2024 State of AI in Distribution

By Jonathan Bein, Ph.D.

Commercial AI was launched in the 1980s, but the idea of artificial intelligence dates to the beginning of computer science. Alan Turing and John Von Neumann, fathers of modern computing, dreamed up the science we're living in today, what we consider the Industry 4.0 — the time of artificial intelligence (AI).

AI is a set of computer algorithms that mimic human learning at warp speeds. Consider how humans improve any skill set, and it demystifies how AI works. If you're practicing your golf swing or shooting at a target, you capture the available data and make minute adjustments so your output improves with each subsequent try. Each micro-correction of how you swing the club or aim the gun gets you closer to your target. Then, you replicate the patterns that created your success.

Humans learn from examples and patterns; then, we apply the patterns. That's how learning works. AI functions similarly, with millions of examples to learn from within the data these machines are fed. AI isn't scary; it's simply a tool that understands and applies patterns.

What's different today versus the beginning of commercial AI in the 1980s is that computing power is 60 million times greater than in 1984, which has enabled a whole new class of AI tools that distributors can use.

How humans learn

See examples

Learn patterns

Apply patterns

AI learns the same way, **but needs more examples**

See examples

Learn patterns

Apply patterns

Today, AI is delivering value in several ways:

- **General Purpose AI**
  Like human intelligence, AI can perform all the functions of our brains, from image and speech recognition to audio and video generation, pattern detection and more.

- **Generative AI**
  Capable of interacting with natural language, these tools can solve an extraordinarily broad range of problems. ChatGPT and BARD fall into this category.

- **Task-Specific AI**
  These AI models focus on a specific function, such as diagnosis, configuration, interpretation, classification or prediction.

- **AI as a Feature**
  These models leverage one AI feature or algorithm as part of a more extensive system, such as transcription. The average consumer uses AI on the Amazon ecommerce website with Siri or Alexa and many other tools you use every day.

Should we fear AI? We won't see general intelligence AI, like the thinking computer, Hal, in "2001: A Space Odyssey," for decades. But AI brings opportunity to the distribution community, and we're learning to harness it to improve our work.

The key to AI adoption is to orchestrate it into workflows now—and plan for its use later. [McKinsey says](#) early movers into the AI space stand to increase their cash flow by 122%. Those early movers will win big. Those that follow the early adopters will only add around 10%. Late AI adopters stand to lose the most in cash flow — up to 23%. Companies that adopt AI now will win earlier returns and create competitive advantage, whether it's efficiency, effectiveness or both.

Understanding the Components of AI

AI's ability to understand human language has grown exponentially in the past 10 years. The technologies behind what we call AI include:

- Language Understanding
- Optimization
- Image Recognition
- Generative AI

Language Understanding

AI-based language recognition evolved around 40 years ago, but we didn't have the advantage of today's computing power. The difference today is that the computing power behind AI uses machine learning to power the understanding of human language. Machine learning mimics how humans learn by minutely adjusting the response based on the data it's fed.

Twenty years ago, we thought that machine translation wasn't possible. But when you couple AI algorithms with modern computing, it solves the problem nicely. Today, AI can process language in three key areas:

- **Text** – Understanding written language
- **Speech** – Understanding spoken language
- **Translation** – Understanding from one language to another

Optimization

Optimization is another area of AI within the subset of machine learning, which gets less attention but is high value. Optimization improves how the computer model functions by finding the best possible solution to a problem.

For example, say you're packing a suitcase with 10 items to go on vacation. There are literally 3.6 million possible ways to pack those 10 items. Optimization could review the problem and find the best way to pack. Apply this to the broader picture of distribution, where the problem is how to pack boxes into a truck. Or it could select the best route for that truck to travel on. The idea of optimization is that it maximizes the efficiency of the task you're trying to accomplish. There are numerous applications of optimization technology to increase the efficiency and effectiveness of warehouse and supply

chain operations, for example. It helps distributors streamline processes, reduce costs, enhance customer satisfaction and make data-driven decisions.

