



BUILDING THE RETAIL SUPERSTAR:

How unleashing AI across functions
offers a multi-billion dollar opportunity

Executive Summary

Retailers around the world are embracing artificial intelligence. Our analysis reveals that more than a quarter of the top 250 global retailers are integrating AI into their organizations. However, we also found that only 1% of AI initiatives reach full-scale deployment.

This research also reveals a number of other challenges that are undermining retailers' best AI efforts:

- Most are focusing their AI efforts on sales and marketing, when there is a significant opportunity to unleash AI use cases across the value chain
- In particular, many retailers are overlooking the \$340 billion prize offered by AI use cases in operations

- In addition, retailers are going after complex use cases and missing the easy-to-win AI opportunities.

To address these issues, and drive value from retail AI investments, we believe leaders should focus on these critical actions:

- Focusing on quick wins, such as adding AI capabilities to existing websites, chat boxes, or fulfillment route plans
- Driving the maturity of data practices, such as the ability to augment insights with external data sources
- Choosing AI use cases by looking through the consumer lens
- Treating AI as a strategic imperative
- Boosting investment at an enterprise level.

Introduction

AI offers one of the most significant opportunities in the retail space. Retailers across the world are investing in this advanced technology to improve the customer experience while driving up operational efficiency and productivity. It is estimated that global annual spending on AI by retailers will top \$7.3 billion by 2022.¹

But how can retailers ensure that they drive value from these significant strategic investments? What are the use cases that offer the most value? How can they unlock AI's full potential? And where, strategically, should AI be embedded? To answer these and other questions, we undertook significant, comprehensive research:

- Surveying 400 retailers that are implementing AI use cases at different stages of maturity – a group that represents 23% of the global retail market by revenue
- Analyzing 43 real-world use cases, assessing their maturity, complexity, and expected benefits
- Undertaking significant and extensive secondary research of the top 250 retailers across the world to assess their current state of AI deployment.

Drawing on this in-depth research, the analysis in this report focuses on:

- Where retailers currently stand in their AI journey
- Their key areas of AI focus
- The critical AI use cases that merit investment
- Key recommendations for embarking on a successful AI journey.

Artificial intelligence (AI) is the collection of capabilities and behavior by learning systems that are perceived by humans as intelligence

While the perception of intelligence evolves over time, typical AI capabilities currently include speech, image and video recognition, autonomous objects, natural language processing, conversational agents, prescriptive modeling, augmented creativity, smart automation, advanced simulation, as well as complex analytics and predictions

Where retailers currently stand: AI deployments accelerating but discrepancies across companies and segments remain

Retailers are accelerating their AI deployments

Retailers are getting serious about exploring what AI can offer the industry:

- Customers at some Walmart stores will find more than meet-and-greet robots. Instead, as part of a trial exercise, they will also find robots that can scan shelves, alerting managers about the state of inventory in real time and suggesting inventory models.³ They are currently live at over 50 Walmart stores.⁴

- Stitch Fix, an online service that offers subscription-based personal styling, is deploying AI throughout their business, from identifying trends to the logistics required for better customer personalization.⁵ The company is now considered a disruptor in the fashion industry, with \$1 billion in revenue and 2.2 million customers.

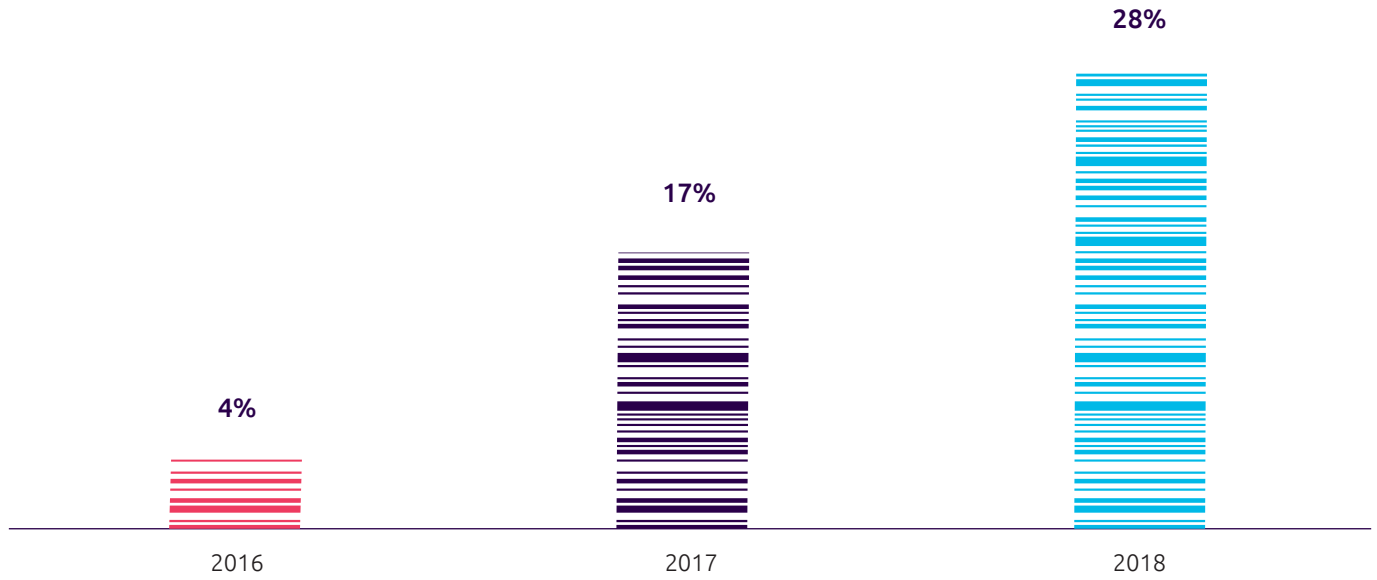
These examples provide a glimpse into why retail – across all sectors – is expected to be the biggest spender in 2018.⁶ And, we found that retailers are accelerating AI deployment. Over a quarter (28%) are deploying AI in 2018, when in 2016 it was a minority – just 4% (see Figure 1).



AI is completely in a disruptive league of its own – it's the one to rule them all, in the Tolkienian sense. It lets you accomplish really exciting things with other technologies."

Paul Clarke,
CTO, UK online grocery retailer Ocado²

Figure 1. Share of retailers deploying AI in their organization



Note: These are retailers that are working on AI at any stage of maturity: pilot, multi-site deployment, and full-scale deployment.
Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018.



28%

Percentage of retailers deploying AI in 2018

Large retailers take the lead in AI adoption

We found that large retailers (those with \$10 billion or more in annual revenues) are more active in AI deployment (see

Figure 2). Twenty-eight percent of the top 250 retailers on the list work with AI. But, for the top 100 of those, this number increases to 41%.

Figure 2. Share of retailers deploying AI in their organization



Note: Share of retailers comprise of organizations who are working on AI at any stage of maturity – pilot, multi-site deployment, and full-scale deployment in the respective revenue category.

Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018.

Overall, smaller retailers lag their larger counterparts and invest less:

- For large retailers, with revenue greater than \$10 billion, 24% invest between 5% and 10% of their IT spend in AI
- For retailers with revenue below \$10 billion a year, just 7% spend those levels.

There are notable examples of large players making significant moves. For example, Tesco is incorporating

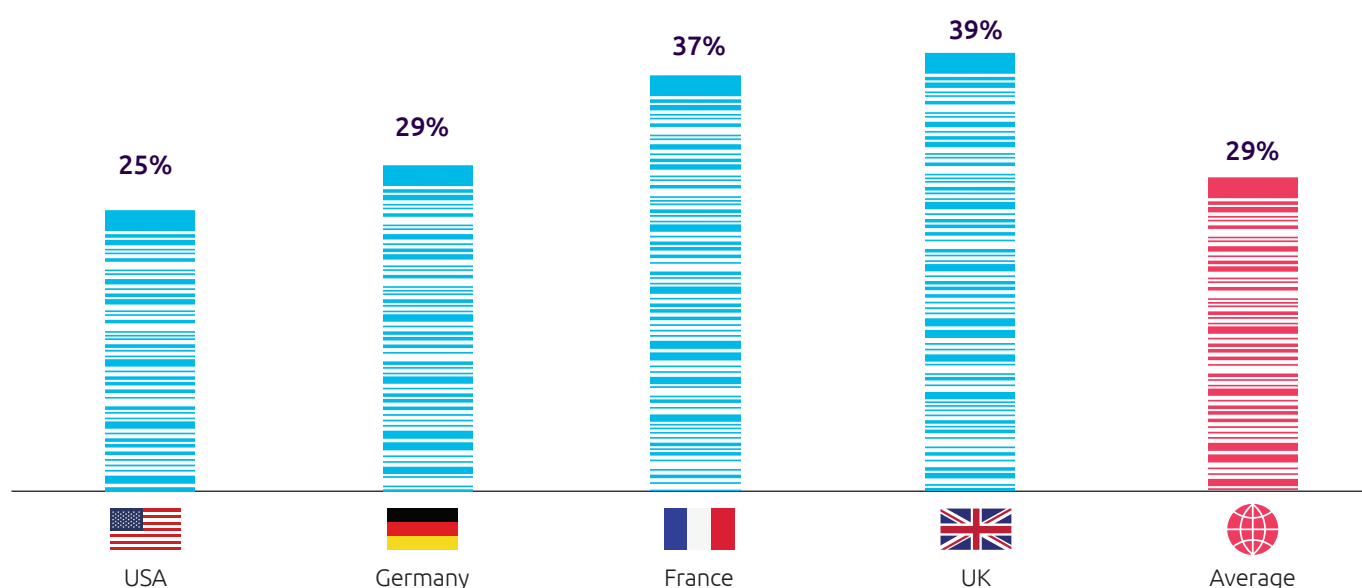
machine-learning algorithms across its business, from customer-facing functions to operational departments – and setting up the groundwork for centralized data models to overlay their AI initiatives.⁷ Walmart is investing significantly in high-level graphical processing units (GPUs) to power artificial intelligence algorithms.⁸ There are, however, interesting AI initiatives from medium and small retailers too. For instance, US-based apparel retailer Guess Inc. is partnering with Alibaba to bring Alibaba’s “Fashion AI” concept to its stores.⁹

The UK and France have the highest penetration of AI in the retail sector

While retailers across the world are upbeat about AI's

potential, our research shows some discrepancies across countries. France and the UK have the highest penetration, with over a third of retailers deploying AI initiatives.

Figure 3. AI penetration, select geographies



Note: AI penetration represents the share of retailers that are working on AI at any stage of maturity – pilot, multi-site deployment, and full-scale deployment in the respective geography. The above chart only shows countries that had a reasonable sample. Please also note that the US market accounts for a disproportionately large percentage of the largest 250 retailers in the world. (N for USA=147, Germany=28, UK=28, France=19).

Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018.

In the UK, online supermarket Ocado – one of the world's largest online-only retailers – has been an aggressive adopter of artificial intelligence technologies. The company, in addition to selling groceries, also licenses its automation technology and equipment. At its warehouses in the UK, thousands of robots help pick groceries out of storage and fulfill as many as 65,000 orders every week.¹⁰ Paul Clarke, Ocado's CTO explains, *"Artificial intelligence (AI) offers the prospect of a frictionless existence, making us more efficient, helping us prevent mistakes, spotting the onset of potential problems before they become problems, and enabling us to spend more time on the things that really matter to us."*¹¹ Similarly, major British supermarket player, Morrisons, has been an early adopter of AI in operations. In 2017, the company's then-CEO, David Potts, spoke about its

automated ordering system, which is powered by AI. *"Our biggest new initiative has been our new automated ordering system,"* he said. *"It is reducing costs and stock levels while also saving time for colleagues, and providing a better offer for customers."*¹²

