Strategic Measurement

Intelligent Choice Architectures in the Manufacturing Sector

by Michael Schrage and David Kiron

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Increasingly capable AI systems can optimize many elements of the manufacturing process, but the real opportunity for AI is to equip manufacturing decision makers with better choices for driving better outcomes in performance, quality, and innovation.

By Michael Schrage and David Kiron

As increasingly capable AI systems generate thousands of production design variations, predict maintenance needs, and optimize supply chains, the fundamental opportunity for manufacturing leaders isn't "automation" or better harnessing intelligent systems to improve business process efficiencies. Instead, AI's real power and potential is to equip manufacturing decision-makers with better choices for driving measurably better outputs — and outcomes — in performance, quality, and innovation.

Decision-making processes underperform without diverse, detailed, and high-quality options. Our research finds that healthy decision environments require intelligent choice architectures (ICAs) that empower human decision makers with diverse, fine-grained, and tailored options. These ICAs are increasingly critical to navigating high-stakes manufacturing decisions in a sector confronting unprecedented pressures around sustainability, digitization, and supply chains. The emergence of ICAs in the manufacturing sector resets and reframes how manufacturers invest in and make strategic decisions to create value for the company.

This manufacturing industry brief illustrates the power and potential of ICAs, drawing on insights from Cummins, Danaher, and Schneider Electric.

ICAs for Manufacturing: Better, Faster, Smarter Decisions

Cummins, Danaher, and Schneider Electric combine technologies, data, and intelligent analytics to form ICAs that create better choices in product design, supply chain optimization, and other manufacturing processes.

Intelligent Choice Architectures (ICAs)

Choice architectures influence decisions by intentionally "organizing the context in which people make decisions."[i] Intelligent choice architectures are dynamic systems that combine generative and predictive AI capabilities to create, refine, and present choices for human decision makers. They actively generate novel possibilities, learn from outcomes, seek information, and influence the domain of available choices. These choices range from recommendations that assist human decisions, to options for augmenting existing processes, to opportunities for automating complete workflows, where appropriate. ICAs typically mature through three stages.

Assist: Supporting human decisions with AI-driven insights

Augment: Enhancing decision-making capabilities through AI collaboration

Transform: Enabling new decision paradigms through integrated AI systems, including selective automation

At Cummins, a U.S.-based multinational manufacturer of diesel and alternative-fuel engines, generators, and related components, ICAs are transforming design decisions — about individual parts, manufacturing lines, supply chains, and more. The people driving the future of manufacturing won't be AI engineers, says Cummins CIO Earl Newsome, but rather "AI artists": those who can use multiple models to produce options and then, using human synthesis, combine those outputs. These hybrid roles, which require a blend of technical, operational, and creative skills, will become critical for manufacturers to extract value from expanded choice sets.

"Cummins seeks to push beyond traditional testing limitations by using generative AI to simulate unlimited edge cases as a future application," says Newsome. That approach "will provide an increased opportunity to obliterate design blind spots" by delivering products tested against many more scenarios than the company can today. Instead of testing a part against 10 human-generated engineering circumstances, for example, ICAs might generate 10,000. By testing parts against exponentially more scenarios, Newsome says, "my part, manufacturing line, factory, system, or network should be designed better."

Global biotechnology company Danaher is starting to deploy ICAs to transform decision-making across its M&A, product strategy, and innovation road maps. The goal is to synthesize complex data into user-friendly "cockpits" that streamline decision processes. In genomic medicine and biomarker identification, AI can be used to forecast clinical, regulatory, and technical trends to shape strategic partnership choices. While Danaher's leaders retain decision authority, the approach is designed to give them a "real-time ability to dive into data that would've taken analysts weeks to prepare. One concrete example for this is supply chain optimization, where advanced analytics can

lead to substantial gains," says Martin Stumpe, Danaher's chief data and AI officer.

Schneider Electric, a French digital automation and energy management giant, similarly uses a mix of generative and predictive AI capabilities to enhance the specificity and reliability of its predictive maintenance interventions, reducing uncertainty about when and where to perform maintenance.

Measurable Outcomes Matter

Cummins seeks to deploy ICAs across five key domains: role-based copilots, AI-led design, intelligent summarization, hardware and software engineer productivity, and transformation of customer experiences. In each of these areas, ICAs generate choices that directly support what Newsome calls the company's "PQU promise" to its business customers: better performance, quality, and uptime than they could achieve on their own.

Newsome also points to AI's role in harnessing what he calls the datafication of the ecosystem. "We will have all these connected parts — a connected supply chain, connected vehicles, connected utilities, and connected users," he explains. ICAs can integrate and make sense of large volumes of data across the entire ecosystem. For example, Cummins combines robotic process automation with AI to revamp its federal bid evaluation process. The system can analyze thousands of requests for proposals, assess their strategic fit, and present optimized choices to sales teams. "Through those reasonable inferences," Newsome explains, "we can actually create amazing outcomes."