Image Recognition

Scientists have been working on the problem of how computers see an object and identify it for nearly 40 years. The problem of what the actual objects in the scene are, which is evident to any human being, isn't obvious to a computer looking at a set of pixels – just a set of ones and zeros. It's an evolving science, but today, the computer can process digitized images to recognize features and patterns. These algorithms train on massive datasets that help the computer spot and define each image to discern a pattern, meaning and output. Forty years ago, we lacked the computing power to manage this.
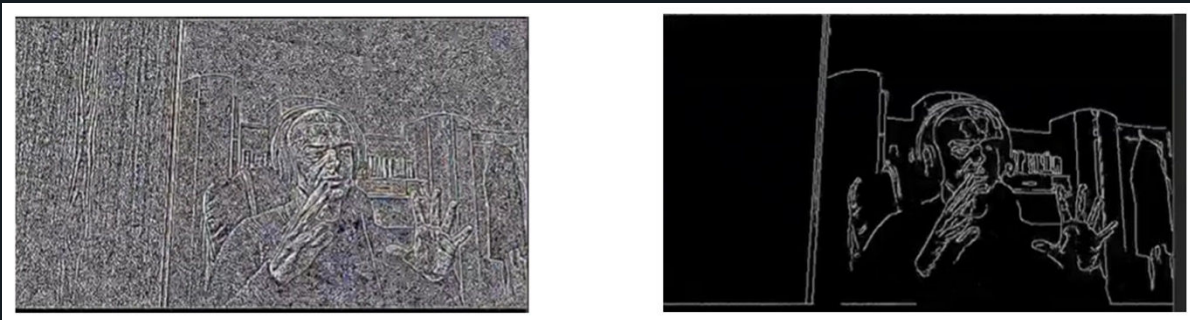
If you've flown recently, the TSA took a photo of you for a database. The neat trick is that AI takes that image and can discern from the pixels what the actual object is by comparing it against potentially other photos of the same person. Again, AI mimics how humans identify an object and classify it.

Generative AI

Generative AI (GenAI) is a type of computer intelligence that generates new content or content not in the original data training set. It's not general-purpose AI, but it can at times mimic that level of intelligence. GenAI can create perceptually similar data but not the same as the training data. These models learn the training data's patterns, structures and features and use this knowledge to create novel, coherent outputs.

GenAI can handle:

- Summarization
- Classification
- Prediction
- Generation
- Extraction
- Question Answering

GenAI models like ChatGPT use the entire internet (pre-2022) to gather data. So, when you tell it to compose an article, it scans all the information, discerns the best "average," and gives you a response.

Best Use Cases for AI in Distribution

We asked distributors what they're doing to come to grips with these tools. They've:

- Participated in AI events
- Identified key projects
- Formulated strategies to deal with AI

