

A close-up photograph of a person's hands holding and interacting with a smartphone. The background is blurred, showing what appears to be a retail counter with a keyboard and other items. The overall lighting is soft and focused on the hands and device.

FRICTIONLESS CUSTOMER JOURNEYS

Elevating the Shopping Experience in the Intelligent Store



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Table of Contents



CLICK BELOW TO NAVIGATE TO EACH SECTION IN THIS DOCUMENT.

Executive Summary.....	3	Back-end Data Analytics Key to Operational Efficiency, 360-degree Customer Understanding	14
Elevated Shopping Experiences in the Intelligent Store.....	5	Intelligent Store Technologies Drive Efficiencies in All Aspects of Operations.....	15
Frictionless Shopping Innovation Continuum.....	6	Challenges to Securing Innovation Budgets	16
Computer Vision Enables Frictionless Shopping Experiences	7	Industry Adoption of Intelligent Store Technologies.....	17
Digital Shelf Enhances Personalized Interaction and Workforce Efficiency.....	8	Inaction Means Missing Out on Significant Benefits.....	18
Digital Workforce Tools Engage Employees, Improve Customer Service	9	Essential Guidance for Creating Frictionless Shopping Experiences	19
Micro-fulfillment Tools Offer Customer Choice, Aid Operational Efficiency.....	10	Essential Guidance for Capitalizing on Customer Engagement In Store.....	20
Additive Benefits of Computer Vision Implementation.....	11	Essential Guidance for Choosing Technology Partners and Assessing Cultural Readiness.....	21
The Value of Engagement Across All Screens and Devices Grows When Tied to Retail Media Networks.....	12	About the Analysts.....	22
Video, Electronic Article Surveillance Technologies, RFID, and Other Sensors Offer Asset Protection, Queue Management, and Safety	13	Message from the Sponsor.....	23

Executive Summary

Frictionless Customer Journeys: Elevating the Shopping Experience in the Intelligent Store

Key Points

- ▶ A continuum of technologies are enabling frictionless customer journeys in stores, elevating the shopping experience.
- ▶ Computer vision, smart carts, and digital engagement across all screens and devices:
 - Automate store operations
 - Personalize customer interactions and promotions
 - Activate new revenue streams including retail media networks
 - Allow for real-time inventory awareness and reduced shrink
- ▶ Workforce engagement applications automate tasking and free up time and resources for high value interactions with customers.
- ▶ Micro-fulfillment and robotics solutions offer customers choice and improve profitability for ecommerce purchases.
- ▶ Capturing data threads from these applications and platforms is key to backend data analytics.
 - AI and machine learning drive improvements in real-time.
 - 360-degree view of customer improves contextualized offers, interactions, and loyalty.

Executive Summary (continued)

Challenges

- ▶ Securing budget and buy-in for restructuring of complex systems and legacy architecture.
- ▶ Capitalizing on real-time data-use opportunities due to lack of compute power or connectivity.
- ▶ Cutting through the noise to choose the right technology partner.

