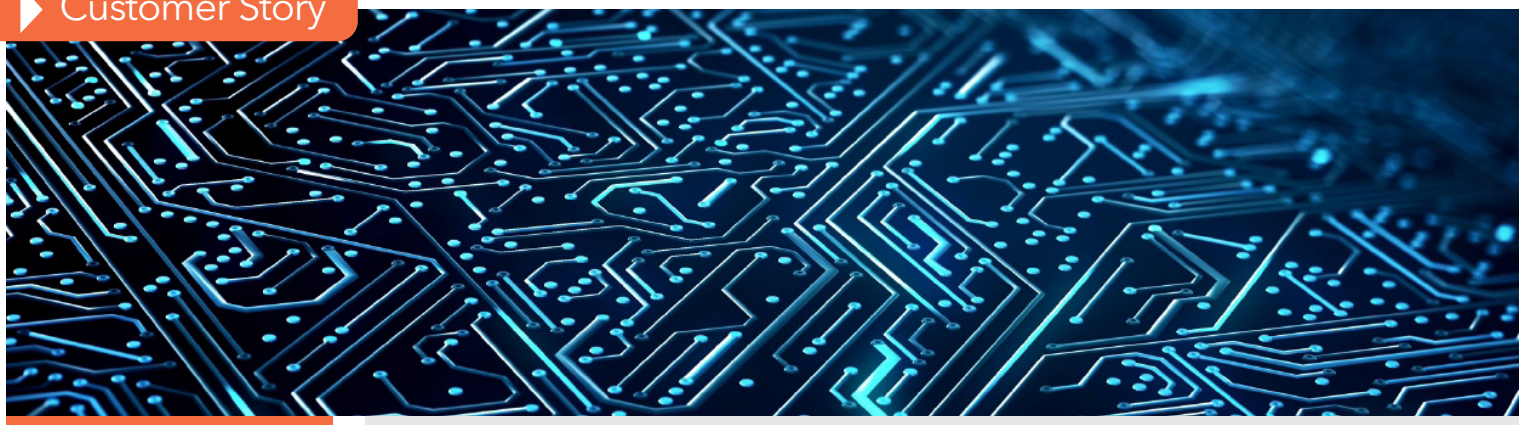
Customer Story



M VENTURES

Challenge

One of the biggest challenges of growing a startup from proof-of-concept to fully commercialized business is scaling up technology from a single lab to mass manufacturing. Entrepreneurs must demonstrate to investors their growth potential by providing evidence of their efficiency and ability to add value.

Transformational technologies make the leap from the lab to the marketplace

Venture capital firm M Ventures looks for evidence that deep-tech startups are commercially viable. Entrepreneurs can prove technology readiness with the help of design of experiments.

Chemist Owen Lozman has always worked in R&D roles, from disruptive technologies to the most commodity-mature products on the display and semiconductor market. Bringing innovative, new tech to fruition, he says, involves not only good design but also the ability to transfer emerging technologies from the lab to a high-volume production environment.

"Between the initial [scientific] concept and running on a full scale, there are lots of things that need to be figured out," Lozman explains. "The quicker you make that journey, the fewer costs and risks there are for everyone. It's all about reducing risk."

Successful commercialization, he says, hinges in large part on an effective data management strategy – the ability to efficiently apply data to manufacturing challenges like calculating yield and navigating strict process controls can have a dramatic impact on scalability. As former Global New Platform R&D Director for the Merck Group, Lozman now brings experience on the technology transfer front lines to M Ventures, the strategic capital arm of Merck KGaA, Darmstadt, Germany, where he serves as Vice President.

M Ventures' remit is to drive innovation by backing entrepreneurs and supporting them with the resources needed to attain commercial viability. With an eye to bringing transformational technologies to market, M Ventures takes an active role in its portfolio companies' growth through research, strategic management support and equity investment.

Lozman explains that one of the most important services M Ventures provides is access to both the networks of M Ventures and that of the Merck Group, a broad network of scientists, industry experts, financial professionals and opinion leaders. "It may be as simple as making introductions," he says. "We aim to bring value to all of these people by effectively bringing them together where it makes sense." For Merck, that value lies in the ability to connect to novel technologies that could have an impact on the pharmaceutical giant's core business areas. In essence, Lozman says, it's all about "bringing two worlds together to help startups be more successful on the one hand and help [Merck KGaA, Darmstadt, Germany] bring in the innovation and ideas on the other."

Take, for example, M Ventures' recent $5 million investment in Seeqc, maker of all-digital quantum computing systems for problem-specific applications. Together with its other investors, M Ventures is providing the startup support to help define the market for its transformational new technology, finding problems that would be best solved with Seeqc's quantum computing product at the same time the scientists and engineers of the two companies are working to solve some of the challenges associated with building a scalable quantum computer.

Strategic data management, key to attracting venture capital

In the deep tech industry, the competition for investment from firms like M Ventures is fierce and investment seekers must demonstrate improvement through experimentation and problem resolution. And, says Lozman, they must do so as strategically and efficiently as possible. "In the industry we're in, we're effectively financing companies to do experiments to show an output that makes people in the financial industry [see] they're worth more money than when they started.