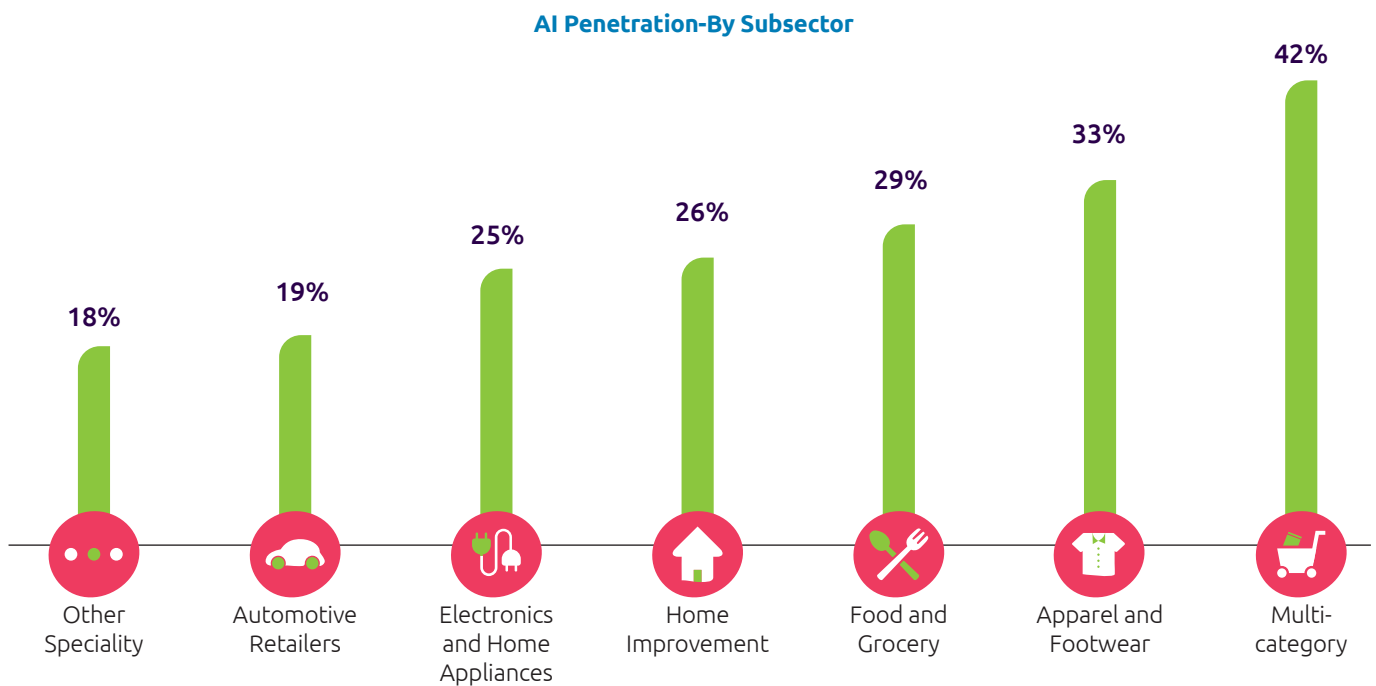
France boasts of a strong AI ecosystem: 270 AI-focused startups; 5,300 AI researchers and €400 million public funding for AI research.¹³ Companies such as Facebook, Google, Fujitsu, and Samsung have already established AI research centers in France.¹⁴ The French government has also recently increased its focus on making France a hub for artificial intelligence. In early 2018, the government launched a major initiative aimed at making France a key AI hub.¹⁵

Apparel and footwear followed by food and grocery lead in single-category retailers

Our research reveals that two retail sub-sectors are leading

the way in using AI to transform operations and personalize customer engagement: apparel and footwear and food and grocery (see Figure 4).

Figure 4. Apparel and footwear lead in AI penetration in single category retailers



Note: AI penetration represents the share of retailers that are working on AI at any stage of maturity – pilot, multi-site deployment, and full-scale deployment in the respective subsector.

Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018.

Apparel has been a high-growth area in ecommerce and apparel retailers have begun extensively leveraging AI to personalize customer engagement and product search. In the US, online channels accounted for 27.4% of overall apparel sales in 2017.¹⁶ AI is used in apparel and footwear to personalize customer engagement and product search. For instance, French sporting goods retailer Decathlon is enhancing its website with AI capabilities to help customers find the exact product they are looking for.¹⁷ Similarly, US-based department store chain Neiman Marcus uses text-bots as part of its website to answer a range of customer queries, from fulfillment to availability.

Food and grocery retailers – such as Auchan (France), Sainsbury, and Morrisons (both UK) –use AI to generate insights from integrated data sets. For example, combining

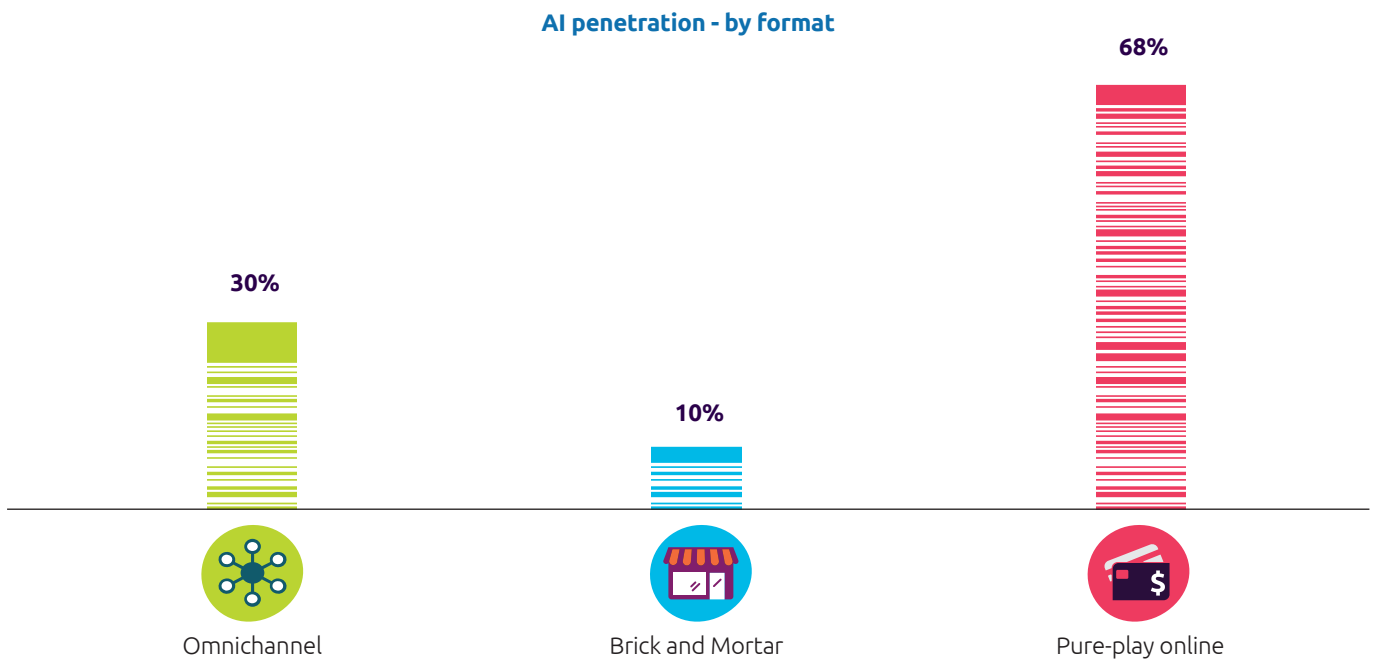
the companies' data on CRM profiles and loyalty programs with external data sets such as weather conditions allows them to personalize product recommendations, promotions or optimize assortments. *"We use AI all the time for our algorithms, we are constantly learning what customers put in their baskets to understand what products are popular."*¹⁸ says Clodagh Moriarty, director of Online at Sainsbury.

At the same time as these single-category pioneers, online retailers – such as Amazon, Otto and eBay – have AI built into their business models, driving AI penetration in the multi-category segment. On the potential that AI can offer, Tom Pinckney, VP of Applied Research at eBay, has said, *"It is indeed north of \$1 billion per quarter. AI and ML are driving incremental sales that wouldn't otherwise have happened."*¹⁹

Online retailers lead the AI race

We see the greatest penetration of AI in digital native firms – the pure-play online retailers (see Figure 5).

Figure 5. Pure-play online retailers lead in AI penetration



Note: AI penetration represents share of retailers that are working on AI at any stage of maturity – pilot, multi-site deployment or full-scale deployment in the respective format.

Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018.

Online retailers are also pioneers in adding AI capabilities. One potential reason is that most online retailers are, by nature, more data-driven companies than their offline peers. For instance, US-based online retailer Wayfair uses image-recognition tech to both show similar products and recommend complementary products based on users' purchase and browsing history.²⁰ Amazon's AI-powered recommendation engine examines an individual customer's profile alongside customers with similar profiles before recommending products.²¹ While these technologies have been around for a while, and have become more powerful in recent times, these have been adapted by online retailers ahead of their peers.

Omnichannel retailers – who largely began as brick-and-mortar stores and later integrated digital capabilities – are playing catch up, with 30% penetration levels. This can be attributed to their inherent challenges in driving a unified approach across channels. There are exceptions to this trend. Germany's bricks-and-mortar retailer, Metro AG, invested in a startup offering AI-powered visual recognition solutions for in-store insights. Olaf Koch, CEO at Metro AG, said, *"In a digitized world, e-commerce players get detailed insights into their customers' wishes and behavior and are often ahead of the game. However, brick-and-mortar retailers were mostly not able to gain comparable information until now – although this is highly relevant to better understand their customers and improve the shopping experience in their stores ..."*²²

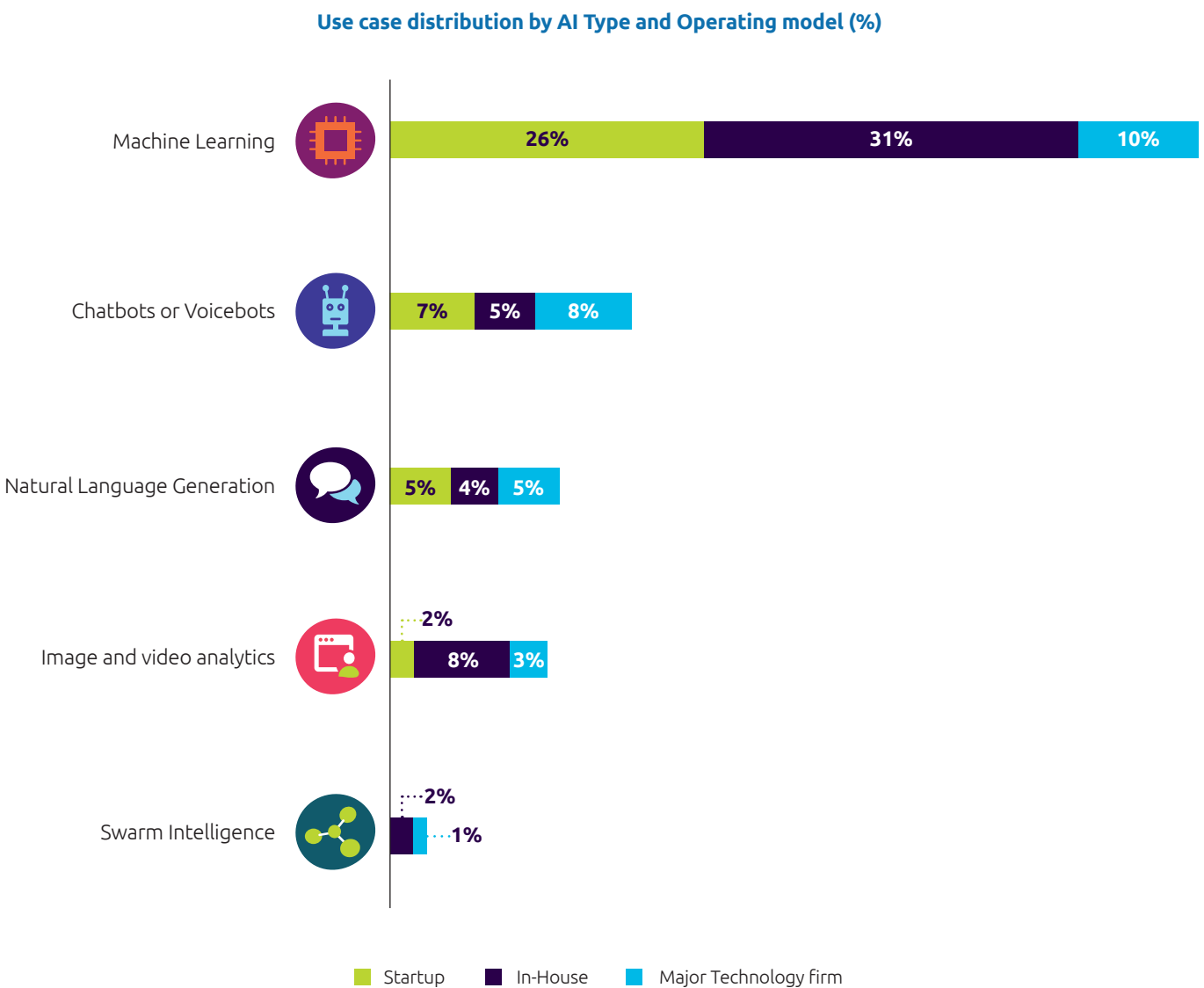
68% Percentage of pure-play online retailers that are working on AI

Machine learning is retailers' AI technology of choice

AI encompasses a wide variety of technologies. However, our research reveals that machine learning is the AI deployment of choice for retailers (see Figure 6). Retailers engaging with machine learning are banking on leveraging their extensive data sets from internet and external sources to draw deep

insights on their business and customers. US-based pet store retailer, PetSmart, uses machine-learning algorithms to detect fraudulent orders. The algorithm aggregates transactions, determine outcomes and risk factors in each customer order, and continues learning with each transaction. AI helped PetSmart cancel \$4 million of fraudulent orders in 2017.²³

Figure 6. Machine learning leads as AI deployment of choice for retailers



Note: Machine learning is the science of getting computers to act without being explicitly programmed (Source: Andrew Ng, Stanford University)

Note: Data represents percentage of use cases leveraging a given technology.