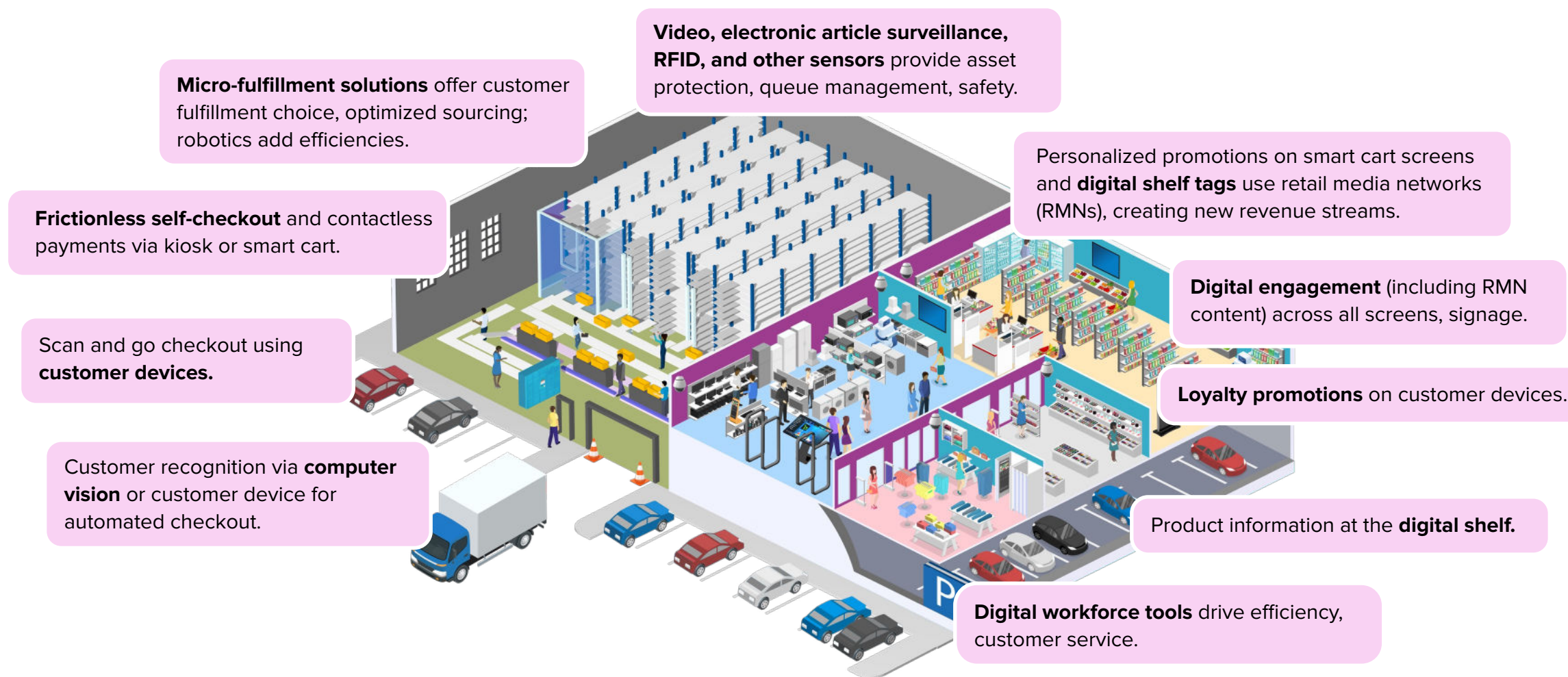
Recommendations

- ▶ Enable convenience and choice while reducing shrink using a combination of computer vision, smart shelf, and smart cart applications.
- ▶ Automate in-store processes — including employee tasking, loss prevention measures, inventory management, and micro-fulfillment.
- ▶ Build back-end data analytics into every solution; AI should empower next best actions and strategic decisions.
- ▶ Engage customers across all screens, devices, shelves, and carts, activating new revenue streams such as retail media networks.



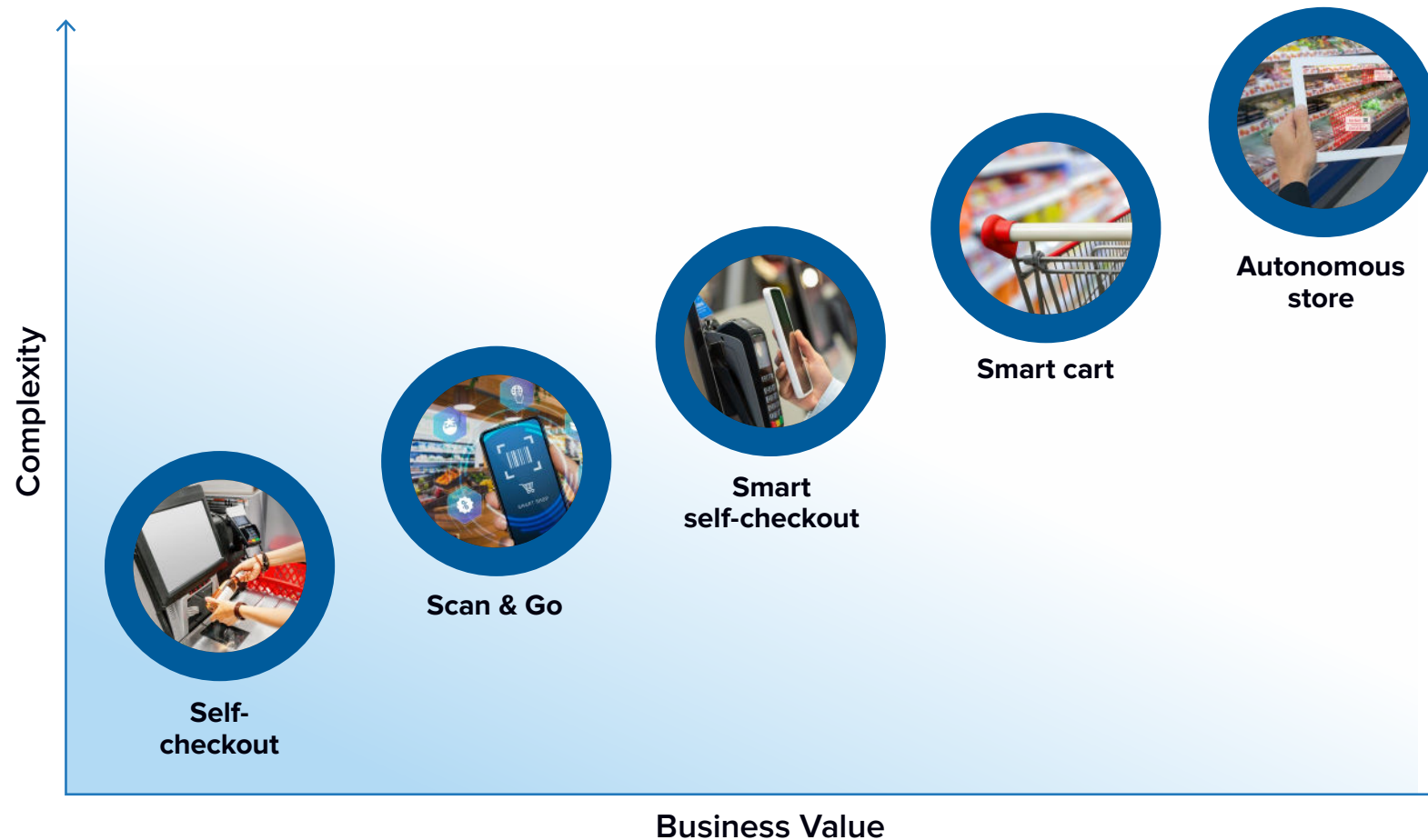
Choose technology partners who help navigate cultural roadblocks to innovation while minimizing retrofitting and rework to maximize speed to value.

Elevated Shopping Experiences in the Intelligent Store



Frictionless Shopping Innovation Continuum

Retailers are focusing innovation efforts on technologies that use computer vision for frictionless shopping.



