

# The Future of AI in Distribution

Artificial Intelligence, Machine Learning  
and the Implications for Distributors



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*"Information technology and business are becoming inextricably interwoven. I don't think anybody can talk meaningfully about one without talking about the other." –Bill Gates*

Traditionally, distribution has not been on the leading edge of technology application – at least compared with some other industries. Most distributors only offer their customers basic internet ordering, and many don't even have that.

It's important that distribution leaders fully understand how Amazon and other technology-driven retailers are leveraging advanced technology to build new competitive capabilities – and the vast resources they can bring to any market where they choose to compete.

Much has been written about Amazon's technology prowess, but it's hard to find a resource that explains the basis of these capabilities and how the company will likely apply them in business-to-business distribution.

The purpose of this document is to define these technologies and how leading companies are using them so that executives understand both the promises of AI and the threat posed by competitors who use it well. In this analysis, we will cover a wide range of technology topics, and we will start by defining and explaining some terms that may be new to you.

## **What is artificial intelligence?**

We hear a lot about artificial intelligence (AI) these days; the term seems to be popping up frequently in popular media, on websites and in marketing literature. In practical terms, AI is the science of programming machines to be aware of their real or virtual environments, so that they react to circumstances and stimuli the way a human would. As an example, many new cars have an array of technologies that strive to maintain safe distances around them, such as "smart" cruise control and "lane-keeping" aids. This is an example of a machine simulating how a human would interact within an environment.

However, these cars do not automatically "learn" and get better at this over time, like humans can; their capabilities are installed at the factory and never change. When these systems do improve over time – on their own – they will look more like what "artificial intelligence" really is.



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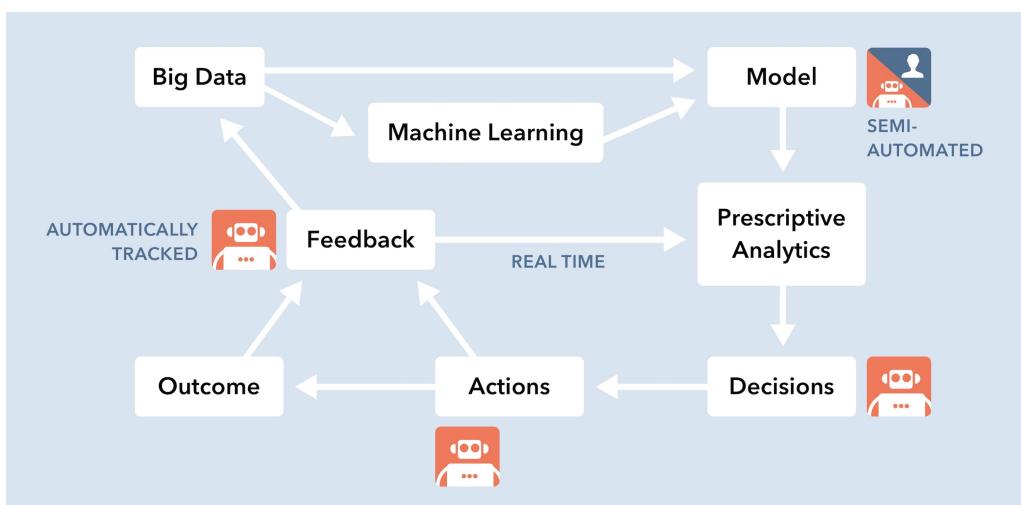
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# Analytics Have Evolved from Describing the Past to Prescribing the Future

Artificial intelligence is rooted in business analytics, which have become dramatically more powerful over time. Even though the definition of AI has changed as technology advanced, one thing is clear: AI has become a game-changer for businesses that are able to leverage even a portion of its potential. Here's how it has evolved:

- ♦ Initially, business intelligence (BI) systems provided **descriptive analytics**, which are a summary of business operations data that describe what took place. Stock market indicators are descriptive analytics, as are website page views and call center response times.
  - ♦ As data volumes grew, BI systems started to include **predictive analytics**, which are often used to provide an eye into the future, forecasting the future trajectory of data. Mathematically, predictive analytics is all about using
- data that you have (i.e., historical data) to estimate data that you want, but don't have (i.e., future data). In this more general perspective, "sentiment analysis" is also a kind of predictive analytics - for example, the analysis of social media conversations (i.e., data you have) to infer how a consumer feels about a brand (i.e., data you want, but don't have).
- ♦ As data systems matured and became more sophisticated, **prescriptive analytics** emerged, which prescribe an action to take based on optimizing an objective. In the stock market, it is the recommendation of where to buy or sell to optimize your profit. For Amazon, it is the recommendation of a product that optimizes your likelihood of buying, based on historical purchases.

