AI in the Real World

Kruger Products | Manufacturing

SCALE AI

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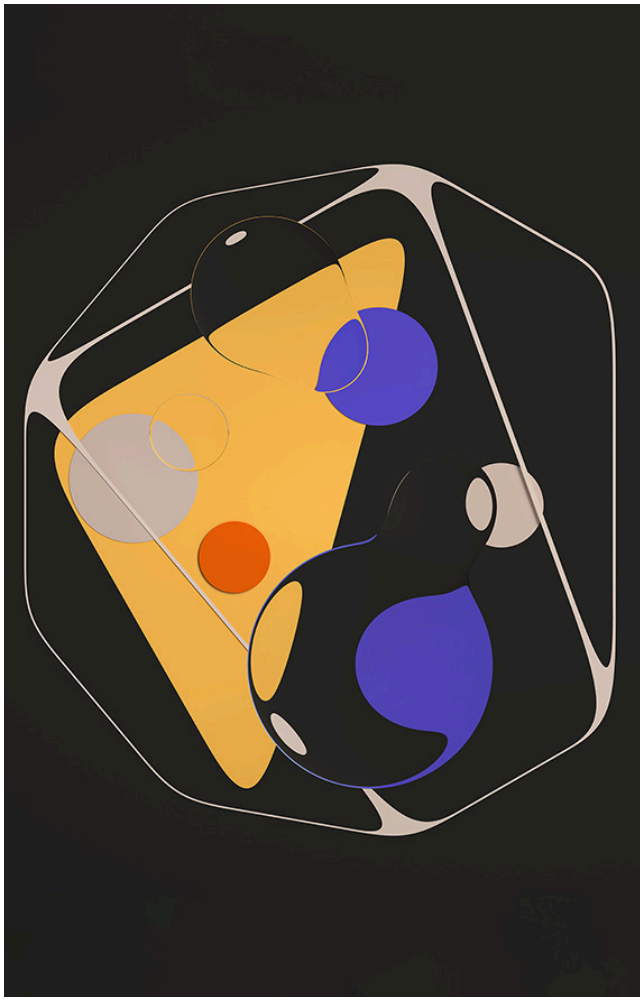
Written in collaboration with tech and business journalist Vawn Himmelsbach.

The Competition Is One Step Ahead of You

This is something no CEO wants to hear.

Manufacturing has entered a new era: Industry 4.0. Advanced production lines combine the latest technologies, from machine learning and artificial intelligence, to data analytics and automation, to optimize supply chains and manufacturing processes. So, how do you stay one step ahead of the competition?



All manufacturers, no matter what they're producing, have the same challenge: maintaining uptime. Disruptions cause delays and reduce output, while shutdowns can cost thousands or even millions of dollars. And on high-speed, high-frequency production lines, maintaining quality is paramount. That's where AI help: It allows manufacturers to quickly adjust production according to market demands, predict when parts or components will fail or need replacement and assess quality control on production lines.

Whether you're a CEO or an IT manager, keeping up with Industry 4.0 is no longer a competitive differentiator, but table stakes. If you're not already making the leap to AI, then you're already falling behind. That's because AI models are trained on new data and, over time, become more and more accurate. Those who choose not to invest now will be much less competitive than manufacturers who leverage their data and digital tools now.

But AI isn't just a technology strategy; it's a business strategy. And to be successful, the two must work in tandem. That's why leadership plays an essential role in driving AI strategy throughout the organization and IT leaders should have a seat at the table. If done correctly, manufacturers can reduce risk (and costs) while gaining new flexibility to meet customer demands—and set them up for success with Industry 4.0.