Benefits of computer vision solutions + AI:

- Generates insights into the shopping experience
- Automates store processes for efficiency, scale
- Blends the in-store experience with the convenience of online shopping
- Raises the level of personalization and value to the customer

Computer Vision Enables Frictionless Shopping Experiences

Technology description: computer vision

Computer vision refers to a range of image sensing technologies including digital video, image scanning, object recognition, and infrared imaging that is then processed by software and used to make decisions and take actions within the store environment. Images and data are processed and analyzed by AI, leading to next-best-action recommendations.

Benefits

- Gathers data about customer journey, enabling personalized, 360-degree customer interactions.
- Powers convenient interactions at the shelf, cart, or checkout, improving customer experience.
- Enables inventory management and workforce optimization when combined with modular software applications.

Challenges

- There's not a "silver bullet" solution that solves for all desired uses. It can be hard to know where to start.
- Single-purpose implementations can seem cost-prohibitive at scale when efficiency is the only ROI measure.
- Retailers need to build frameworks that can support multiple modular cloud and edge applications.

Risks of not investing

Computer vision + AI technology offers retailers huge advantages in optimizing almost every area of store operations, from how customers interact with products, to guiding employee activity on the floor, to recognizing opportunities for shrink reduction and security. Not investing means losing those advantages.

A range of devices support computer vision use cases:

- Customer mobile devices
- Employee mobile devices
- Self-checkout kiosks
- Smart carts
- Overhead cameras and sensors
- Smart shelf cameras and sensors
- Entry/exit gate cameras and sensors

Digital Shelf Enhances Personalized Interaction and Workforce Efficiency

Technology description: digital shelf

Digital workforce tools and platforms include tasking software and AI, communications applications and wearable devices, training and resource tools, and applications that allow employees to manage schedules and communications with managers. Digital workforce tools depend on connectivity, as well as data threads from IoT, inventory, and customer awareness.

Benefits

- Connects customers to the information they need to make frictionless, informed purchases.
- Automates tedious, manual pricing tasks using electronic shelf labels; computer vision prompts quick restocks.
- Provides significant in-store opportunities to leverage and monetize retail media networks.

Challenges

- Ongoing management of a variety of device types may be cumbersome.
- This technology may be transformational, but it's still in the pilot-testing phase in most segments.
- Integration with many systems will be required to see full ROI — but integration will lead to digital twin capabilities.

Risks of not investing

Shoppers expect the same benefits of online shopping in stores. Retailers who do not provide a frictionless way of interacting with product information or fulfilling orders at the shelf may lose customer loyalty. Failing to automate routine tasks such as pricing will result in lost labor cost and employee dissatisfaction.

“Digitization of inventory management using electronic shelf labels, RFID, and IoT technologies boosts **sustainability**. AI and machine learning gather and analyze data and make recommendations that minimize waste and keep customers happy with selection and endless aisle capabilities.”

Leslie Hand
Group VP, IDC Retail Insights

Digital Workforce Tools Engage Employees, Improve Customer Service

Technology description: digital workforce tools and platforms

Computer vision refers to a range of image sensing technologies including digital video, image scanning, object recognition, and infrared imaging that is then processed by software and used to make decisions and take actions within the store environment. Images and data are processed and analyzed by AI, leading to next-best-action recommendations.

Benefits

- Applications and platforms that prioritize tasks offer real-time feedback on performance, and enable communications that allow the front-line workforce to focus on high-value interactions with customers.
- Lower labor costs, better compliance, and overall employee retention will deliver ROI.

Challenges

- Workforce optimization depends on apps and tools having access to data in real time. Connectivity and data architecture must be able to access and process the right information at the right time (cloud/edge/in-store compute priorities).
- Workforce engagement tools should simplify the workplace, not add to complexity. Interfaces should be intuitive and streamlined and designed for employee ease of use.

Risks of not investing

The complexity of delivering on personalized, choice-based customer journeys puts great pressure on frontline employees. The modern workforce seeks tools that empower them to provide good service, as well as channels for employee feedback, voice, and values alignment with the company. Manual processes and siloed data are not up to the task. Retailers risk losing customers and employees if they don't invest in digitized workforce management.

“Digital workforce tools empower employees to serve customers better. Productivity improves, but perhaps more importantly, when connected to resources, information, and a broader community of employees, the workforce flourishes. The workforce with a sense of belonging and loyalty is more satisfied and a better contributor to organizational success.”

Leslie Hand
Group VP, IDC Retail Insights

Micro-fulfillment Tools Offer Customer Choice, Aid Operational Efficiency

Technology description: micro-fulfillment

Micro-fulfillment uses small-scale warehouses in stores, or in urban areas close to end customers, and leverages advanced analytics and robotics to automate and optimize distribution. Computer vision, electronic shelf labels, inventory management platforms, RFID tags and scanners, workforce tasking platforms, and robotics play a role.

Benefits

- Responsive to growing customer demand for channel-agnostic, contactless fulfillment and delivery options.
- Computer vision technologies ensure accuracy, creating digital twins of orders for better customer satisfaction.
- AI-directed picking, packing, and last-mile fulfillment offer efficiencies that drive profitability.

Challenges

- Retailers must offer intelligent promising, real-time inventory awareness, and fulfillment choices to the customer.
- A flexible, distributed framework for app integration will require change to old ways of managing data.
- Smaller retailers may need to outsource the capability, so data and relationships/loyalty will be shared.