"That means doing the fewest number of experiments, doing the most cost-effective experiments, doing the experiments you learn the most from, and exploring as much of the parameter space as you can by making sure you're solving problems that are going to be relevant in the future." Proper statistical design – and asking the right questions of data in the first place – are crucial in this pursuit.

"I think it's our responsibility as scientists to make sure that we're doing science in the most scientifically robust way possible," Lozman says, adding that one of the most important tools available to scientists is design of experiments (DOE). It's a means by which scientists can use statistical analysis to make strategic decisions about which factors are examined, and how.

Every scientist experiments in some way, Lozman explains. DOE simply provides a framework for scientists to look at experimentation from a more statistically robust prospective that brings with it both time and cost efficiencies – two features that potential customers and investors value when thinking about commercial viability.

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>
> Owen Lozman, Global New Platform R&D Director

"The [success of the venture] is being heavily driven by DOEs. The sooner entrepreneurs can get into the mindset of how their customers are going to think, the better it is for them. It's also important for them to communicate how they're developing the product in line with what the customer's going to need."

DOE imparts scientific rigor to scientists

Lozman has long been a proponent of strategies like DOE, beginning in the early 1990s when he ran long-form designs in Excel. It was the early days of designed experiments in industry, and Lozman had to overcome initial resistance among colleagues who didn't see the value in devoting time and energy to learning statistics.

"We were making critical decisions based on data that were not reproducible," he recalls. Once the team invested in a data management system, however, they started making decisions based on substantiated data, not just noise. "We were also able to increase the throughput in our lab," he explains. "After a year, we were something like 35% more efficient. And we were able to demonstrably show that our data was more reliable and more reproducible."

Many early stage companies, Lozman explains, are used to running full factorial experiments with no repeats. Scientists may feel more confident knowing nothing is missed, but a half factorial with some repeats is always going to be better, he contends, and there are significant benefits to thinking of more optimal ways to experiment.

DOE removes some of the guesswork of traditional experiments and allows practitioners to be confident in their predictions as reproducible experiments stand up to scrutiny. With DOE, Lozman says, "You don't just have a model, you have a model of the space which you can operate within. You can understand exactly what's going to happen if you move within that space. That's not something you can do without DOE."

When the variable space becomes bigger – or when practitioners need to better understand leverage – DOE is an essential tool. And these scenarios become more important as companies scale up operations. But as Lozman can attest, this kind of DOE can't be done in Excel alone, and it's one of the primary reasons he recommends solutions like JMP®.

"It's very difficult culturally to get people to change the way they manage their data," Lozman says. "But if you're able to really distill out insights from the data – and make critical business decisions based on those insights – then you should be sure that those decisions are right. There are some very simple things that can help you do that. And for me, JMP is one of those tools."

Reproducible experiments and efficient resource allocation help secure investment

M Ventures, like many venture capital firms, leaves it to individual entrepreneurs to show that they're efficiently using their resources. If the company relies heavily on experimentation, Lozman explains, they need to be able to show how they're maximizing value while minimizing experimental costs. Digital tools like JMP and those developed by other providers not only help scientists achieve optimization and efficiency milestones, it also enables them to communicate evidence of this to current and future investors.

"All venture capitalists should be interested in recommending people use statistical software, computer modeling and ways to try and improve research efficiency," Lozman explains, noting that the more efficiently companies answer these questions, the more efficiently they can use the capital that has been invested.

In many cases, M Ventures' portfolio companies already have JMP licenses. Connecting them with support to expand their use of the software from graphing and exploration to DOE adds significant value on the path to commercialization.

"I've found, through my career, that the ability to critically acquire, analyze and interpret data is patchy and not consistent across all companies," says Lozman. "Not every company has the luxury of having a statistician [on staff], but everybody can afford a JMP license. Even just a basic understanding of statistics and how to use it can help people to really add more value to the experiments they're doing. It's only once we've found those answers that we can have confidence in our research."

JMP® democratizes best practices for demonstrating scalability

With a low barrier to entry, Lozman says that one of the most important features of JMP is its ease of use for non-statisticians. "What I like about JMP is that it's a simple, self-explanatory tool – you don't have to be a statistician to work it," he explains. "And if you do need help you're only an email away from somebody who can really help you understand how to get more value out of a particular feature.

"Part of our responsibility [as venture capitalists] is to help install best practices," Lozman reflects. "It's not extra work – it's extra value."

Solution

Venture capital firm M Ventures looks for its portfolio companies to utilize statistically driven methods like design of experiments (DOE) to optimize experimentation and resource use. JMP® is an accessible tool that, when in the hands of scientists and engineers, makes statistical methods like DOE a best practice.

Results

By investing in startups with a well-conceived data management strategy, M Ventures adds value to all its stakeholders, from parent company Merck KGaA, Darmstadt, Germany to the scientists, opinion leaders and financiers working to bring transformational ideas to fruition.

To contact your local JMP office, please visit: jmp.com/offices