leverage company and external data.

The DXC customer had 100,000-plus spare parts in every region, and the system was initially built for one European country. It has since been deployed to six other countries in Europe and Asia. The analytics solution is based on intelligent machine learning algorithms and attempts to boost sales by making use of price elasticity when it comes to recommending prices. Price elasticity is the measure of the effect that a price change or a change in the availability of supplies will have on demand for a product or service.
Using price elasticity, three distinct groups of spare parts were identified (Figure 2) — high-roller definitive inelastic parts, indirect elastic parts, and direct elastic parts — and pricing strategies for each group were calculated.

Before the DXC smart pricing solution was implemented, the OEM company was using a manual process to price spare parts, which numbered more than 100,000 in one country alone. Pricing data was available from 10 sources in different formats, representing close to 9 billion records, and the pricing team of five to six people needed to consider prices from as many as 50 competitors. Given the complexity, the team could price and adjust prices for only 50 to 100 parts per month.

With the DXC smart pricing system implemented at the OEM (Figure 3) a single front end ingests all the data, considers competitors and, through analytics, classifies parts as elastic or inelastic and provides price recommendations for all spare parts. Since the process is fully automated, the pricing team can now review prices for 100,000 parts per month.

**Figure 2.** Profiting from price elasticity: Part sales are only partially driven by price. In fact, while it may seem counterintuitive, the price of some parts can be increased without decreasing sales. The key is using smart pricing strategies to maximize parts revenue.

**High-roller definitive inelastic parts**
- Price increases can be realized without risking a decrease in the sales volume. This will lead directly to higher turnover and margin.

**Indirect elastic parts**
- Such parts behave counterintuitively, meaning that as prices go up, sales don’t necessarily go down. These parts can be used for experimental price increases, which should increase sales volume and lead to higher turnover and margin.

**Direct elastic parts**
- Such parts behave intuitively, meaning that as prices go up, sales go down. However, an adjustment of the general pricing strategy is recommended to optimize sales or turnover, which should improve margins.

**Figure 3.** The business impact of smart pricing: DXC implemented a front end for one large OEM that automated many steps in the pricing process, enabling the pricing team to adjust prices for 100,000 parts per month, compared to the original limitation of 50–100 parts/month.
DXC helped a customer create an automated price recommendation system and implement the solution.

Addressing the challenges through analytics

Here’s how the DXC analytics solution addressed the OEM’s core pricing challenges:

1. **Large part count.** Ideally, you would have a machine learning model for each spare part. Computationally, that’s too expensive given the number of parts, and it’s unrealistic to assume one model will be able to support 100K spare parts. So, we needed to balance the number of models with the model efficiency and compute needs. After exploring multiple options, DXC used an adaptation of the Pareto principle (i.e., for many events, roughly 80 percent of the effects come from 20 percent of the causes) to determine the models required. In consultation with the business stakeholders, the parts inventory was segmented based on profitability. The parts were then further clustered based on sales behavioral patterns discovered in the data. With this method, we were able to cut down the models by more than 90 percent, from 100,000 to about 3,000.

2. **Huge amounts of data from many sources.** A data mart was created in a distributed environment. Data from 11 sources of multiple formats was extracted, loaded and transformed. Data was preprocessed to use for analytics, and aggregations were applied based on results of exploratory data analysis iterations.

3. **Varied competitor information.** Through extensive exploratory data analysis, aggregations were created to represent a large amount of competitor data.

4. **Changing economic factors.** Machine learning algorithms were used to create analytical models to adapt to dynamically changing factors. The models have the capacity to fine-tune themselves to adjust the prediction and price elasticity based on changing factors.

5. **Operationalizing a digital pricing system.** DXC helped the customer create an automated price recommendation system and implement the solution. The combined expertise and experience in operationalizing the analytics solution helped to streamline implementation.
Solution

The solution flow took into account different inputs, data preprocessing, modeling and different outputs (Figure 4).

