RetailWire

A.I.'s advancing role in fueling the retail supply chain

Results of RetailWire's study of nearly 200 retail industry execs and managers.

Underwritten by:

IBM

Mapping the future of the supply chain

Retail operators are at a Darwinian crossroads: Consumers, witnessing the future of retail unfold before their eyes, are demanding that retailers evolve to meet their newfound expectations of what constitutes good service. New data-driven digital technologies are systematically disrupting every aspect of the retail value chain, from how retailers communicate, to how they build their selections, present their offers, build relationships with consumers and interact with key stakeholders.

And while it may appear that operators are placing disproportionate emphasis on the technologies that yield customer-facing improvements, the greatest promise of emerging digital technologies may in fact be the optimization of the supply chain — the backbone of retail. To be sure, supply chain performance affects everything from the quality, delivery and cost of goods, to customer service, customer satisfaction and, ultimately, profitability.

In the last decade, tech developers have increasingly turned to the cognitive sciences — referred to more informally as Artificial intelligence (A.I.) — when seeking ways to improve supply chain processes. A.I. holds great promise for a wide range of retail applications — from robotic production to predictive analytics and improving human-to-machine communications. As theory advances into retail practice, however, companies need a firmer grasp on what aspects of the value chain are ripe for A.I. improvements and how to prioritize new investments.

RetailWire, in coordination with IBM, sought to fill in this knowledge gap in a survey fielded in June and July of 2017. The findings suggest that retailers have an appetite for A.I. and its many applications across the supply chain. RetailWire surveyed nearly 200 industry execs and managers – retailers and those who work with them (e.g., brand marketers, consultants and technology vendors). The goal was to gauge familiarity with the application of artificial intelligence in retail, and how A.I. can address current challenges in the supply chain.

Specifically, the survey asked:

What the biggest challenges and risks are to retail supply chains today;

Where A.I. is likely to have the biggest impact on the retail value chain;

And what the biggest challenges are to implementation of A.I. in retail.

In this report we offer key findings from the research, along with recommended actions written in consultation with our research sponsor, IBM, a leading provider of integrated retail management and supply chain solutions.

Retailers have an appetite for predictive capabilities

Their partners, however, emphasize the challenges associated with poor data integration and interpretation.

About two-thirds of retailer respondents (66.7 percent) place difficulty predicting demand for purchasing and procurement among the three biggest challenges faced by retail supply chains. Retailers' partners generally agree but don't all point to demand prediction quite as often. Beyond retailer respondents, only brand marketers/manufacturers cite it most often, which at 56.3 percent is the same share that indicates integrating and interpreting data from disparate sources is the biggest challenge.

Indeed, more consultants and tech/solutions providers agree data integration and interpretation is a top challenge than predicting demand. And a larger share of consultants, tech/solutions providers, and brand marketers identify the lack of visibility into in-stock positions among the top challenges compared with retailers, whose top three list is rounded out with predicting and preventing supply chain disruptions.

TOP THREE CHALLENGES FOR RETAIL SUPPLY CHAINS
Select up to three

	All respondents	Brand marketer/ manufacturer	Consultancy/ agency	Retailer/ wholesaler	Technology/ solutions provider
Predicting demand	62%	56%	66%	67%	50%
Integrating and interpreting data	61%	56%	71%	52%	61%
Predict and prevent disruptions	46%	44%	34%	60%	47%
Visibility into in-stock positions	39%	50%	37%	31%	50%
Pinpointing demand origin	30%	25%	26%	38%	29%
Control and track inventory	29%	13%	37%	31%	24%
Product traceability	18%	13%	21%	10%	21%