## What Makes AI Intelligent?



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Michael Wu, Ph.D., PROS, Inc.

# Unleashing Big Data and Computational Power

While BI systems have evolved over the years, they are passive decision-support systems that aid humans in making decisions. Whether providing information about what stock to trade or forecasting inventory demand, ultimately, humans make the call. And for good reason, because traditional analytics are no match for human intelligence. Expert decisions can often contradict results supported by analytics.

Traditional business analytics haven't been accurate enough due to constraints imposed by the data, the models and the sheer amounts of computing power required. But that has changed with the emergence of mind-boggling "big data" sets and equally impressive computational power.

*Big data* is the term used to describe sets of data that are so vast and so complex that it is impossible to effectively analyze them with traditional tools. Big data has been enabled by the rise of interconnected computers that allow aggregation of real-time information for everything from transactions to traffic flows.

However, computers initially proved more effective at collecting data than analyzing it. More recent advances in computer hardware technology have helped to address this problem with the introduction of powerful graphics processing units (GPUs) that have reduced computing power bottlenecks. The newest generation of supercomputers employ parallel infrastructure where the data and instruction sets are processed by numerous processors working side by side, rather than a few large processors. As an example, the newest U.S. supercomputer, Summit, uses 36,864 processors.<sup>1</sup>

The new computer hardware has given data scientists unprecedented freedom to use much more sophisticated models while generating results in less time than ever.



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Expert decisions can often contradict results supported by analytics.

1. Summit also occupies over 5,000 square feet, is cooled by 4,000 gallons of water per minute and consumes 15 megawatts of power at peak output. This is, obviously, overkill for the average business' AI requirements, but scalable systems are available through the cloud for most applications.



## Machine Learning and the Learning Loop

*"Big data is not about the data."*

*–Gary King, Harvard University*

The ability to detect and track vast amounts of data is only the start. The analytics employed to evaluate this data to create actionable information is the real game changer.

Not all AI is created equal. For really smart AI, data scientists use machine learning algorithms to turn data into models. This is the essence of machine learning, and it's often referred to as training and tuning the models. The goal is to produce results that closely match those obtained by human experts.

Some of these models mimic the processing within the human brain, such as deep learning networks that contain layers of neurons, and recurrent neural networks. Deep learning is just one class of learning algorithms that has become popular recently because it mimics how the human brain learns and achieves some pretty amazing results in image and speech processing.

Because performance data of these AI can be collected and fed back into the machine learning engine, it can update and improve the model. It is this constant stream of feedback data that allows AI to learn over time.

This continuous learning loop – where AI learns from every experience – is what makes AI smart. And it's what makes one AI smarter than another. Machine learning with feedback data will update and improve prescriptive analytics so the next prescribed decision is optimized even further to bring it closer to, or better than, what human experts would do.

This is how the AlphaGo computer program beat the world champion at "Go," a two-player strategy game considered substantially more sophisticated than chess. AlphaGo didn't learn from the world champion; it learned from average Go players.

Once AlphaGo became good enough, it could then start playing the game against itself – perhaps even millions of games in a day – learning all possible mistakes quickly to get smarter with every single game. So even though AlphaGo wasn't programmed with the level of intelligence or strategies that could beat top players, it learned and improved with every game, and so taught itself to be better than the world champion.

