



# The coming AI revolution in retail and consumer products

*Intelligent automation is transforming  
both industries in unexpected ways*

In association with



IBM Institute for Business Value

## Executive Report

Consumer Products and Retail



## *In this report*

*Adoption of AI-driven intelligent automation in the retail and consumer products industries is projected to leap from 40 percent of companies today to more than 80 percent in three years. In retail, the highest growth is expected in supply-chain planning, while in consumer products companies the deepest penetration is anticipated in manufacturing.*

*Retailers and brands are initially using intelligent automation to improve efficiency and reduce costs. As the capability matures, it opens up entirely new ways of doing business that can increase operational agility, improve the quality and speed of decision making, and enhance the customer experience.*

*Intelligent automation brings with it a new category of risk associated with ethics and machine responsibility. Organizations must take steps to avoid creating biases that can generate negative outcomes.*

### How IBM can help

For more than a century, IBM has been providing businesses with the expertise needed to help consumer products companies win in the marketplace. Our researchers and consultants create innovative solutions that help clients become more consumer-centric to deliver compelling brand experiences, collaborate more effectively with channel partners and align demand and supply. For more information on our consumer product solutions see [ibm.com/consumerproducts](https://ibm.com/consumerproducts).

With a comprehensive portfolio of retail solutions for merchandising, supply chain management, omnichannel retailing and advanced analytics, IBM helps deliver rapid time to value. With global capabilities that span 170 countries, we help retailers anticipate change and profit from new opportunities. For more information on our retail solutions, please visit: [ibm.com/industries/retail](https://ibm.com/industries/retail).

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## *The next frontier of innovation*

*Retail and consumer products organizations are entering a new phase of technological innovation – with intelligent automation at its core. The ramifications are profound, offering a host of previously unimaginable capabilities – from automatically rerouting shipments to bypass bad weather, to personalizing in-store services based on analysis of a customer’s facial expressions. Our newest research shows that two in five retailers and brands are already using intelligent automation, and that number is on track to double within the next three years. Future AI-driven applications look to be far more extensive than many consumer products and retail companies currently realize.*

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## Shifting into high gear with intelligent automation

Brands and retailers are already adopting AI-powered intelligent automation at a breathtaking pace – and that process is about to accelerate. Over 80 percent of executives in both the retail and consumer products industries expect their companies to be using intelligent automation by 2021, according to our new IBM Institute for Business Value study, developed in collaboration with the National Retail Federation.

What’s more, 40 percent say their organizations are already engaged in some form of intelligent automation. Companies that aren’t experimenting with this capability risk falling behind and need to move quickly if they hope to remain competitive.

Why the surge in participation? Intelligent automation represents a major technological breakthrough that has the potential to not just improve, but to transform the way companies do business. In intelligent automation, artificial intelligence (AI) is infused into automation, enabling machines to learn and generate recommendations, and to make autonomous decisions and self-remediate over time (see sidebar on page 2, “Intelligent automation and AI”).

In the 1990s, the ecommerce revolution initiated a fundamental change in consumer shopping behavior, which has continued to gain momentum in the mobile and social media era. In the process, customer demands have reshaped the retail and consumer products industries. To meet these changes, retailers and brands have leveraged technologies over the past decade that enable them to stay close to local market trends, understand consumer preferences and shopping behaviors, design products, provide value-added services and engage consumers in contextual ways.



**85% of retail and 79% of consumer products companies** plan to be using intelligent automation for supply chain planning by 2021



**79% of retail and consumer products companies** expect to be using intelligent automation for customer intelligence by 2021



Retail and consumer products executives project that intelligent automation capabilities **could help increase annual revenue growth by up to 10%**

To understand how brands and retailers are using intelligent automation today and what they expect its future impact to be, we conducted a survey of 1,900 consumer products and retail executives who are leaders in the areas of supply chain and operations, and customer engagement in 23 countries. We then took a deeper look into impacts within industries and across organizational functions to determine how retailers and brands can address the upcoming challenges and opportunities intelligent automation creates.