Respondents again are generally aligned on the primary sources of current supply chain risk. IT-related malfunctions consistently rank among the top three across respondent types, tying with cybersecurity, fraud and/or theft at 51.7 percent.
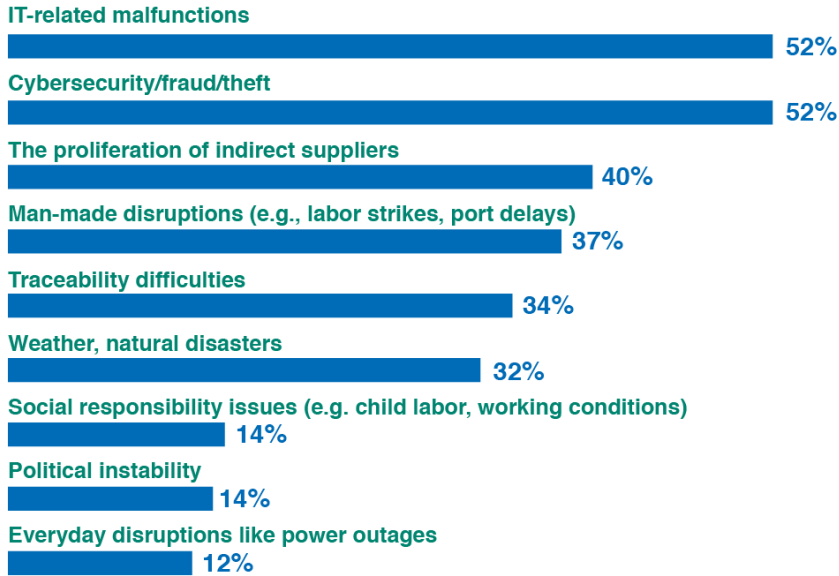
Technology/solutions providers are the only participants that do not include cybersecurity (36.8 percent) among the top three risk drivers. Instead, larger shares of these respondents say that the proliferation of indirect suppliers (52.6 percent), IT-related malfunctions (44.7 percent), traceability difficulties (44.7 percent) and man-made disruptions (44.7 percent) are bigger risks.

It's also interesting to note that, while monthly comparable-store sales have largely gone by the wayside, retailers' favorite scapegoat – weather – rounds out that segment's top three risks.

TOP THREE CHALLENGES FOR RETAIL SUPPLY CHAINS
Select up to three

Challenge	Percent
IT-related malfunctions	52%
Cybersecurity/fraud/theft	52%
The proliferation of indirect suppliers	40%
Man-made disruptions (e.g., labor strikes, port delays)	37%
Traceability difficulties	34%
Weather, natural disasters	32%
Social responsibility issues (e.g. child labor, working conditions)	14%
Political instability	14%
Everyday disruptions like power outages	12%

TOP THREE SOURCES OF SUPPLY CHAIN RISK
As rated by survey segments

Brand marketer/ manufacturer	Consultancy/ agency/ design firm	Retailers	Technology/ solutions providers
Cybersecurity/ fraud/theft	Cybersecurity/ fraud/theft	Cybersecurity/ fraud/theft (TIE)	Proliferation of indirect suppliers
Proliferation of indirect suppliers	IT-related malfunctions	IT-related malfunctions (TIE)	IT-related malfunctions (THREE WAY TIE)
IT-related malfunctions	Traceability difficulties	Weather/ natural disasters	Man-made disruptions (THREE WAY TIE)
			Traceability difficulties (THREE WAY TIE)

Addressing the challenges will assuredly involve technology

Thanks to the confluence of computing power, algorithms and access to data, artificial intelligence is finally coming of age as a powerful agent for businesses across industries, including retail.

Artificial intelligence is a branch of computer science dealing with the simulation of intelligent behavior in computers. A.I. is often referred to interchangeably with cognitive technology, but it is, according to IBM's definition, a subset of the latter. Other forms of cognitive technology — or, if you will, sister technologies to A.I. — are robotics, machine learning systems, natural language processing, deep learning, predictive analytics and recommendation engines. A.I.'s aim in particular is to simulate the way human intelligence solves complex problems characterized by uncertainty and ambiguity.

Despite broad media coverage and high-profile examples such as Watson's winning performance on Jeopardy over a decade ago, only three out of 10 respondents to our survey say they are familiar with the application of artificial intelligence in retail.

The remaining seven out of 10 respondents have either limited or no familiarity with the concept, suggesting that technology vendors have a substantial amount of educating to do with prospective clients. Likewise, many retail CIOs will likely need to add A.I. champion and coach to their job descriptions in the next few years.