Julien Billot, CEO at Scale AI

5 Ways That AI Creates Business Value in Manufacturing

01

→ Optimize costs through better planning and predictive maintenance

02

→ Build more agility and flexibility into operations

03

→ Build resiliency and redundancy into production lines and supply chains

04

→ Respond more quickly and accurately to fluctuating supply and demand

05

→ Create future-forward factories that can withstand disruptions and economic downturns

AI Success Story

An In-depth Look at Kruger Products

Customers might not think about artificial intelligence when they're buying a package of Scotties tissue, White Swan toilet paper or SpongeTowels paper towels. But AI is helping Kruger Products—a Canadian company founded in 1904 who has become one of the most diversified family-owned companies in North America—improve operations, from planning to predictive maintenance.

The company's new state-of-the-art Sherbrooke plant, which opened in 2021, is equipped with North America's most advanced through-air-dry tissue machine. But it's advancing innovation further by creating a digital twin of its supply chain: a virtual model that uses real-time data augmented with predictive and prescriptive AI capabilities. This model replicates the entire supply chain, from raw material procurement and production planning, to equipment maintenance, risk management, logistics and delivery of finished products.

Scale AI—one of Canada's five innovation superclusters—is an original investor in this project, helping to advance AI innovation within the manufacturing sector.

OPTIMIZING PRODUCTION LINES

Kruger deployed the first phase of its AI rollout in June 2021, with plans to roll out subsequent phases over the following 18 months. "This project is about optimizing the entire supply chain. But the first stage is the converting lines because this is where we have bottlenecks right now," says Mathieu Laroche, Director, Data, Analytics & AI with Kruger.

"Each converting line has around 10 000 tags and millions of points of data but not all of those tags matter or are important. This is why we leverage different

techniques to have a smaller number of data points, less than 100 for example, to be used by the machine learning algorithm so we achieve our target perfo-mance," he says. "Usually, our most experienced operators have a sense of which ones are important, but they might miss a few opportunities that could really make a significant improvement on the performance of the asset."

But AI is still a tool—and it doesn't eliminate the need for operators. That's why Kruger's approach takes into account the experience and insights of operators, which has also been key to adoption.

"One of the risks is that you build your AI tools and operators won't use it. So we wanted to build it with their input, and we're already out with the third or fourth iteration of the tool that incorporates their feedback," says Laroche.

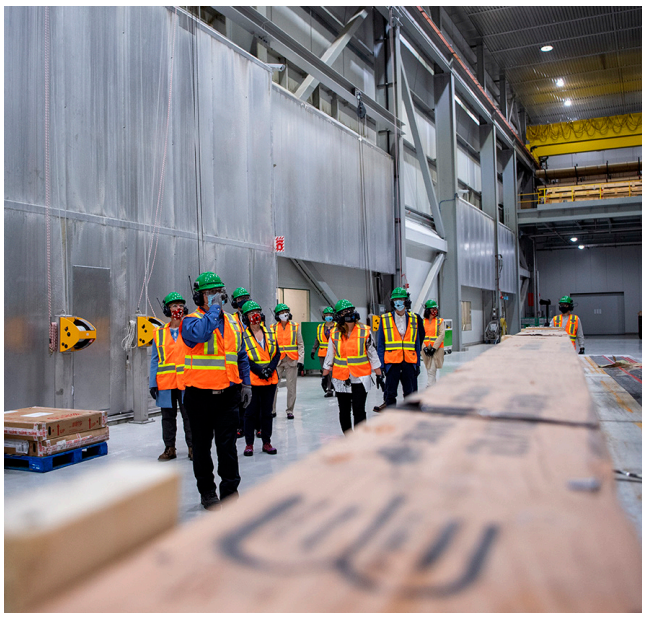
FORECASTING CUSTOMER DEMAND

Aside from optimizing the performance of their converting lines, AI will be used for demand forecasting so they can better anticipate consumer demand for different types of tissue products. The plant has three production lines, which need to be modified for different products and brands. For example, they might need to change the type of paper or the design on the paper.

Since a changeover causes a delay in production, it requires planning to minimize downtime. “It takes hours for the planner to come up with an optimized schedule for the coming weeks. And if the next day there’s a major change, then the planner may need to revisit everything to technically optimize the production schedule,” says Laroche.