Risks of not investing

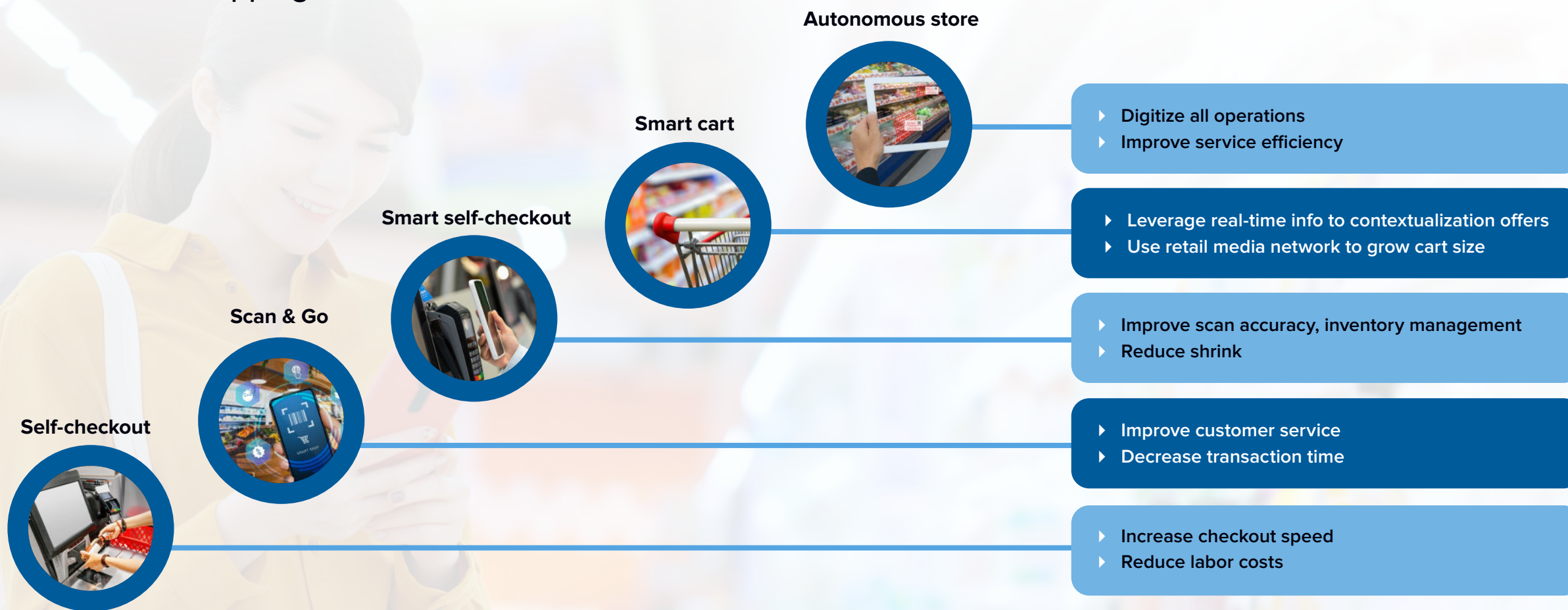
Customers want choice in how their orders are fulfilled and delivered. Executing in a way that delights the customer requires automation in order to achieve profitability. Retailers who neglect this aspect of digitization risk losing customers to retailers who offer choice, and risk losing revenue to inefficient processes.

“Retailers must offer intelligent promising, real-time inventory awareness, and fulfillment choices to the customer. To succeed they’ll harness a variety of AI-directed solutions that meet customer needs. Careful analysis, planning, and adaptability shall be cornerstones of successful fulfillment programs.”

Leslie Hand
Group VP, IDC Retail Insights

Additive Benefits of Computer Vision Implementation

Frictionless Shopping Innovation Continuum



The Value of Engagement Across All Screens and Devices Grows When Tied to Retail Media Networks

At front of store (or store display)

- Media at the shelf possible with smart shelf label technology.
- 360-degree customer awareness means huge potential for personalized offers and interactions at the decision point.
- Loyalty and shopping list awareness, tie-ins.

At the smart cart

- Deliver relevant promotions on cart screens based on the shopper's location in the store without targeting customer's mobile device.
- Innovate funding sources for retrofit using retail media networks.
- Reduce shrink with carts that track purchases and generate checkout codes.

On the customer's device

- Loyalty and wallet applications connect to QR codes at the shelf and to Intelligent Store and IoT systems to generate relevant offers.
- Scan and go applications can offer tie-ins to loyalty, shopping list, and wayfinding.

According to IDC research, over the next two years

48% OF RETAILERS

will focus their innovation efforts on acquiring and retaining customers through more personalized offerings.

“Having a smart cart accompanying a shopper is like holding the shopper's hand — the interactive capabilities build relationships and trust, deliver personalized content, and reduce the chances of theft and unintentional shrink.”

Leslie Hand, Group VP, IDC Retail Insights

Video, Electronic Article Surveillance Technologies, RFID, and Other Sensors Offer Asset Protection, Queue Management, and Safety

At front of store



- Staged interventions at self-checkout nudge customers to avoid missed scans, intentional fraud.
- Customized intervention sequences allow retailers to build relationships based on customer understanding.
- The higher up the continuum, the more accurate the retailer's understanding of cart contents and payments.
- Cameras provide traffic intelligence and track shopper purchases without collecting personally identifiable data or images.
- Queue management applications alert workforce to open new stations.