FAMILIARITY WITH THE APPLICATION OF A.I. IN RETAIL
All respondents

Unfamiliar **18%**

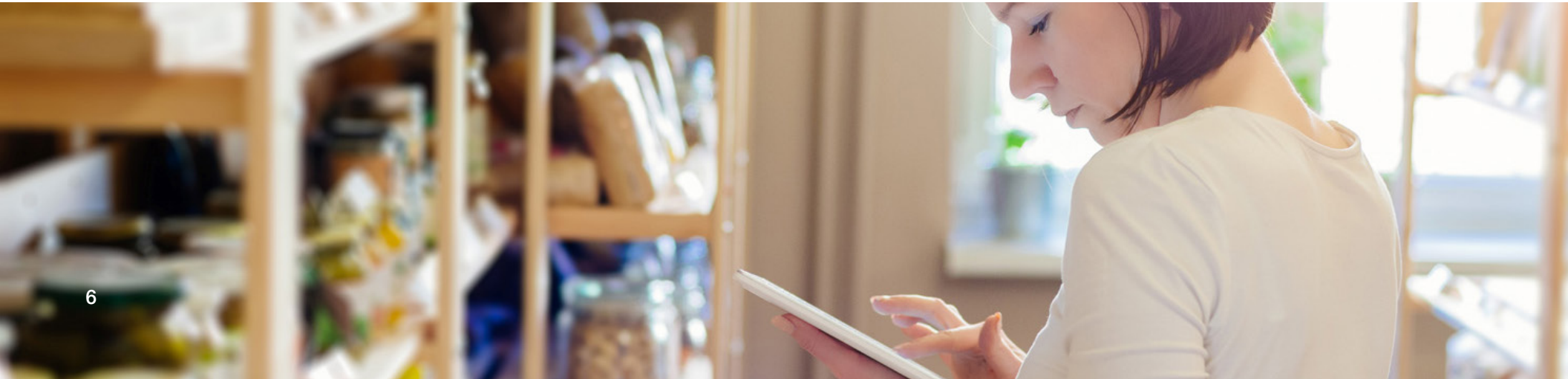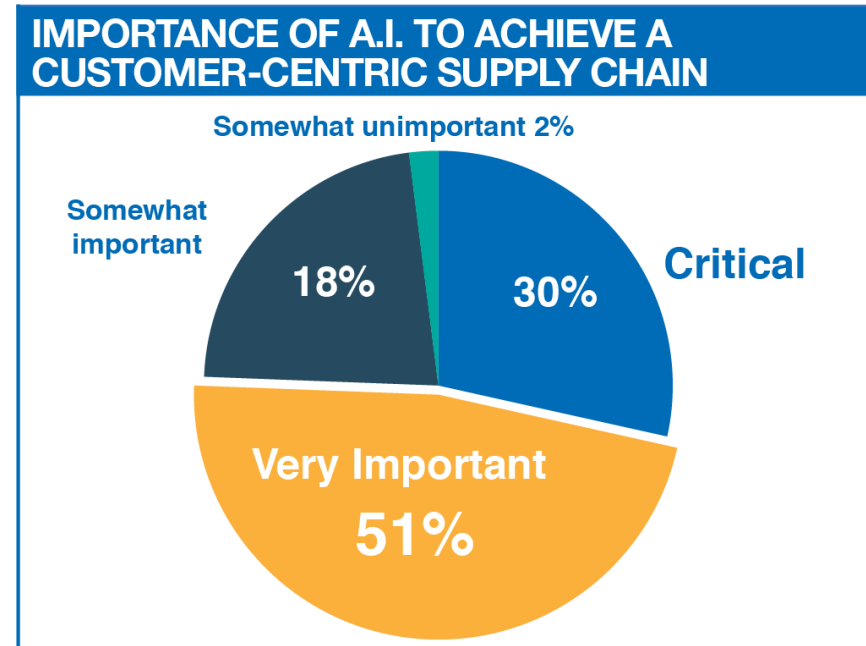Familiar **30%**