More than half of distributors believe that AI will provide a competitive edge over the next three years; another 15% believe it is vital to the success of their businesses. The question is, when formulating strategies, how does each business define its competitive edge?
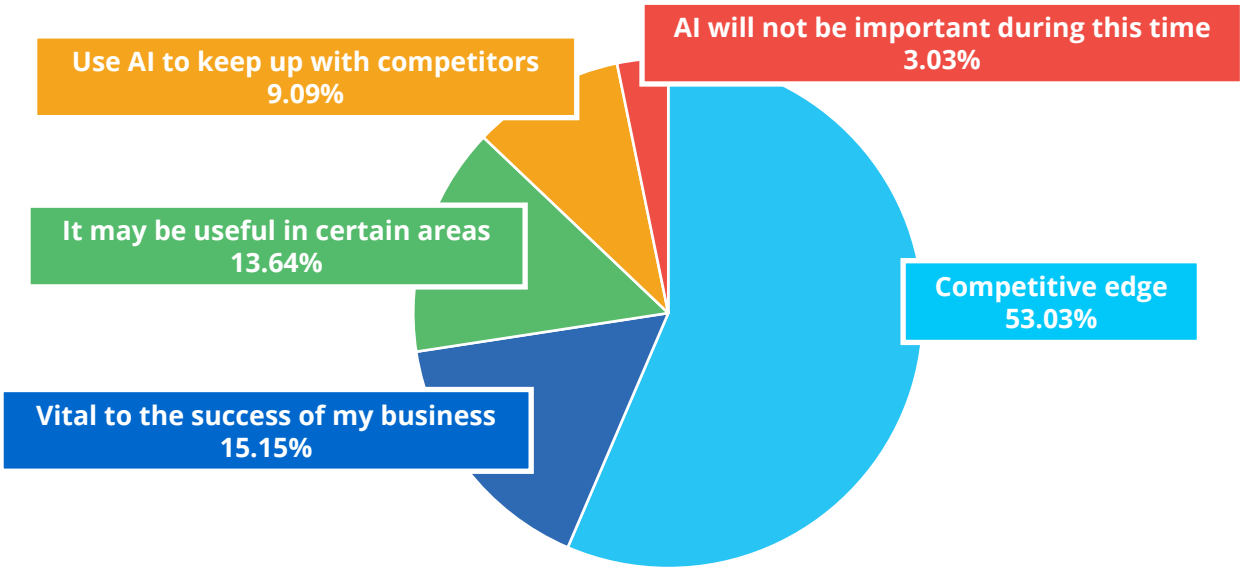
The competitive edge could be lowering costs in one specific business area. It could be improving productivity by working smarter. Competitive edge could encompass better customer service or faster on-time delivery.

Because AI offers increasingly broad areas of impact, we asked which areas of the business distributors anticipate applying AI in the coming years.

Distributors see the greatest opportunities over the next three years to streamline and improve marketing, website/digital, customer service, sales, IT and cybersecurity, and supply chain management.
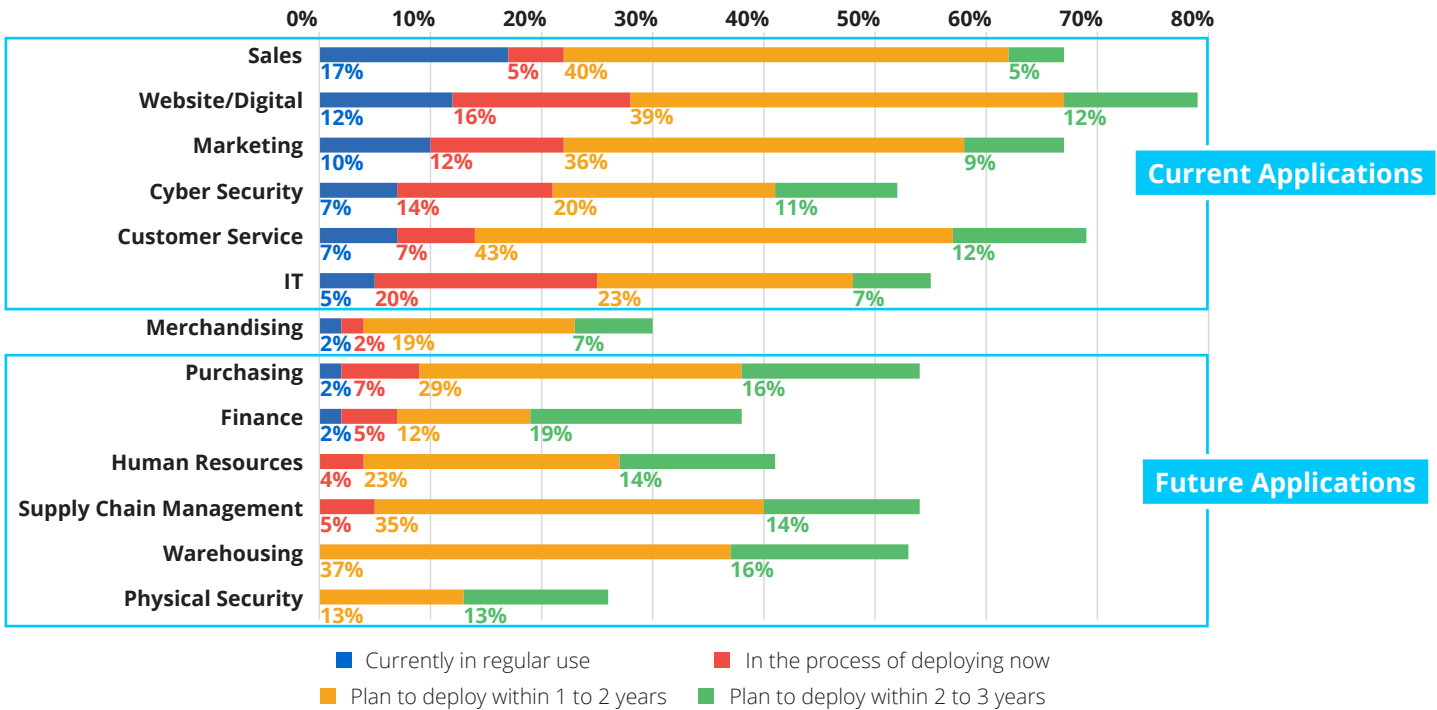
Importance of AI to Your Business Over Next 3 Years