We found that retail and brand executives have high expectations that intelligent automation can boost their organizations' bottom lines. Survey respondents anticipate that these capabilities can help reduce operating costs by an average of up to 7 percent, while increasing annual revenue growth by up to 10 percent – four times the average revenue growth in consumer products for 2017 and two times the forecasted growth in retail for 2018.<sup>1</sup>

### Intelligent automation and AI

For our survey, we defined artificial intelligence as a capability in machines to reason, remember information, learn and identify new insights through data discovery. Intelligent automation is guided by AI tools that need minimal manual routine interventions. This operational shift augments and assists human capabilities, reduces human errors and builds efficiencies, while enabling digital operations and innovations. Four components make up intelligent automation: the first three are fueled by AI, the fourth by automation.

**Engagement** over external touch points where users interact with systems

**Learning** from analytics across different data sources and recognizing semantic references to use as criteria for decisions

**Reasoning** from learning to make autonomous decisions and self-remediate over time

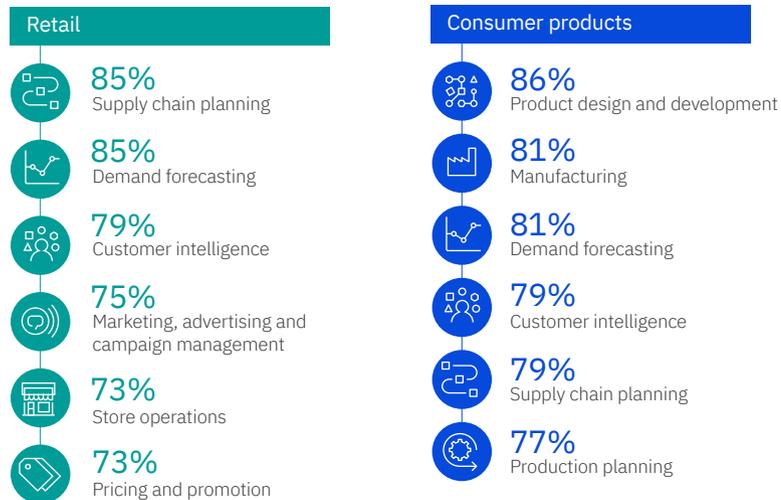
**Doing or executing** to carry out the next best action that systems can execute digitally and/or that people or robots can execute physically

## Focusing internally today, externally tomorrow

Today, retail and consumer products organizations primarily use intelligent automation to perform discrete internal processes that rely on existing rich-data sets, such as demand forecasting and customer intelligence. But within the next three years, executives plan to incorporate intelligent automation into more complex processes that require broader sets of data, external collaboration and additional system integrations. And during that time, the projected penetration is expected to burgeon to more than 70 percent across organizational areas that span the value chain (see Figure 1).

**Figure 1**

*More than 70 percent of retail and consumer products executives expect their companies to be engaging in intelligent automation across the value chain by 2021*



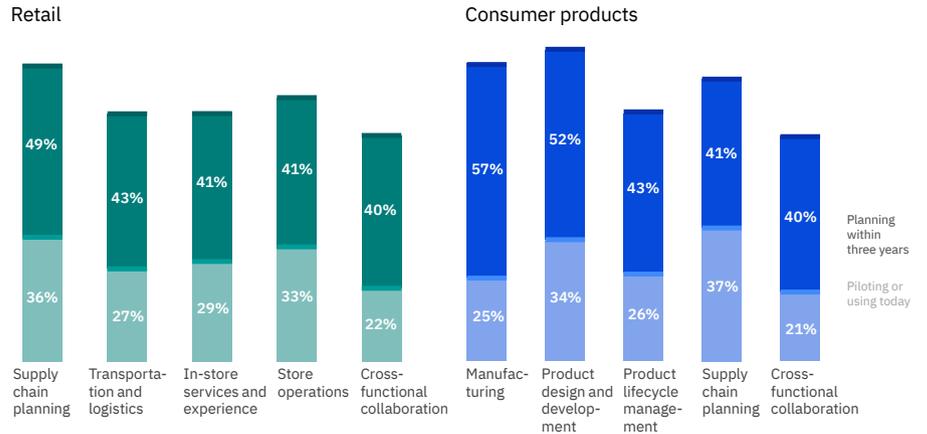
*“We’ve learned a lot about our customer preferences from the rich data we’ve collected over the past several years. Now, we are in a position where we can use data science and machine learning to provide truly personalized experiences for our millions of customers.”*

**Bindu Thota, Vice President of Technology**  
zulily, LLC

How retailers and brands use intelligent automation is changing – and the highest growth is not necessarily in the areas one would expect. Over the next three years, we anticipate seeing adoption surge most in areas that differ from those with the highest penetration today. And projected adoption rates also vary between retail and consumer goods companies based on each industry's unique business requirements (see Figure 2).

