

TeknoVe, Auto Manufacturer

Business Case Description

AI for Business Leaders

Project: Delivering an ML/AI Strategy

Udacity

TeknoVe is a fictitious Irish-headquartered manufacturer of electric vehicles with global operations across China, Germany, Canada, and Mexico. The company operates its own sales and assembly facilities but relies heavily on vendors for certain component manufacturing. They also have a global leasing arm, TeknoVe Financial.

Initial Description for Each Use Case:

1) Given TeknoVe's scale of production, flaws are inevitable and the company has always had a robust quality control process. Today that process is largely manual but the TeknoVe board has been pressing the company to think bigger as other auto manufacturers have seen outsized consequences to microscopic flaws in their materials. After reading about computer vision's use in crop monitoring from satellite data, the company CEO asked why zooming the problem in and using cameras to detect these types of microscopic errors isn't a feasible solution. The team was pleased to see evidence of a similar process in the semiconductor manufacturing industry. Armed with thousands of pictures of finished goods, both faulty and not, the team feels confident that such a system can be built but worries about its place in the production cycle.

2) As an Irish-headquartered company with global operations, TeknoVe puts considerable thought into tax planning each year. With income received in several different tax jurisdictions each year and a constant change in relevant tax laws, the firm spends millions each year on third party advisors who help them achieve tax efficiency. The firm's Chief Accounting Officer recently saw a demonstration of an AI Auditing tool and was inspired to create a similar tool to help with transfer pricing, a key component of tax analysis for any global manufacturer.

3) Keeping in line with their vision of delivering a tech-forward experience, TeknoVe has long been exploring different ways to personalize a rider's experience. With the advent of facial recognition, the company has been exploring potential uses of the technology both inside and outside the car. One thought is to tie keyless ignition and auto-unlock to facial recognition. There is even potential to control heating, lighting, and entertainment based on emotional queues. This has historically been managed with key proximity but the team thinks the added layer of security is a plus and that the added feature will further TeknoVe's "image" as a cutting edge technology company first and an automobile manufacturer second.

4) As a company, TeknoVe has always strived to remain far ahead of its customers on even the most basic features. One point of frustration for the company has always been the concept of a "check engine light". As a futuristic company, TeknoVe believes that these lights should rarely go on, and that their vehicles should be able to not only predict failures but also identify what is likely to cause a failure ahead of time. By providing these details to their largely technically-inclined customers, they believe they can improve customer satisfaction and minimize costs associated with their roadside service program.

5) TeknoVe manufactures several different vehicles and battery units in each of its facilities. It takes a considerable amount of time to reconfigure a factory from one model to another. At the same time, the team cannot build certain vehicles if there are supply chain issues and wants to avoid building more of any given vehicle than the market demands. The team's VP of supply chain has suggested analyzing past production data and using demand predictions to form an optimization model that seeks to minimize switching and inventory costs.

6) TeknoVe's supplier network is constantly changing to accommodate the company's rapid pace of innovation as well as various geopolitical risks associated with maintaining a cost-efficient global supply chain. One key function of TeknoVe's procurement team is to evaluate potential risks for existing suppliers and react in real time to ensure as few delays in the supply chain as possible.

7) TeknoVe Financial provides auto sales financing to more than 200,000 customers globally. Contract terms vary in lease term (24-60 months),

anticipated annual mileage (10-15,000 miles/yr.), and of course model chosen. The president of TeknoVE Financial recently saw an AI contract analysis tool and suggested to the team that AI analysis of key contract terms could potentially remove inefficiencies in the leasing process, enabling better financial projections etc. Today leases are tracked in a simple database that tracks key information in table form and appends a copy of the lease contract.

8) Because TeknoVe owns and operates its own dealerships, making sure all locations are active is imperative. Historically, the team has placed dealerships in modern, urban locations where there are concentrated populations. But now that the firm has generated significant data around their sales history, their CTO believes there's an opportunity to explore putting dealerships in other areas. The team plans to use demographic data about existing locations and sales figures to predict what sales would be in new locations.

9) As an electric vehicle manufacturer, TeknoVe considers sustainability core to their mission. Unfortunately, much of the electricity used to power the company's cars is produced through burning fossil fuels. In many locations, more renewable forms of electricity are available at off-peak hours. The corporate responsibility organization has suggested launching a new charging product that uses predictive and optimization models to charge vehicles only at select times where the electric grid has lower demand, a process known as demand response. The company knows it can build the product but can't decide if it's better left to third party vendors or if making such an offering available is their ethical obligation.

10) The heavy machinery used in TeknoVe's manufacturing process is highly complex and requires regular, scheduled maintenance to prevent downtime. One advantage the company has is that because all of its factories were built in the last five years, their production line contains tens of thousands of sensors measuring heat and pressure continuously throughout time and recording all of this information in a time-series database. The disadvantage the team has is that they haven't seen enough failure events to successfully formulate a predictive model for most scenarios. The company's CTO recently suggested the idea of simulating the lifetime of the factory's assets using a "digital twin" in order to create some level of predictive power based on the limited data that is available.

This would help maximize uptime and provide a more proactive maintenance schedule than previously employed.