

ARTIFICIAL INTELLIGENCE

Reinvention and Rigor: What CEOs Should Look for in an AI-First Chief Operating Officer

The AI-First Senior Leadership Team

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To build an AI-first company, CEOs need bold executives who can challenge assumptions, reimagine how the business works, and keep people focused and inspired through relentless change. In this fifth article of our series on building an AI-first senior leadership team, we examine how AI will demand enduring strengths and new capabilities from the chief operating officer.

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AI has arrived in operations. The first wave is already reinventing white-collar work across procurement, planning, logistics, engineering, and other core operational processes. The next wave—physical AI—is starting to roll in, promising to expand automation across shop floors and supply chains.

Some CEOs will ride these waves to an end-to-end AI transformation that BCG research estimates will increase the productivity of industrial operations by more than 30% within the first two to three years. Within five years, productivity could potentially triple while costs decline by 60% or more. Other CEOs, though, will struggle to apply AI strategically to unlock the full value of the opportunity. The difference between success and failure will rest largely on how well their chief operating officer (COO) develops an AI-first operating model.

AI won't change the COO's core mandate. They will still focus on cost, delivery, quality, innovation, and time-to-market. But how they deliver on that mandate will change considerably because of AI.

The task goes beyond automating today's operating model. The AI-first COO will need to reinvent processes from first principles, redefine how operational decisions are made, shape teams and technical capabilities to extract real value from AI, and shift from reacting to problems to using AI’s early signaling capabilities to make better decisions faster.

For CEOs, the challenge is to understand which evergreen strengths become even more valuable in a COO working in an AI-first organization, as well as which new capabilities and mindsets will be necessary to successfully ride today’s AI wave and tomorrow's.

Enduring Qualities and New Capabilities

The hallmarks that have long defined great COOs—strong pattern recognition skills to enable insightful decision making, operational discipline, resilience and adaptability, resource efficiency, a capacity for continuous improvement, people leadership, and sound judgment—don't disappear in an AI-first organization. If anything, they become more valuable.

Take pattern recognition. COOs have always been called upon to interpret geopolitical shifts, inflationary pressures, supply chain disruptions, and other external forces, and then adapt strategy to mitigate risk and carve a competitive advantage. AI can significantly strengthen this capability by rapidly analyzing vast amounts of data, stress-testing strategic options across multiple scenarios, and identifying early signs of potential trouble that might otherwise go undetected.

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Operational discipline is another case in point. Root-cause analysis, rigorous performance management, and unwavering accountability for results remain at the heart of the COO role, even as AI changes how the organization performs those activities. And even as they become increasingly AI-enabled, organizations will still have people at their core, making leadership, talent development, and the ability to mobilize teams every bit as important as they are today.

But AI will also demand new strengths, given the different expectations it creates around ROI, timelines, resources, and risk. To adapt and excel in an AI-first organizations, COOs will need to shift their mindset and develop five capabilities:

- **Think and decide differently.** Perhaps the biggest change COOs must make involves mindset. As they move beyond optimizing today's operating model to continuously reinventing tomorrow's, COOs will need to challenge long-held assumptions about what is possible. The boundaries between human-led, AI-executed, and AI-led processes will continue to shift, making new operating models possible at a speed and cost that not long ago would have been unthinkable. Increasingly, the constraint will not be what technology can do, but whether COOs know what they want it to do. That will entail defining the operating model they want to build, often without an established playbook or years of industry experience to guide them.

- **Reinvent operations rather than incrementally improve them.** AI-first COOs will redesign processes for the current wave of agentic AI and for the next wave of physical AI. They will start with the desired outcome, and then work backward, delving into the details of procurement, planning, logistics, engineering, and other operational processes to strip away unnecessary work and determine where humans create the greatest value and where AI agents do. Reinvention on this scale will necessitate a different investment approach, too. COOs will need to determine where targeted experiments can prove value quickly, where broader transformation is appropriate, when to scale from one to the other, and how to set expectations for returns that may materialize differently than traditional technology investments.