Solution specifics included the following:

- The solution was hosted in a Hadoop ecosystem.
- Data preprocessing is performed in Hive, and modeling is done on Scala Spark.
- Layered preprocessing makes algorithms and queries reusable for new markets — meaning that for any new market, only the first layer needs to be customized, while the others remain the same, resulting in faster development.
- The modeling layer is encapsulated from data preprocessing and oblivious to features it receives. As a result, execution is fast and can be adapted for new markets with less effort.
- As data presented is manipulated in Hive, the presentation layer is light and can be reused for new markets/countries.

**Figure 4.** Optimizing parts pricing: The DXC smart pricing system ingests data from multiple sources, consolidates, cleans and organizes the data, and uses advanced modeling techniques to estimate price elasticity and recommend optimal prices. The results are presented in user-friendly tables and graphs.
The spare parts business is a vital component of OEM revenue, a lucrative sales stream that has attracted unbridled competition from aftermarket competitors.

Operationalizing price recommendation system

The next step is making sure the business can leverage the new capabilities. Auto manufacturers, like many organizations, are using predictive analytics for business decisions. But the greatest benefit is realized when analytics are implemented as part of an organizational system. Unfortunately, many analytics teams and organizations rely on tools and methods that cannot be seamlessly integrated with other solutions and migrated into production.

What’s more, some analytic teams think the work is done when the model is built and validated. A team focused on operationalizing analytics will instead focus on the point at which operational decisions are being made more effectively — thanks to analytics being embedded in the systems used to make those decisions. This requires a change in focus and the use of more modern technologies.

DXC successfully operationalizes our smart pricing solution by complying with the four pillars of operationalizing analytics: People, governance, technology and process (Figure 5).

Taken together, these are the core improvements that DXC helps OEM companies to achieve:

- Realize cost savings by identifying the best prices for spare parts
- Automate price recommendations for 100,000-plus spare parts
- Identify parts with high potential for price optimization
- Facilitate frequent price changes in response to market fluctuations
- Track relevant sales and pricing data for any given spare part with one click, using a simple dashboard
- Realize a contemporary scalable architecture (20×) using advanced machine learning that can integrate various data sources and business rules, as well as accommodate additional features such as macroeconomic factors

Figure 5. Operationalizing the system is key: If you can’t seamlessly integrate smart pricing with other solutions and migrate into production, then the upside is minimized.
DXC helps maximize profit from these indirect business benefits:

- Focus on pricing by reducing time-consuming research
- Speed the price-building process
- Automate alerts of competitor price changes or declines in sales and margin
- Create a single data lake for all related data sources of after-sales units

The spare parts business is a vital component of OEM revenue, a lucrative sales stream that has attracted unbridled competition from aftermarket competitors. To stay current and competitive, automakers need to adopt smart pricing systems to gain the insights and agility required to turn their market positions into competitive advantage.

**How DXC can help**

DXC Technology advises, develops and implements modern analytics and artificial intelligence (AI) solutions by applying industry expertise, technology and business solutions and services, proven methodologies, and experienced people. DXC draws on decades of experience in helping manufacturing and automotive OEMs modernize the way they use technology to deliver better outcomes. Just as DXC developed and operationalized an automated and digitized smart pricing system for a leading European automobile manufacturer, as described in this paper, we can help you realize the same benefits.

**Learn more at www.dxc.technology/analytics**

---

**About DXC Technology**

DXC Technology (NYSE: DXC) helps global companies run their mission critical systems and operations while modernizing IT, optimizing data architectures, and ensuring security and scalability across public, private and hybrid clouds. With decades of driving innovation, the world's largest companies trust DXC to deploy our enterprise technology stack to deliver new levels of performance, competitiveness and customer experiences. Learn more about the DXC story and our focus on people, customers and operational execution at [www.dxc.technology](http://www.dxc.technology).