**Use AI to keep up with competitors
9.09%**

**AI will not be important during this time
3.03%**

**It may be useful in certain areas
13.64%**

**Competitive edge
53.03%**

**Vital to the success of my business
15.15%**

Progress has been limited, however. While many have plans to deploy AI in the next one to two years, fewer distributors said they have implemented AI, with the most naming sales (17%), website/digital (12%) and marketing (10%).

Progress Deploying AI

	Currently in regular use	In the process of deploying now	Plan to deploy within 1 to 2 years	Plan to deploy within 2 to 3 years
Sales	17%	5%	40%	5%
Website/Digital	12%	16%	39%	12%
Marketing	10%	12%	36%	9%
Cyber Security	7%	14%	20%	11%
Customer Service	7%	7%	43%	12%
IT	5%	20%	23%	7%
Merchandising	2%	2%	19%	7%
Purchasing	2%	7%	29%	16%
Finance	2%	5%	12%	19%
Human Resources		4%	23%	14%
Supply Chain Management		5%	35%	14%
Warehousing			37%	16%
Physical Security			13%	13%

Current Applications

Future Applications

Legend:
- Currently in regular use
- In the process of deploying now
- Plan to deploy within 1 to 2 years
- Plan to deploy within 2 to 3 years

Applications for AI in Distribution

Shopping and Buying

There's a lot of promise to leverage AI technologies in shopping and buying.

Some categories include:

- Voice search and ordering
- Item recognition that uses computer vision to identify and match the product with a database
- AI-based selling to cross-sell, upsell, reorder, offer substitutes and automate quotes
- Contactless checkout that allows customers to shop, buy and checkout without human assistance
- Order automation that takes multimodal purchase information and processes it automatically into and enterprise resource planning (ERP) platform
- Product selectors and configurators

Many distributors are familiar with voice search and ordering, whether it's Alexa, Siri or your smartphone's version. On the customer side, we predict that voice search and ordering will take off in distribution. These tools allow our customers to ask, "Show me a roll of FSC uncoated paper," a product they're looking for, and AI will show the product, location and inventory level; it will also suggest upselling items to go with that order. They remove the keyboard from the ordering process.

The idea is to increase customer convenience while detaching humans from monotonous call-and-response behaviors. It's a high value-add for customers. Say you're a plumber dealing with a legacy water heater and trying to find the correct part. AI can use image recognition to match the request with the right product. It can also look intelligently at the customer's order history to improve its response based on what you've bought. What's incredibly powerful is that AI can put all these things together to produce a highly accurate response at digital speed. Then, these models can improve their response by minutely adjusting their behaviors.