“For example, by planning the next product that will be made based on the previous one, the current status of the line, the crew operating it, etc., you can optimize production. There are probably 50 factors to consider, so the planner is doing the best they can, but it’s impossible for a human to factor in everything.”

With the tool developed, they can start simulating different scenarios to see what will happen if they make certain tweaks or add a new optimization factor. This can help during the planning phase, so planners can see the impact by visualizing different scenarios.



PREDICTING PROBLEMS AND EQUIPMENT FAILURE

Through the use of sensors, AI will also provide predictive capabilities that will reduce downtime or quality defects.

> “If we can predict when a problem is about to happen, we can alert operators so they can take action and avoid downtime,”

says Laroche. “We know the main reasons why we are losing efficiency on the lines, so we’re building machine learning algorithms to learn how to anticipate and predict when issues will arise.”

A common problem, for example, is when a sheet of paper breaks in the machine, which means they have to remove everything and restart the process, resulting in several hours of downtime. The first phase of the AI rollout involves alerting operators of an impending issue before it happens, but eventually the algorithm will automatically tweak and modify the parameters to avoid downtime completely.

These capabilities can also be used for predictive maintenance on equipment, parts or components that are about to fail, so repairs, replacement and maintenance can take place before that happens. “This allows us to plan for maintenance instead of reacting to a break, stopping the line and waiting for a mechanical engineer to fix the problem,” says Laroche.

Using sensors, AI can also detect whether or not a component can keep running past its routine replacement cycle. That saves time and money. “Predictive maintenance is not just anticipating, but also making use of the full lifetime of a part or component,” says Laroche. “Once you have the data, then you can avoid unnecessary maintenance.” AI-powered cameras can also be used for automated visual quality inspection and optimization, such as identifying defects earlier in the production process.

BUILDING A CENTRE OF EXCELLENCE

To take these learnings even further, Kruger is establishing a Center of Excellence (CoE) at the Sherbrooke facility and its headquarters in Montreal. The CoE will help to upskill employees so they can develop their own AI capabilities and train others. New operations and technology roles at the Sherbrooke facility will be created specifically to help with on-site AI specialization and seamlessly integrate AI into their operations.

The CoE is expected to have lasting benefits as workers transition to a data-driven economy. Overall, the project is expected to generate 15 to 20 direct jobs, more than 100 indirect jobs throughout the supply chain network and over 70 upskilled workers. The CoE will also serve as a stepping stone to support AI solutions across Kruger's Canadian and North American operations, as well as its broader supply chain.

"We want to share our knowledge and create momentum so we can expand these use cases to other business units," says Laroche. "That's important so other mills will benefit from what we have learned and developed in Sherbrooke."

But it also allows them to recruit operators. When an experienced operator retires, it's difficult to replace that person. "We really need more people—it's a challenge everywhere right now. And it's more attractive to work for a company that makes your job easier with advanced tools," says Laroche. "It also allows us to recruit people who have no or little experience in the pulp and paper industry, knowing that our tools using analytics and AI will help them learn quickly."

BENEFITS OF BETTER ASSET MANAGEMENT

While it's still early days, the Sherbrooke plant has already seen an increase in performance on its production lines. Currently, two crews are using the first version of the AI-based tool to optimize the operation of the converting line. It's been so successful, the other crews want to know how soon they can get their hands on it too. That's helping to create further momentum and adoption of AI.

"I was concerned about adoption, that operators would say, 'Don't tell me how to do my job with magic AI.' But I think we did it right by making sure to explain the value of the tool and involving operators in the design process," says Laroche.

