The Forrester Tech Tide™: AI And Analytics For Retail, Q2 2021

Nineteen Technologies Underpin AI And Analytics For Retail

by Sucharita Kodali, Madeline Cyr, George Lawrie, and Brendan Witcher
May 26, 2021

Why Read This Report

Artificial intelligence and analytics are increasingly critical to retailers' ability to win, serve, and retain their customers. To accelerate their performance by harnessing AI and analytics, retailers are evaluating and adopting a range of technologies. This Forrester Tech Tide™ report analyzes the maturity and business value of the most commonly implemented or discussed technology categories that support AI and analytics for retail. Digital business professionals should read this report to shape their firm's investment approach to these technologies.

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by Sucharita Kodali, Madeline Cyr, George Lawrie, and Brendan Witcher
with Fiona Swerdlow, Brandon Purcell, and Taylor Hansen
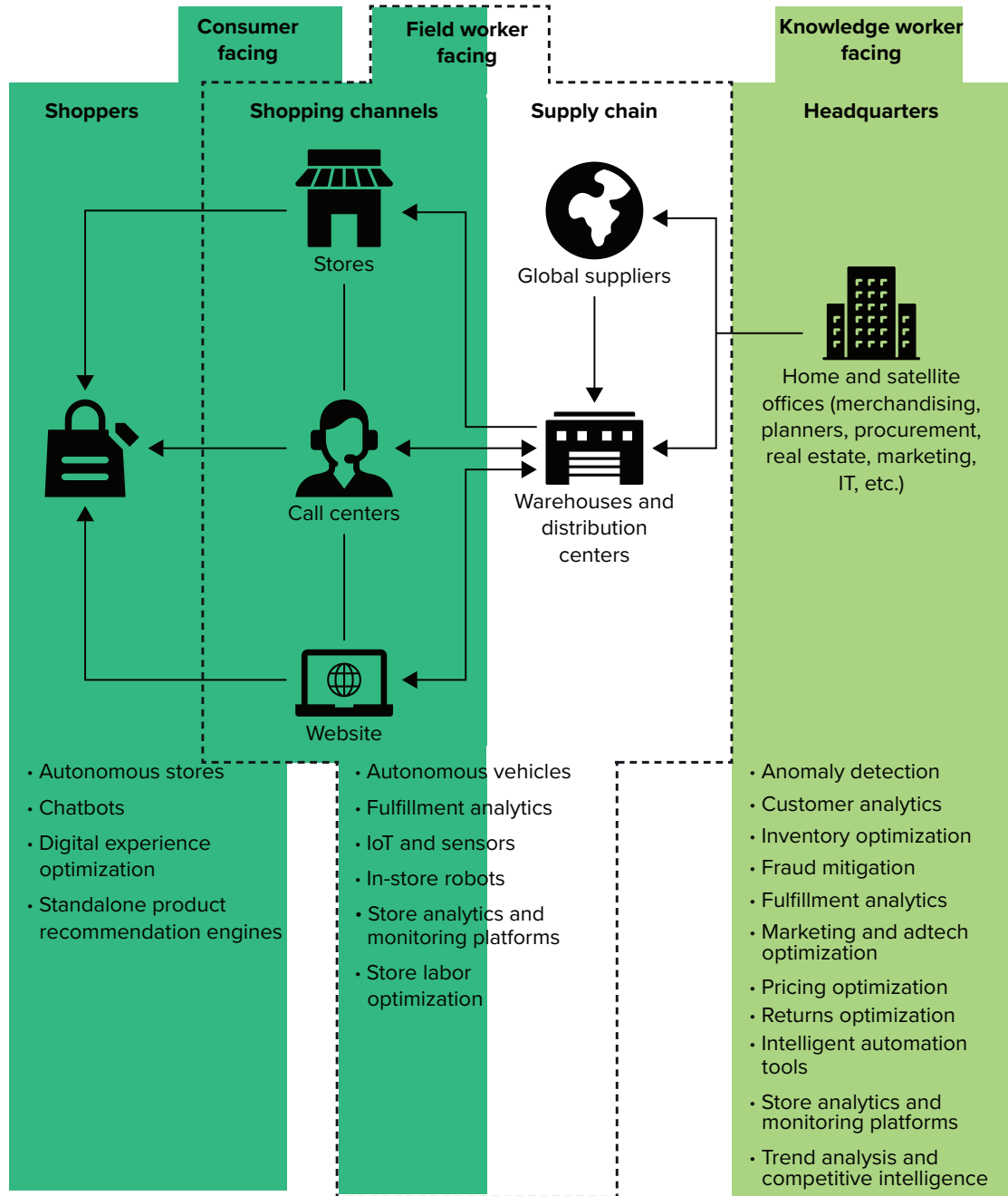
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Leverage Artificial Intelligence And Analytics For Retail Success