Numbers may not add up to 100% due to use cases utilizing multiple technologies.

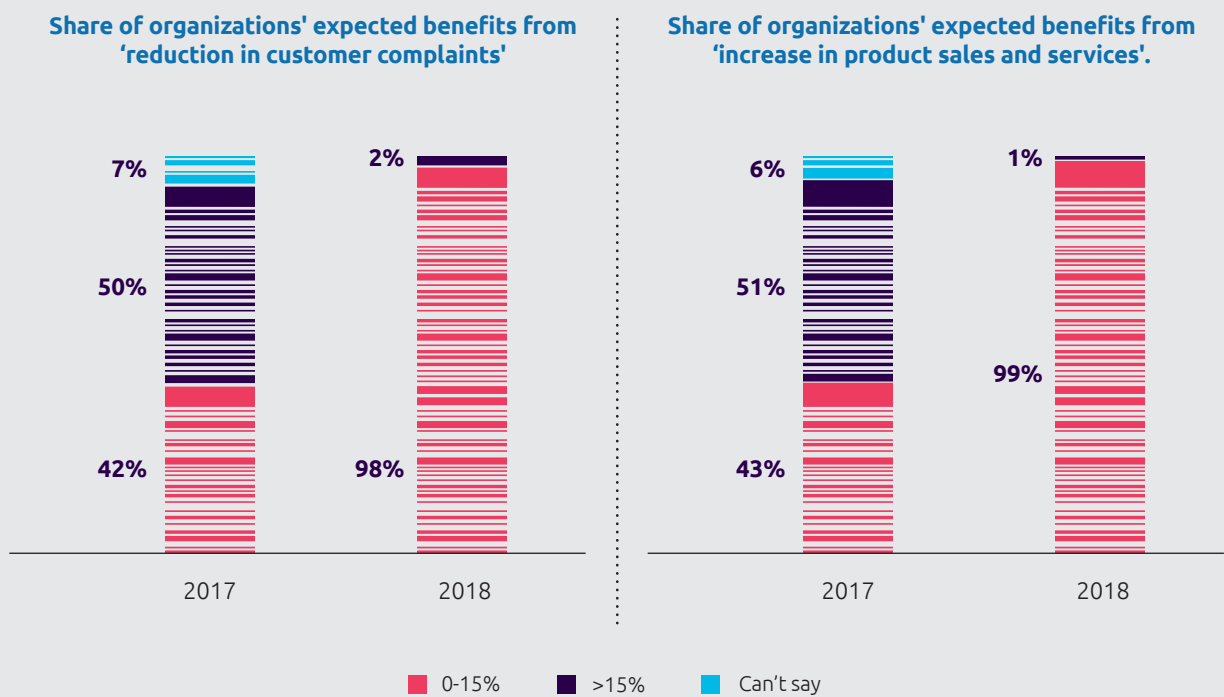
Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018.

Retailers more guarded about delivery of AI benefits

Many retailers are starting to realize that while AI offers many benefits, achieving those benefits will not come as an easy plug-and-play solution. *“When we first started working with the AI technology, I thought I was getting the Jeopardy champion right out of the box. [...] It didn't know everything,”* said Cal Bouchard, Senior director of e-commerce at The North Face.²⁴ *“You have to teach it about your consumer and your products. That was a lot of work. I underestimated that.”*

As retailers have begun scaling up, they now seem to have a more realistic view of the benefits that they can expect. While we found that high benefit expectations for various functions were a norm in our 2017 research, retailers are now far more guarded in the benefits they hope to see from AI (see Figure 7). This, in our view, is not a reflection of AI's capabilities, but a realization borne out of greater understanding of AI. With experience and progressive insights, companies are better informed of what it takes to yield benefits from AI.

Figure 7. Retailers have more cautious expectations from AI



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018, and State of AI survey, June 2017.

Are retailers more realistic about their AI capabilities?

Our research shows that retailers also now have a more balanced assessment of their own abilities when it

comes to driving and implementing AI. In 2017, more than eight out of ten retailers were confident of their data ecosystem for implementing AI. Today, this has dropped to 55% (see Figure 8).

Figure 8. Retailers are more self-aware of their AI implementation capabilities



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018, N=400 retailers State of AI survey, June 2017, N=222 retailers.

As they experiment with AI in multiple use cases and gain better understanding of AI, retailers are realizing that getting AI to deliver also requires robust data. Andy Done, director of data engineering at Farfetch, an online retailer, said, *"No impressive algorithms or technologies can overcome a lack of high-quality data...retailers*

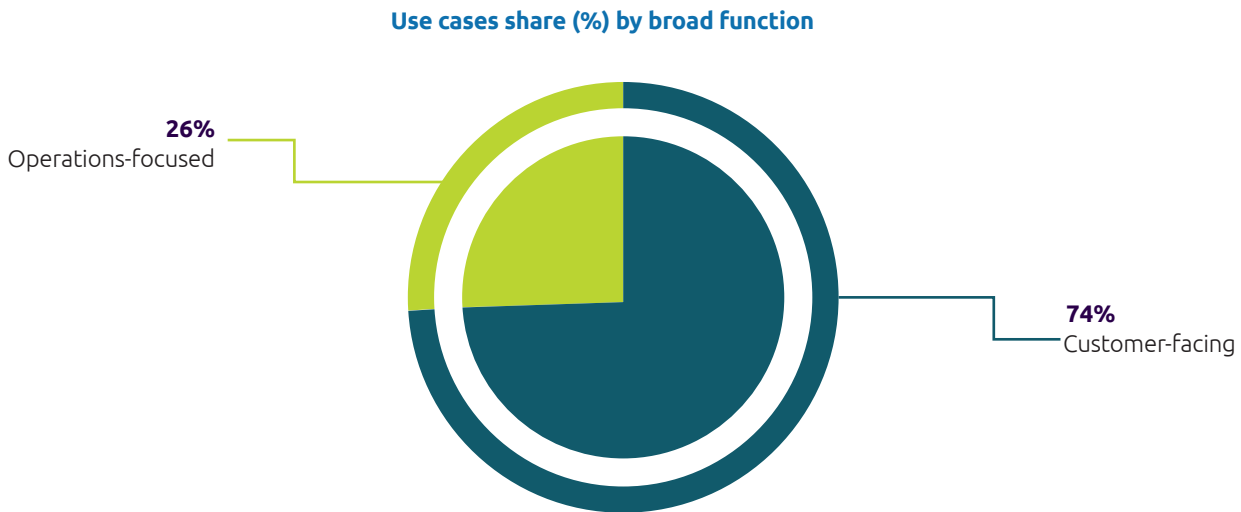
*cannot expect to drop AI on top of a big data mess."*²⁵ Danielle Haugedal-Wilson, head of architecture and analysis at Co-op Digital, also recommends prioritizing the use case before expecting magical returns, *"Just like any technology, there's no point using it and putting it in if you're not going to fill a need."*²⁶

Retailers' focus on consumer-facing AI initiatives ignores a big opportunity in operations



Our analysis shows that around three-quarters of use cases in retail are consumer-facing, with the rest focused on operations (see Figure 9).

Figure 9. A lion's share of use cases deployed in customer-facing functions



Source: Capgemini Research Institute analysis; Analysis of Top 250 retailers based on 2017 revenue from Bloomberg, October 2018. Operations-focused use cases are defined as use cases impacting operations of retailers, not necessarily visible to the end customer, for example, supply chain optimization, procurement, etc. Customer-facing use cases are defined as use cases with a direct impact on the end customer, for example, a chatbot for customer service.

Retailers have been aggressively adopting AI for customer-facing functions. The rise of chatbot platforms, and the number of startups offering AI for targeted recommendations, is indicative of this trend. Among the various categories of AI use cases for customer-facing functions, we found that personalized search, targeted recommendations and chat bots for answering customer queries were the most common implementations. Examples include:

- Luxury retailer Louis Vuitton has integrated chatbots in Facebook messenger to drive a personalized and conversational shopping experience for their customers. The chatbots, which have Natural Language Generation capability, provide suggestions by asking specific questions, helping showcase the brand's full product line and providing information on stores. Michael Burke, Louis Vuitton CEO, says, *"We see messaging platforms as future key drivers of conversations with our clients, and potential for the integration of artificial intelligence and chatbot technologies to further enhance service to clients across these new channels."*²⁷ Similarly, UK-based clothes retailer, Ted Baker, has deployed a chatbot that helps customers

track their product orders, answers queries on product lines, and drive direct purchases.²⁸

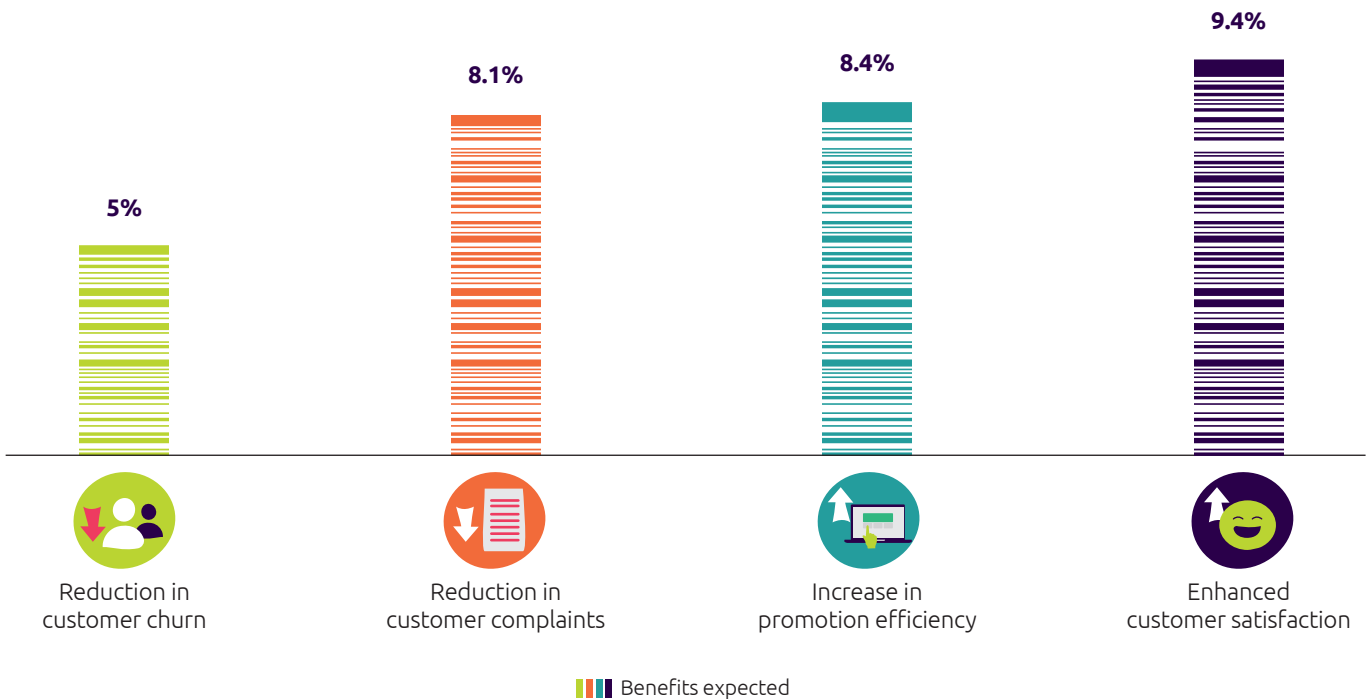
- French retailer Auchan has launched AI-driven personalized promotions. Customers are encouraged to participate in a gamification program and the AI tool helps create a specific profile for each participating customer based upon their responses. This insight is then leveraged for targeted promotions.²⁹
- John Lewis (UK), Macy's (US) and Zalando (Germany) have deployed "find similar" tools. These use image-recognition technology to display a range of products within the particular category that a customer is looking for. These products are visually similar in terms of color, pattern, style and shape.³⁰

Some of these tools are also yielding strong early results for retailers. US-based home improvement retailer Overstock.com saw a 3% lift in conversion rate when customers used its image-recognition based search tool.³¹ And Decathlon, which used AI to enhance its search capabilities, saw a range of benefits. For example, it saw a 48% reduction in the time from search to sale.

Our research has shown that retailers believe that they can drive significant benefits in areas such as customer satisfaction and reduction in customer complaints (see Figure 10). For instance, Showroomprive.com, a French online retailer, uses AI to identify high-churn customers. According

to the retailer, the machine-learning solution identifies high-churn customers with 77% accuracy by crunching a variety of data sources: customer data, catalogue data, and order and delivery data. The inputs are then used by the retailer to send targeted campaigns.³²

Figure 10. Benefits expected by retailers through usage of AI in customer-facing functions



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018, N=400 retailers.