Somewhat familiar **51%**
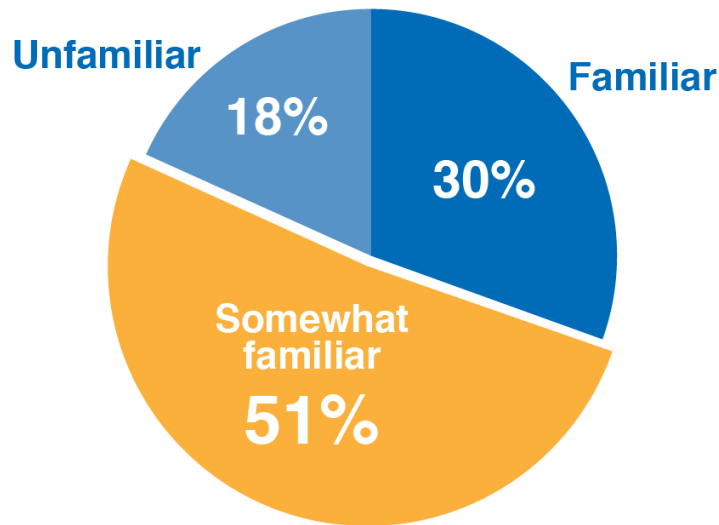
To be sure, artificial intelligence has numerous applications relevant to the improvement of retail processes. Natural language generation, speech recognition, virtual agents, machine learning platforms, decision management, deep learning platforms, biometrics, robotic process automation and text generation/natural language processing are among the more buzzworthy.

In considering the use of A.I. throughout retail, more than a quarter of respondents say the supply chain is the area most likely to be affected by A.I.. This suggests that many respondents see how meaningful the combination of machine and deep learning platforms, robotic process automation and decision management could be to moving product swiftly and intelligently through the pipeline.
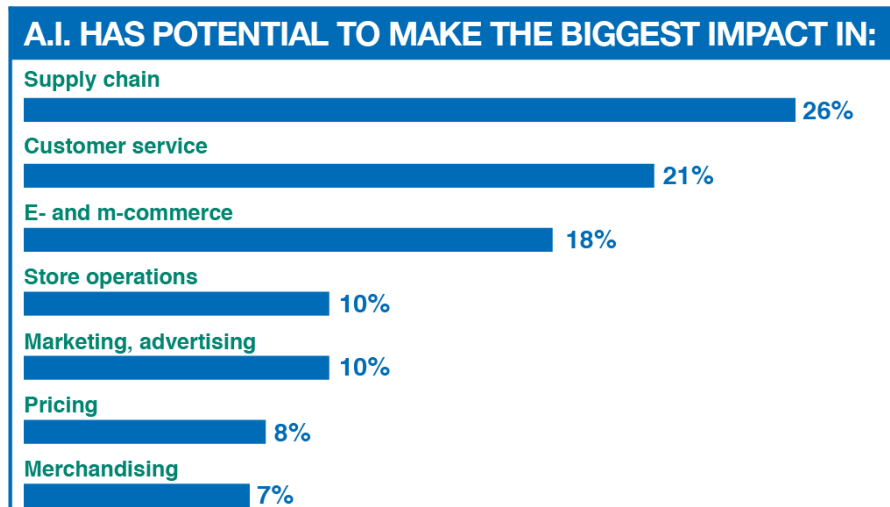
Virtually all respondents (98.0 percent) view A.I. as at least somewhat important to helping retailers achieve a customer-centric supply chain. Indeed, with three-quarters seeing A.I. as "very important" or "critical" to accomplishing this goal, it's clear that industry stakeholders are able to draw a direct line from the technology to higher customer satisfaction.

A.I. HAS POTENTIAL TO MAKE THE BIGGEST IMPACT IN:

Supply chain 26%

Customer service 21%

E- and m-commerce 18%

Store operations 10%

Marketing, advertising 10%

Pricing 8%

Merchandising 7%

IMPORTANCE OF A.I. TO ACHIEVE A CUSTOMER-CENTRIC SUPPLY CHAIN

Somewhat unimportant 2%

Somewhat important 18%

Critical 30%

Very Important 51%

Demand management is likely the biggest beneficiary of A.I.

Identifying and addressing internal problems and real-time supply chain updates round out the top three areas in which respondents think A.I. will have the biggest impact in the next five years.

A quarter or more of respondents across all segments indicate that demand management is the area of the supply chain in which A.I. will have the biggest impact over the next five years. Recall that more than six out of 10 respondents indicate that predicting demand is a current supply chain challenge. It's easy to see why — the inability to communicate in real time can cause misalignment between current demand, orders and supply. A.I. not only enables real-time knowledge of the status of these elements but also provides context-based intelligence to optimize inventory and fulfillment.