AI, including automation technologies and even autonomous robots, and analytics solutions promise to reduce retailer costs and improve sales and customer experiences. The retail AI solutions in this report run the gamut, from solutions that employ simple forms of robotic process automation (RPA) to AI technologies that use deep learning frameworks. The AI and analytics solutions we discuss affect all players in the retail ecosystem — consumers, store associates, and knowledge workers such as buyers, planners, or IT developers (see Figure 1).

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FIGURE 1 AI For Retail Technologies Touches All Parts Of The Retail Ecosystem

Consumer facing

Field worker facing

Knowledge worker facing

Shoppers

Shopping channels

Supply chain

Headquarters

Stores

Global suppliers

Home and satellite offices (merchandising, planners, procurement, real estate, marketing, IT, etc.)

Call centers

Warehouses and distribution centers

Website

- Autonomous stores
- Chatbots
- Digital experience optimization
- Standalone product recommendation engines

- Autonomous vehicles
- Fulfillment analytics
- IoT and sensors
- In-store robots
- Store analytics and monitoring platforms
- Store labor optimization

- Anomaly detection
- Customer analytics
- Inventory optimization
- Fraud mitigation
- Fulfillment analytics
- Marketing and adtech optimization
- Pricing optimization
- Returns optimization
- Intelligent automation tools
- Store analytics and monitoring platforms
- Trend analysis and competitive intelligence

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Curate A Set Of Technologies That Enable AI And Analytics For Retail

Forrester interviewed technology decision-makers, suppliers, and other subject-matter experts in our search for the most important AI and analytics solutions for retail. Each of the technology categories analyzed in this Forrester Tech Tide meets three criteria:

- **It is a key contributor to customer, field worker, or knowledge worker engagement.** The technologies in this report improve customer experience (CX) by engaging customers directly or engaging with retail employees to improve their performance.

- **It is commercially available at enterprise scale.** The vendors that offer these technologies vary in size, regional focus, and market approach, but all have live deployments. The companies vary in maturity; we include both established businesses and startups.

