KPMG

Generative AI: Shaping the future of efficiency and innovation in industrial manufacturing

Industrial manufacturers (IMs) thrive on their ability to innovate and adapt to the world beyond their factory doors. Their resilience is earned from experience and a willingness to seek growth and prosperity through new ideas and evolving technologies. This is as true today as it was a century ago as IMs turn to artificial intelligence (AI) to drive efficiency, innovation, productivity, and profits, while responding to existential challenges in their path.

Today, those challenges are in clear view. Beyond mounting competition, Canada's manufacturing sector is being shaped by inflation, climate change mandates, supply chain disruptions, and geopolitical conflicts. That's to say nothing of the risks of the ongoing (and unpredictable) threat of tariffs, which leave Canadian manufacturers particularly vulnerable and in need of immediate assistance. AI has the potential to help IMs brace for this as well as other hurdles.

From streamlining operations to honing competitive advantages, to responding to tariffs and adapting supply chains, there are many roles for Generative AI to play in the IM sector. KPMG in Canada recently surveyed IM leaders across Canada to get a sense of how Generative AI is transforming this vital industry. Our study included public and private companies across the country, generating insights into their Generative AI investments, use cases, challenges, and ambitions.
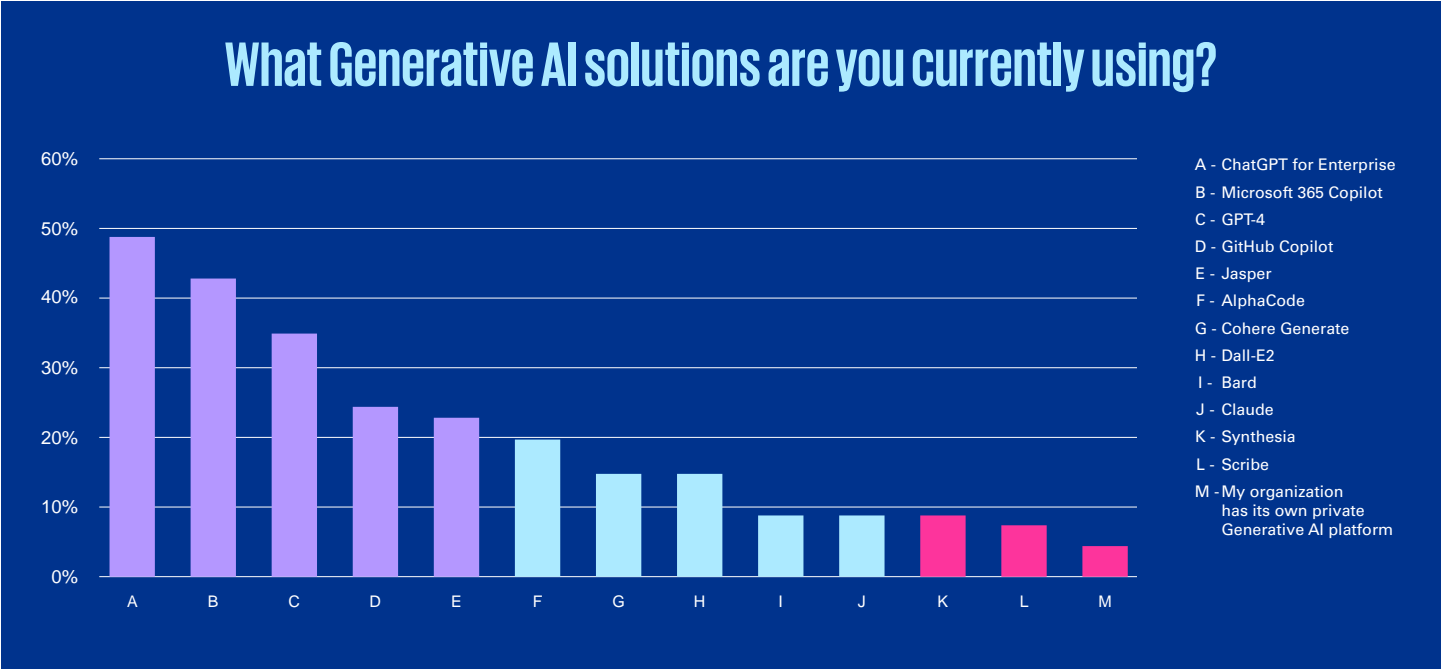
Defining Generative AI

Generative AI is the term applied to AI solutions powered by machine learning and neural networks, which can analyze and generate data to produce new content from text to images based on user prompts. In many cases, it is implemented to help employees perform routine tasks quickly and efficiently, and free them up to focus on high-value work. Rather than replace jobs and human judgment, Generative AI serves to augment human expertise and improve overall efficiency and productivity.