IN THE NEXT 5 YEARS A.I. WILL HAVE MOST IMPACT ON:
Select up to three

	All respondents	Brand marketer/ manufacturer	Consultancy/ agency	Retailer/ wholesaler	Technology/ solutions provider
Demand management	27%	25%	29%	26%	34%
Identify and address internal problems	20%	31%	10%	21%	13%
Real-time supply chain updates	19%	25%	23%	21%	9%
Accelerate the last mile	13%	0%	19%	18%	9%
Robot-assisted production	10%	6%	10%	8%	9%
Mitigating disruptions from external events	8%	13%	10%	3%	13%
Quality control	5%	0%	0%	3%	13%

Related comments from RetailWire.com:

"In most cases, a lot of data exists within retailers but it is not used in efficient ways to generate results. Data streams come from different parts of the organization. Unless there is a good system in place to aggregate the data, run automated processes and use AI and predictive models, it is very difficult to turn the data into actionable communication.

"The most efficient use for Big Data for retailers is to communicate to customers using mass personalization tools that take into account purchase history, consumers behavior, demographics, churn and loyalty patterns and generates shopper profiles or rather shopper 'DNA' to the level of the single shopper or household."

Nir Manor, Retail-Tech Specialist Advisor

"This is all about actionable insights. Truly. There's no problem grabbing the mountains of data from transactions. However 80 percent of retailer data is "dark data" that is virtually invisible to current systems. And the data that is being captured is not being analyzed with tools that create simple, intuitive next best actions. The latest machine learning technologies are helping retailers make sense of all this as we speak."

Ralph Jacobson. Global Retail & CPG Sales Strategist, IBM

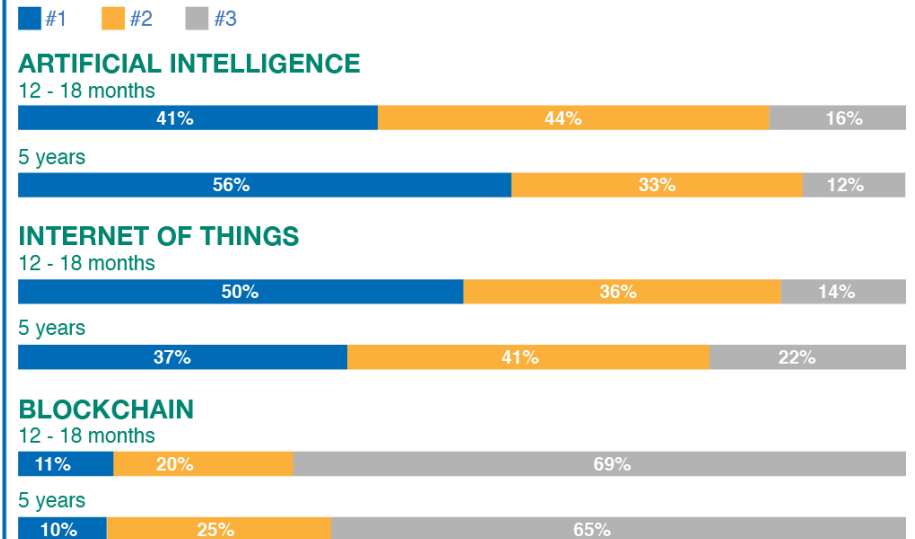# Internet of Things is positioned for a more near-term impact

However, more than half of respondents think that, over the horizon, artificial intelligence will be the greater catalyst for progress.

Asked to select which technology — artificial intelligence, blockchain or Internet of Things (IoT) — will have the biggest impact on the retail supply chain in the next 12 to 18 months, half of respondents choose IoT. The Internet of Things is the interconnection via the internet of computing devices embedded in everyday objects, enabling them to send and receive data. While typically surfacing as of late in consumer electronics and wearables, IoT will likely play an integral role in in-transit visibility, selected earlier in the survey among the top three current supply chain challenges by 29.3 percent of respondents.

The share of respondents who thinks blockchain will have the biggest impact over either the short or long term hovers around 10 percent. Blockchain is a digital ledger in which transactions made in bitcoin or another cryptocurrency are recorded chronologically and publicly. The process ensures that no data in the chain has been tampered with.