# Four Key Applications of AI with Machine Learning

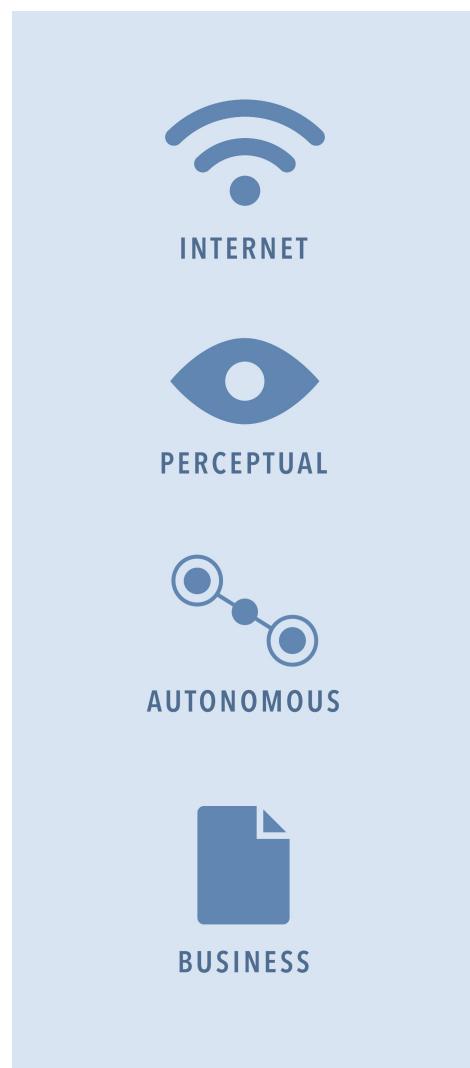
The automation of decisions and the proper execution of all subsequent actions is the essence of cutting-edge AI today. AI is used in thousands of applications in our modern world, but these are the big four, as defined by Michael Wu, PhD., Chief AI Strategist at PROS Software. Amazon and other advanced retailers are doing all of them and Amazon Business is applying these forms of AI to B2B distribution.

**Internet AI.** There are many applications of AI found on the Internet. Amazon and Netflix, for example, leverage your shopping patterns, likes and dislikes. These companies use AI to learn your preferences based on where you browse and what you buy to provide personalized recommendations based on that data. The learning loop in this class of AI helps them improve their recommendation over time to better match your tastes and preferences. Amazon is actually a pioneer in this application of AI, and the success of their recommender system on Amazon.com has become a classic case study for the industry.

**Perceptual AI.** Applications of AI that mimic higher cognitive functions of humans, such as speech and sight, fall into this category. The resulting technologies - for example chatbots like Siri and Cortana - are primarily used in the area of human computer interaction (HCI). If you've ever used a music service like Pandora or Spotify that uses Internet AI, you know they play different song selections as they learn your tastes. Similarly, chatbots and other virtual assistants will "learn" your way of speaking over time, via the learning loop, and get better at understanding what you're asking them to do.

Amazon's well-known chatbot is Alexa, which "resides" in Echo smart speakers but also in a growing diversity of devices, including televisions, "smart glasses" and will soon be integrated into cars from manufacturers including Ford, Volkswagen, BMW and Toyota.

With this capability, customers describe products, and Alexa and other systems recognize what is being requested and order it automatically. Amazon's formidable "Alexa for Business" brings sophisticated voice-directed management to companies in the form of "intelligent digital assistants."



Four key applications of modern AI.

The system can set up conference calls, place calls for you, check your emails and help you manage your calendar by voice. The technology is impressive, highly useful, and is also somewhat of a “Trojan horse” that introduces easy voice ordering of supplies – from Amazon, of course – into businesses everywhere.

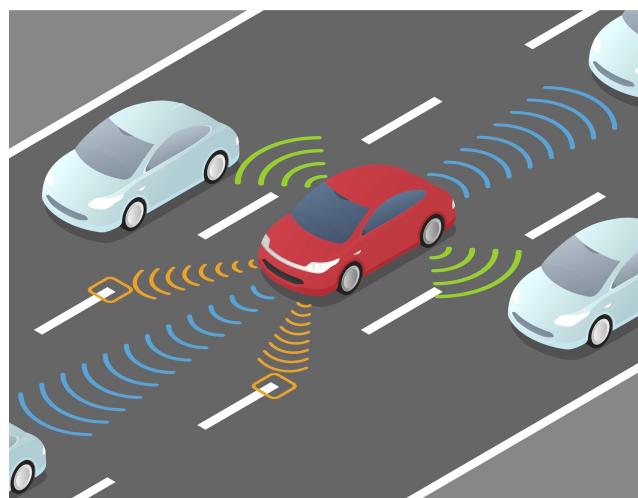
But you don't have to order Alexa for Business to experience Amazon's voice-ordering capability. You can simply open the Amazon app on your phone, press the microphone icon and describe what you want to order. Amazon will be happy to sell you millions of items you can find by voice.