**Figure 2**

*The expected areas of highest growth in intelligent automation adoption over the next three years differ by industry*



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### **Boosting manufacturing and design in consumer products**

Consumer products executives project the highest rate of intelligent automation adoption over the next three years to be in manufacturing, and product design and development. These are areas in which intelligent automation can have potentially transformational impacts.

In manufacturing, ongoing maintenance of production line machinery and equipment can represent a major expense. On the other hand, any downtime can be even more costly. Brands can use predictive maintenance to address this challenge. Predictive maintenance employs advanced AI algorithms to identify potential machine malfunctions and automatically schedule the specific services needed.<sup>2</sup>

In addition to maintaining equipment, brands must keep product quality high, despite ever-shorter time-to-market deadlines and increasingly complex products and processes. Regulations and standards add an extra layer of difficulty, as does pressure from customers for faultless products.

Using AI algorithms, machines equipped with intelligent automation can evaluate emerging production issues likely to cause quality problems. When they detect a potential issue, they can automatically notify manufacturing personnel, and may even autonomously execute corrective actions.<sup>3</sup>

In designing and developing products, brands must consistently come up with new – and hopefully trendsetting – design concepts (see sidebar, “AI search engine could inspire next trend in fashion design”). To that end, brands can use intelligent automation capabilities to ingest vast pools of data related to product use, as well as contextual and global consumption information.

### **AI search engine could inspire next trend in fashion design<sup>4</sup>**

An AI-powered search engine could reshape the way fashion designers develop new designs. The engine was trained using 100,000 print swatches from 10 years of winning entries from Fashion Week. It can search for images with specific elements or design patterns based on image data sets users choose. Designers can use the engine to find inspiration or to check their design ideas against inadvertent plagiarism. Future modifications may include the ability to modify search-engine-generated designs and the ability to generate entire designs by inputting a few basic parameters.

### **Nike automates process for customer-designed sneakers<sup>5</sup>**

Nike Inc., an athletic footwear, apparel and equipment company, has developed a system with which customers can design their own shoes and leave the store wearing them. With the new automated system, dubbed The Nike Maker Experience, customers put on blank Nike Presto X shoes and, using voice activation, select graphics and colors with which to design them.

The system uses augmented reality, object tracking and projection systems to display the designed shoes for the customer. Once the customer has completed his or her choices, the system prints the design on the sneakers, which are available to the customer in under two hours. The standard customization process can take up to two weeks.

They can then analyze and learn from that data to generate precise, relevant insights and apply them to designing products at unprecedented speeds. Some companies are already automating parts of their design and production processes, enabling customers to interact directly with systems to make and execute product design choices (see sidebar, “Nike automates process for customer-designed sneakers”).

### **Targeting the supply chain and store operations in retail**

Many of the retail executives in our survey, on the other hand, are exploring ways to apply intelligent automation to cross-functional collaboration and interactions with customers. These activities require more complex processes that involve additional system integrations. This focus is evident in the two areas that show the highest growth in intelligent automation adoption over the next three years: supply chain planning and in-store operations.

Supply chain planning involves collaboration across multiple functions, such as materials, distribution and transportation planning. Previously, many of the processes tying these planning functions together were manual.

Intelligent automation is ideally suited for this type of environment. AI-powered tools can absorb data from different planning functions, and digest and analyze it quickly. They can then produce calculations to help retailers make near real-time decisions when developing and balancing plans, determining tradeoffs and gaining consensus. As they work through the process, retailers can use automation to execute repetitive tasks, direct workflows and execute resolutions to exceptions.