Stumpe also emphasizes the importance of the business value that AI can deliver. "Outcome matters more than explainability, interpretability, or even causality," he notes.

Although each company has a different aim, they all use AI to generate choices that help improve immediate performance and drive long-term value creation.

As manufacturers confront the need for greater sustainability, improved quality, digital transformation, and supply chain resilience, old operating models that involved carefully evaluating a few alternatives at a time must evolve.

Danaher's ICAs build trust through fast and effective data analytics capabilities, ensuring that the choices they serve up to decision makers align with manufacturing requirements while accelerating innovation. This synthesis capability can fundamentally change how manufacturing decisions are made and how choices are evaluated.

Danaher's ICAs also reduce siloed decision-making. In the past, multiple teams might have been working on related decisions independently, without leveraging collective insights. Integrating ICAs across functions generates "massively better output," Stumpe says. Every choice (and thus every decision), whether in R&D, operations, or customer service, can draw on a shared knowledge base.

Although each company has a different aim — Cummins is focused on operational excellence and customer experience, Danaher on improving R&D and accelerating innovation, and Schneider Electric on predictive maintenance — they all use AI to generate choices that help improve immediate performance and drive long-term value creation.

Augmentation Over Automation

As manufacturers confront the need for greater sustainability, improved quality, digital transformation, and supply chain resilience, old operating models that involved carefully evaluating a few alternatives at a time must evolve. Manufacturing's AI transformation isn't fundamentally about automation — it's about managing an unprecedented explosion of high-quality choices. These companies need entirely new frameworks for evaluating and acting on thousands of options that would have been impossible to generate just a few years ago.

At Cummins, implementing ICAs is not about automating away jobs but augmenting human capability within the company. "I'm a big believer in saying, 'AI plus you will make you exponential,'" Newsome says. "We're very much focused more on collaborative AI." This people-centric implementation approach seeks to balance choices around efficiency gains with developing higher-order human capabilities. Cummins's AI strategy focuses on intelligent systems that enhance human decision-making by presenting choices validated across the entire value chain. The company's role-based agents and its AI-led design approach exemplify its AI-as-augmentation ethos as well. As ICAs become more prevalent in the manufacturing industry, value creation will increasingly depend on their ability to design, maintain, and scale intelligent decision environments for employees.

Building/Enabling More Intelligent Decision Environments

The experiences of Cummins, Danaher, and Schneider Electric highlight key imperatives for designing, developing, scaling, and deriving value from ICAs:

1. Identify, curate, and emphasize value-driving data. Perfect data is a myth that paralyzes progress. What matters is generating better choices with available data. "Through reasonable inferences, we can create amazing outcomes," Newsome contends. Companies must identify and prioritize the critical 10% of data that delivers 90% of business value. This "frugal data cultivation" approach, combined with domain-specific training and real-time operational data, accelerates the production of meaningful outcomes.

2. Design with economic clarity, business purpose, and desired outcome in mind. Every ICA initiative must answer fundamental questions: Who is the user? Why will this ICA be useful? How will it be deployed? How will it be monetized? At Cummins, Newsome drives "experimentation at scale" but constantly assesses whether "the juice is worth the squeeze." This ensures that projects deliver measurable outcomes rather than chasing technological speculation.

3. Orchestrate for intelligence. ICAs must coordinate humans, AI models, and automated workflows to maximize throughput and decision quality. This orchestration transforms siloed decisions into integrated intelligence — what Danaher's Stumpe calls "massively better output." At Cummins, this means transforming everything from federal bid evaluation to maintenance planning into intelligence-driven operations.

4. Establish a pervasive presence. Cummins demonstrates how ICAs must become part of the everyday flow of work. Its unified approach connects design, production, and service functions to unlock cross-functional insights that drive operational efficiency. ICAs that exist outside normal workflows fail to deliver sustained value.

Better Choices for Manufacturing's Biggest Challenges

The experiences of Cummins, Danaher, and Schneider Electric suggest that ICAs represent not just a technical evolution but a fundamental reimagining of how manufacturing organizations operate, innovate, and compete. Legacy narratives around using AI to automate manufacturing processes miss the point.

The true transformation comes with exponentially expanded choice quality and scope for decision makers. Success here demands more than technological prowess. "AI is a tool, not an outcome," Newsome emphasizes. "The wielder of AI will determine its outcome." Organizations that master this crafting, art, and science of choice — that is, those that build dynamic decision environments where humans and AI collaborate to drive unprecedented performance — will be the winners.