*Image recognition* is also a form of perceptual AI and is currently available from Amazon. If you download the company's app, hit the camera icon and point it at a common product, the system will attempt to recognize it and bring you to a page on Amazon where you can buy it with one-click ordering. The system is surprisingly effective given the variability of cameras, ambient lighting and individual photographers. Even if the app doesn't recognize the specific product, it will still direct the consumer to the relevant section of the website. As Amazon builds better technology and collects more product data, the system will become better than humans at recognizing products. The system will remember everything ever purchased by customers and infer from the data what is needed even if the image is incomplete or partially occluded.

**Autonomous AI.** This application of AI is primarily associated with self-driving cars, but it has great potential in advanced robotics and Internet of Things (IoT), where machines and components are starting to talk to each other. As more autonomous vehicles connect to the

“cloud,” the AI's learning loop can share data between them to build a collective understanding of optimal reactions to countless stimuli, including accidents and other failures.

If the autonomous system only learned from one driver, its driving ability would be severely hindered because it is biased by having a single data source. A teenager driving a Ford Mustang exhibits different tendencies from a retiree in a Buick. Collecting the data from a large universe of millions of drivers will create a more traditional bell curve of experience that mutes the effect of outliers. Eventually, it's not hard to see that the AI can produce vastly safer “drivers” than people, particularly since all of these vehicles will interact with each other and their environments in real time as they move.



Self-driving cars, with their ability to learn from millions of drivers, are a prime example of autonomous AI.

Amazon is using this type of AI, too, in their fulfillment centers. Amazon's warehouse operation is assisted by robots and conveyor belts that shuttle bins and pallets around to be packaged together, labeled, shipped and delivered with impeccable precision.<sup>1</sup>

As for IoT, while you may have seen television commercials where refrigerators have computer screens or request service when needed, the technology is actually far bigger. IoT allows machines all over the world to connect with each other to improve productivity in many fields, including purchasing. You can even have smart shelves that detect inventory levels and automatically order the proper SKUs to fill market demands.

Ultimately, Amazon, like all suppliers, would prefer not to compete for orders and instead become the default source for its customers. If Amazon's technology is connected to sensors throughout a customer's business – from the tool crib to the office supplies closet to the cleaning crew's shelves – all fulfillment can become automatic. And, notably, all orders go to Amazon.

**Business AI.** Artificial intelligence is the new business intelligence. This application of AI is usually very specific to the business, in areas that include, for example, fraud detection, machine-aided medical diagnosis and drug discovery, as well as revenue management and pricing recommendations. Ultimately, the learning loop in these AI systems will help stakeholders make better decisions that directly improve results across various business functions.

For example, many distributors are using data-driven, prescriptive insights to uncover opportunities that recover margin leakage and grow revenue. Selling on experience and gut instinct limits a distributor's reach within each account to the individual abilities of each sales rep and curbs the company's overall revenue potential.

But with specific recommendations sent directly to their CRM, salespeople can take immediate action. With insight into customer buying behaviors, such as declining volumes, erratic buying trends or gaps in ordering profiles, businesses are empowering their sales organizations with science-driven recommendations to expand wallet share with their customers – and driving millions in annualized revenue growth.

*Predictive ordering* is another type of business AI. Six years ago, Amazon filed patents for a system called "anticipatory shipping," which will send products you need before you order them, and often before you knew you needed them.

For example, consider a machine tool that needs a bearing. Now imagine that as the bearing begins to exhibit some wear, the tool senses it, estimates when it will fail and balances that against the need to limit "downtime" and orders a replacement on its own. The system then schedules the technician to come and repair it.

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1. Amazon also uses autonomous AI to determine the stocking plan for its warehouses. This results in models that achieve greater SKU density and more efficient picking while adapting itself to new products, changing customer preferences, etc., in real-time.



## Augmented Reality

New technologies continue to unfold quickly – such as augmented reality. You can think of augmented reality as a way that software can overlay computer-generated imagery (CGI) on top of the physical reality. You see this represented in movies all the time now, but it's becoming more common in marketing and industrial applications.

In 2009, BMW released a video showing a mechanic wearing AR glasses that guide him through an engine repair. The glasses show him the fasteners to remove, where the part is located, which tools to use, etc.

You can see the technology in action as well if you buy a bottle of "19 Crimes" wine and download the "Living Wines" app onto your phone. If you give the app access to your camera and it point it at the label, the character on it virtually (and somewhat eerily) "comes to life" on your screen.