At the shelf



- Cameras and shelf sensors monitor dwell times, identify patterns, and recognize theft and concealment events.
- Cameras at the shelf can also identify stock-outs, aisle spills, and planogram compliance or error for better overall customer experience.
- In fresh food displays, cameras and sensors can alert retailers to spoilage or identify products that need to be promoted with special pricing as they near their best-by dates.

At back of store



- Retailers can opt to fully digitize the store, including warehouse and delivery areas in computer vision strategy.
- Computer vision can identify incorrect deliveries or theft.
- Facilitates supplier relationships.
- Exterior cameras provide security data and monitoring.
- RFID and Bluetooth create inventory awareness, prevent mis-deliveries.

“Computer vision strategies ease shrink pain points for retailers, while making the security measures invisible to the customer. Retailers can customize staged, step-up interventions to the self-checkout experience based on their customer patterns and actions, ultimately forging better relationships and trust.”

Leslie Hand, Group VP, IDC Retail Insights

Back-end Data Analytics Key to Operational Efficiency, 360-degree Customer Understanding

Technology description: back-end data analytics

Stores are data rich environments. Technologies and applications are capturing more data than ever. Modernized data analytics requires the ability to capture structured and unstructured data that can be used to analyze business processes and make improvements — and to make real-time decisions about operations and promotions.

Benefits

- Improves functional areas by recognizing patterns in logistics, inventory, customer behavior, and fulfillment.
- Improves inventory planning and workforce planning with predictive analytics.
- Improves KPIs due to AI recommendations for next best actions and customer interactions.

Challenges

- Enterprise-wide commitment to changing how data is collected and managed requires culture change.
- Multiple legacy data systems will need to integrate with multiple new cloud and edge-based systems.
- Many retailers lack capacity for compute load and will need to prioritize what is in cloud, at edge, or in store. 5G will bring improvements.

Risks of not investing

Take steps or get left behind. It may be hard to know where to get started, but the dangers of doing nothing are worse. Retailers must invest in back-end analytics to derive value from all other digital transformation efforts.

Retailers will increasingly apply AI to become more resilient and responsive to demand and customer needs.

57% OF RETAILERS

plan to have some form of computer vision and AI-enabled store technologies in place in the next two years.

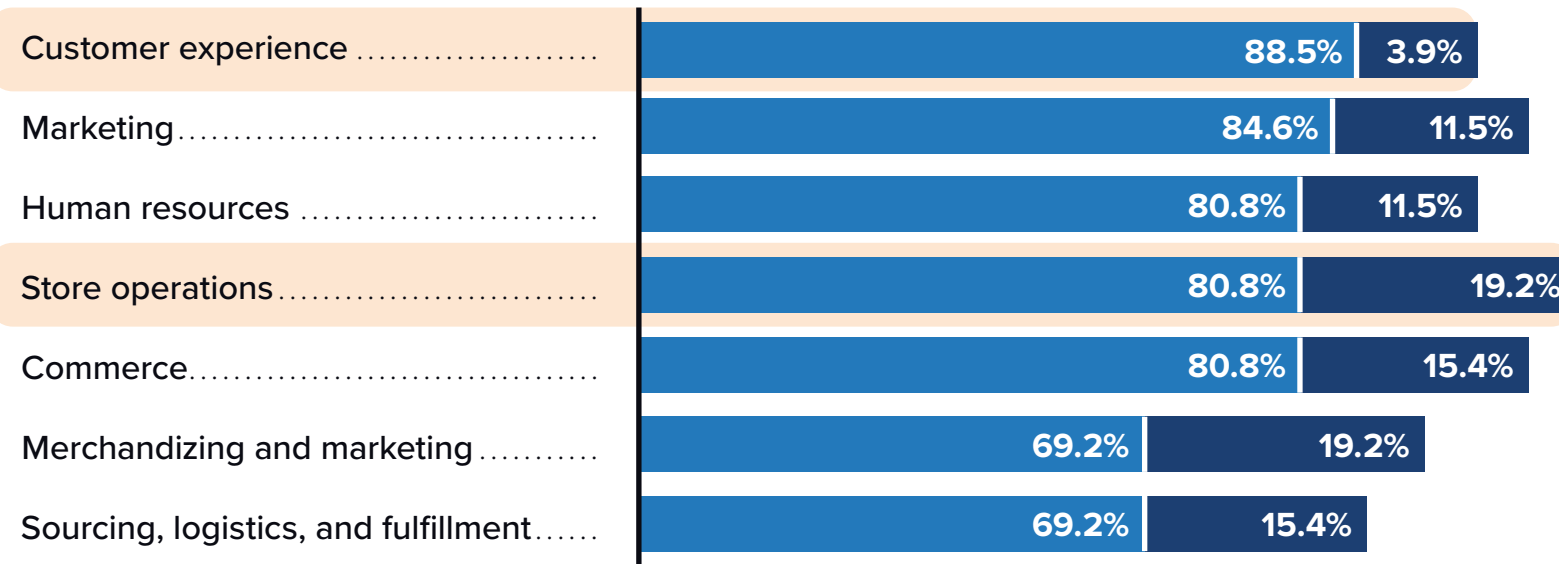
Source: IDC Global Retail Operating Models Survey, August 2022.

Intelligent Store Technologies Drive Efficiencies in All Aspects of Operations, Elevate Everyone's Experience

Where will retailers focus innovation efforts within next 2 years?