74%

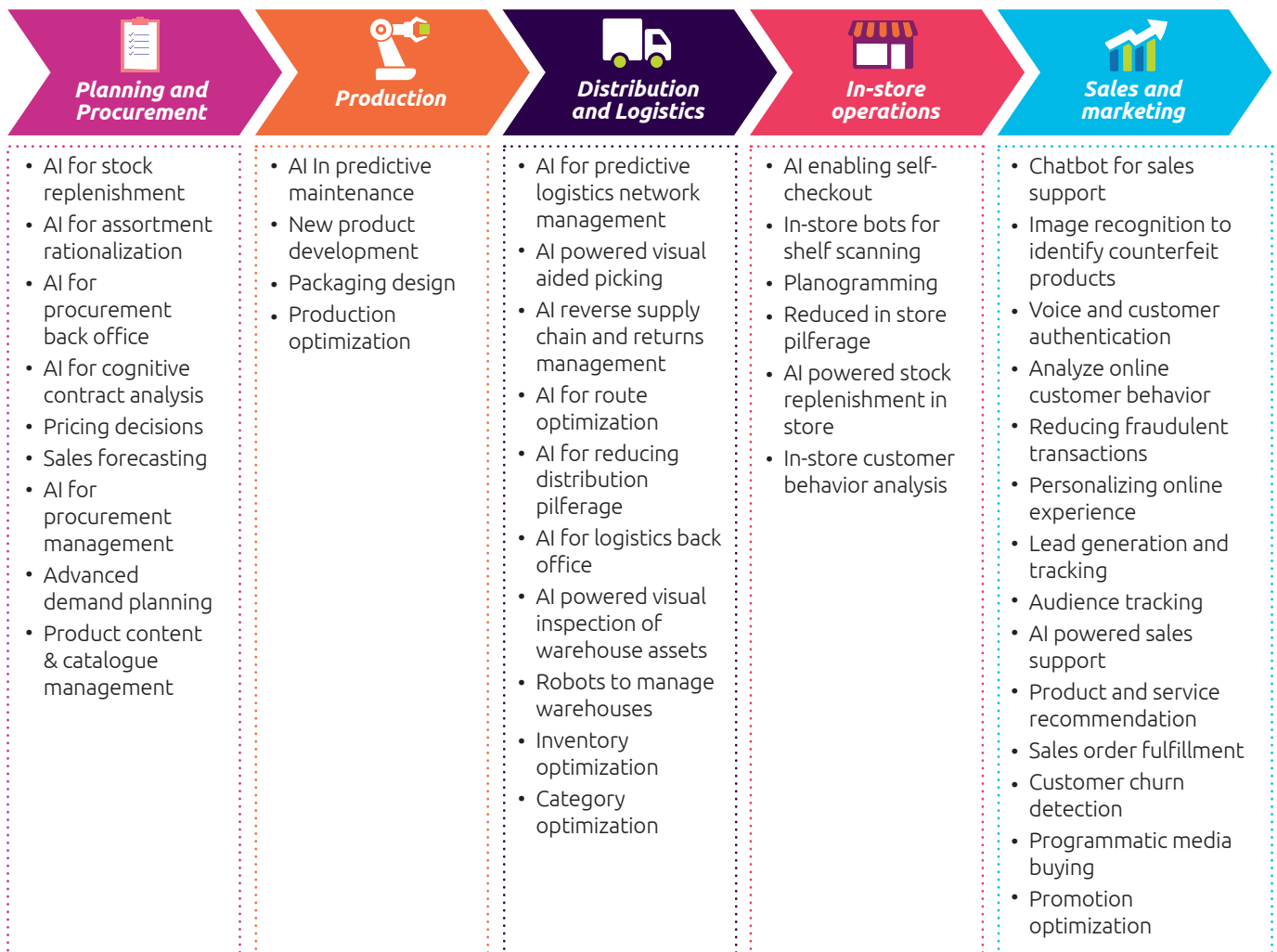
percentage of use cases deployed in customer-facing functions"

The focus on customer-facing AI is masking an operations opportunity

The strong focus on AI in sales and marketing comes at a price – the limited impact that AI is having on other elements of the value chain. Our research shows that fewer than one in five use cases are being deployed in areas such as distribution and logistics or in-store operations.

Retailers are focusing predominantly on one aspect of the value chain when there are also significant opportunities in operations. In Figure 11, we outline use cases across the retail value chain, which shows there are numerous opportunities in operations.

Figure 11. AI use cases across the retail value chain



Source: Capgemini Research Institute analysis

AI in operations: a \$300 billion prize that cannot be ignored

We estimate that retailers can save as much as \$340 billion

by taking AI to scale across the operations spectrum: procurement, supply chain, logistics, returns, and in-store pilferage (see Figure 12).

Figure 12. AI can help retailers realize benefits in operations

| | Operating cost as a % of revenue | Operating cost in \$ billion for the global retail sector (2022) | Average cost savings from AI (From survey data) | Average cost savings in \$ billion from AI at scale |
|--|----------------------------------|--|---|---|
| Procurement | 1.0% | \$206.9 | 7.9% | \$16.34 |
| Supply Chain | 9.1% | \$1,886.7 | 7.6% | \$144.15 |
| Logistics | 2.9% | \$597.7 | 6.9% | \$41.36 |
| Returns* | 8.0% | \$1,655.0 | 7.5% | \$123.63 |
| In-store pilferage | 0.9% | \$186.2 | 7.9% | \$14.76 |
| Total cost savings annually (in billions) | | | | \$340.2 |

Source: Capgemini Research Institute analysis.

*Returns denote the share of merchandise that is returned to the retailer for a refund/store credit.

APQC Key Supply Chain Management Benchmarks.

2018 National Retail Security Survey.

Global data: 2017–22 forecast.

Approach to analysis

We looked at estimating the potential cost savings that retailers can realize by leveraging AI across the following key areas of their operations:

1. Procurement
2. Supply chain
3. Logistics
4. Returns
5. In-store pilferage.

Using the results from our survey, we then accounted for the proportion of savings that retailers expect from AI on the operating costs of these functions. Using the expected savings along with the forecasted revenues of 2022, we estimate that by 2022, AI will enable retailers to save up to \$340.2 billion in reduced cost.

Given the size of this prize, it is not surprising that some retailers have started to realize significant benefits from deploying AI in operations:

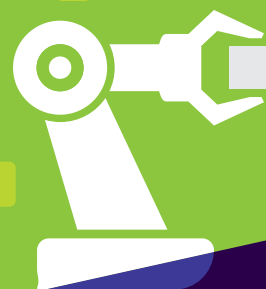
- **Supply chain** is one area where AI can bring transformed efficiency. Over their many years of operation, retailers have experimented with optimal route plans in supply chain. With AI, each optimized route plan is saved for an algorithm to learn and improve its suggestions. UK-based Tesco, China's JD.com and Alibaba are some of the retailers implementing AI-based optimized routing. Flipkart, an Indian pure-play online retailer (now owned by Walmart) is using machine learning (ML) to arrive at a structured address classification system for order deliveries, addressing the challenge posed by India's unstructured postal address systems. The ML solution classifies and resolves inconsistencies with a 98% accuracy rate.³³
- **AI-powered visual aided picking (within warehouses/ distribution centers):** Physical forms of AI are now

extending beyond chatbots to robots in the warehouse. The AI robots markets is expected to grow at 28.8% CAGR between 2017 and 2023.³⁴ In Ocado's warehouses, apart from the autonomous picking and packing jobs, robots also collaborate with each other through visual recognition. This allows them to come together or split up to fulfill a typical 50-item order in minutes. American retailer Kroger has now partnered with Ocado to build AI-powered warehouses and up their grocery delivery capabilities. Grupo Casino, Kroger, and Morrisons are some of the other retailers partnering with Ocado to build smart warehouses.

- **Returns management:** To predict customers' purchasing patterns over the next 30 days, German-based ecommerce player Otto analyzes about three billion past transactions and 200 variables, including sales, searches, and weather conditions. The AI system predicts customer purchases at 90% accuracy, thereby reducing product returns by over two million items a year.³⁵



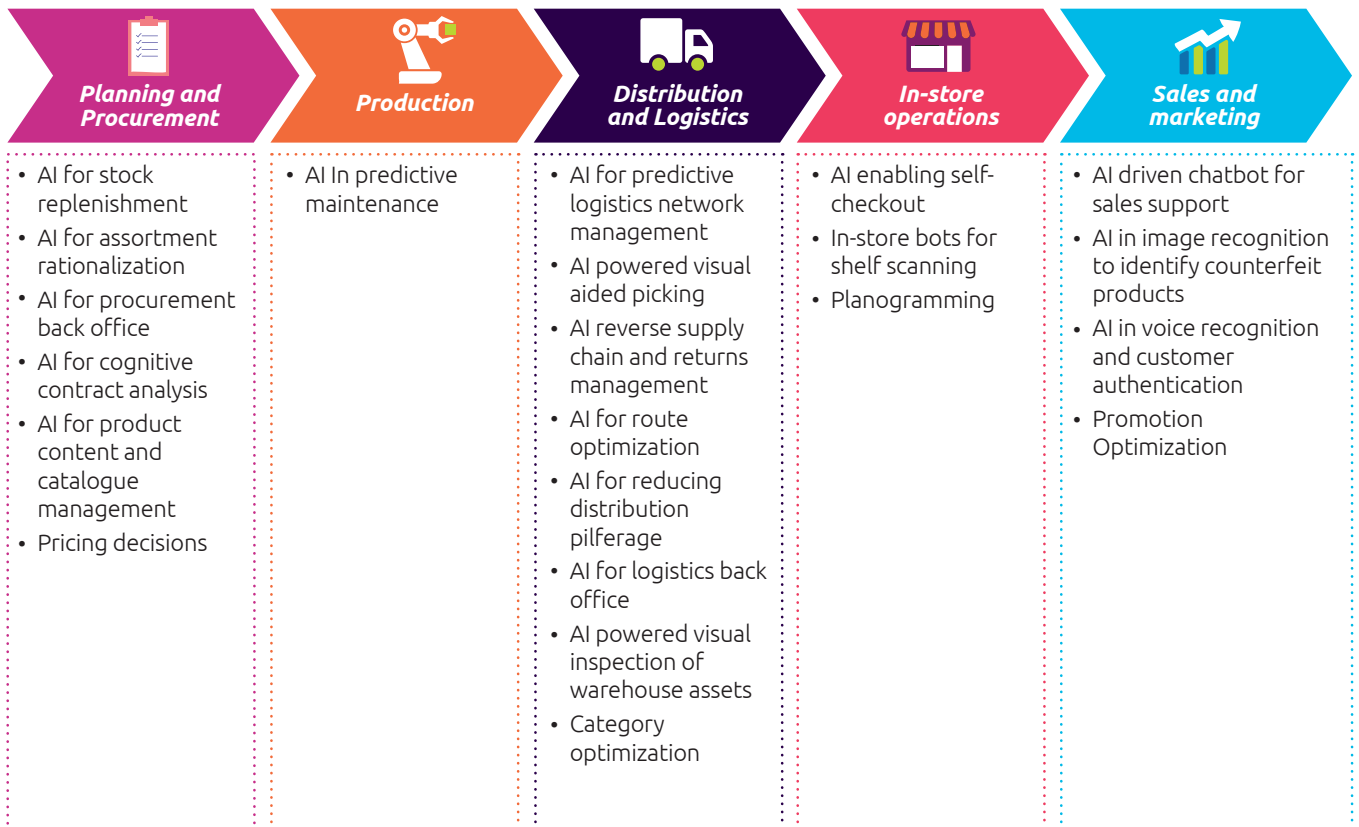
Where should
retailers focus
their AI efforts?



We analyzed 43 use cases across key parameters, such as the benefits expected and the feasibility of implementation.

Based on our analysis, we arrived at a shortlist of 22 use cases that we recommend retailers focus on (see Figure 13).