- **It has (or will have) market traction.** The technologies in this report are regularly the subject of user client inquiries and conversations. We've included technologies that clients use today and technologies that they should consider using in the future.
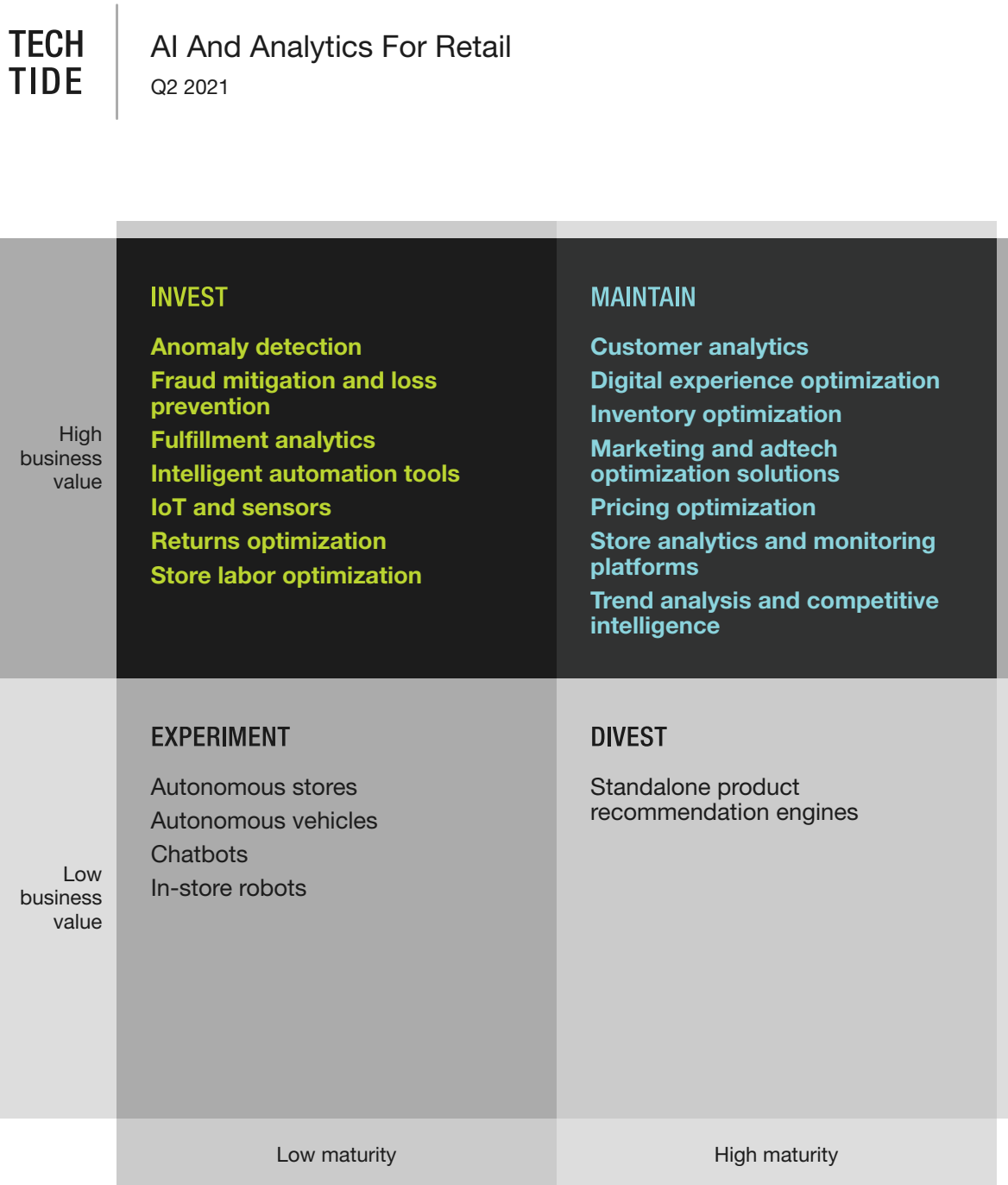
Select AI And Analytics For Retail Technologies That Offer High Business Value

The central 2x2 graphic offers a summary of the state of the technology categories that make up the AI and analytics for retail landscape (see Figure 2).

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FIGURE 2 Tech Tide™: AI And Analytics For Retail, Q2 2021

TECH TIDE
AI And Analytics For Retail
Q2 2021

INVEST

Anomaly detection
Fraud mitigation and loss prevention
Fulfillment analytics
Intelligent automation tools
IoT and sensors
Returns optimization
Store labor optimization

MAINTAIN

Customer analytics
Digital experience optimization
Inventory optimization
Marketing and adtech optimization solutions
Pricing optimization
Store analytics and monitoring platforms
Trend analysis and competitive intelligence

High business value

EXPERIMENT

Autonomous stores
Autonomous vehicles
Chatbots
In-store robots

DIVEST

Standalone product recommendation engines

Low business value

Low maturity

High maturity

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Evaluate Business Value And Maturity For Each AI And Analytics For Retail Technology

We plot the categories on two dimensions:

- **Business value.** This is the expected business return on technology investment over the reasonable lifetime of the technology. Some technologies deliver value faster than others. Returns for this study focus on sales, profit, or engagement that creates deeper relationships with customers and employees. When returns are not tangible, we look at the likelihood of higher Customer Experience Index (CX Index™) and Employee Experience (EX) Index scores, higher conversion rates for customers, higher productivity and job satisfaction rates for employees, or other subjective metrics.

- **Maturity.** Maturity places a crucial check on hype among the technologies we evaluate. Vendor offerings with only theoretical value — but few customers — are accordingly rated less mature. The ability to demonstrate engagement with customers and employees in real, repeatable use cases for enterprises is key, as are KPIs to prove replicability. The entry of vendors with proven track records and deep pockets can increase maturity, but real-world implementations trump all else. For instance, RPA implementations have dozens of implementations to evaluate, compared with relatively few for, say, autonomous vehicles.

Determine Strategies For Retail AI Solutions Based On Business Value And Maturity

The business value and maturity dimensions, in turn, position each category in one of four quadrants:

- **Experiment.** Low maturity and low business value characterize technologies in the Experiment zone. Most enterprises should limit their exposure to these technologies to bounded experiments, waiting for the expected business value of these newer categories to improve before investing.