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Store operations and in-store services can also benefit greatly from intelligent automation. Every city or neighborhood is unique, with its own highly localized flow of people, places and events that shape consumer behavior and demand. A store in a college town requires different product assortment than a store in a resort area. Intelligent automation can learn from local data to determine products and services that serve the needs of the neighborhood. Based on local venue characteristics and available ingredients, it can automate assortment selection for a particular store.

AI technology also can apply what it learns to tailor in-store product and service offerings to the individual customer's needs. Imagine, for example, that you walk into a sporting goods store looking for golfing gear. As you enter the store and opt-in for assistance, the store's AI-powered app accesses data about your purchasing patterns, interests and preferences. It then automatically assigns you a sales associate who is a competitive golfer.

At the same time, the app provides your information to the sales associate, so she is equipped with pertinent knowledge at her fingertips. She greets you personally, strikes up relevant conversation while leading you to the golf section of the store, provides product-specific advice based on her golfing expertise and offers recommendations for the right gear.

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*“Like all retailers we see the future is in knowing who we are talking to and speaking to them in the right way.”*

**CMO**, North American Retailer

## Expecting efficiency, gaining agility

The upsurge in intelligent automation and AI can offer unexpected benefits to brands and retailers. Executives whose companies are using intelligent automation today are experiencing a much higher degree of positive impact than the degree of impact the executives in the planning stages expect (see Figure 3). And the order in which the two groups of executives rank those impacts also indicates notable differences between expectations and reality.

**Figure 3**

*Executives implementing intelligent automation are seeing more transformational impacts*



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Executives in the planning stages expect intelligent automation to help their organizations do a better job of what they do now – to improve operational efficiency, extend and expand capabilities, reduce costs and increase revenue growth. Intelligent automation can indeed help companies achieve these goals, but its potential benefits are far deeper and more significant than incremental improvements. Executives whose organizations are already using intelligent automation are experiencing impacts that enable them to fundamentally change the ways they do business – to increase operational agility, improve the quality and speed of decision making, and enhance the customer experience.

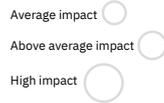
The focus is less on lowering costs and more on increasing competitiveness and sustaining long-term growth. While gaining efficiency and reducing costs may be the initial impetus for engaging in intelligent automation, much greater benefits can be unlocked as the capability matures.

### **Measuring impact across functions**

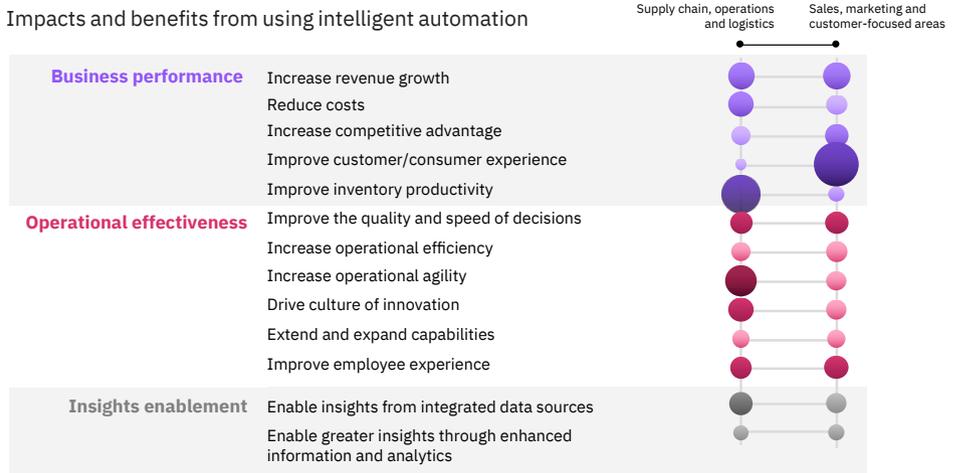
So organizations using intelligent automation today are experiencing impacts that their peers aren't expecting. To further understand this phenomenon, we analyzed responses of the 56 percent of survey participants who are currently either piloting or using intelligent automation. We call this group the "Early Adopters."

We then broke down Early Adopters' responses into functional areas to gain insights into impacts with higher than average ratings (see Figure 4). And because these impacts are widely spread across the enterprise, we grouped them into categories based on their capacity to drive business performance, enhance operational effectiveness or enable insights.