Another aspect of AI-based selling, whether online or on a phone call, is offering substitutes and similar items. The best sales reps know a product line so well they can recommend substitutes within or beyond the brand for specific products. These reps are worth their

weight in gold, but it takes a great deal of time for people to learn this when a catalog has thousands or even millions of SKUs.

AI can play that role, whether it's in an ecommerce setting, on the phone or even a field sales rep. AI can level the playing field between an experienced sales rep and a new hire, bringing everyone up to the same level faster for greater productivity, higher sales and happier customers.

Another related area is cross-selling. It's been the holy grail of distribution for years and contributes significantly to the bottom line. AI can recommend what goes with what the customer has in their shopping cart, so the CSR or ecommerce platform can capture the additional sale. The returns on applying AI in this space are phenomenal, in about 90 to 180 days. By the time you've made a fourth or fifth payment on an AI-powered sales tool like this, it's already generated new revenue.

Reorders are also rich for revenue improvements. For example, AI can look at past order behavior and automatically generate a reminder that it's time for a critical production component.

Finally, automation is a critical part of AI-driven buying applications. AI-powered automation can monitor emails, texts and phone calls and convert these complex communications into your ERP. These tools are so powerful that even if your customer is missing part numbers (or lacks them entirely), some can fill in the blanks and take a guess at what they're searching for. AI can interpret emails with Excel, PDF, Word, image attachments and more, converting the request into an order for the customer review without human intervention.

Input   ERP Output

Contactless Checkout

Four years ago, we started to wonder what would shopping look like if you could walk into a store, grab what you want and just go. What if we could weave the most advanced computer vision into the very fabric of a store? So, you never have to wait in line, no lines, no checkouts, no registers. Welcome to Amazon. Go use the Amazon Go app to enter, then put away your phone and start shopping. It's really that simple. Take whatever you like; anything you pick up is added to your virtual cart. If you change your mind about that cupcake, just put it back. That's now a reality.

Imagine a branch where you've got a core set of customers that stop by three to five times a week on their way to a job site. They can purchase and leave the store without the usual checkout process thereby saving several minutes per visit. Considering the volume of orders that come through email, text or some other unstructured format, you can reap massive time savings and eliminate manual lookups and guesswork.

The top five benefits of applied AI in the areas of shopping and buying include:

- **Enhanced Efficiency** - Automate time-consuming tasks and save valuable hours.
- **Increased Sales Performance** - Boost hit rates and drive revenue growth.
- **Improved Accuracy** - Eliminate errors and ensure precise product identification.
- **Respond to customer quotes and orders in minutes**
- **Convert sales team from order-takers to order managers** - These solutions remove manual data entry from sales processes and empower inside sales teams to focus on what truly matters – customer satisfaction and revenue growth.

Fulfillment

Areas where AI can have an impact on fulfillment include:

- **Supplier lead time** – Machine learning can estimate more accurate lead times that reduce working capital costs so distributors can better meet customer expectations. Significantly, errors can be reduced by up to 60% with these solutions.
- **Inventory management**
    - **Demand forecasting** – Analyze historical data and market trends to accurately predict demand. The tool maintains optimal inventory levels and reduces excess or insufficient stock.
    - **Inventory optimization** – Determine optimal stocking levels, reorder points and safety stock levels to minimize carrying costs while ensuring product availability.
    - **Warehouse drones** – Identify and count products on shelves, helping to maintain accurate inventory levels.
- **Route optimization** – Calculate the most efficient routes for vehicles, considering factors like traffic, delivery windows and vehicle capacity for distribution and delivery. It can reduce transportation costs and improve delivery times significantly.
- **Load optimization** – Determine how to load cargo into trucks or containers optimally, considering weight distribution and space utilization.
- **Autonomous vehicles** – A vehicle capable of sensing its environment and operating without human intervention.

Some larger companies, like FedEx and Amazon, are rolling out drones and autonomous vehicles. A company called Nuro offers an autonomous vehicle to wrap in your brand and deploy. Then there are the drones that can count inventory, tracking stock by barcode and location. Distributors can compare the pictures or barcodes with the information in their systems, gaining an 80% savings over manual inventory counting and reconciliation.