PLEASE INDICATE WHICH TECHNOLOGY WILL HAVE THE BIGGEST IMPACT ON THE SUPPLY CHAIN DURING THE FOLLOWING TIME PERIODS.
(#1 = biggest impact, #3 = smallest impact)

■ #1   ■ #2   ■ #3

ARTIFICIAL INTELLIGENCE
12 - 18 months

#1	#2	#3
41%	44%	16%

5 years

#1	#2	#3
56%	33%	12%

INTERNET OF THINGS
12 - 18 months

#1	#2	#3
50%	36%	14%

5 years

#1	#2	#3
37%	41%	22%

BLOCKCHAIN
12 - 18 months

#1	#2	#3
11%	20%	69%

5 years

| #1	#2	#3
10%	25%	65%

Structural and cultural challenges

Before stakeholders begin measuring the impact of A.I., though, they will need to overcome a number of implementation challenges.

The implementation of A.I. will undoubtedly require both structural and cultural changes. The former typically are more costly, but the latter are more time-consuming to adjust to.

Roughly one out of five respondents says re-structuring business processes to fully benefit from A.I. is the toughest challenge. Most acknowledge A.I. will provide management better information to make business decisions and execute the supply chain more efficiently. But, as one respondent put it, "unless management re-engineers the business processes to take advantage of the new information, the information will not be of much value."
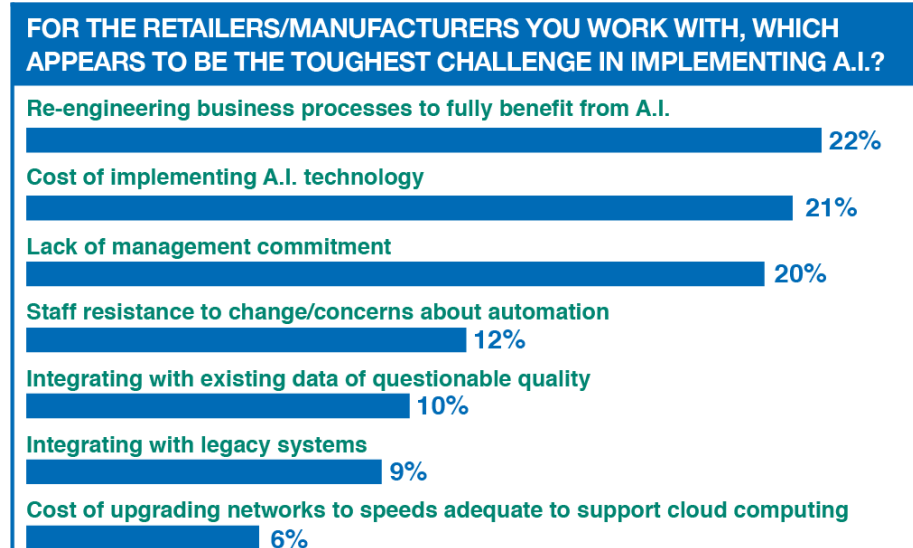
A similar share of respondents (20.6 percent) views the cost of implementation — a habitual challenge amid tight budgets and heightened competition — as the biggest hurdle. Reeling from the pace of change in consumer behavior and the competitive landscape, companies find it hard to maintain their footing, let alone envision what it will take to get ahead of the curve. Understandably, as one respondent notes, "Companies are hesitant to make the investment if they can't see the payoff in the short term. They aren't thinking long term."

Finally, respondents seem to believe that, in order to implement A.I. effectively, companies need to first address persisting data gaps and roll out real-time enablement across all touch points. Both are considered big endeavors in and of themselves.

FOR THE RETAILERS/MANUFACTURERS YOU WORK WITH, WHICH APPEARS TO BE THE TOUGHEST CHALLENGE IN IMPLEMENTING A.I.?

Re-engineering business processes to fully benefit from A.I.
22%

Cost of implementing A.I. technology
21%

Lack of management commitment
20%

Staff resistance to change/concerns about automation
12%

Integrating with existing data of questionable quality
10%

Integrating with legacy systems
9%

Cost of upgrading networks to speeds adequate to support cloud computing
6%

Garbage in, garbage out

"To get the maximum benefit from A.I., there is a missing depth and quality to both structured and unstructured data needed to train the algorithms."