- **Invest.** Low maturity and high business value characterize technologies in the Invest zone. These new technologies have ripened to the point where enterprises can confidently invest.

- **Maintain.** High maturity and high business value characterize technologies in the Maintain zone. These are the bread-and-butter technologies that most enterprises rely on to run their business. They're generally stable, well-understood technologies that continue to have high returns to the business. Most enterprises should maintain their installations and usage of these technologies.

- **Divest.** High maturity and low business value characterize technologies in the Divest zone. These older technology categories have reached a point where their business value has dropped. Most enterprises should be looking for newer, higher-value replacements and divesting from these categories.

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Invest In And Maintain Retail AI And Analytics Technologies With High Business Value

While retailers say they are investing in AI solutions, there is also a lot of hype. In mapping the current trends in the ecosystem, we found that:

- **Retail AI solutions are AI centric or AI infused.** Forrester has a broad definition of AI: "Artificial intelligence refers to the theory and capabilities that strive to mimic human intelligence through experience and learning." We are most interested in the degree to which AI and analytics deliver value for retailers and their customers (which many simple solutions can do for retail), rather than how much computing a solution requires.

- **There is a plethora of solutions touching every part of retail.** Retail has many functions (e.g., merchandising, supply chain, store operations, marketing) and there are dozens of AI companies that purport to improve metrics throughout the retail flow. We conducted dozens of interviews to identify the highest-value solutions among them.

- **The most promising solutions are clustered in back-office functions.** The world seems to be fascinated by delivery robots and cashierless convenience stores. However, the most valuable (i.e., least expensive and most effective) solutions with clear-cut, quick ROI are often long-standing, even "boring," back-office solutions that simply make retailers more efficient.

Experiment With Autonomous Stores, Autonomous Vehicles, And Others

Four of the AI and analytics for retail technologies fall into the Experiment quadrant of the Tech Tide, meaning they are early-stage solutions with promising business value. (The operative word is "promising," as we do believe many of these solutions will one day have strong ROI, but they need more live deployments at scale.) Given the growing maturity of these technologies, we suggest experimenting with them in a limited setting as they prove greater business value.

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Autonomous Stores

Autonomous stores purport to be "cashierless solutions" for retailers (see Figure 3). One-third of global data and analytics decision-makers in retail and wholesale expected their organization to use customer self-service solutions in 2020. Following the launch of Amazon Go in 2018, numerous enterprise and venture-capital-backed solutions have crammed into the space. But the cost of deploying cameras in these stores is very high, and they often require enormous computational capabilities, so for now they primarily work in limited types of retail experiences such as stores that either sell packaged goods or have small-format settings.

Recent innovations like better touchscreens, faster processors, and better connectivity may improve self-service solutions, but they are currently rare deployments. Furthermore, these stores do not eliminate entirely the need for labor, as humans are still needed for functions such as restocking shelves and helping customers with restricted goods such as alcohol and cigarettes. Handheld devices, while cheaper, aren't yet commonplace for shoppers.

FIGURE 3 Experiment: Autonomous Stores

Strategy: **EXPERIMENT**	**Autonomous stores**
MATURITY ↓ **Low** **BUSINESS VALUE** ↓ **Low** **LIFECYCLE COST** **$ $ $** **SAMPLE VENDORS** **AiFi; Avery Dennison; ByteFoods; Caper; Chowbotics by DoorDash; Everseen; Fuelmatics; Grabango; Loop Neighborhood; SandStar; Scandit; Standard Cognition; Stockwell; Trigo Vision**	**Definition** Autonomous stores give customers the ability to check out without going through a cash wrap. The underlying technologies include sensor-enabled point of sale (POS), camera vision, shopper's self-directed phone scan, carts that check out shoppers automatically, robots, vending machines, and smart fridges. **Maturity rationale** These solutions are only a few years old, as the computing capability to enable them is recent. Some vendors in the space optimistically believe there could be tens of thousands of deployments in a few years. **Business value rationale** These technologies can reduce the amount of time customers wait in line for human employees. But many of the solutions are expensive, have long deployment times, and can only handle a small quantity of merchandise or shoppers at any one time.