Other applications in fulfillment include:

- **Warehouse layout and design**
    - **Slotting optimization** – Optimize warehouse product placement to minimize picking and put-away times. This technology results in faster order fulfillment and reduced labor costs.
    - **Warehouse design** – Determine the optimal layout to maximize storage capacity and minimize travel distances when designing new warehouses or reconfiguring existing facilities.
- **Order fulfillment**
    - **Picking and packing** – Optimize the picking routes and packing processes to minimize the labor and time required for order fulfillment.
    - **Batch processing** – Group orders by batches to reduce the picker's trips within the warehouse.
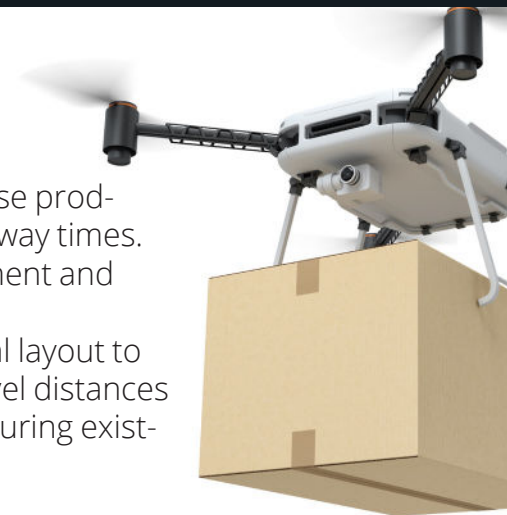
Invoicing and Payment

Nearly 50% of invoices end up on paper. The cost of processing each invoice is $10 to $12, and the time to process takes two weeks or longer, on average.

In the past few years, many companies have been offering automated accounts receivable (AR) collection. The challenge is that there's still a lot of paper with material time and cost to process each invoice. The net result of these invoicing challenges is errors, delays and lower productivity.

Automated AR powered by AI significantly reduces overall invoice-processing costs. The primary benefit is automating the manual reconciliation process, where staff try to match products on the invoice with something in the ERP inventory.

The benefits of AI in invoicing include:

- 82% reduction in overall invoice processing costs by eliminating manual reconciliation
- 72% faster invoicing and approval times
- Fewer errors and exceptions
- Better visibility into transaction status

Customer Support

Customer support benefits significantly from generative AI models. Automated, intelligent chatbots are light years ahead from when these models were first introduced.

AI-powered chatbots can handle returns, product questions or even generate quotes. These support applications pull from several rapidly improving AI tools:

- **Intelligent chatbot** – Handles customer inquiries and issues through automated chatbots or email, improving customer service efficiency.
- **Sentiment analysis** – The process of analyzing digital text or speech to determine if the emotional tone of the message is positive, negative or neutral.
- **Automated transcription** – The ability to accurately convert speech into text.

Large language models (LLMs) form the backbone of these tools. LLMs are next-word predictors that make the computer seem eerily intelligent. Behind the scenes, it's just math and computer language, but the impact is a game-changer. LLMs are used in chatbots to:

- Assist customers
- Address inquiries
- Resolve issues
- Find the right product
- Sell solutions

An AI solution can assist a customer in addressing their inquiry and resolving the issue without tying up a CSR. Significantly, these models can find the right combination of product and selling solutions based on prior customer behaviors.

That's how Amazon can scroll a feed at the bottom of your page that says, "Based on your buying history, you may also like." However, the technology Amazon uses is available to the average distributor. These tools are perfect in a reordering situation that can tie up a CSR.

That brings up an important point. Finding the right product-selling solution has, until recently, been the sole province of a person, whether a field sales rep or a customer service rep. This reality means about 10% of your inventory typically brings in 90% of the business. It's a vulnerability we can alleviate with AI.