82%
of IMs consider Generative AI a top investment priority.

Widespread adoption

Generative AI is finding a home in Canada's IM sector. Many survey respondents (75%) have already adopted it, while almost all (92%) of those who have yet to adopt are planning to do so. Whether moving ahead with Generative AI or not at the time of our survey, virtually all our respondents (99%) recognized that Generative AI is important to their competitive market advantage and ability to gain market share.

What Generative AI solutions are you currently using?

A - ChatGPT for Enterprise
B - Microsoft 365 Copilot
C - GPT-4
D - GitHub Copilot
E - Jasper
F - AlphaCode
G - Cohere Generate
H - Dall-E2
I - Bard
J - Claude
K - Synthesia
L - Scribe
M - My organization has its own private Generative AI platform

Use cases for Generative AI vary across the IM sector. Nearly half (44%) of those utilizing Generative AI solutions today are doing so to monitor and ensure compliance with regulations, policies, and industry standards by analyzing vast amounts of data, detecting anomalies, and generating alerts or reports for proactive risk mitigation. This practice will become even more of a priority as IMs work to anticipate and to respond to the evolving tariff and trade landscape.

Generative AI is also proving valuable for workforce development. 37% of IMs are using Copilot for Microsoft 365 to assist and enhance the capabilities of employees by providing real-time suggestions, recommendations, and automation of routine tasks. Further top-ranking use cases include using AI algorithms to analyze market trends, conduct competitive analysis, create more personalized product or service recommendations in customer-tailored conversation styles, develop marketing materials, and enhance their risk mitigation strategies.
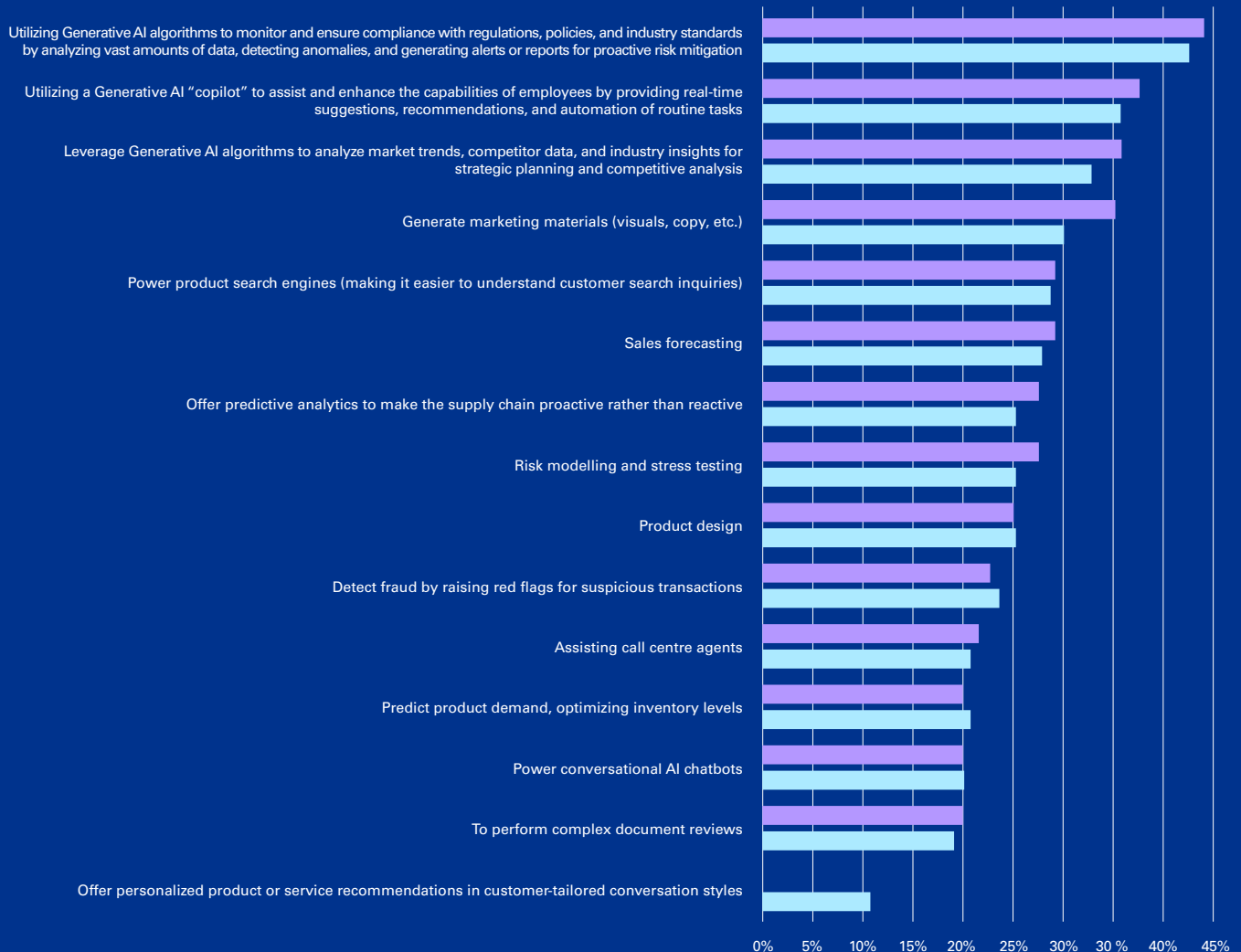
Many of the IMs not currently exploring these use cases are planning to do so in the future.