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Autonomous Vehicles

Labor is an enormous cost of retail, particularly transportation (e.g., between warehouses, ports, and stores; within delivery yards; and to customer homes). Autonomous vehicles can reduce some retail labor costs by moving items around a distribution center yard or delivering items to customers in specific areas such as college campuses. Forrester believes that the narrower the use case is, the greater the utility, reliability, and adoption are. One-quarter of global data and analytics decision-makers in retail and wholesale expected their organization to use delivery robots in 2020 (see Figure 4). A potential snag in the adoption of these solutions is regulatory frameworks, which are immature and could hamper deployment for driverless cars, trucks, ships, and drones.

FIGURE 4 Experiment: Autonomous Vehicles

Strategy:
EXPERIMENT

MATURITY
↓ **Low**

BUSINESS VALUE
↓ **Low**

LIFECYCLE COST
$$$

SAMPLE VENDORS
AEye; FedEX SameDay Bot; Matternet; Nuro; nuTonomy; Outrider; Robomart; Scout (Amazon); Starship Technologies

Autonomous vehicles

Definition
Autonomous vehicles include driverless cars and trucks, sidewalk robots, maritime vehicles including container ships, and even package delivery drones.

Maturity rationale
While promising category, this category remains unproven at scale. Pilots continue to refine software and gain data to improve navigation, but supplemental human (non-autonomous) operation is still common, particularly in driverless cars and trucks.

Business value rationale
Today only a small percentage of orders — like goods requiring synchronous delivery (e.g., restaurant order delivery) are appropriate candidates for this technology. Early indicators are that this technology (particularly driverless trucks) can reduce the cost of some deliveries, but solutions like drones are limited by small weight-bearing loads and a currently nonexistent landing infrastructure.

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Chatbots

Chatbots gather upfront information from retail customers to ensure that the customer reaches the best agent to help them, and then they provide context to that agent for a smoother interaction (see Figure 5). We are still a long way from a chatbot resembling Scarlett Johansson's character in the movie *Her*, but chatbot technology has improved over the years. While many chatbots are still rules based, new generations of vendors are now leveraging machine learning and natural language understanding to improve and scale high-touch, high-service models. In the future, we envision chatbots (plus greatly improved audio processing tools) that also support store associates. For example, a bot could suggest to a store associate what to say and even how to respond to a certain tone of voice or unspoken verbal signals.

FIGURE 5 Experiment: Chatbots

Strategy: **EXPERIMENT**	**Chatbots**
MATURITY ↓ **Low**	**Definition** Chatbots are conversational commerce solutions that use either deterministic decision trees or natural language understanding and AI to provide automated assistance by simulating a two-way conversation with employees and customers via speech or text.
BUSINESS VALUE ↓ **Low**	**Maturity rationale** Chatbot solutions are constantly evolving as new generations of vendors are now leveraging machine learning and natural language understanding. Where we expect these solutions to be in five years is substantially different than where they are now.
LIFECYCLE COST $ $ $	
SAMPLE VENDORS **Ada; Avaamo; Linc Global; Microsoft Power Virtual Agents; Sherpa.ai; Snaps; Vee24; Verint**	**Business value rationale** Chatbots drive benefits through pre- and post-sales support. They also influence revenue through additional insights like service cost optimization and CX improvements.

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In-Store Robots

In-store customer service robots are particularly impactful in larger stores, where goods are spread across large spaces with numerous aisles, making it harder for customers to quickly locate the products they're looking for. These robots are often used to manage inventory and verify store planograms. Some robots are essentially customer-facing digital store associates (e.g., the storied "LoweBot") that help with wayfinding, answering questions, and even translating languages. Other types of robots in this category help to complete manual store tasks like cleaning (see Figure 6). Retailer receptivity has been mixed: While Germany's Adler TORY rollout has continued, Walmart ended a contract for in-store robots because store associates were more efficient at the same tasks.

FIGURE 6 Experiment: In-Store Robots

Strategy:
EXPERIMENT

MATURITY
↓ **Low**

BUSINESS VALUE
↓ **Low**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Bossa Nova; Chowbotics by DoorDash; Fellow Robots; Gather AI; Pensa Systems; Simbe; Zebra Technologies

In-store robots

Definition
These self-propelling machines wander a store, warehouse, or other environment to monitor products, safety, cleanliness, or other objectives with the goal of improving the efficiency of retail operations and CX.

Maturity rationale
Although intriguing pilots are underway for in-store robots, the technology platforms themselves are not very mature. Performance in busy shopping areas requires dexterity that these robots cannot always deliver.