The future of manufacturing belongs to companies that transform not just what they do but how they think and decide. ICAs provide the framework for this transformation, equipping manufacturers to address their most pressing challenges while delivering value across their ecosystems.

Intelligent manufacturers must move beyond AI as a process-improvement medium and enabler. Those that successfully develop and deploy ICAs won't just improve their operations — they'll reshape the very nature of manufacturing decision-making for decades to come.

Appendix:
ICAs Transform the Decision Environment

The table below outlines the capabilities of intelligent choice architectures to change decision environments.

Intelligent Choice Architecture (ICA) Capabilities	How ICA Capabilities Change Decision Environments
Elevating Decision Quality Through Expanded Choice Sets	ICAs bring a wider array of high-quality, contextually relevant choices to the forefront. Unlike traditional decision tools, which often present static or limited options, ICAs dynamically generate new alternatives based on evolving data patterns and contextual insights. This expansion means that decision makers are not confined to conventional or habitual choices; instead, they can consider innovative options that may have been previously hidden or overlooked. This boosts the quality of decisions by ensuring that people's choices reflect a more comprehensive understanding of the decision context.
Anticipating Outcomes With Predictive Foresight	By integrating predictive modeling, ICAs provide decision makers with insights into potential outcomes for each option in real time. This anticipatory capacity helps decision makers weigh trade-offs and risks more effectively. For example, a retail manager assessing inventory decisions might see not only the immediate costs but also the projected downstream impacts on sales, supply chain dependencies, and seasonal trends. This predictive foresight helps decision makers align their choices with longer-term strategic goals rather than just short-term gains.
Adapting Choices Through Continuous Learning and Feedback	ICAs learn from previous outcomes, continuously refining their own architecture based on new data and feedback. This means that decision environments are not static; they evolve and improve over time, becoming more aligned with organizational goals and individual decision makers' preferences. In a talent management scenario, for instance, an intelligent choice architecture might identify patterns in employee performance and turnover to adjust its recommendations for promotions, training, or transfers. This adaptability ensures that the system remains relevant and valuable as situations and objectives shift.
Enhancing Decision Confidence by Revealing Hidden Interconnections	ICAs expose the interdependencies between different choices, making it easier for decision makers to understand how one choice impacts others across the organization. This interconnected view is particularly valuable in complex environments where decisions in one area can have cascading effects in others. For example, a marketing manager at a global retailer like Pernod Ricard could see how adjustments to campaign targeting affect inventory needs, distribution channels, and customer engagement. By making these connections transparent, ICAs help decision makers feel more confident and informed since they can see the broader implications of their choices.

Intelligent Choice Architecture (ICA) Capabilities	How ICA Capabilities Change Decision Environments
Decentralizing Decision-Making With Tailored Choice Architectures	By providing context-specific guidance directly to individuals at all levels, not just top leaders, and tailoring decision environments to the needs of different roles, intelligent choice architectures enable more agile and decentralized decision-making across the organization.
Reducing Cognitive Load by Streamlining Complex Information	ICAs filter and prioritize information, presenting decision makers with the most relevant data and choices, which minimizes cognitive overload. Rather than wading through endless reports or raw data, decision makers receive streamlined insights and summaries that highlight essential patterns, anomalies, and recommended actions. For example, in supply chain management, an intelligent choice architecture could surface key inventory adjustments or supplier choices based on real-time demand fluctuations and historical trends, sparing managers from unnecessary complexity. By simplifying complex information, ICAs allow decision makers to focus their attention on critical decisions with clarity and confidence, improving both speed and accuracy in decision-making.
Personalizing and Interacting With Decision-Making Environments	ICAs create an interactive, engaging, and highly customized environment that adapts to each decision maker's preferences, needs, and goals. Rather than offering a one-size-fits-all interface, these architectures adjust dynamically, using user interactions and feedback to shape how information and options are presented. For instance, a retail executive might prioritize metrics like customer lifetime value or churn predictions, while a store manager may need insights on daily inventory and staffing. ICAs can personalize dashboards and recommendations accordingly, making interactions feel more intuitive and responsive.
	Additionally, intelligent choice architectures can incorporate interactive tools like what-if scenarios, simulations, and decision trees, enabling decision makers to explore potential outcomes in real time and test various options before committing to a course of action. This interactive engagement not only makes the decision process more enjoyable but also boosts confidence, since users can see the immediate effects of adjustments and tailor their decision pathways to better align with strategic priorities.

AUTHORS

Michael Schrage is a research fellow with the MIT Sloan School of Management's Initiative on the Digital Economy. His research, writing, and advisory work focuses on the behavioral economics of digital media, models, and metrics as strategic resources for managing innovation opportunity and risk.

David Kiron is the editorial director, research, of *MIT Sloan Management Review* and program lead for its Big Ideas research initiatives.

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