**Figure 4**  
*Early Adopters are experiencing a wide array of benefits from intelligent automation*



Impacts and benefits from using intelligent automation



**Creating a better customer experience**

In sales, marketing and customer-focused functions, Early Adopters indicate the top two impacts of intelligent automation are to improve the customer experience and increase revenue growth. A direct correlation can exist between the two, as in many cases improvement in customer experience can lead to improvement in revenue growth.

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By enhancing the customer experience, retailers can unleash entirely new approaches to customer engagement and interaction. With intelligent automation, they can identify customers' anticipated needs at precise times and capture the right moment with the right offer in the pursuit of competitive advantage.

For example, Avenue Stores LLC, a retail apparel chain, integrates data across multiple touchpoints, including in-store activities and market trend analysis, to learn and reason about what customers want and when they want it. The company leverages real-time messaging and automated personalized offers to keep visitors engaged and incentivizes them to purchase while they are in the right "shopping mode."<sup>6</sup>

The automation of customer experience processes is seeing a little less traction compared to other components of intelligent automation. Today, brands and retailers have begun to leverage AI-powered engines to automatically trigger email campaigns (see sidebar, "Retailer uses intelligent automation to speed up campaign development"). An even more powerful use of this capability would be to apply it to the order fulfillment process, enabling customers to make purchases directly from within the campaign.

### **Improving inventory productivity and operational agility**

Within the functions of supply chain planning, operations and logistics, Early Adopters attribute the highest levels of impact to inventory productivity and operational agility. Both of these areas are critical to growth.

The goal of supply chain planning is to match supply to demand – delivering products to the right place at the right time to meet customer needs and desires. Overstock can result in markdowns and understock can mean lost sales. Either scenario has a negative impact on inventory productivity and margin.

### **Retailer uses intelligent automation to speed up campaign development<sup>7</sup>**

A North American retailer had a wealth of information on customer preferences and buying habits. Because integrating this data into the campaign management tool was difficult, the data went unused. The company wanted to harness this data and automate campaign workflows, making it easier to tailor content to the right audience. Marketing used to require four days to design and launch generic emails. Now, with AI-powered campaign automation software, teams produce rich, personalized campaigns in just one and a half days, enabling them to respond quickly to business needs. Marketing has also boosted email open rates, helping incentivize conversion and strengthen loyalty.

To increase inventory productivity, retailers and brands can harness AI and machine learning algorithms to optimize demand forecasting and supply chain planning. The automation engine can then direct workflow to automatically update and adjust plans, addressing demand spikes and dips due to both unexpected and planned events, such as new product introductions or seasonal shifts.

For instance, The Procter & Gamble Company, a multi-national consumer goods organization, is working toward deploying a next-generation demand planning solution to improve its near-term forecast accuracy globally. Its goal is to enhance productivity and equip planners to make better decisions in areas that are traditionally challenging, such as promotional lift predictions.<sup>8</sup>

Operational agility – the ability within operations to adjust to change quickly and easily – is another area in which intelligent automation can be a game changer. Companies are increasingly using IoT and other smart devices to monitor their fleets and warehouse operations, and to track the movement of goods throughout the supply chain. AI and machine learning can apply learning and reasoning capabilities to monitoring and tracking data. They can then use that data to derive insights and develop recommendations for next best actions for handling potentially costly bottlenecks and damages.

In the case of bad weather or road conditions, systems equipped with intelligent automation can dynamically reroute shipments to avoid delays and rebalance stock levels as needed. For example, a new United Parcel Service machine learning app can identify and eliminate bottlenecks based on cost-and-benefits analysis. If the app detects an incoming storm, for example, it can reroute packages away from trouble spots in a cost-effective way.<sup>9</sup> By automating these processes using advanced algorithms, companies can be better equipped to meet customer demand, maintain service levels and handle unexpected events with agility.

## Plotting the path to the future

While intelligent automation provides retailers and brands tremendous potential for transformational growth, executives in our study identified a number of critical factors to realizing its benefits. Key among them are obtaining the right skills, culture, infrastructure and technology (see Figure 5).