- Survey respondent

The legacy of legacy systems

"Legacy systems tend to serve the most customized and critical functions in a business — that is why they are still around in every company. They also tend to be the systems that require the most human interaction because they need inputs 'that only Bob can give.' This means a cultural shift from 'Bob's intelligence' driving decisions to A.I. driving decisions."
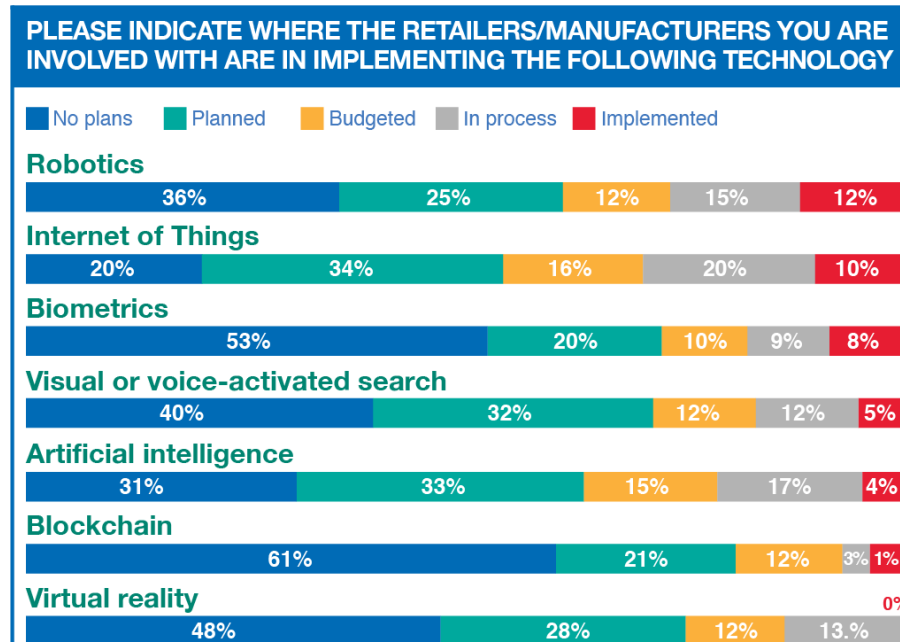
- Survey respondent

The best made plans...

A majority of respondents indicate that the partners they are involved with are in at least the planning stage across various technologies — with the exception of biometrics and blockchain.

Confirming again the interest in IoT, nearly 30 percent of respondents say the retailers and/or manufacturers they are involved with are either in the process of implementing or have implemented IoT. Slightly more than a quarter (26.2 percent) of respondents are aware of retailers and/or manufacturers that have at least begun the process of incorporating robotics into their business. Artificial intelligence rounds out the top three, with 20.8 percent of respondents aware of companies that are in the process of rolling out or have rolled out A.I.

Beyond the top three, it's unclear which, if any, technology is poised to be the next big disruptor. It is, however, clear that the implementation of game-changing technology such as artificial intelligence doesn't occur overnight. Those who evaluate its potential and success with a narrow lens may very well put their companies at risk falling too far behind in a movement that promises to redefine supply chain efficiency and customer-centricity in decades to come.

PLEASE INDICATE WHERE THE RETAILERS/MANUFACTURERS YOU ARE INVOLVED WITH ARE IN IMPLEMENTING THE FOLLOWING TECHNOLOGY

Legend: ■ No plans ■ Planned ■ Budgeted ■ In process ■ Implemented

Technology	No plans	Planned	Budgeted	In process	Implemented
Robotics	36%	25%	12%	15%	12%
Internet of Things	20%	34%	16%	20%	10%
Biometrics	53%	20%	10%	9%	8%
Visual or voice-activated search	40%	32%	12%	12%	5%
Artificial intelligence	31%	33%	15%	17%	4%
Blockchain	61%	21%	12%	3%	1%
Virtual reality	48%	28%	12%	13.%	0%

Methodology

The "What will A.I.'s role be in fueling the retail supply chain?" survey was conducted online from June to July 2017. Only employees or owners of retailers and those who work with them (e.g., brand marketers, consultants and technology vendors) were invited to participate. In total, 179 responses were included in the research findings, all from that exclusive group.

Type of company

Retailer, wholesaler	28.5%
Technology or solutions provider	27.4%
Consultancy, agency, design firm	24.0%
Brand marketer/manufacturer	10.6%
Other	9.5%

Job position

Executive management, Owner	27.9%
Senior management	24.6%
Non-management	24.6%
Department manager	22.9%

Contact information