45%
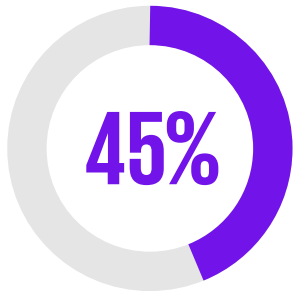
of IMs are using a mix of public and private Generative AI tools (only 2% plan to build their own Generative AI tools).

Current and future use cases for Generative AI

● Currently using   ● Plan to use

Use case	
Utilizing Generative AI algorithms to monitor and ensure compliance with regulations, policies, and industry standards by analyzing vast amounts of data, detecting anomalies, and generating alerts or reports for proactive risk mitigation	
Utilizing a Generative AI "copilot" to assist and enhance the capabilities of employees by providing real-time suggestions, recommendations, and automation of routine tasks	
Leverage Generative AI algorithms to analyze market trends, competitor data, and industry insights for strategic planning and competitive analysis	
Generate marketing materials (visuals, copy, etc.)	
Power product search engines (making it easier to understand customer search inquiries)	
Sales forecasting	
Offer predictive analytics to make the supply chain proactive rather than reactive	
Risk modelling and stress testing	
Product design	
Detect fraud by raising red flags for suspicious transactions	
Assisting call centre agents	
Predict product demand, optimizing inventory levels	
Power conversational AI chatbots	
To perform complex document reviews	
Offer personalized product or service recommendations in customer-tailored conversation styles	

0% 5% 10% 15% 20% 25% 30% 30 % 40% 45%

Advantages across the board

IMs see diverse potential for Generative AI across all functions of their organization (e.g., manufacturing, information technology, strategy, research and development, etc.). When asked how they see Generative AI benefitting their operations the most, almost a third reported increased efficiency and productivity via automation, followed by increased profitability and greater organizational capabilities.

Top benefits of Generative AI

%	Benefit
28%	Increased efficiency and productivity
12%	New product and market growth opportunities
12%	Increased profitability
9%	Increased personalization of services/customer engagement
8%	Fraud detection and cyber-attack response | Increased diversity of skills and capabilities | Increased innovation

The opportunity to strengthen customer relationships through AI is not lost on IMs. Over half of manufacturing executives believe the greatest opportunities from their Generative AI investments will be the ability to bolster customer engagement and loyalty (51%). At the same time, 35% anticipate that their Generative AI investments will derive value by enabling them to enhance existing products and services by analyzing customer data and identifying unmet needs and preferences.