Figure 13. Recommended use cases for retailers across the value chain



Source: Capgemini Research Institute Analysis

Function: planning and procurement

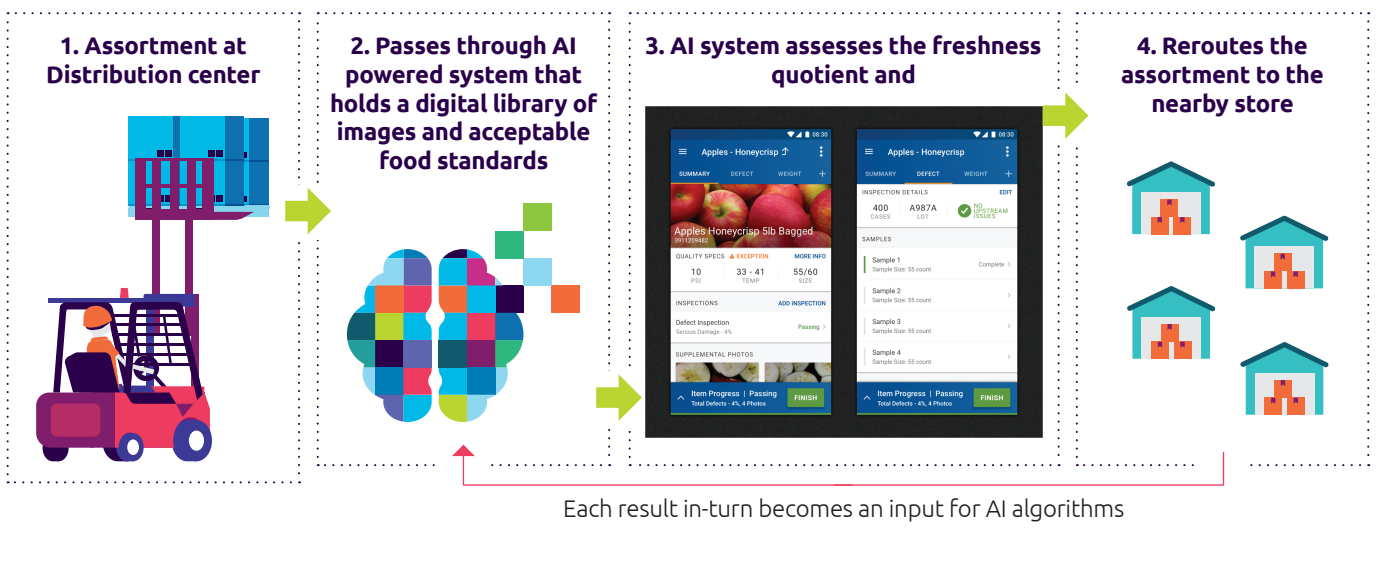
- AI for stock replenishments:** AI-driven insights from varied data sets offer significant scope to automate stock replenishments. UK retailer Morrisons is working with Blue Yonder, a tech firm, on an AI deployment that analyzes different data sets: internal data sets (such as sales) along with external data sets (such as weather patterns or public holidays). This allows the company to predict demand down to the individual store level and then automates the product orders. As a result, shelf gap was found to be reduced by 30% during trial sessions.³⁶
- AI for assortment rationalization (rationalizing SKUs in range):** Clothing retailer H&M faced a significant challenge: \$4 billion worth of unsold stock. To address this, it applied machine learning on different data sets, such as returns, purchases, loyalty card, search results and store receipts. This aim was to customize assortments to each individual store, reversing the previous practice of merchandising based on past sales. The number of SKUs reduced by 40% as a result.³⁷
- AI for product content and catalogue management:** AI can help retailers trawl the vast unstructured data sets that they hold and help define and label them. For instance,

AI helped Walmart.com increase what it sells from 700,000 items to 60 million items. Machine learning algorithms were used to organize inventory data, price items, and fix any pricing errors.³⁸

Function: Distribution and logistics

- AI for logistics network management:** Tesco uses AI for efficient van routing and scheduling for drivers. Tesco also deployed similar routing algorithms for the in-store staff who pick up online orders. According to the retailer, its staff pick up 1.5 billion items a year for online orders. Machine learning algorithms reduced their average walking time by 20%.³⁹
- Supply chain optimization:** AI-driven image recognition tech can solve a significant problem – food waste. For some produce, rising temperatures shorten shelf life. Walmart’s Eden solution can tell if a temperature rise on a delivery truck threatens the produce and then route the truck to a closer destination. In the long run, the solution will also be able to predict produce’s shelf life, using factors like appearance. The trial version of Eden has so far saved Walmart \$86 million and is considered a key driver to eliminate \$2 billion of food waste in the next five years.⁴⁰

Figure 14. Visualization of AI-driven image recognition use case



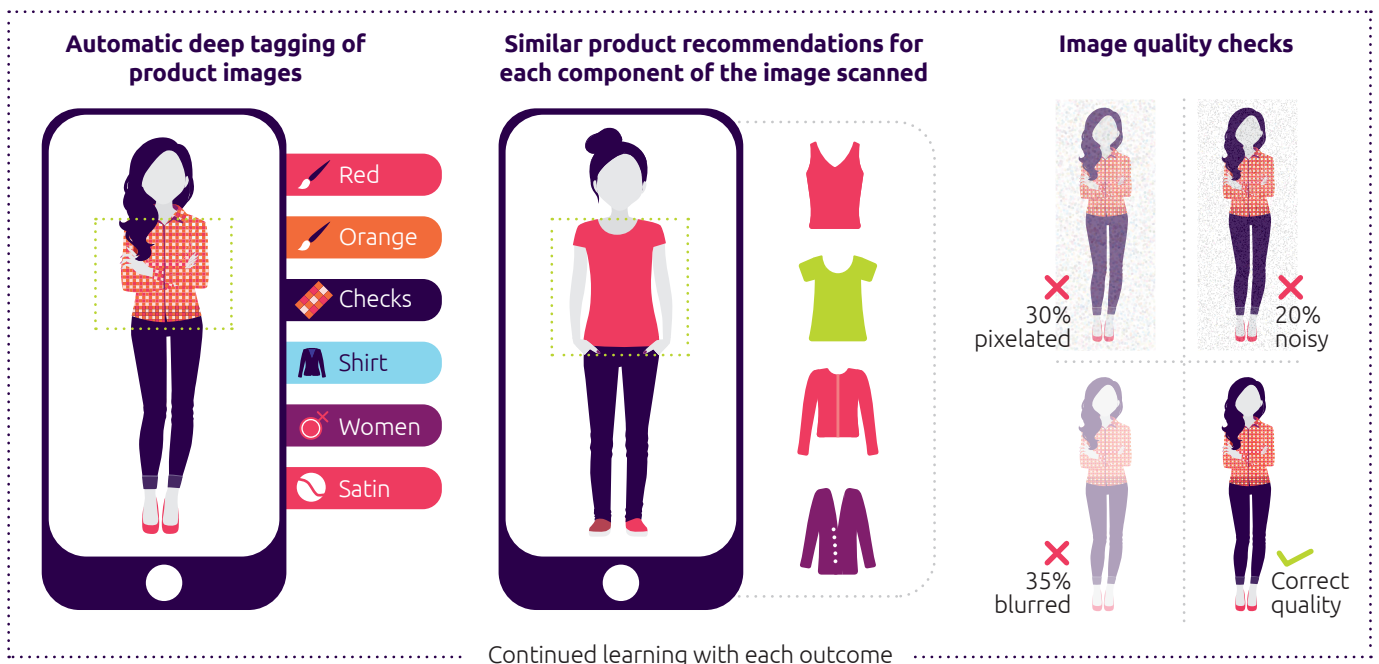
Function: In-store operations

- **AI enabling self-checkout:** Self-checkout has been an active area of interest for retailers. However, the results have historically been subpar, given the friction that's associated with a consumer checking out their own shopping. AI can significantly help reduce this friction by using image recognition to track when an item is removed from a shelf and taken out of the store. Tesco is looking at implementing AI-powered self-checkout in its stores.⁴¹
- **In-store bots for shelf scanning:** Machine learning and image recognition are driving a variety of in-store, shelf-related use cases. At home improvement retailer Lowe's, small cameras powered by image recognition identify, in real time, where items are out-of-stock on a shelf. It then alerts associates. UK electronics retailer Dixon Carphone uses its in-store chatbot, Cami, to process in-store shelf pictures and answer store associates' queries on stock status.⁴²

Function: Sales and Marketing

- **AI-driven chatbot/virtual assistant for sales support:** Online carts and chatbots powered by machine learning can provide personalized recommendations. Ocado's TensorFlow solution, based on AI, personalizes online shopping carts. Tesco, and French retailer Monoprix, are leveraging conversational commerce systems such as Alexa and Google Home in tandem with machine learning capabilities. This allows them to offer personalized recommendations. US-based active-wear retailer, The North Face, uses an AI-powered app to ask consumers relevant questions and learn from the answers. This ensures they offer consumers the most relevant products for their preferences and needs.⁴³
- **Image recognition to identify counterfeit products:** Goat, a US-based online sneaker marketplace, asks resellers to submit photos of the merchandise they wish to sell on its platform. These images, once analyzed by Goat's deep-learning tech,⁴⁴ are authenticated against heuristics and varied data points, such as color, features, and texture.⁴⁵

Figure 15. AI in action: AI-powered Image recognition

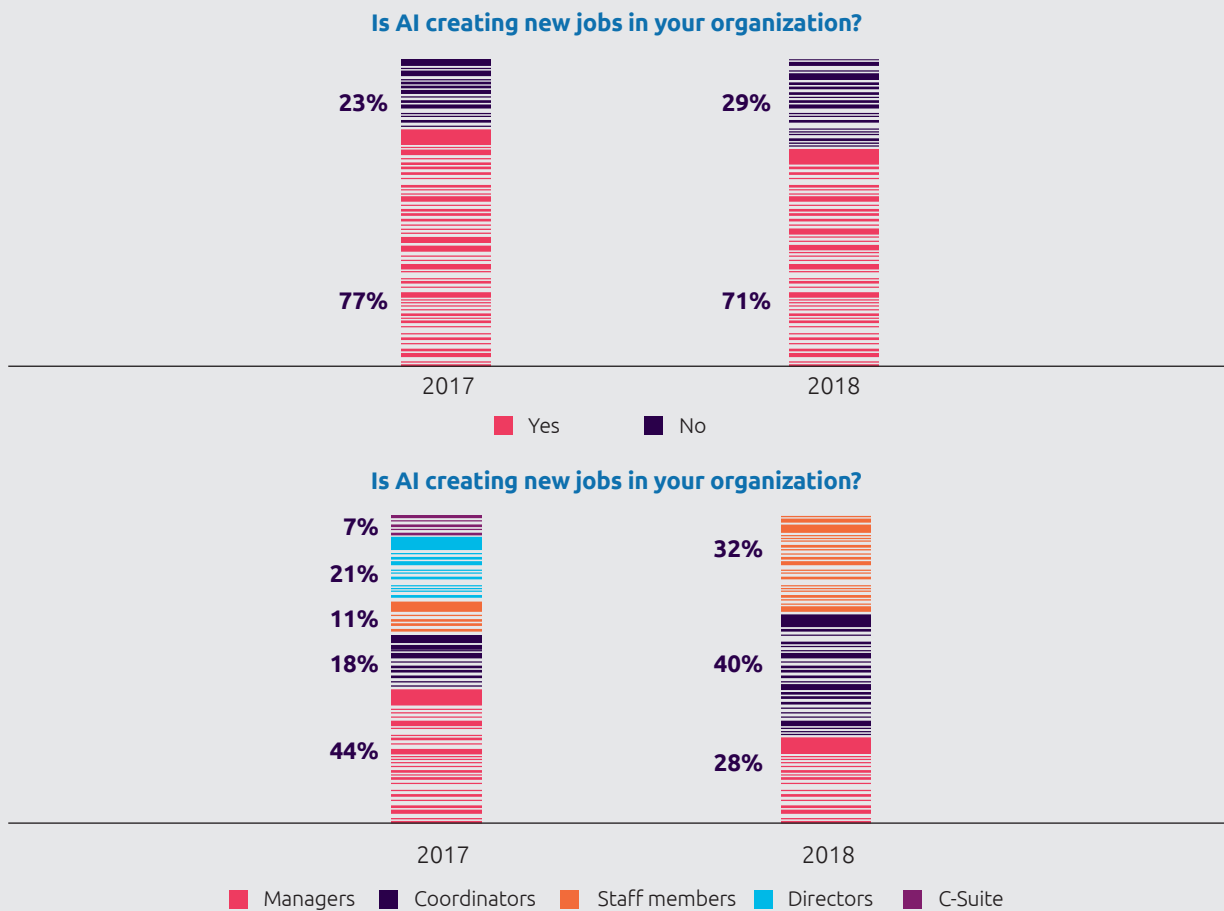


Limited negative impact on jobs so far

Close to three-quarters of our respondents (71%) say that AI is creating jobs in their organization. Not

only that, the jobs being created are at a fairly senior level. We found that 68% of jobs will be created at a coordinator level or above. (see Figure 16)

Figure 16. AI is helping create more jobs

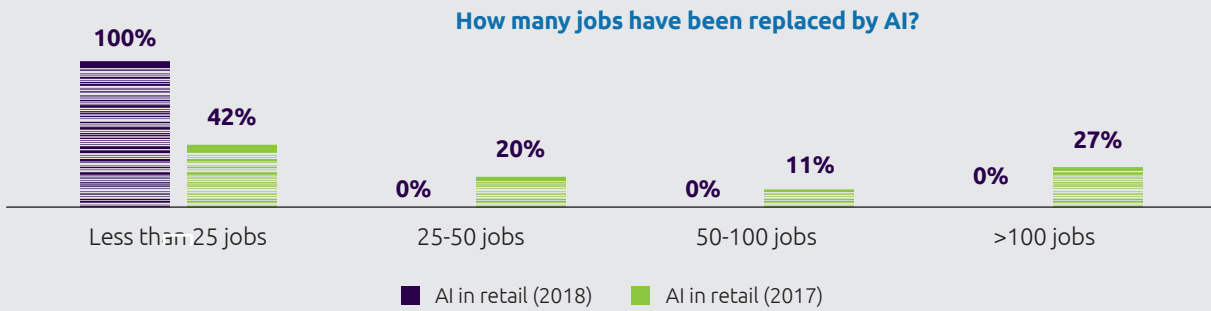


Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018, N=400 retailers. Capgemini State of AI survey, June 2017, N=222 retailers. Numbers may not sum up to 100% due to rounding.