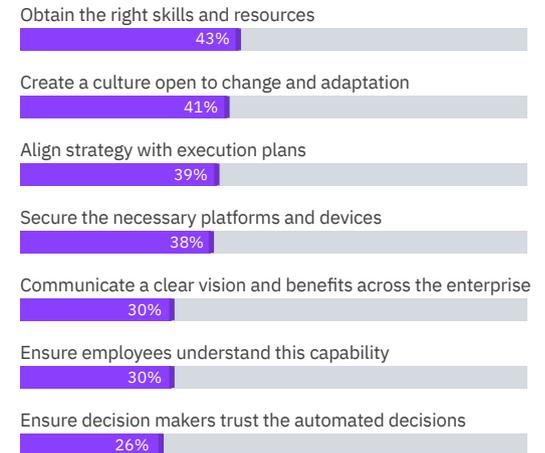
Many companies have used AI to automate processes, but those that deploy it mainly to displace employees are expected to see only short-term productivity gains, according to a Harvard Business Review report.<sup>10</sup> The report found that the firms that achieve the most significant performance improvements are those that have successfully adopted intelligent automation to work alongside their employees.<sup>11</sup>

Our study results indicate executives are in alignment with this way of thinking: While not all roles are projected to change as a result of intelligent automation, 81 percent of survey participants expect to reskill and retrain employees as they implement these capabilities into specific functional areas. This could include training employees how to use customer insights so they can offer more personalized services or equipping merchandisers with tools that allow them to create more targeted inventory plans.

In addition, executives expect intelligent automation to drive demand for new roles within their organizations. The top new roles cited by survey respondents include: machine-learning engineers, data analysts, data scientists, AI interaction designers and AI engineers.

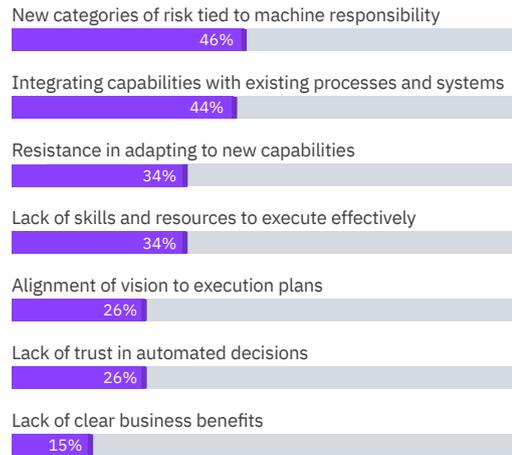
**Figure 5**

*Retail and consumer products executives indicate the right skills and culture are critical success factors for intelligent automation*



**Figure 6**

*Retail and consumer products executives name new risks associated with machine responsibility as a top challenge*



Online retailers are growing their footprints by opening physical stores, bringing fresh concepts and new energy to compete with traditional retailers. Both online and traditional retailers aim to win over customers with compelling store experiences. In fact, over 70 percent of retail executives surveyed say they plan to implement intelligent automation in store operations and in-store services

Consumer products and retail executives identify new categories of risk tied to machine responsibility as the top challenge to adopting intelligent automation (see Figure 6). Working with intelligent automation relies on training employees and entering high-quality data into the models over time. Without proper care, organizations can unintentionally create biases that generate negative outcomes.

Consider the data that brands and retailers use for training, for example. Organizations using facial recognition technology to measure customer responses need to select culturally diverse sets of images. While emotional expressions are largely universal, they do sometimes vary across cultures.

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## Recommendations

### **Think big: Take a strategic approach when evaluating intelligent automation**

- Break down vertical silos and collaborate horizontally across organizational functions to assess and prioritize processes.
- Analyze every aspect of your enterprise, whether you're examining trends, consumption data and consumer feedback, or scaling that data down to the pulse of a neighborhood.
- Look for ways intelligent automation can improve brand experience throughout the customer journey and create competitive value for your brand in the long term, rather than focusing on its ability to improve operational efficiencies and reduce costs.
- Assess both upstream and downstream processes across the integrated supply chain when evaluating intelligent automation capabilities. While each individual function can yield incremental benefits, an interconnected automated supply chain can provide a new level of value.
- Choose your platform carefully to ensure it has measurable, scalable automation components. You should be able to measure business impact, gain visibility and apply governance to the end-to-end processes.