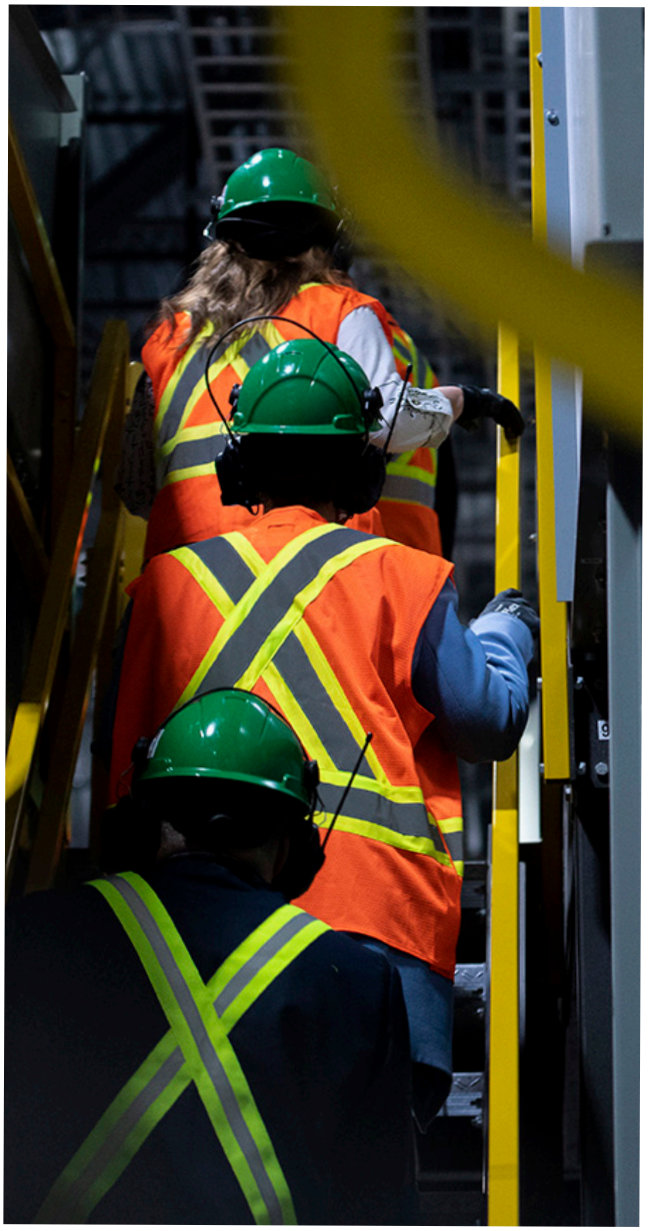
"They were key to our success because they guided us with their insight and domain expertise, so at the end of the day we delivered a tool they want to use."

AI allows plant managers and operators to make agile adjustments and boost operational efficiency at every link along the facility's supply chain. As the project progresses, AI algorithms will ingest new data, recalculate and 'learn,' ensuring operators can react quickly to changes in the supply chain.

Better management of assets will optimize changeovers, speed production and adapt to fluctuations in supply and demand, all while cutting costs. Benefits extend to reduced waste, increased energy efficiency and a smaller carbon footprint, thanks to lower greenhouse gas emissions and the optimization of chemicals used in paper production.

AI will also benefit Kruger's suppliers, partners and customers by providing products that are higher quality, more readily available and increasingly competitive in the market. But Kruger isn't finished: this project will spur a future rollout of AI-powered supply chain management across Kruger's entire manufacturing infrastructure—at home and abroad—and help to fortify Canada's position as a global leader in artificial intelligence. "It's a journey. It's not a one-off project," says Laroche.

"There are so many opportunities with AI. We're becoming a data-driven company, where we know our decisions are backed by data."