It's easy to imagine a time when a technician responsible for the machine bearing repair mentioned earlier uses VR to do the job. He would start by putting on his Alexa-enabled glasses and following the visual instructions as the machine literally – but virtually – disassembles in front of his eyes.

The processing power behind such a system is impressive, but even more daunting is the

amount of detailed product data that must be accessible to the software. The combination of rich product data and AI creates new capabilities for customers.

For example, customers prefer to "try out" a product before they buy. Amazon is out to enable this by using augmented reality to let shoppers virtually view items at home before they buy them. The system allows a shopper to see what furniture, home décor or other products might look like in their homes to aid in purchasing decisions.

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The combination of rich product data and AI creates new capabilities for customers. What's daunting is the amount of detailed product data that must be accessible to the software.

# Case Studies of Leading AI and Technology Companies

While Amazon is certainly one of the leading companies in the world at utilizing advanced technologies, including artificial intelligence, the company faces sophisticated rivals on the retail side of its business. This is pertinent to distributors since retail technologies tend to trickle into B2B over time.

Some of these Amazon rivals are collaborating to compete with the company. In this section, we'll explore some of the capabilities of a few of Amazon's primary rivals in the use of technology, including:

**The Kroger Co** (NYSE: KR). Kroger is one of the world's largest food retailers, with fiscal 2017 sales of \$123 billion. However, same-store sales only grew 0.7% in 2017 and the company faces stiff competition – including from Walmart and Amazon, which owns Whole Foods.

**JD.com** (NASDAQ: JD). Although less well-known than Amazon's other large Chinese-based eCommerce competitor, Alibaba, JD.com is often cited as the world's leading company in the use of certain kinds of AI and has built a business model similar to Amazon's. The company achieved \$56 billion in revenue in 2017, a 40% increase over the prior year. It recently announced plans to launch operations in the U.S. and undoubtedly has the attention of Amazon.

**Walmart** (NYSE: WMT). With more than 2.3M employees, Walmart is the largest private employer in the US and achieved revenues of \$486 billion in FY2017, which represented 0.8% growth. However, eCommerce sales grew 29% in 4Q17.

## WHAT'S NEXT?

Companies are combining different technologies to create more sophisticated capabilities. For example, Alexa is actually a combination of several different AI algorithms, including speech recognition, chatbot, voice synthesis and a recommender system.

Amazon's AR View (augmented reality) combines image recognition and image processing with a recommender system. Predictive ordering combines technologies like IoT sensors (like the example of the failing bearing) with predictive analytics to estimate the time to failure and ordering/delivery times.

Distributors also have access to artificial intelligence that combines multiple applications of the technology. PROS Software recently coupled its AI pricing science software ("Business AI") with

Microsoft's Hololens technology ("Augmented Reality AI") to provide an advanced configuration tool. In one use case, a construction equipment distributor sales rep can use the system, called PROS Smart CPQ, to configure an AR image of a backhoe. As the user changes options like colors, tires and attachments, the image updates from all angles. Pricing updates dynamically, considering factors such as the customer's calculated "willingness to pay" and other variables.

The landscape is changing quickly, and as technologies continue to emerge and get combined in new and creative ways, the businesses that embrace them will gain a big competitive advantage over those that don't.

## The Kroger Co.

Kroger launched its "Restock Kroger" initiative in October 2017 – a variety of programs to improve performance, including using data to customize offers for customers, enhancements in its technology, including its digital value proposition. The Food Marketing Institute estimates that 20% of all U.S. retail grocery will be purchased online by 2022 (\$100 billion in sales), so Kroger has a keen interest in leading in technology. Kroger summarized how it planned to gather and use data about customers in a slide from its Oct. 11, 2017 investor meeting presentation (pictured right).

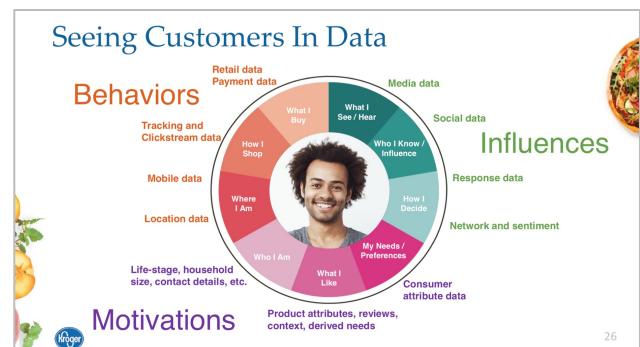
Leveraging all of these inputs (which certainly qualify as "big data") requires advanced technology tools, including AI. The company has introduced a variety of technology-driven initiatives to combine internal and external data for "convenience, instant gratification, inspiration & solutions."