(% of respondents)

■ Now ■ In 2 years



n = 774, Base = retailers worldwide; Source: IDC's Global Retail Operating Models Survey, August 2022

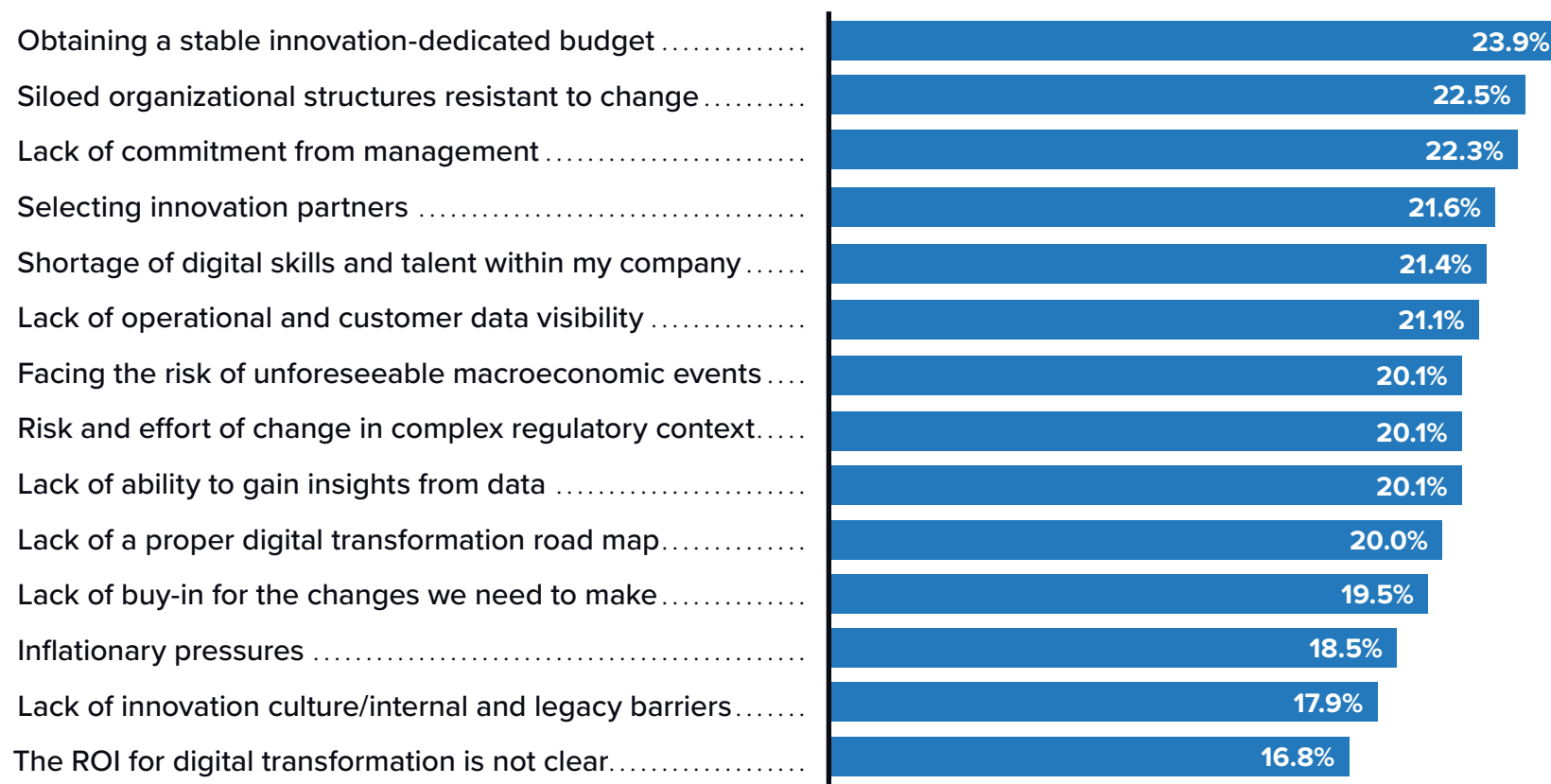
The fully digitized store uses data and AI decisioning to automate:

- **Customer experience**
 - Navigation
 - Virtual assistants/chat
 - Price changes
 - Contextualized promotions
 - Frictionless checkout, payments
 - Customized fulfillment
 - Store environment/IoT
- **Workforce optimization**
 - Task management
 - Communications
 - Customer assistance
- **Inventory awareness**
 - Product information
 - Real-time supply chain information
 - Loss and fraud prevention
 - Returns management

Challenges to Securing Innovation Budgets

Biggest Challenges to Innovating in Retail Organizations

(% of respondents)