On actual job losses, we found that only one in four executives says that AI has replaced jobs in their organization. However, for those who said that job losses did happen, the actual impact was minimal, with all of them saying that fewer than 25 jobs were affected. This is in stark contrast to our earlier study, where more than half of the executives surveyed (58%) expected

more than 25 jobs to be replaced (see Figure 17). While the data is encouraging from the perspective of moderating the heightened fears of large-scale job loss due to AI, it is important to bear in mind that this data relates to jobs that have already been replaced in the past, and is not a projection of the future.

Figure 17. Share of organizations on the quantum of jobs replaced by AI



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018, N=400 retailers
Capgemini State of AI survey, June 2017, N=222 retailers.

Top use cases – By subsector

The distribution of use cases that are low in complexity

and high on benefits varies across sub sectors. There are some common use cases emerging across subsectors.

| Food and Grocery | Home improvement | Apparel and footwear |
|---|---|---|
| AI for Reducing distribution pilferage | AI for Stock replenishments | AI in Voice recognition and customer authentication |
| AI for Stock replenishments | AI-Powered visual inspection of warehouse assets | AI for Stock replenishments |
| In-store bots for shelf scanning | AI driven Chat bot/ Virtual assistant for sales support | AI-Powered visual inspection of warehouse assets |
| AI driven Chat bot/ Virtual assistant for sales support | In-store bots for shelf scanning | AI for route optimization of last mile delivery |
| AI enabling self-checkout | AI for route optimization of last mile delivery | AI driven Chat bot/ Virtual assistant for sales support |
| Beauty and personal care | Pharmacy | Luxury and accessories |
| AI enabling self-checkout | AI in Voice recognition and customer authentication | In-store bots for shelf scanning |
| AI for Stock replenishments | AI driven Chat bot/ Virtual assistant for sales support | AI for Reducing distribution pilferage |
| AI in Voice recognition and customer authentication | AI for Reducing distribution pilferage | AI for Stock replenishments |
| AI reverse supply-chain and returns management | AI for Product Content and Catalogue Management (e.g. labelling products attributes from unstructured data) | AI-Powered visual inspection of warehouse assets |
| AI for route optimization of last mile delivery | In-store bots for shelf scanning | AI driven Chat bot/ Virtual assistant for sales support |
| Electronics | | |
| AI for Stock replenishments | | |
| In-store bots for shelf scanning | | |
| AI for Predictive logistics network management | | |
| AI driven Chat bot/ Virtual assistant for sales support | | |
| AI for Assortment rationalization (Rationalizing SKUs in Range) | | |



How should retailers leverage AI for greatest benefit?

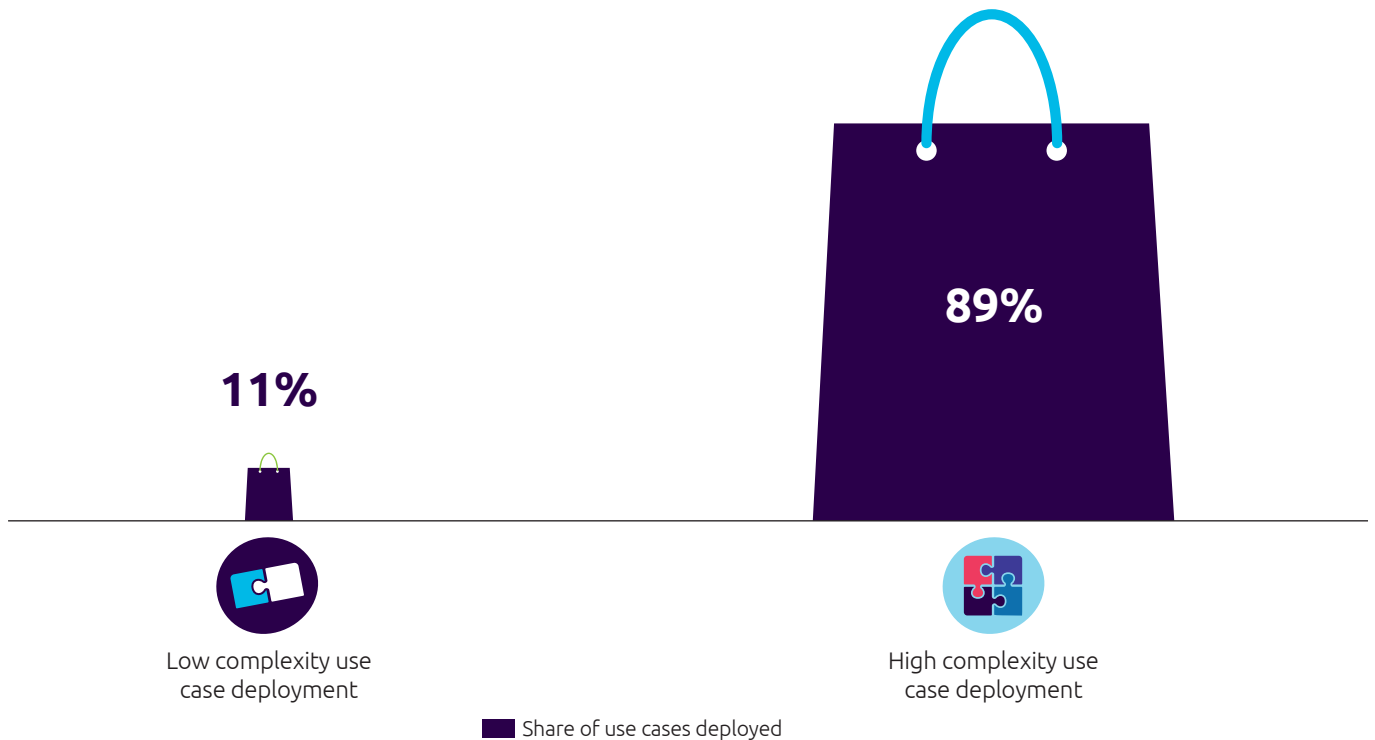
The use cases detailed in the previous section offer a significant opportunity. But, how can retailers use them to drive the greatest return on their investment? We believe five success factors are critical.

I. Focus on quick wins

As Figure 18 shows, retailers are going after complex use cases that offer high benefits, while ignoring less complex use cases that might be easier to implement (albeit with lower benefit projections). However, an overly ambitious

approach can cause problems. Dan Wulin, director of data science at Wayfair – a US-based, pure-play, online furniture retailer – believes that pragmatism is important. *“A lot of third-party vendors and data scientists immediately get down to the complex marketing solutions AI can deliver,”* he says. *“Maybe that is where you end up after a year or two, but what I’ve seen succeed is being pragmatic about things. This means being okay with building a simple minimum viable product. Then, once you have positive signs there, then invest to get more in-depth and more complex.”*⁴⁶

Figure 18. Retailers are focused on high complexity use cases

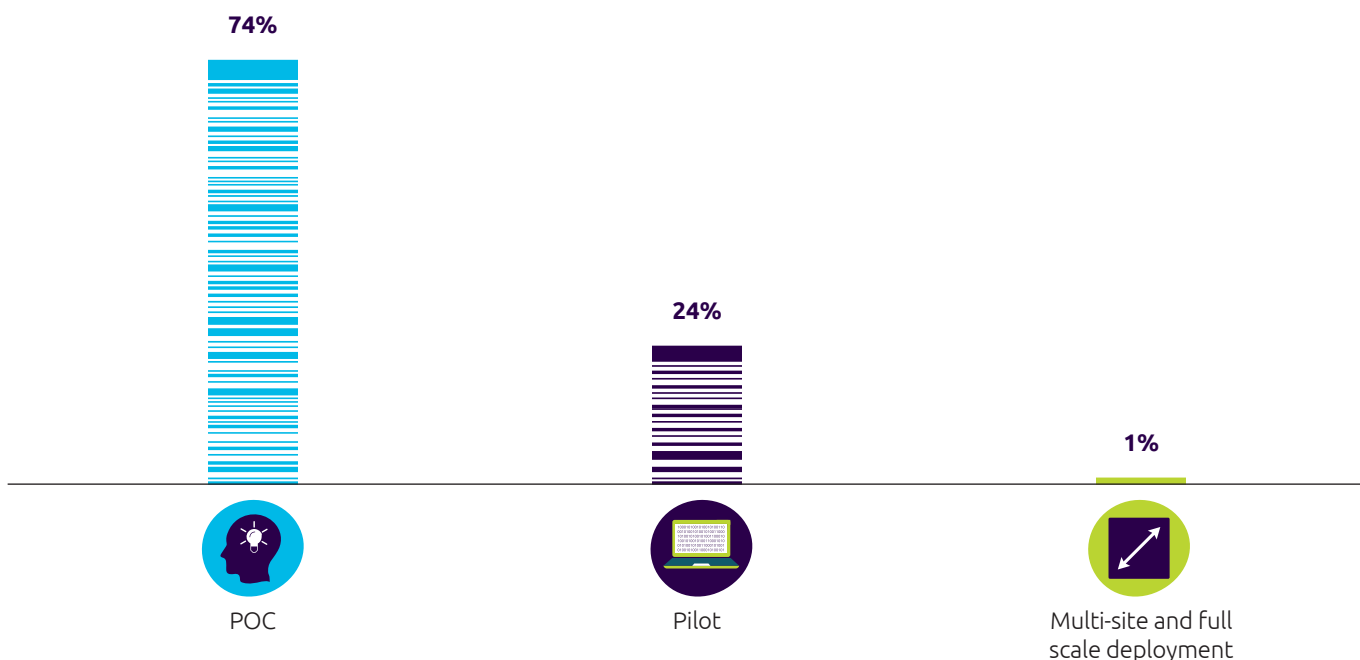


Source: Caggemini Research Institute analysis; Caggemini AI in Retail Executive survey, August 2018, N=400 retailers. Low complexity represents use cases that have low complexity of implementation. High Complexity represent use cases that have high complexity of implementation.

A key risk with focusing on complex use cases is that they become extremely challenging to scale. Our research suggests that of all the deployments in our study, only 1% of AI deployments are at multi-site/full-scale implementation (see Figure 19). This was also in line with our earlier cross-sector 2017 findings, where we found that organizations had a tendency to first engage with high-complexity use cases.⁴⁷ Given the wide proliferation of easy-to-use tools from a

variety of vendors, it has never been easier to do pilot AI initiatives. However, making the transition from pilot to scale is not a straightforward task, as our data shows. Target’s CEO Brian Cornell, who leads a company with some 1,800 stores, sees achieving scale as critical, noting that *“Experimentation is interesting, but if I can’t scale it – if I can’t do it 1,800 times – it’s not going to add a lot of enterprise value.”*⁴⁸

Figure 19. Only 1% of AI deployments make it to multi-site/full-scale implementation



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018, N=400 retailers
 Share of use case deployed represent all use cases which are currently at POC or Pilot, or multi-site or full-scale deployment
 Note: Numbers may not add to 100% due to rounding.