Kroger is launching its "Scan, Bag, Go," app that allows shoppers to scan their own items as they shop in the store. If you load your shopping list into the app, it will notify you as you walk by an item you need. Downloaded coupons are applied automatically and shoppers see a real-time total of items purchased and fuel points accumulated. Checkout is a quick stop for verification and payment; that will get even faster when Kroger allows customers to simply pay from their phones.

Kroger also announced it would begin grocery delivery in Arizona using autonomous cars from a company called Nuro and is rolling out, "Kroger Edge," digital panels that replace price stickers on shelves. The panels can also display nutritional information, warn you about allergies and show video ads, coupons and alerts about items on your shopping list.

Theoretically, it also allows the company to change pricing dynamically in all locations, in response to everything from weather conditions to demand patterns.

Kroger is also doing AI-driven personalization and warehousing. Obviously, the largest grocery chain in the U.S. is not backing down in the face of competition from Walmart and Amazon.



Data sources Kroger gathers to understand customer behaviors, influences and motivations.

Source: Kroger Investor Conference. Oct 11, 2017.  
<http://ir.kroger.com/events-and-presentations>



Kroger's grocery delivery service, using autonomous cars from Nuro.

## JD.com

JD.com may be the biggest and most impressive company you've never heard of before now. Founded by Liu Qiangdong, also known as Richard Liu, as a brick-and-mortar store in 1998, JD.com is far more like Amazon than its better-known rival Alibaba. While the latter has two marketplaces, Alibaba primarily relies on third-party logistics partners.

Like Amazon, JD.com has built its own extensive and impressive logistics network, consisting of 500 warehouses totaling nearly 125 million square feet. In addition, the company is the world's leading commercial user of drones, which have been delivering packages in China since 2016 and currently have more than 5,000 hours of flight time across 100 routes. In addition to enabling customer deliveries into remote locations of China, JD.com claims to be developing drones capable of carrying five tons that it will use to transfer inventory between distribution centers.

The company is also experimenting with autonomous robot delivery on college campuses and is currently piloting self-driving trucks on some routes.

In an interview in March 2018, Richard Liu said, "I hope my company would be 100% automation someday...no human beings anymore, operated by AI and robots." JD.com invests heavily in warehouse automation and operates one facility that can process 200,000 products a day - with four humans. JD.com employs 65,000 people in its delivery operation alone, so it's easy to see how implementing autonomous robots for warehousing and delivery is appealing.

JD.com also makes intensive use of AI in other areas like marketing and brick and mortar

retail. For example, it's testing facial recognition software that would allow shoppers to pick up merchandise in stores and then simply walk out. Payment is reconciled automatically by systems that recognize individuals and bills them.

China operates the most sophisticated eCommerce retail market in the world, so JD.com enters many alliances to access capital and capabilities. In 2016, JD.com announced a strategic alliance with Walmart, which bought 10% of the company. The companies are collaborating in logistics, marketing and AI.



JD.com's use of autonomous vehicles and drones enables deliveries even into remote areas of China.

## Walmart

Some analysts have criticized Walmart for falling behind Amazon in retail technology. Walmart is now aggressively investing to compete and is likely the only U.S. retailer with the scale to challenge Amazon's dominance.

In 2Q18, Walmart sales grew 4.5% but U.S. eCommerce grew 40% as the company built digital momentum. The company now offers online buyers grocery pickup in more than 1,800 locations and plans to be able to deliver groceries to about 40% of the U.S. population by the end of the year.

Walmart is building alliances as well. In August, the company closed a deal to acquire 77% of Flipkart Group, India's largest online eCommerce group. Flipkart entered that market in 2013, led by two former Amazon employees. Earlier, Flipkart received a \$1.4 billion investment from a combination of China's Tencent, along with eBay and Microsoft.