### **Start small: Streamline expansion with an automation Center of Excellence**

- Establish an automation Center of Excellence that provides structure and governance to the development and use of information automation assets. This is a key success factor since most organizations have thousands of potentially automatable process tasks to consider, convert and manage.
- Assess where you are investing today, build on that investment and plan future execution. For example, if your goal is to improve inventory productivity and you are already using some components of intelligent automation for demand forecasting, consider extending this capability to inventory management.

- Continuously validate implementation priorities. Communicate regularly to fully educate executives and employees on capabilities and implications across the value chain. Because intelligent systems learn at a tremendous speed, you need to monitor them closely and train them properly to avoid biases or other potential issues.

**Work differently: Rethink the way work gets done in the digital age**

- Envision the end results. Be open to uncovering new capabilities and iteratively evaluate automated tasks and activities for opportunities to redesign processes using intelligent automation capabilities.
- Partner with intelligent automation experts with design thinking expertise to guide and host regular work sessions with executives and employees. Extend the invitation to your customers, and allow your brand enthusiasts to co-create the next-generation customer experience with you.
- Think beyond basic automation to capitalize on the potential of intelligent automation. This capability isn't just about removing human activities from business processes, but rather shifting to a culture of speed, agility and innovation.

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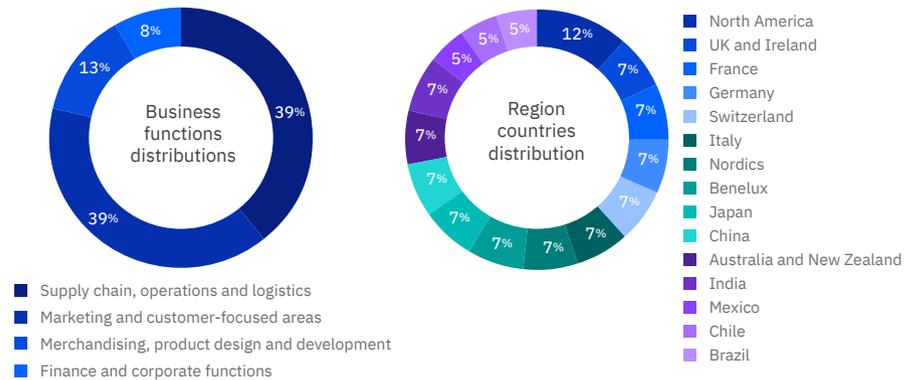
## Key questions

- How can you better understand intelligent automation capabilities, and what steps is your organization taking to communicate its capabilities and implications across the value chain?
- How do you plan to educate, train and prepare executives and employees to adopt this capability?
- What steps can you take to assess, identify and prioritize the strongest opportunities for using intelligent automation to engage with consumers and improve the customer experience, while ensuring back-end processes across the supply chain can deliver the brand promise?
- How do you plan to integrate intelligent automation across your existing tools to engage with consumers and processes, and deliver the products and service consumers demand?
- How do you plan to build an enterprise approach for intelligent automation that can deliver compelling brand experiences throughout the customer journey?

### Methodology

The IBM Institute for Business Value (IBV) and Oxford Economics surveyed 1,900 retail and consumer products leaders in 23 countries between July and September of 2018.

Participants included executives in supply chain, store operations, merchandising, product design, finance, sales and marketing, and customer-focused areas.



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## For more information

To learn more about this IBM Institute for Business Value study, please contact us at [iibv@us.ibm.com](mailto:iibv@us.ibm.com). Follow @IBMIBV on Twitter, and for a full catalog of our research or to subscribe to our newsletter, visit: [ibm.com/ibv](https://ibm.com/ibv).

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## National Retail Federation

The National Retail Federation is the world's largest retail trade association. Based in Washington, D.C., NRF represents discount and department stores, home goods and specialty stores, Main Street merchants, grocers, wholesalers, chain restaurants and internet retailers from the US and more than 45 other countries.

## IBM Institute for Business Value

The IBM Institute for Business Value (IBV), part of IBM Services, develops fact-based, strategic insights for senior business executives on critical public and private sector issues.

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