1%

Share of use case deployments that make it to multi-site or full-scale deployment

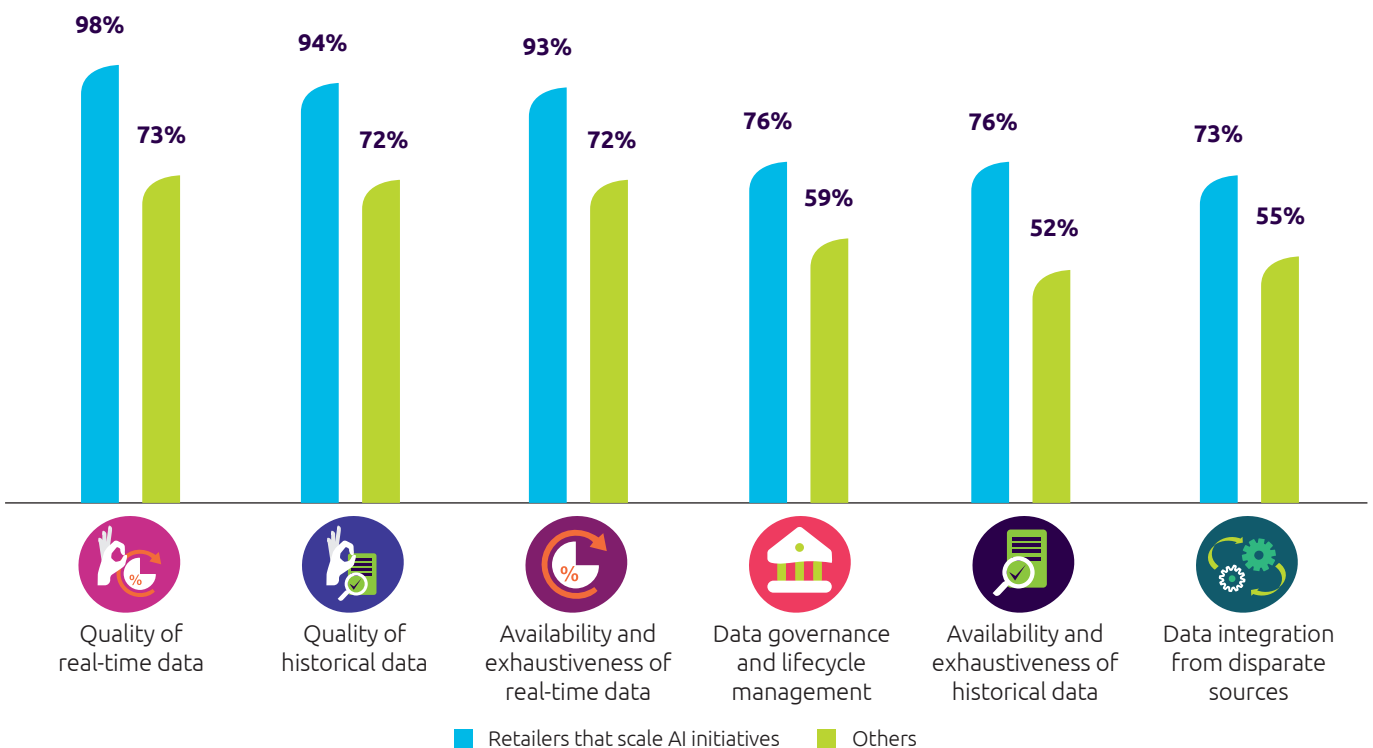
II. Retailers should focus on the maturity of their enterprise data practices

To realize AI’s game-changing potential, organizations need mature data practices as well as AI expertise. Our research shows that retailers who have achieved scale have a stronger grip on their data practices (see Figure 20). Michael Schrage, a research fellow at the MIT Sloan School’s Initiative on the Digital Economy, said, *“Companies need to manage data as an asset to get meaningful and measurable economic returns.”*⁴⁹

Retailers who are able to scale understand how fundamental data is to unlock value in their AI initiatives. We also found that 89% of retailers who have scaled AI have the required data ecosystems in place, compared to less than half (47%) of others. To boost data maturity, retailers need to focus on a number of areas:

- Integrating datasets across the organization to create a single view of data
- Using a variety of data to enhance the quality of insights
- Using external data to augment internal insights.

Figure 20. Retailers that scale have more mature enterprise data practices



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018. Retailers that scale AI initiatives are those retailers who have scaled AI use cases within their organization, N= 80. Others represents retailers who have not yet scaled AI use cases in their organization, N=320.

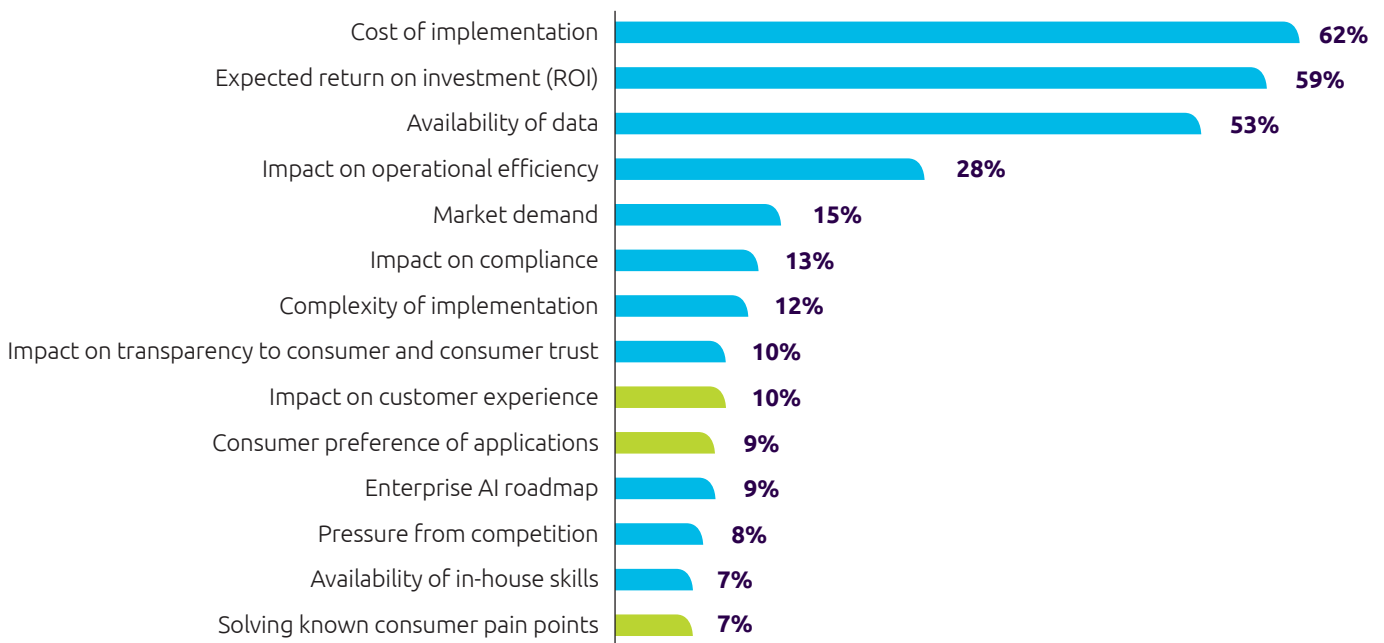
III. Look through the customer lens when deploying AI initiatives

Our recent report on the role of artificial intelligence in the customer experience⁵⁰ uncovered a major reason why most AI initiatives, and specifically customer-facing ones, fail to deliver to their potential. Namely, that most organizations

do not look through a consumer lens when designing AI initiatives. Instead, most companies focus on implementation costs and ROI as key parameters ahead of the impact on the customer experience or solving customer pain points (see Figure 21). Retailers should be wary of falling into this trap, given their overarching focus on deploying sales and marketing AI use cases.

Figure 21. Organizations are focusing on implementation costs and ROI and not on customer experience

Share of organizations who rank these parameters higher when deciding on implementing AI-enabled use cases



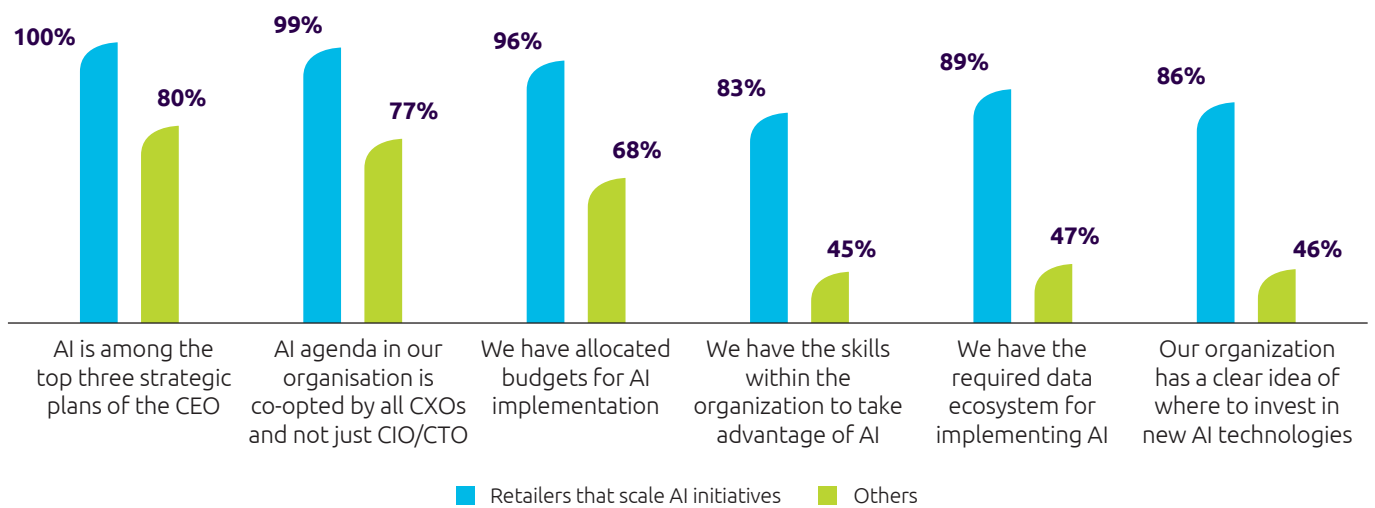
Source: Capgemini Research Institute, AI in CX Executive Survey, N=528 executives, 2018.

IV. Retailers need to treat AI as a strategic imperative

Those retailers that have successfully scaled AI solutions see this area as a strategic imperative. For all of them (100%), AI is a top-three strategic issue for the CEO. In addition, close

to all (96%) have budgets in place for implementation (see Figure 22). *“It is important that the business – including the C-suite – learn about and can talk the language of analytics, data science, and AI, as these will change the way the entire organization works,”* says Andrew Day, Chief Data Officer of Sainsbury’s.⁵¹

Figure 22. Retailers that scale treat AI as a strategic imperative



Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018. Retailers that scale AI initiatives are those retailers who have scaled AI use cases within their organization, N= 80. Others represents retailers who have not yet scaled AI use cases in their organization, N=320.

At the same time, it is imperative that retailers do not see AI as a “magic dust” for their organization. H&M has a team of over 200 data scientists to write algorithms that continuously determine and adjust based on customers’ evolving behavior and expectations. However, that doesn’t mean the human hand goes away. Arti Zeighami, H&M’s head of advanced analytics and artificial intelligence says, *“It’s about empowering that gut feeling. We can now be sharper, more accurate and hyper-relevant, not have one solution that fits all.”*⁵²

V. Boost investments in AI

Retailers need to make significant strategic investments in these technologies. Our research found that almost half (49%) of leaders invest 5–10% of their IT budgets in AI. But, only 2% of the others commit to similar levels of investment (see Figure 23).

Figure 23. Share of IT budget invested in AI across retailers that scale and others

| Share of IT Budget invested in AI | Retailers that scale AI initiatives | Others |
|-----------------------------------|-------------------------------------|--------|
| <1% | 0% | 0 |
| 1-2% | 0% | 50% |
| 2-5% | 51% | 48% |
| 5%-10% | 49% | 2% |
| >10% | 0% | 0% |

Source: Capgemini Research Institute analysis; Capgemini AI in Retail Executive survey, August 2018. Retailers that scale AI initiatives are those retailers who have scaled AI use cases within their organization, N= 80. Others represents retailers who have not yet scaled AI use cases in their organization, N=320.

For retailers focused on consumer-facing AI initiatives, funding will have largely come from the marketing function. Function-level funding can play an important role – ensuring initiatives get off the ground quickly without being held

back by internal bureaucracy. However, given the potential of AI, funding needs to become a key line-item in the overall organization’s budget.

Conclusion

Artificial intelligence is creating significant opportunities across industries and retailers have their own huge set of benefits from AI. Consumers too have their own set of AI-powered tools, such as personal assistants, to help them make decisions. But while it is important that the sector focus on the customer experience, it is not the only area that merits serious attention. A transformed and super-charged supply chain, for example, offers a significant operational opportunity, and also supports the customer experience. Given the intensity of competition in the retail industry, it is just a matter of time before all retailers start adopting and embracing artificial intelligence. Those that want to stand apart in the long run should give serious thought to deploying AI across both operations and customer-facing functions.