23%

of manufacturing executives expect the greatest opportunities from their Generative AI investments to be improvements in marketing effectiveness and customer acquisition.

Tariffs and trade wars: Adaptable supply chains for uncertain times

One of the most pressing obstacles for today's IMs is navigating the evolving tariff landscape. Generative AI can be a valuable ally in that journey by enabling IMs to adapt their supply chains and applying efficiencies to help cushion the financial and operational impacts. For example, Generative AI might be used to integrate external data sources (e.g., news articles, market data) to keep up with potential market changes and use these insights to help supply chains anticipate and respond to external factors that may impact demand or supply. Furthermore, Generative AI can give IMs a view into their potential futures by simulating the impact of external factors (e.g., tariffs, interest rates, consumer price indices, on supply chain performance), allowing companies to assess how different scenarios may play out and make more informed adjustments.

Generative AI will also be valuable in driving supply chain automation and providing enhanced decision support. It can, for instance, be used by IMs to analyze data and generate actionable insights and reduce the need for manual analysis. This grants IM leaders more time and headspace to focus on more strategic decisions.

Investing in AI capabilities

Integrating Generative AI isn't as simple as flicking a switch. IMs recognize that optimizing their Generative AI tools requires investments in skills, capabilities, and infrastructure. In fact, 54% are laying a foundation for Generative AI by investing in data and analytics, enhancing customer experience (35%), and in research and development, such as exploring new applications and technologies (34%).

Additional investments are being made to enhance how organizations are sourcing and purchasing AI solutions, training and upskilling their workforce, and building a responsible AI and governance program.

As for when manufacturing executives anticipate returns on their investment (ROI), a majority (45%) are hoping to see results within 1-3 years, while only 7% believe they'll begin seeing some ROI in less than 6 months.

31%
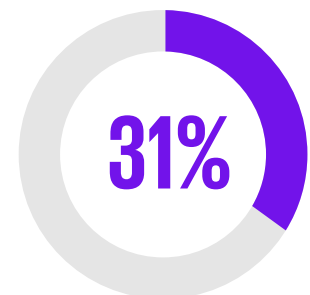
of IMs "strongly agree" they have implemented strict guidelines on what information employees can put in Generative AI tools.