- **Move from reactive to predictive operations.** Instead of relying primarily on retrospective reporting and on responding after problems emerge, COOs will increasingly use AI to surface early warning signals, interrogate problems, and evaluate multiple scenarios before disruptions occur. By harnessing these capabilities, COOs can make more forward-looking operational decisions. They can also intervene earlier to limit negative impacts from external disruptions and turn them into a competitive advantage. But AI can't predict or simulate everything, which is why human judgment remains essential.

- **Become AI fluent while exercising human judgment.** COOs will need to understand AI well enough to determine whether it is producing the right decisions, define what operational systems should do rather than leaving that responsibility to vendors, and articulate a clear vision of the organization's AI-enabled operating environment. Crucially, they will use AI to build human capability—not atrophy it—and they will ensure that they never cede human

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judgment to the machine. In practical terms, this means that COOs will need to interrogate and crosscheck AI outputs, interpret context, resolve ambiguities, and ultimately decide which tradeoffs to make.

- **Build new capabilities across the team.** As AI accelerates the pace of operations, COOs will need to assert greater ownership of their technology stack rather than relying primarily on vendors, treating it as a core operational asset alongside the organization's physical infrastructure. Doing so will require more technological expertise across the operations organization. To address this need, COOs must develop critical capabilities in existing leaders and employees, selectively introduce deeper technical expertise, and build in-house implementation capabilities so that AI becomes embedded in everyday work rather than residing in a centralized team. They will also need to listen closely to employees who are using AI in their day-to-day work, to learn how the technology is changing operations on the ground.

How CEOs Can Help Prepare Their COO for an AI-First Future

Rather than expecting the organization's COO to have all the answers today, a CEO should look for evidence that the operations leader is building the capabilities, teams, and mindsets needed to lead an AI-first operating model. Three questions can help a CEO determine whether the COO is making progress and where additional support may be required:

- **Is your COO reinventing operations or simply running them?** When they are reinventing operations, COOs don't simply layer AI into existing workflows. They challenge long-held assumptions about how work gets done, and they identify places where AI can fundamentally reshape it. They dive into the details of procurement, planning, logistics, engineering, and other operational processes, and redesign them around AI agents, not just AI tools. And while they drive the white-collar transformation, they also prepare the organization for the next wave of physical AI. Critically, they take personal ownership of the transformation rather than delegating responsibility for AI.
- **Is your COO building the capabilities that the organization will need or just deploying AI tools?** AI-first COOs recognize that the capabilities needed for success are changing. That means shaping leadership teams with the right level of AI fluency and capability to define

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what future operational systems should do, instead of relying on vendors to do it for them. They develop in-house implementation capabilities and upskill employees so that AI becomes part of everyday work rather than residing in a centralized team. Finally, they redefine what great talent looks like by placing greater emphasis on learning agility, AI fluency, and technology leadership than on traditional experience alone.

- **Is your COO rethinking familiar problems based on what AI now makes possible?** Besides changing the solutions available to COOs, AI changes how they can frame the problems themselves. Challenges that once seemed constrained by cost, technology, data, or organizational complexity may now have fundamentally different solutions. For example: What systems do we really need? What is the target automation level in our manufacturing and logistics setup? On that basis, what level of fragmentation, customization, or new product introduction can we drive for a reasonable cost? What is the real cost of using AI itself to scale AI in manufacturing (harness engineering)? CEOs should encourage their COOs to revisit long-standing operational problems, challenge assumptions about what is possible, and ask how AI could solve problems differently, rather than simply incorporating AI in established approaches.

AI-first COOs won't succeed by abandoning the fundamentals of operational leadership. They will succeed by building on them—combining enduring strengths with new capabilities and mindsets to reinvent how operations work. As AI continues to reshape white-collar operations and as physical AI moves onto the shop floor, companies that capture value most successfully won't simply deploy better technology. They'll have COOs who can lead through both waves.

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