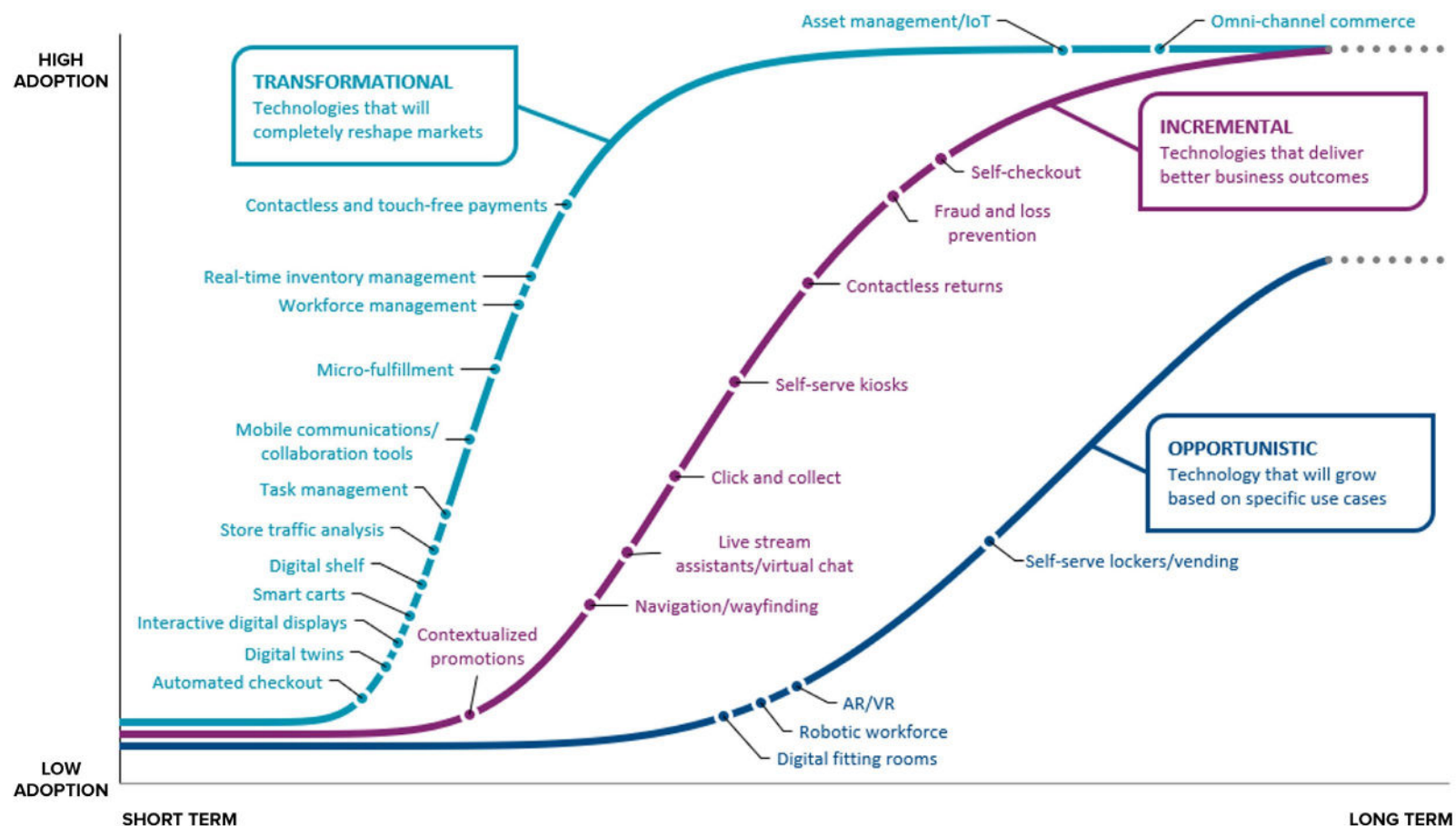


“Simplifying complexity is required. Retailers will minimize retrofits and re-dos and will architect for modular, rapid deployment, physically and digitally.”