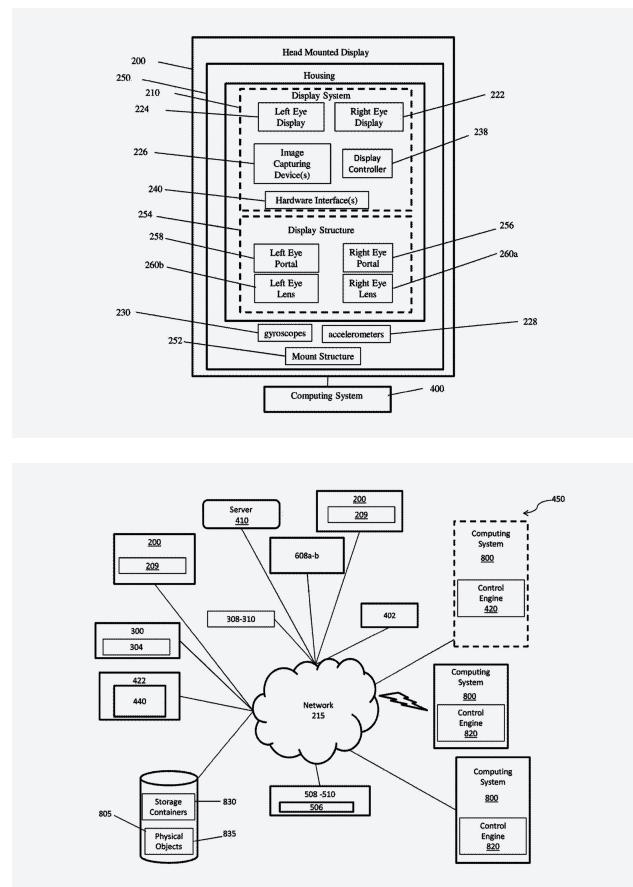
Separately, in July of this year, Microsoft and Walmart announced a five-year AI and cloud partnership. As part of the deal, Walmart will begin using Microsoft's IoT for various operational applications. The deal will allow the company to leverage Microsoft's machine learning, AI and data platform for a variety of internal and external capabilities.

Google has already partnered with Walmart to provide a marketplace where customers with the company's smart speakers ("Google Home") can make purchases by voice. This helps Google to monetize "Home" and gives Walmart badly needed access to a smart speaker that can order from its marketplace.

On Aug. 16, 2018, Walmart filed for a patent for a "Virtual Retail Showroom System" that

would allow shoppers to "virtually walk" through a representative but fully-merchandised store and pick items for checkout. The 17-page patent application demonstrates the company's determination to invest in leading technologies.

Whatever criticisms Walmart has received in the past, the company clearly is determined to compete in all areas of AI in the future.



Walmart's patent application for a "Virtual Retail Showroom System" illustrates how the company is investing in AI infrastructure.



## What Does All of this Mean for Distributors?

All of this technological advancement is very interesting, but why should distribution leaders care about what's happening in retail? MDM believes there are several reasons this is important to our industry:

Retail is the business model most similar to wholesale distribution. In both industries, working capital (primarily inventory) is the lifeblood of the business. Distributors can learn from this industry.

The lines between retail and wholesale are blurring in the U.S., primarily because Amazon has launched "Amazon Business," which MDM believes is now a \$5 billion distributor, just three years since its inception.

Retail has generally been several years ahead of distribution in technology. Many technologies pioneered in retail have "trickled down" to distribution over time, including inventory management methods, price optimization and marketing automation. That means distribution leaders need to pay attention to retail because it's often a preview into what's going to happen in our industry.

Interestingly, none of the companies examined here have shown the slightest interest in B2B distribution - except Amazon. If this reality seems to offer some relief to you, we posit that you are misreading the situation.

Here's why:

Amazon faces highly-sophisticated, well-capitalized and technologically-advanced competitors in retail. JD.com is arguably even more tech-savvy than Amazon and is coming to the U.S. Walmart and Kroger are formidable competitors aggressively pursuing advanced technology and artificial intelligence capabilities to battle Amazon.

By comparison, wholesale distribution, at least in the U.S., is both a larger market than retail (roughly \$5.7 trillion vs. \$4.2 trillion based on MDM estimates) and is defended by much less-sophisticated incumbents. Amazon may believe it can generate superior returns in B2B.

Amazon's Alexa-enabled smart speakers offer voice-based purchasing. The combination of smart speakers and the largest assortment of inventory is very appealing to both consumers and business customers. Amazon can both monetize its AI investments as well as build competitive barriers to other B2B entrants by achieving penetration quickly.