AI Success Story
In Numbers

The project required a

25 M$ → Investment

The project is expected to generate

15 to 20 → Direct jobs

100 → Indirect jobs

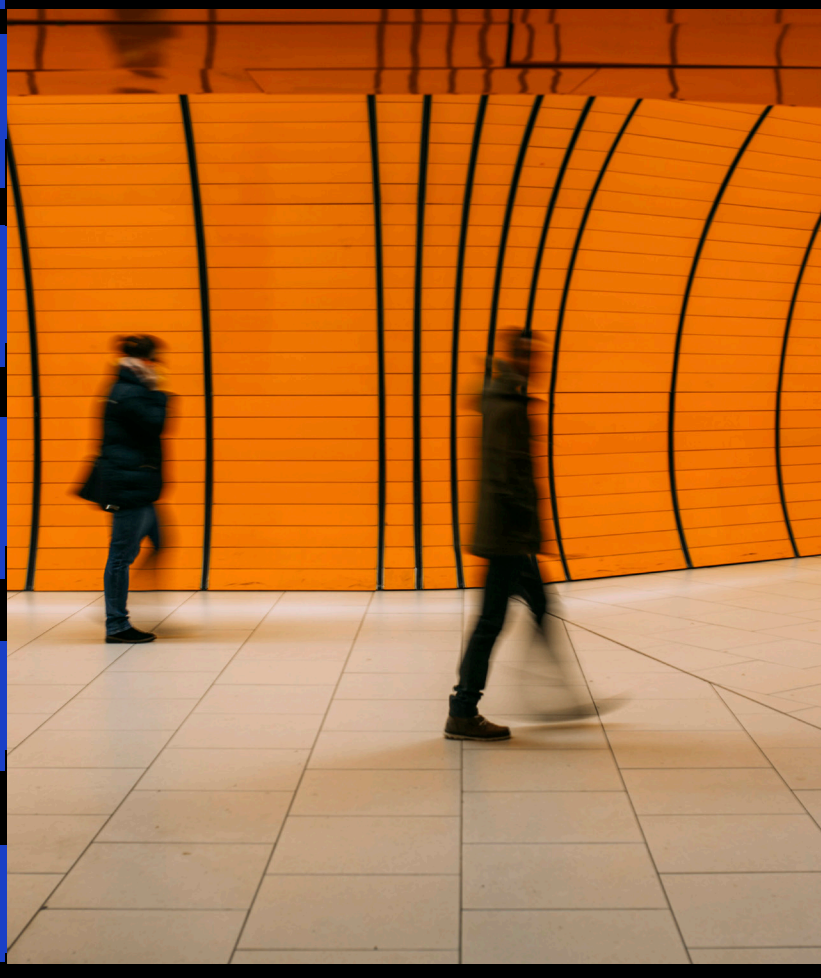
70 → Upskilled workers

Kruger's production lines have around

10 000 → Tags on each production lines

Introducing Canadian Supercluster Scale AI

Scale AI is one of Canada's five innovation superclusters, created to advance the Canadian AI innovation ecosystem. Scale AI offers funding, expert guidance and a community of like-minded peers, and invests in companies across a range of industries that are deploying AI to enhance their supply chain—with $200 million of collective investment, and counting.



Scale AI is an original investor in Kruger's AI project, which serves as an example of how an increasing number of Canadian companies are using the power of AI to boost productivity, strengthen competitiveness and secure long-term growth.

The project required a $25 million investment, which included hiring data scientists and data engineers. By partnering with Scale AI, Kruger was able to take the project to new heights. In addition to funding, members like Kruger can obtain guidance from the Scale AI investment team, and benefit from opportunities to partner with potential clients and service providers.

For example, several organizations partnered with Kruger to help bring its AI project to life. Quebec's Ministry of Economy and Innovation invested in the project, while researchers from Polytechnique Montréal and Laval University lent their expertise.

"Surrounding yourself with the right people is more than a strategy, it's the key to success for companies looking to integrate AI into their business."

→ Isabelle Turcotte, CMO at Scale AI

Scale AI's funding

Osedea (a custom software development and UI/UX firm), Vooban (a digital transformation company) and Boston Consulting Group (among the world's largest management consultancies) supplied their skills and knowledge.

"It was an opportunity for Kruger to dream bigger about AI and reduce the investment risk," says Laroche. "It's important that this isn't a one-off project, but a journey, and Scale AI is helping to support that journey."

"You can't speed up the training of your algorithm. So it's important to start as soon as you can because every day that you lose, you're losing ground."

