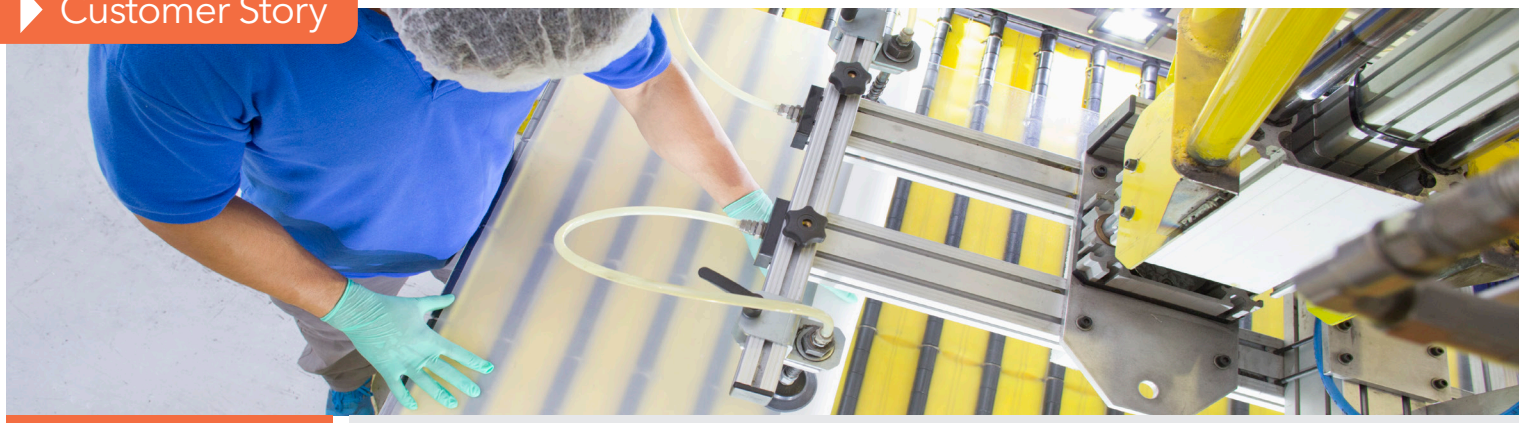
Customer Story



ALLNEX

Challenge

Drive continuous improvement and innovation in an industry demanding new solutions that are simultaneously higher-quality, more effective and lower-cost. To better understand the marketplace, experts must evaluate huge volumes of data from existing patents.

allnex on the outside. JMP® on the inside.

allnex is the world leader in industrial-coating resins for a broad range of industries. As it pursues groundbreaking new solutions, it relies on the advanced statistical analysis of JMP®.

You may never have heard of allnex. But if you've driven a car, flown in a plane, crossed a bridge, opened a package, used a 3D printer, consumed renewable energy – in short, if you've participated in any aspect of modern life – then you've benefited from an allnex innovation.

allnex is the world's leading producer of resins and additives for industrial, automotive, marine, architectural and protective coatings and inks. With a corporate center in Frankfurt, Germany, the specialty-chemicals pioneer operates 33 manufacturing sites, 23 research and technology centers and five joint ventures across five continents. Its 4,000 employees serve customers in more than 100 countries to generate €2.1 billion in annual revenues. But all that science- and data-driven innovation demands its share of statistical analysis and visualization. That's why allnex experts rely often on JMP – in some particularly creative ways.

One of those experts is Markus Schafheutle, Ph.D., an allnex Knowledge Manager and Associate Research Fellow based in Austria. Schafheutle has developed a method, using Text Explorer and other platforms in JMP, to analyze free-form text-based patent data to build a "patent landscape." The tool allows allnex to better understand market trends and identify areas ripe for research.

All innovation, all the time

A chemist by training, Schafheutle devoted much of his career to managing a lab where he and his colleagues studied water-based resins. He also became a Six Sigma Master Black Belt and still runs the company's Six Sigma program. But in recent years, he's given up his lab to focus on statistics. Schafheutle believes statistics are mission-critical because they help allnex respond to its greatest challenge: the perpetual demand for new innovations. In today's market, many of those developments are focused on energy efficiency and environmental sustainability.

"There is always constant pressure on innovation," Schafheutle says, "to improve quality, to improve performance, to make [products] cheaper – often all at the same time." Those innovations also need to meet the requirements of every market around the world. "The automotive industry and general industry, they are selling their products globally," Schafheutle notes. "When they get approval for a coating, they want to be able to use the same material all over the world, wherever they make the product."