Knowing all of this, if you were running Amazon, how important would it be for you to continue to invest in and pursue the B2B distribution market?

# The Imperative for Distribution Leaders

Modern AI, working alongside humans, is transforming businesses and driving unprecedented levels of innovation, profitability and growth.

But not all AI is created equal. There are two crucial elements of AI:

1. Automating decisions and actions resulting from the output of the model.
2. Learning via a feedback system that enables it to get smarter over time.

Amazon invested in AI years ago, and is working aggressively to build new capabilities. Today, all of this technology is connected to their marketplace, so they are poised to capture market share. Customers improve productivity through automating purchasing processes to cut down on labor costs and inventory investments while improving facility and machine uptime.

Distributors must rapidly advance their understanding of these technologies because customers will want the same benefits in their working lives that they are increasingly enjoying as consumers.

This battle has just begun. It's vital that distributors invest aggressively in core systems that enable the development of AI over time. A variety of technology vendors offer both retail and B2B solutions and can help distributors ramp up their capabilities quickly.

If you do not have a long-term plan to develop your technology and provide AI-

driven benefits to your customers, you must act now. It's urgent that you formulate and maintain a long-term technology plan that includes artificial intelligence capabilities.

In 1833, Blackwood's Edinburgh Magazine published an article about betting odds that said, "We say that the race is – if not always – ninety-nine times in a hundred – to the swift and the battle to the strong." This phrase has been modernized over the years, but the core lesson remains the same. Most distributors don't have the scale to match the strength of Amazon but there's no excuse not to be swift.

Distributors are uniquely close to their customers and should leverage these relationships to understand needs and rapidly invest in capabilities that meet them. Work with technology suppliers that "get it" and push your organization to develop, invest in and execute a plan.

But be sure those technology suppliers can show you examples that demonstrate:

1. Their technology is true AI - if the model doesn't learn and improve on its own, it's not "intelligent."
2. How AI is delivering benefits to other distributor customers today. Many technology promise AI and can address the concepts; many fewer actually have the capabilities in place to deliver right now.

The race has just begun, but distributors must gain speed quickly to compete.

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"I've always been at the intersection of computers and whatever they can revolutionize."

–Jeff Bezos, CEO, Amazon

# ABOUT THE AUTHORS

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Ian Heller is the president and COO of MDM, the leading provider of analysis, research and events for distribution executives. Heller has served as a VP in marketing or eCommerce roles at Grainger, GE Capital Rail, Corporate Express and most recently at HD Supply Construction & Industrial. Heller founded and then sold Real Results Marketing, a consultancy focused on the distribution industry.

Heller holds a BA in history from Roosevelt University and an MBA from Northwestern University's Kellogg School of Management, where he was elected commencement speaker by classmates and won the "Distinguished Service Award" from the Dean's office.

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Wu is one of the world's premier authorities on artificial intelligence, machine learning and data science. Prior to joining PROS, Wu served as chief scientist at Lithium Technologies. Wu earned both post and undergraduate degrees from the University of California, Berkeley, including an undergraduate degree with a triple major in applied math, physics, and molecular and cell biology and a Ph.D. in biophysics. His research included computational visual neuroscience using statistical and machine learning techniques. Wu is the author of two books: *The Science of Social: Beyond Hype, Likes & Followers*; and *The Science of Social 2: Social Strategies for Long-term Business Advantage – and the Science Behind How They Work*.

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# How PROS Helps Distributors Leverage Artificial Intelligence

Why modern commerce with dynamic pricing science is the key to improving margin

PROS AI technology enables our customers to extract actionable insights from data even in the most complex, fast moving businesses, to make better, faster decisions to maximize revenue, deepen their relationship with customers, and improve margin in the face of unprecedented disruption and competition.

We are helping distributors shift to modern commerce, helping create a personalized and frictionless experience for their customers. Fueled by dynamic pricing science, PROS offers solutions making it possible for distributors to price, configure and sell their products and services with speed, precision, and consistency through their branches and across sales channels.

Now is the time to act - Visit our website and learn how PROS is helping distributors improve their margin.

To learn more, visit [www.pros.com](http://www.pros.com)

Powering Modern Commerce  
with Dynamic Pricing Science





# Is your business ready for AI?

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