Leslie Hand
Group VP, IDC Retail Insights

Source: IDC 2022 Retail Operating Models Survey

Industry Adoption of Intelligent Store Technologies

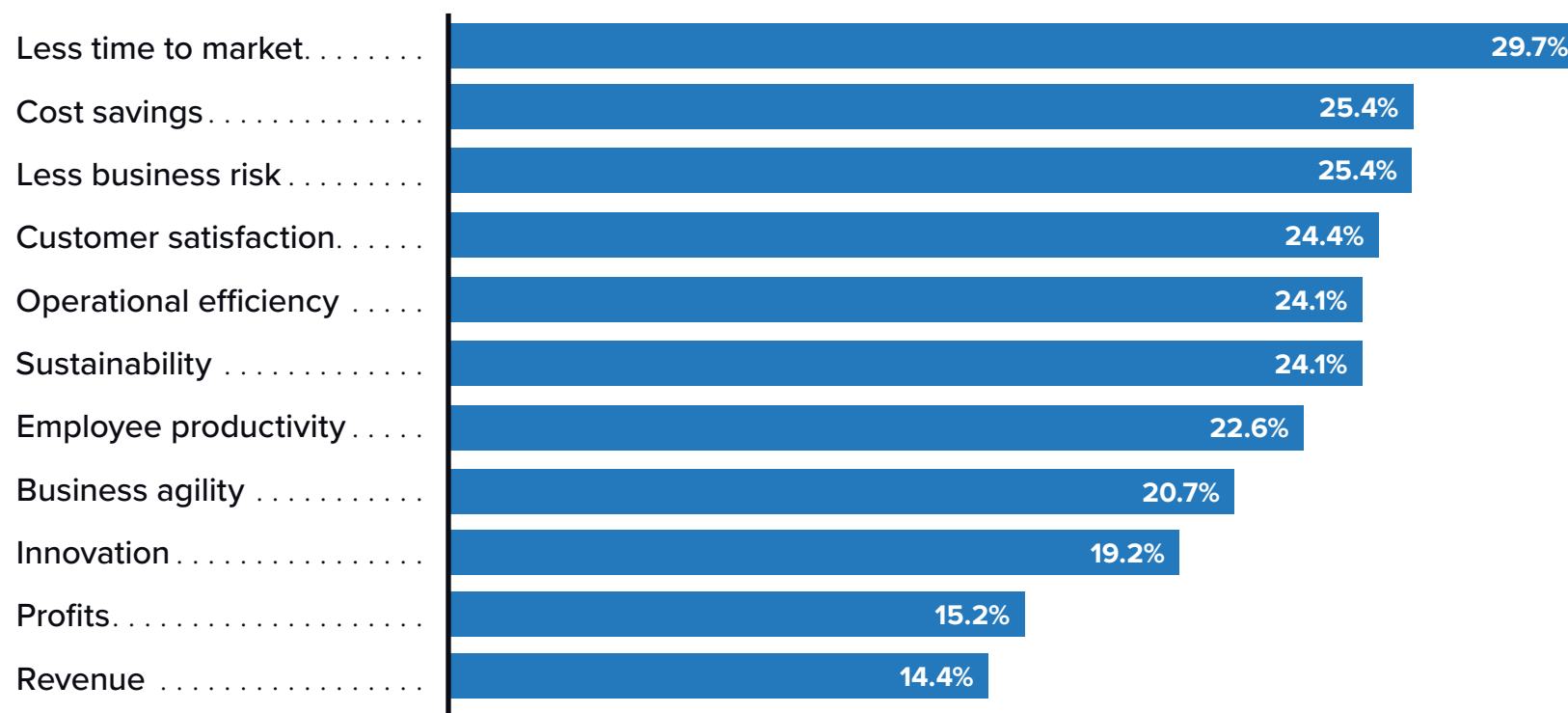


Source: IDC TechScape: Worldwide Omni-Channel Retail Operations Technology, 2023

Inaction Means Missing Out on Significant Benefits

Retailers report that digitizing the customer journey has immediate and long-term benefits.

(% of respondents)



“When implementing new technology, retailers now see the bigger picture and are investing strategically. Multi-use solutions such as computer vision have applications that can be deployed over time.”

Leslie Hand
Group VP, IDC Retail Insights

Source: IDC's *Future Enterprise Resiliency & Spending Survey* — Wave 10, November 2022

Essential Guidance for Creating Frictionless Shopping Experiences

Retail Challenge

Create frictionless, omni-channel shopping experiences for the customer.

Key Question

How do I enable convenience and choice while reducing shrink?

60% OF RETAILERS

plan to have some form of automated checkout solution in place in the next two years.

Source: IDC Global Retail Operating Models Survey, August 2022.

Call to Action

- Use computer vision, digital shelf technology, and smart carts to create a frictionless shopping experience for today's convenience-driven customer.
- Build back-end data analytics into every solution; AI should empower next best actions and strategic decisions.
- Automate in-store processes — including employee tasking, loss prevention measures, inventory management, and fulfillment — based on data analytics to derive operational efficiencies and reduce shrink.

Essential Guidance for Capitalizing on Customer Engagement in Store

Retail Challenge

Personalize interactive experiences in stores to increase customer loyalty at scale.

Key Question

How do I automate the process of making a customer feel known and valued?

Call to Action

- Engage the customer across all screens, devices, shelves, and carts using computer vision and AI, with the addition of customer awareness data and retail media networks.
- Provide opportunities for customer interaction with product information, brand values, loyalty, and rewards at shelf, aisle, cart, and checkout.
- Build empathetic relationships based on 360-degree views of customer interactions with the brand.

“Customers are seeking the same choice and convenience they have online — but now in stores.

Retailers, meanwhile, are seeking the same level of customer behavior awareness available in ecommerce — but now in stores.

Personalized, interactive experiences give the customer and the retailer what they are looking for. Tying these programs to retail media networks multiplies value.”

Leslie Hand
Group VP, IDC Retail Insights

Essential Guidance for Choosing Technology Partners and Assessing Cultural Readiness

Retail Challenge

Cut through the noise to choose the right technology.

Key Question

How do I know which solution is right for my culture, legacy assets, and customers?

Call to Action

- Look for partners that minimize retrofitting and rework to maximize speed to value.
- Address the typical “softer” challenges/roadblocks to innovation, including disconnect between known short- and long-term value/ROI of initiatives and budget availability.
- Focus on technology partners that can help identify opportunities to monetize data, media networks, and customer presence in stores.

Address digital transformation holistically across the organization.

Solutions must:

- Be integrated across processes.
- Address customer and employee experience needs.
- Offer real-time access to data and insights to improve engagement.
- Leverage partnerships.
- Increase speed of innovation cycles and enable the ability to pivot quickly.

About the Analysts

**Leslie Hand**

Group Vice President
Retail and Financial Insights, IDC

As group vice president, Leslie Hand is responsible for the research direction and teams supporting IDC Retail Insights and IDC Financial Insights. Hand works closely with the teams to help guide technology suppliers and buyers to develop best practices and strategies, aligned with where they are and where they want to go, leveraging IDC quantitative and qualitative data sets. Hand's specific research focus includes a particular emphasis on the digital transformation of the future "store," which operates in real time, is AI-enabled, and connects omni-channel customers to the frictionless, "touch-free," and secure experience they desire.

[More about Leslie Hand](#)

**Anne Paris**

Research Manager
Worldwide Retail Experiential Operations Strategies, IDC

Anne Paris is Research Manager for IDC Retail Insights responsible for worldwide retail experiential operations strategies. Ms. Paris's core research coverage includes technologies that enable personalized, touch-free customer experience in stores, optimized employee engagement and task management on the store floor, and efficient, resilient operations from ordering through fulfillment and returns.

[More about Anne Paris](#)

Message from the Sponsor



Microsoft Cloud for Retail and our Partner solutions provide innovative store technology and data analytics that transform the shopping experience, helping build stronger relationships with customers. In addressing some of retailers most pressing challenges, these solutions enhance customer experiences and streamline operations to drive sustained profitability and growth.

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