Business value rationale
While these robots can take low-value tasks off human employees' hands, the best store associates currently are just as efficient as robots. Companies should explore concrete scenarios like inventory checks and replenishment or cleaning. If store labor costs rise, as we expect them to, we anticipate that in-store robots will be more attractive financially.

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Invest In Anomaly Detection, Returns Optimization, And Others

Seven of the AI and analytics for retail technologies fall into the Invest quadrant of the Tech Tide, with low maturity and high current business value. While store labor optimization focuses on optimizing field worker capabilities, others, such as fulfillment analytics and returns optimizations, tend to support knowledge workers based in central offices.

Anomaly Detection

These tools recognize outliers amid otherwise "normal" patterns and alert administrators about those variances. Think of them as daily CT scans for an entire business. In e-commerce, that could mean flagging a higher-than-average abandonment rate or unusually high or low conversion figures (see Figure 7). This analysis can alert a team to a problem — or an opportunity — that may exist somewhere but that no one has clearly recognized yet. While similar to intelligent automation tools (and using much of the same technology), the outcomes in anomaly detection are about discovering otherwise "hidden" things versus replicating tedious tasks. Online retail teams that occupy back-office functions are the most likely to benefit from anomaly detection tools. Some of the best benefits of these solutions are that they can replicate otherwise difficult to find user problems — which in turn helps IT teams, executives, and consumers.

FIGURE 7 Invest: Anomaly Detection

Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Baresquare; CallMiner; Contentsquare; DynamicAction; Outlier.ai; Profitect (Zebra Technologies); SoundCommerce; Zebra Technologies

Anomaly detection

Definition
These solutions evaluate broad time series data sets to detect unusual patterns or changes in customer behavior. Anomaly detection solutions can identify major problems on a website but also minor issues like missing content in a large product catalog.

Maturity rationale
Maturity for these solutions is still low, as retailers (often incorrectly) assume costs for these solutions are high and time to deploy is long. The challenge lies in stitching together data and in being able to infer insights from disparate data sources (e.g., site traffic data with merchandising or order management systems).

Business value rationale
The value of these solutions is high because retailers often do not know what they don't know and many of the problems identified are quickly fixable. Some of these solutions can replicate otherwise difficult-to-find user problems — which in turn helps IT teams, executives, and consumers.

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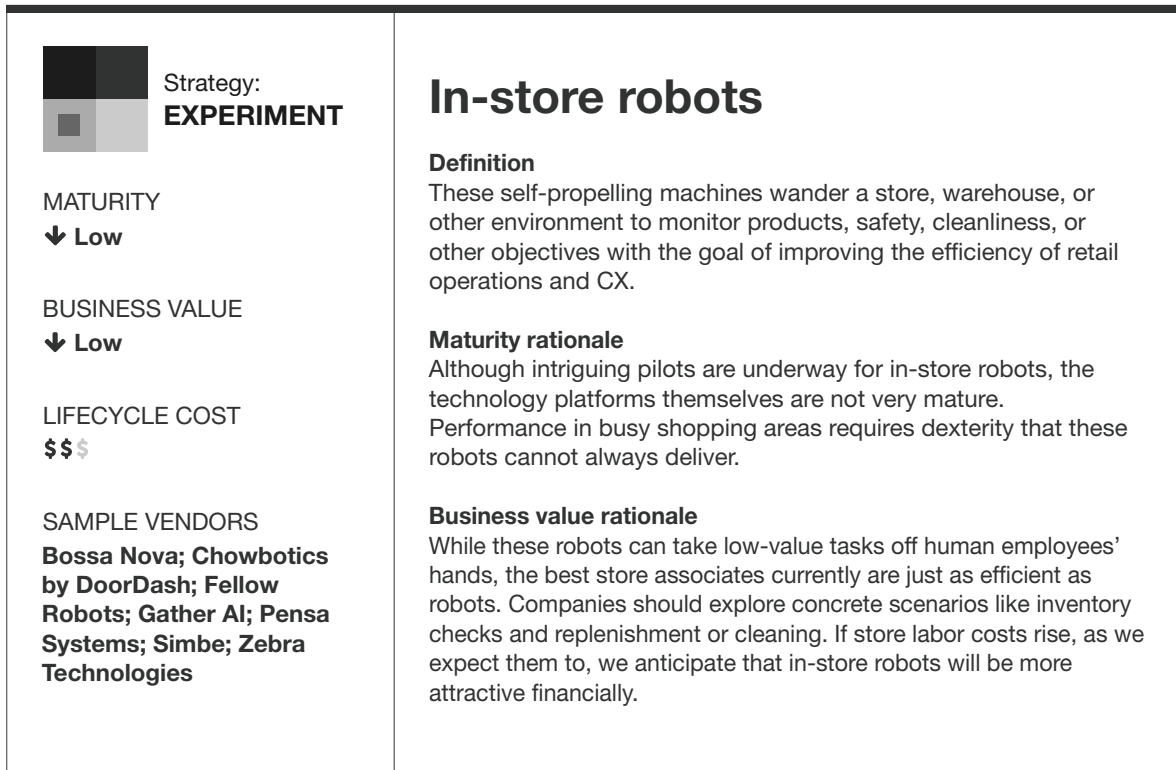**The Forrester Tech Tide™: AI And Analytics For Retail, Q2 2021**
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Fraud Mitigation And Loss Prevention