Today, even new CSRs can use AI to sound like they've been working for your company and that customer for years. There's no way a human can know every product you sell, every part or every component. But AI can enable your sales team to become true experts for your customers and your business.

How can I help you?

AI
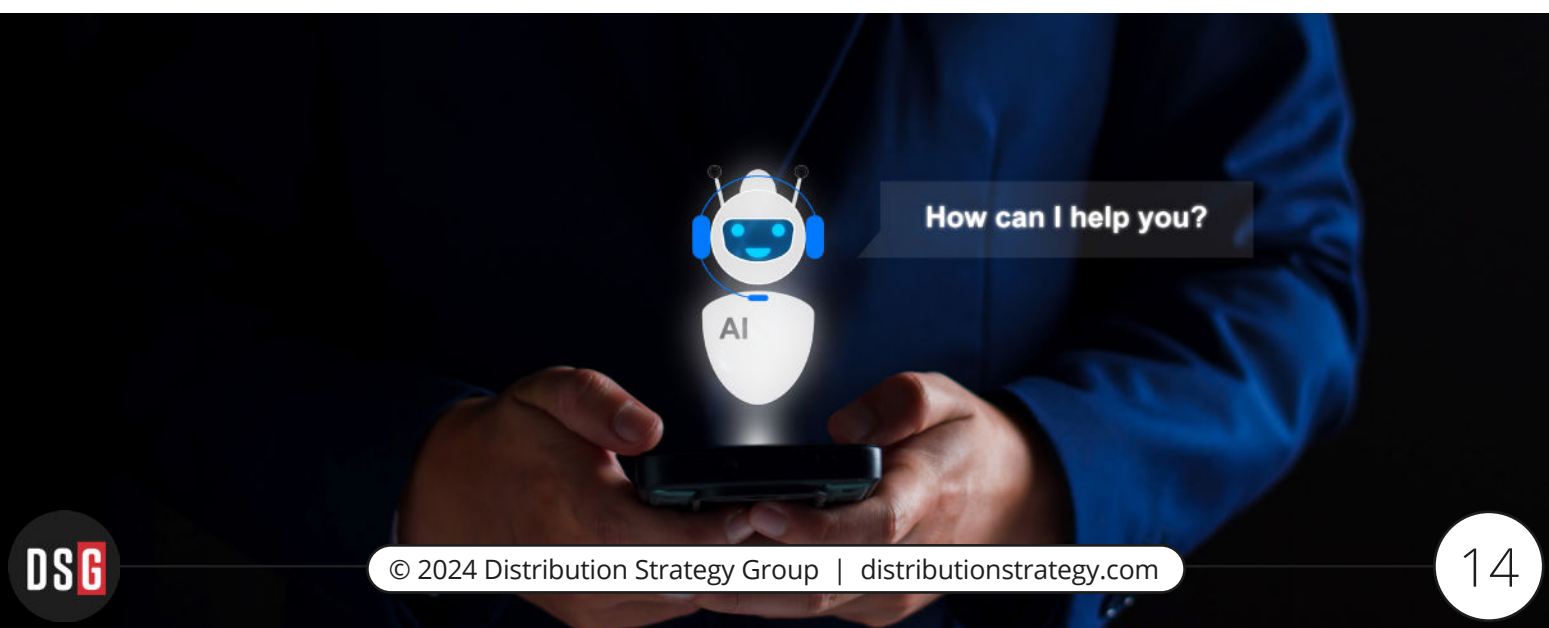
How to Get Started with AI

Distributors can and should pull together an internal group to research these quickly evolving tools. There is, admittedly, a lot to learn. The goal of this research is two-fold: First, to learn about available AI tools, and second, to consider where to begin applying them in your business. Distributors can also begin to talk with their existing or other vendors about task-specific AI tools that can have a big impact on high-value areas of your business.