Statistics are likewise crucial to allnex's efforts to embrace Industry 4.0. Often called the fourth industrial revolution, Industry 4.0 involves digitally enabled data exchange and automation through the Internet of Things (IoT), cloud computing, cognitive computing and cyber-physical systems. "We have started projects on Industry 4.0 to connect the dots from all our text and sensors," Schafheutle says. "That is my biggest job for the moment."

Data explorers club

Schafheutle first embraced JMP for design of experiments (DOE) to drive clear and reliable decisions. In many cases, he says, when researchers began working in an experimental space, they had no clear idea if they were on the right track. "Then we used JMP to do the DOE around it, and after one or two weeks of experimentation we could say, 'OK, the answer is not in this experimental space. We need a new idea.' So we can avoid situations where we have to [rely on trial-and-error]. That alone saves us a lot of time and cost."

More recently, Schafheutle has begun using JMP for text-based data exploration. allnex captures data from experiments, quality control, production, equipment and more. "This data appears on the dashboard for a second, and then it's not seen again," Schafheutle explains. "We need to bring this historical data together so that

jmp® Statistical Discovery.™ From SAS.

That's what I like with JMP – you have the text-exploration capability. But you also have the statistical power to go beyond.

Markus Schafheutle, Ph.D., Knowledge Manager and Associate Research Fellow

we can build models on it and understand our processes better." The goal is to identify the drivers of the company's most important outcomes. "In chemistry, what do we always control for?" Schafheutle asks. "It's temperature, it's runtime, it's feeding times. But now we add things like variability of cooling media, heating media and so on. And we realized that these factors are just as important as the well-known factors."

What Schafheutle likes most about JMP is that it offers flexibility and allows him to understand what the software is doing. "With other solutions, you just upload data and you get a nice picture at the end," he says. "But you don't know what's going on behind the scenes. If you want to do correlations, you have to just take what they give you. That's a main reason I prefer JMP."

From data trees to the patent forest

Today Schafheutle is applying JMP capabilities to achieve even more innovative statistical analysis. In particular, he's using JMP for the analysis of text-based patent data to achieve a broad but clear view of the patent landscape. The need is one any company would recognize: competitive intelligence. allnex needs to understand the competitive landscape – which researchers are using which technologies, materials and approaches to pursue which new solutions.

"In the past we did this by reading," Schafheutle says. "But over the past decades, the number of patents has dramatically increased, especially in China. We assembled a subset of a database on a type of resin that resulted in a data set of 25,000 patents over 20 years. There was no way to manually digest all that data and make sense of it."

The good news is that advanced processor technology has made possible the analysis of large amounts of free-form text data. The even better news is that JMP Text Explorer can apply computationally intensive, or sparse, matrix-based techniques to explore and model such data – right on a laptop. Schafheutle created a workflow to scour patent databases and analyze text descriptions, summaries and ratings of relevant patents. The analysis delivers a detailed picture of the patent landscape that allows allnex to understand industry trends. It also enables the company to identify gaps that represent under-researched areas ripe with opportunity.

"For our chemists, it's interesting to see who's doing what in terms of chemistry," Schafheutle says. "For our marketers, it's important to see who the players are, where their interests have shifted, who's working together." That business intelligence allows allnex to understand market dynamics, where it must compete, and how it might partner for greater business success.

To infrared and beyond

But Schafheutle emphasizes that exploring text is just the starting point. "It's about more than just counting words," he says. "You build the word metrics, you do the transformation in the modeling space, and you do a topic analysis. Then you have another orthogonal space with all the data points, and you can do statistics on it. That's so easy to do with JMP." But that's when the real work starts, Schafheutle says. "When I started with text exploration, I thought, 'I'll do the topic analysis, and I'll see everything.' But that's absolutely not true. The topics are just dimensions. You still need to extract the knowledge."

By way of example, Schafheutle applies a metaphor from organic chemistry: infrared (IR) spectrum analysis. Chemists scan organic molecules with IR light to generate vibrations that sync with the vibrations of the molecule. Because each IR spectrum is characteristic to a given molecule, when chemists see the spectrum, they know a lot about the molecule and the functional groups it falls within.

"This is what we do with patents," Schafheutle explains. "We extract a number of topics. These are roughly equivalent to a wavelength. We create scores that reflect how deep each document goes into each topic. [Hence} we get a spectrum for each document." The team then uses the spectra to compare documents. The beauty of this technique for allnex is that it can be extended beyond patents. Schafheutle has essentially created a prototype for an analytica approach that can be applied to data throughout the company for a variety of purposes. "That's what I like with JMP," Schafheutle says. "You have the text-exploration capability. But you also have the statistical power to go beyond."

Solution

A creative approach to analyzing text-based patent data, made possible in JMP® Text Explorer.

Results

JMP enables allnex to capture and analyze a vast wealth of patent data to better understand the competitive landscape and identify areas primed for new research.

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