ROI timeframe

- 🔴 Less than 6 months
- 🟣 6 months - 1 year
- 🔵 1-3 years
- 🔵 3-5 years
- 🟣 More than 5 years
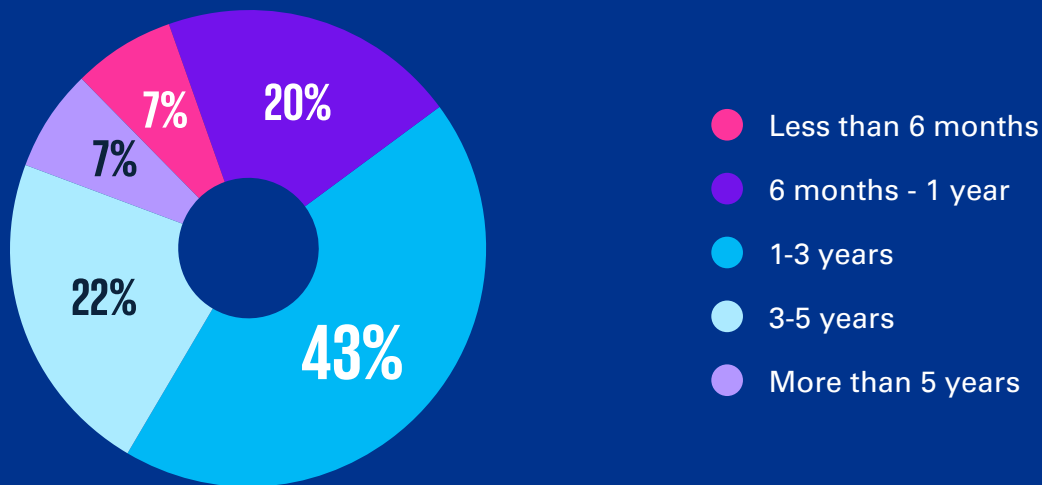
How does one measure ROI for Generative AI? Indicators vary by industry and organization, but for IMs in our survey, ROI is being measured by improved productivity (61%), increased revenue generation (55%), and improved profitability (52%). Other factors considered in Generative AI ROI calculations include workforce satisfaction levels, the scale of organizational adoption, and whether their decision-making processes have improved as a result of Generative AI integration.
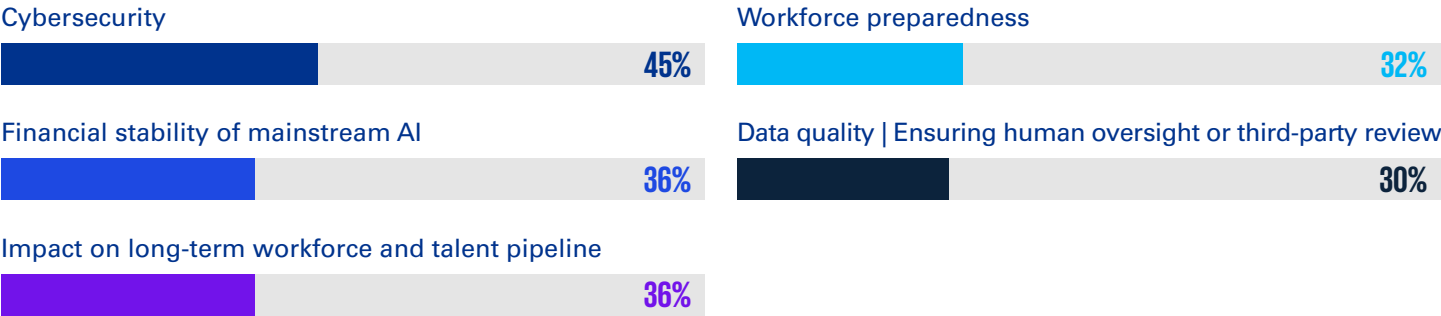
Laying the foundation

IMs are showing signs of confidence and readiness as they begin implementing Generative AI into their core operations. KPMG's study reveals that a majority (91%) "agree" or "strongly agree" they have implemented a trusted or ethical approach to how they implement Generative AI, and a similar amount (88%) demonstrate confidence in saying they are ready to deploy safe integration of Generative AI with robust governance frameworks. Furthermore, a majority of respondents are confident they have prepared their data for the arrival of Generative AI, installed the appropriate guardrails, and feel equipped to manage the upskilling of their employees to fully leverage the benefits of Generative AI.

Obstacles to Generative AI implementation

While confidence in the long-term benefits of Generative AI is high, IMs share concerns over the barriers to implementing Generative AI and extracting full, long-term value from their related strategies. For example, many expressed at least some degree of challenge with understanding how Generative AI will impact their existing operations and the value they might gain from their Generative AI investments. Moreover, its common to find IMs questioning whether they have the foundational elements in place (e.g., frameworks, processes, people, and security controls) to wield Generative AI effectively, safely, ethically, and in compliance with evolving (and varied) AI regulations worldwide.

IMs recognize that there are challenges to address when it comes to actualizing their Generative AI strategy. For example, insufficient technology infrastructure, cybersecurity defenses and data quality were the most frequently cited obstacles hindering their Generative AI strategy.

Top long-term concerns of AI

Cybersecurity
45%

Workforce preparedness
32%

Financial stability of mainstream AI
36%

Data quality | Ensuring human oversight or third-party review
30%

Impact on long-term workforce and talent pipeline
36%

The fact that cybersecurity is a current and long-term cause of concern is understandable when considering today's threat landscape. It also echoes the top concern of organizational leaders across the industries in KPMG's latest CEO Outlook. Anxieties related to cybersecurity preparedness may be attributed to the fact that 44% of respondents have experienced cyberattacks, malicious actor activity or deepfake techniques used to impersonate company personnel or customers.