→ Clement Bourgogne, VP Strategic Programs at Scale AI

Since its inception →

More than

303M$

in investments

More than

300

projects across Canada

Get Started With Your AI Project

Ready to scale your potential? Consider these following aspects before submitting your project. These though-starters will help you get ready to jump ahead of the competition by making the most out of artificial intelligence.

01

PROJECT IDEA

Elaborate on the way you will leverage artificial intelligence and related technologies with your solution.

02

PARTICIPANTS

Join networking events or access the Scale AI community to find potential partners.

03

PURPOSE

Build on your core idea to gather more details on the goals of your project. Focus on the identified opportunity, and the solution you could deploy.

04

TECHNOLOGY

Elaborate on the way you will leverage artificial intelligence and related technologies with your solution.

05

PROJECT COSTS

Estimate high-level costs that you and the other participants may incur for your project.

06

TIMELINE

Identify the key dates for your project: when will you be ready to submit your detailed proposal, when will you launch your project, when will the key deliverables be due, etc.

07

IMPACT

Consider the impact of your project on all participating organizations and the broader ecosystem.

Timeline

YOU ARE HERE

First, you must gather information on the project submission process.
In order to do so, you can:

→ Sign up for a Scale AI membership
→ Register to one of our weekly webinars hosted by a Scale AI investment director
→ Join networking events to find potential partners
→ Download our submission guide

PROJECT SUBMISSION FORM

Then, fill out the project submission form on our website.
You can contact us at any time if you need help at this stage.

DETAILED PROJECT PROPOSAL

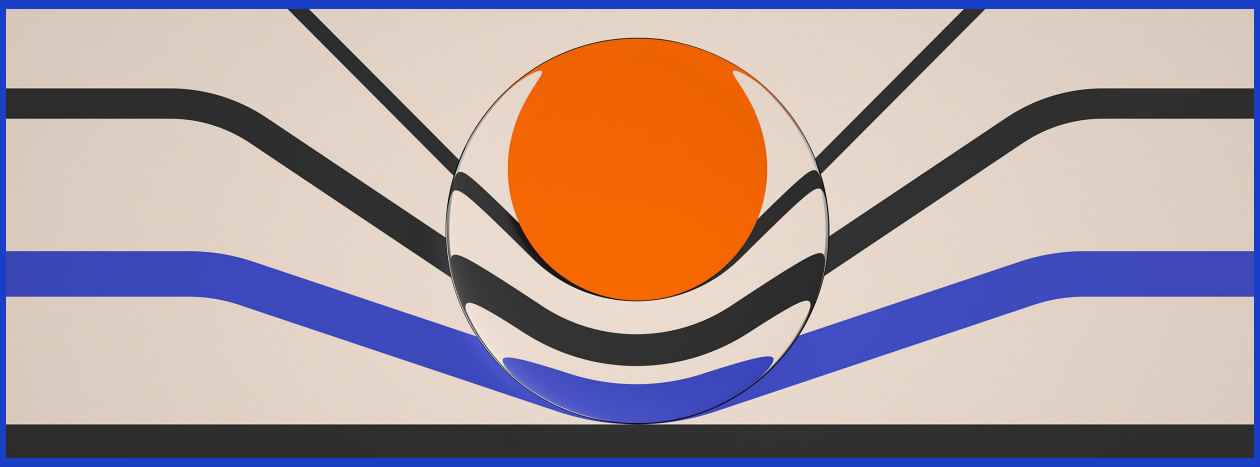
After you have received the initial eligibility confirmation from Scale AI,
you can start working on your detailed project proposal submission.

PROJECT AGREEMENT

Once the Scale AI Board ratifies your project, you can gather resources
and collaborate to gear up for the launch.

LAUNCH

Your AI project is well implemented in your day-to-day operations and you can reveal
the latest news to your peers.



Reach Out ↓

For any question regarding project submissions: question@scaleai.ca

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