Low-hanging fruit may include:

- **Demand Forecasting:** Using historical sales data, market trends and external factors (like seasonal changes or economic indicators), ML models can predict product demand. These solutions help optimize inventory levels, reduce overstock or stockouts, and improve supply chain efficiency.
- **Price Optimization:** Analyze customer demand, competitor pricing, market trends and cost to recommend optimal pricing strategies for different products or regions. These tools maximize profit margins while remaining competitive.
- **Customer Segmentation and Personalization:** By analyzing customer data, algorithms can segment customers into distinct groups based on purchasing behavior, preferences and demographics. Segmentation can help with targeted marketing campaigns, personalized product recommendations and customized promotions.
- **Churn Prediction and Customer Retention:** Models identify the customers you risk losing and suggest interventions or incentives to retain them.
- **Product Recommendation Systems:** Recommendation systems can enhance cross-selling and upselling by suggesting relevant products to customers based on their browsing and purchase history.
- **Resource Allocation and Workforce Optimization:** Optimize workforce scheduling, resource allocation and distribution center planning based on demand patterns and workforce availability.
- **Credit Risk Assessment:** Assess customers' creditworthiness by analyzing transaction history, payment behavior and external credit data. Set appropriate credit limits and terms, reducing the risk of bad debt.

The bottom line is simple: These solutions aren't planning a world takeover or attempting to steal jobs. AI is a tool. Like a wrench that turns a nut, AI is simply the latest evolution of the computing tools available to help distributors improve their bottom lines.

The AI train has left the station and is traveling faster than a speeding bullet toward your warehouse. We predict that in just 10 years, these tools will create a brave new world for the modern distributor. But we are at the beginning of this evolution, and every distributor should step up to the train station now to get their ticket—or get left behind.

About the Author

Jonathan Bein Ph.D. has worked with over 100 distributors to apply advanced analytics and AI to improve customer experience, define value proposition, estimate sales potential and create digital strategy. Prior to Distribution Strategy Group, Bein successfully led and was part of executive management for software product and services companies in information technology, healthcare, and communications. Bein has been CEO of several companies.

Bein earned his Ph.D. in Computer Science at the University of Colorado with a focus in Artificial Intelligence and a BA in Computer Science at Indiana University.

DISTRIBUTION STRATEGY GROUP

Thought Leadership for Wholesale Change Agents

Distribution Strategy Group helps you compete and win. In an evolving business environment marked by digital transformation, shifting customer preferences and the pivotal role of AI, we are your go-to source for research-backed webinars, whitepapers, blogs and live events that will help you make better decisions.

Our proprietary, specialized, distributor-focused analytics systems provide actionable insights you can use to drive superior outcomes with customers and employees, and versus competitors.

Contact us:
distributionstrategy.com | 303-898-8626 | contact@distributionstrategy.com

Thank you to our sponsors:

EPICOR

epicor.com

hawksearch By Bridgeline

hawksearch.com

MightyRep

mightyrep.com

conexiom

conexiom.com

How Much Can an ERP Impact Your Bottom Line?

Turns out, a lot.

Market research firm IDC published a new study on distributors using Epicor for Distribution solutions, who reported **45%** more orders dispatched, **21%** higher productivity, and **35%** more inventory turns.

DOWNLOAD THE REPORT

EPICOR.COM/DISTRIBUTION

EPICOR

SOLUTIONS FOR: Automotive | Building Supply | *Distribution* | Manufacturing | Retail

HawkSearch connects people to products, *faster.*

Don't let complex catalogs and dirty data stop you from converting browsers to buyers. One of our favorite ways to accomplish this? HawkSearch's powerful unit conversion and data normalization tool, making the 'no results page' a thing of the past.
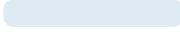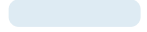
4" junction box

Type

PVC

Size

4 in.

Search Results

"

With Conexiom, we show our customers that we provide timely, accurate service, without errors."

Rose McDaniels
VP of Field Operations and
Administration, Graybar

Your New Easy Button to Win, Grow, and Retain More Customers

Harness AI to deliver an Amazon-like order and fulfillment experience by turning emailed orders into automated digital transactions