Employee error

An overwhelming majority of respondents (95%) are concerned that employees may incorrectly put sensitive information into public Generative AI tools; that is, data that could negatively impact the organization or its people if disclosed (e.g., personal identifiable data, trade secrets, financial information, proprietary research, etc.). This finding signals a need for stronger Generative AI training and upskilling programs for employees, as well as clear and continuous guidance and best practices through internal communication channels on how to leverage public Generative AI tools without triggering reputational, legal, and financial risks. This may also be a reason for a company investing in their own custom Generative AI platform where they have greater control over data privacy, data location, and data security measures.

Fortunately, many IMs are doing just that. Virtually all agree to some degree that they provide some level of Generative AI skill training for leaders and employees.

Promisingly, IMs are largely aware that human talent plays a significant role in designing, implementing, monitoring, and advancing their Generative AI strategies. This is demonstrated through investments in workforce training and upskilling, as well as through plans to measure ROI by workforce feedback and satisfaction.

91%
of IMs say their integration of AI has made them rethink how they train and develop their employees (40% strongly agree / 51% somewhat agree).

88%
of IMs say their organization is ready to deploy safe integration of Generative AI with robust governance frameworks (33% strongly agree / 55% somewhat agree).

Takeaways

Identify your use cases

Generative AI has numerous applications in industrial manufacturing but identifying your organization's priority use cases will ensure your Generative AI initiatives generate the greatest value and ROI for your investments. Consider a committee-based approach for analyzing opportunities and ensuring proper governance for a successful rollout.

Consider the supply chain advantages

Explore how Generative AI can be used to create a more adaptable and resilient supply chain considering US/Canada tariffs and emerging trade challenges.

Take the journey in steps

Begin by identifying issues and areas that stand to benefit the most from Generative AI solutions and launch pilot implementations to see how those ideas translate into practice. Use these exploratory initiatives to gain a better understanding of how Generative AI fits within your operation and how it impacts your workforce.

Establish ongoing upskilling and training

The rapid evolution of Generative AI demands ongoing training and upskilling for employees to maximize the potential of new features and applications. As Generative AI and other AI solutions evolve, so must your team.

Think outside of IT

Implementing Generative AI is not just an IT initiative. It requires a multi-disciplinary approach involving risk management, legal, strategy, operations, HR, and finance.

Establish AI governance

Strong governance is critical to launching and managing AI tools effectively. This ensures alignment with organizational goals, compliance, and responsible use of AI.

Look beyond immediate ROI

Generative AI investments should not be judged by immediate ROI or cost reduction alone. Adopt a broader perspective on value creation, which often requires sustained follow-through to unlock longer-term benefits.

Find trusted partners

Collaborate with reliable partners who can provide expertise and guidance, helping to ensure a smooth and successful Generative AI implementation.

Give Generative AI champions a voice

Leverage the expertise of AI-savvy employees within your organization. These individuals can identify Generative AI use cases, refine potential solutions, and drive implementation. Collaborate with them to build support and foster buy-in among their peers.

KPMG's Trusted AI Framework

Generative AI is rapidly becoming integrated into many facets of industrial manufacturing, bringing essential insights and solutions to entire operations and their supply chains. The potential is clear, but the risks of implementing Generative AI solutions are not always fully understood by its users, let alone accounted for by many businesses. Failure to address risks can have far-reaching consequences, including litigation, compliance violations, reputational damage, cyber security threats, privacy violations, and intellectual property theft.

KPMG Trusted AI is our strategic approach and framework to designing, building, deploying, and using AI solutions in a responsible and ethical manner so we can help you accelerate value with confidence. Through it, we help prioritize regulatory and ethical standards and frameworks at every stage of AI implementation through design, development, and deployment. This approach is led by the expertise of professionals skilled in risk management and AI technology, and KPMG in Canada's strong network of alliances with leading AI solution providers.

Contact us

Tammy L. Brown
Partner, National Industrial Markets Leader
tammybrown@kpmg.ca

Alison Glober
Partner, National Manufacturing Sector Leader
aglober@kpmg.ca

Bryant Ramdoo
Partner, National Audit and Assurance Innovation Leader
bramdoo@kpmg.ca

kpmg/ca/industrialmarkets