Research Methodology

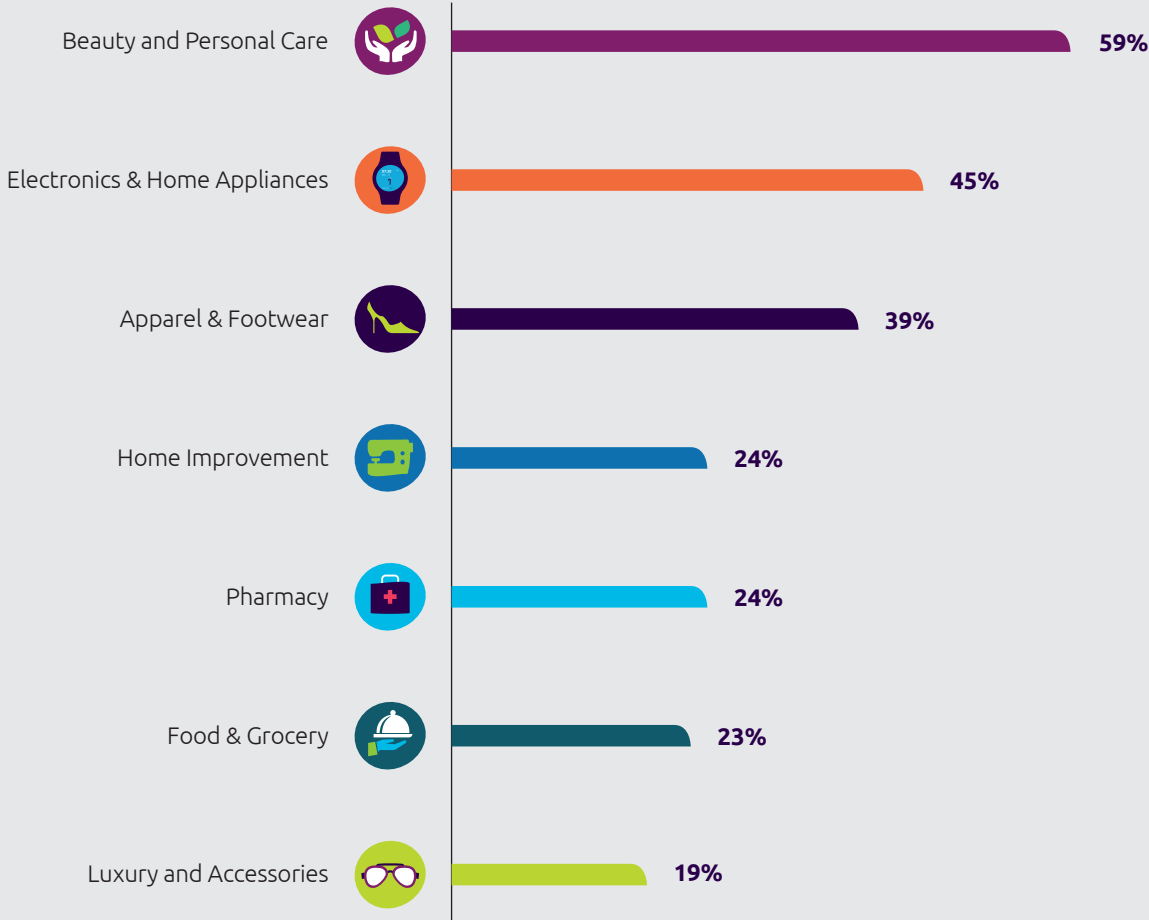
Primary Survey

In August 2018, we surveyed 400 executives from retailers that are implementing AI use cases at different stages of maturity across a range of retail sub-sectors and countries:

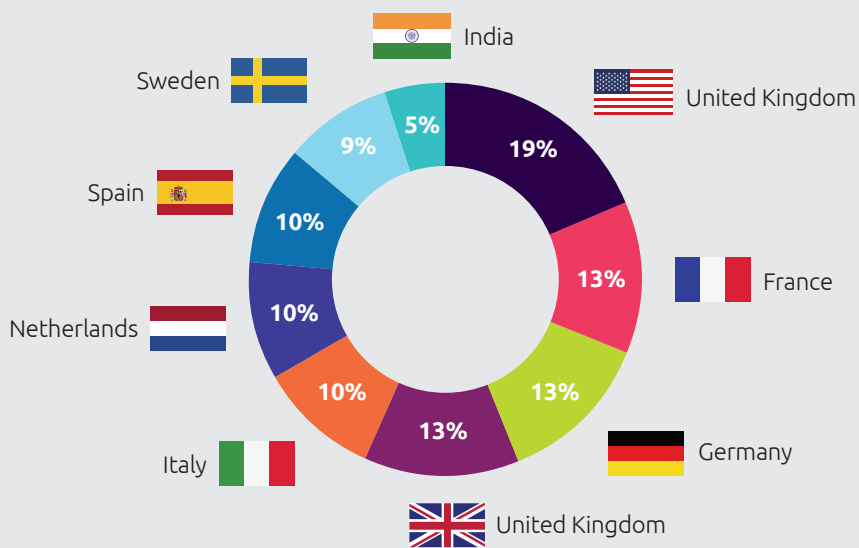
Retail sub-categories surveyed: Food and Grocery, Beauty and Personal Care, Apparel and Footwear, Electronics and Home Appliances, Home Improvement, Luxury and Accessories, Pharmacy

Geographies surveyed: The United States, the United Kingdom, France, Germany, China, India, Italy, Spain, Sweden, and the Netherlands

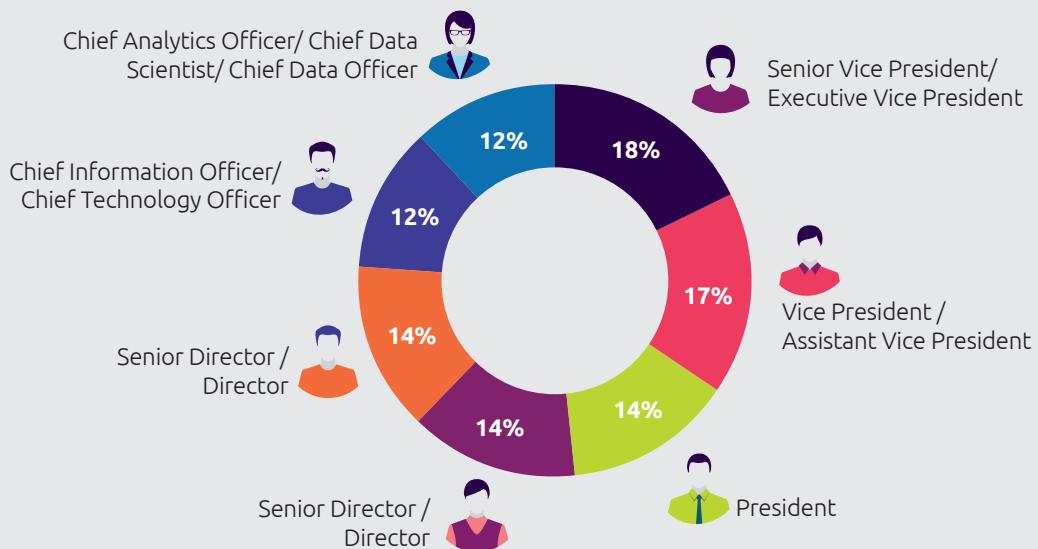
Respondents by Sub Sector



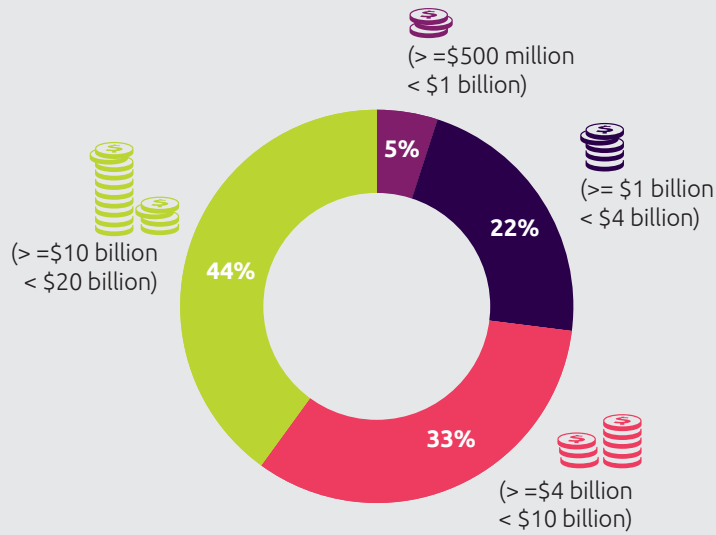
Respondents by Country



Respondents By Job Category



Respondents By Organisation's Revenue

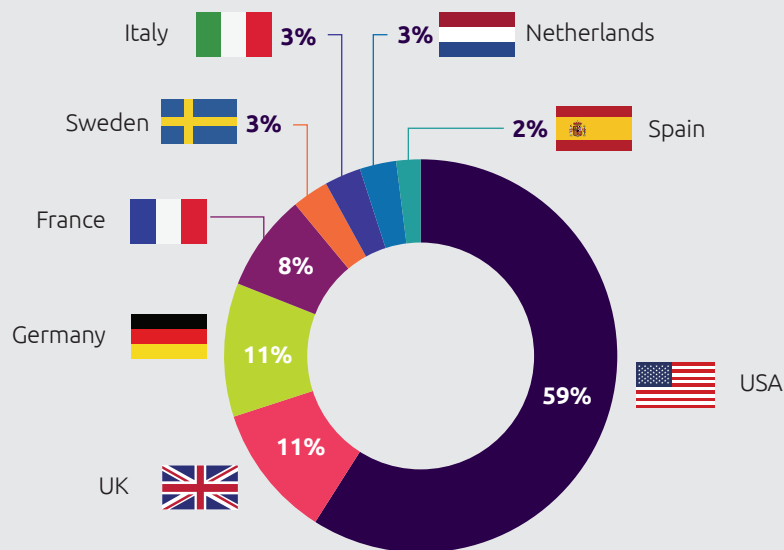


Secondary Research

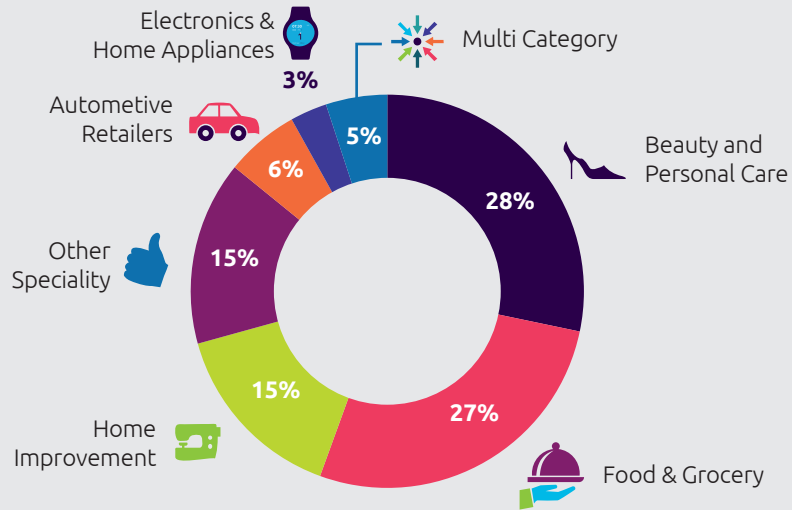
In October 2018, we conducted extensive secondary research of the top 250 retailers by revenue, sourced

from the declared 2017 revenues from Bloomberg. The sample represents a mix of retailers active across multiple retail sub-sectors and geographies.

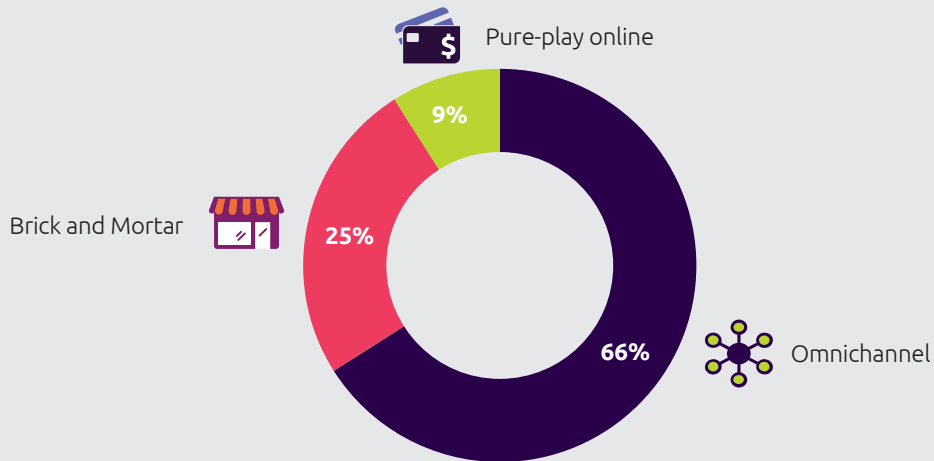
Share of retailers - by geography



Share of retailers - by sub-sector



Share of retailers - by format



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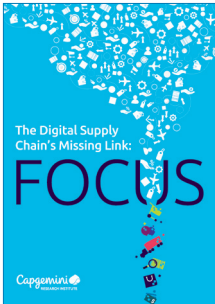
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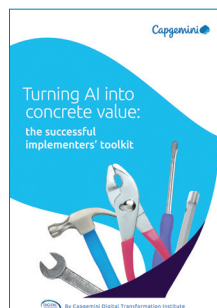
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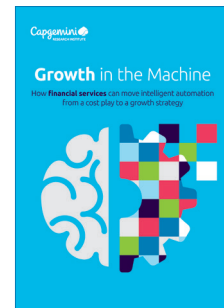
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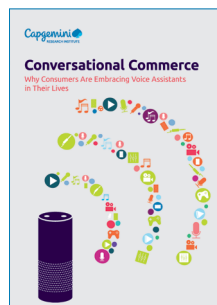
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