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SUCCESSstory

Recognizing delivery bottlenecks before they lead to a line stoppage

AI-supported logistics at Volkswagen de México

„It was crucial for us to be able to act much earlier, not just recognize risks once production was already affected.“

At a glance

Volkswagen de México, S.A. de C.V.

Automobile manufacturer

Puebla (headquarters & vehicle production)
Silao (engine plant)

Approx. 13,000 employees (2025)

Approx. 382,000 vehicles & 507,000 engines produced in 2024

The company

Volkswagen de México, an important subsidiary of the Volkswagen Group, has been a key player in automotive and component production in Mexico for decades. The company operates two plants in Mexico: one of the country‘s most traditional automotive plants in Puebla and an engine plant in Silao, Guanajuato. Volkswagen de México produces vehicles and components for the domestic market, as well as for export to numerous international markets.

The sites are deeply integrated into global production and supply networks, and with a workforce of several thousand, they collaborate closely with numerous national and international suppliers. In addition to efficiency and quality, topics such as supply chain stability, digitalization, and process reliability are increasingly important in order to secure long-term production capacity, even under volatile market and framework conditions.

The challenge

Volkswagen de México carries out its vehicle and engine production under highly synchronized just-in-time and just-in-sequence processes. Minor deviations in the delivery performance of individual suppliers can result in materials not being available on time. This leads to interruptions in production lines and impacts adherence to the production schedule. The challenge lies less in the number of problematic suppliers than in identifying them. Only a very small proportion of suppliers actually cause problems. However, it is crucial to identify these few at an early stage.

Until the start of the project, the approach was very reactive. Risks usually only became apparent when there were delivery delays or missing materials. Although a large amount of data from purchasing, logistics, transportation, and warehousing was available, it was distributed across different systems and primarily used for retrospective analyses. This made it necessary to develop an approach for the proactive assessment of supplier risks. Traditional planning and monitoring tools were reaching their limits because they could not reliably map complex patterns or gradual deterioration in delivery performance.

Added to this was the high economic pressure. In the automotive industry, production interruptions incur considerable costs per event. At the same time, demands for delivery reliability, flexibility, and reaction speed are increasing. Therefore, Volkswagen de México was looking for an approach that would allow them to identify risks earlier and take targeted countermeasures. The goal was to act proactively instead of reacting under time pressure in the event of a crisis. With this in mind, Volkswagen de México decided to commission abat to develop an AI-supported solution that would use existing data intelligently and identify critical suppliers early on.

„The AI solution helps us derive concrete information for daily operations from a large amount of distributed data.“

The solution

abat developed an AI-based forecasting model for the predictive detection of potential supplier failures together with Volkswagen de México. This model analyzes historical and current data throughout the supply chain to identify patterns indicating an increased probability of default. It particularly focuses on suppliers of fast-moving, production-critical parts, as their failure would immediately lead to a production stop.

The model evaluates suppliers not only in retrospect but also uses recognized patterns from historical data to forecast critical situations within a defined time window in the future. The results are visualized via a web-based dashboard that provides responsible departments with a clear, comprehensible basis for decision-making. Integrated monitoring of model quality supplements the solution to detect deviations in data behavior at an early stage. The solution aims to enable the transition from reactive problem processing to predictive supply chain management and prepare for timely operational interventions.

The project

The project began with a comprehensive feasibility analysis. During this phase, available data sources were identified, evaluated, and quality-checked. Data came from various systems, including ERP systems, logistics platforms, Excel evaluations, and other operational applications. It quickly became apparent that the biggest challenge was not the amount of data but rather its consistency and structure. More than one hundred thousand data records had to be cleansed, harmonized, and transferred to a common analysis model.

During the subsequent pilot phase, abat developed the initial model versions and tested various algorithms. The initial results were well below the target values. However, this phase was intentionally included in the process to identify relevant influencing factors and eliminate irrelevant characteristics. Through several iterations, the data was reweighted, additional features were integrated, and the model parameters were adjusted. Exchanging ideas with Volkswagen de México‘s specialist departments played a central role here, as operational process knowledge was directly incorporated into the further development.

A key milestone was the decision to use a classifier based on decision trees, which proved particularly suitable for the complex data situation. Targeted optimizations gradually improved forecasting quality. The F1 score increased from very low initial values to over eighty-four percent through several intermediate stages. Meanwhile, the technical platform was set up and made available in a cloud environment. An interactive dashboard made the results transparent and comprehensible for users.

Prior to launch, the forecasts were validated and assigned to real process scenarios. Productive operation began with a clearly defined user group and monitoring of the model performance. Organizational processes were simultaneously established to systematically address identified risks, such as through early discussions with suppliers or targeted support measures.

„We can now have targeted discussions with suppliers before problems develop into real bottlenecks.“

„The project has shown that predictive analytics in logistics makes a measurable difference in day-to-day production.“

Outcome

- Early identification of critical suppliers instead of a reactive response to acute production problems
- Significantly improved transparency regarding supply chain risks, thanks to a centralized, data-driven decision-making process.
- Reduction of unplanned line stoppages through preventive measures and targeted supplier support
- Scalable AI solution as a basis for further use in other plants and logistics contexts

The results

The project fundamentally changed the way Volkswagen de México addresses supply chain risks. Critical suppliers are now identified much earlier than before. Instead of only intervening in the event of acute delays, responsible teams can now act days in advance. This creates time for coordination, root cause analysis, and countermeasures before production stoppages occur.

The AI-based solution provides reliable, data-driven decision-making. Risks are assessed transparently and prioritized clearly. In day-to-day work, this means fewer surprises and greater planning reliability. Unexpected supplier failures decrease, while the speed of responding to identified risks increases. Collaboration with suppliers improves as well, since potential problems can be addressed early on and solved together.

Another important effect is improved internal coordination. Purchasing, logistics, and production now have access to the same information and can make more consistent decisions. The project has also created a scalable approach. The model can be transferred to other plants, regions, and supplier networks, where it can be continuously developed. For Volkswagen de México, this creates a foundation for stable and resilient supply chains in the long term.

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ABOUT US

abat

Founded in 1998, the abat Group is an SAP service provider and innovative software developer. We provide solutions for software-supported business processes, primarily for companies in the automotive, discrete manufacturing, life sciences, aerospace, defence, and security industries, as well as for companies with logistics processes or production control. Our six service areas give companies the freedom they need for new ideas, efficient processes, and forward-looking solutions.

In our division **consult**, we advise and support you throughout all phases of an SAP project, from conception and implementation to operating your SAP system. abat **manufacture** provides high-availability digital solutions for production control in the complex manufacturing industry. abat **transform** offers innovative and unique solutions that set you apart, including AI, cloud services, and RPA. The division **plm** provides comprehensive process consulting to achieve consistent data flow across PLM, ERP, and MES. The **protect** division offers solutions to help customers protect information and maintain confidentiality, availability, and integrity in business relationships. Finally, our experts in the division **sustain** advise on how to strategically and structurally anchor sustainability and sustainability reporting in a company.