Fraud mitigation and loss prevention technologies for retail include solutions for both online retail and physical store sales. E-commerce solutions include tools to reduce or eliminate fraudulent online orders and returns, traffic, malicious bots, or products in marketplaces. Store solutions reduce fraud in physical environments and may employ technologies such as facial recognition, camera vision, or other sensors to monitor stolen, fake, or misplaced products or dangerous conditions like an active shooter in a public space. Recent enhancements in AI for payment and website traffic security reduce fraudulent transactions, increase the number of valid transactions that were declined, or defend against malicious bots (see Figure 8).

FIGURE 8 Invest: Fraud Mitigation And Loss Prevention

Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
CB4; Entrupy; Evolv Technology; FaceFirst; Fakespot; Forter; Riskified; Signifyd

Fraud mitigation and loss prevention

Definition
Fraud mitigation and loss prevention solutions comprise solutions that reduce omnichannel (online, point of sale, phone, etc.) fraud at merchants, issuers, and payment processors — as well as solutions that monitor counterfeit products, which have proliferated as online marketplaces have grown.

Maturity rationale
As increasingly sophisticated cyber criminals develop new tactics quickly, this is an ever-evolving space that we believe will become much more sophisticated over time.

Business value rationale
Given that fraud is sizable enough that it can adversely impact profitability and reduce shopper trust, any solutions that can prevent fraud — or, by contrast, accept orders that an overly conservative payments engine would have rejected — has an immediate and high ROI.

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Fulfillment Analytics

Free and fast shipping is one of the most important drivers of conversion — and of repeat purchases, second only to price: 44% of US online adults cite free shipping as their top motivator to buy from a retailer that they've bought from before. But free shipping is also a cost center. Retailers that are able to make smart decisions around fulfillment will ultimately thrive with faster delivery and higher customer satisfaction (see Figure 9). A new breed of fulfillment analytics providers enables merchants to make smart decisions before and after they send packages to reduce costs, to optimize transportation, and to inform stakeholders about the real-time location of packages.

FIGURE 9 Invest: Fulfillment Analytics

| Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Bringg; Convey; Manhattan Active Omni; Metapack; Narvar; Rakuten Ready; SoundCommerce | **Fulfillment analytics**

Definition
Fulfillment analytics solutions stitch together data from real-time sources including weather, traffic data, and other logistics information for both pre- and post-shipment.

Maturity rationale
These solutions have been available for quite a while, and solutions like Amazon have established best-in-class customer experience (CX). However, there continues to be opportunity with high-ticket items, which are transported via less-than-truckload and for cross-border solutions.

Business value rationale
The business value of these solutions is high for both pre- and post-shipment decisions. For pre-shipping, it allows merchants to save the company money: Delivery time is "the moment that matters" to customers, and lost or late packages are one of the key drivers of customer calls to contact centers. |

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Intelligent Automation Tools

Retailers can use intelligent automation tools to build out content for a large product catalog, to flag inappropriate images, or even to automate reading handwritten content from shoppers. Sometimes they use computer vision, but many times they are simply more sophisticated, multistep extensions of macro software that do the same actions over and over again. Some of the most common use cases are to give content teams a jump-start on product detail pages by assigning keywords, attributes, and a first draft of a product description (see Figure 10).

FIGURE 10 Invest: Intelligent Automation Tools

Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Baresquare; Clarifai; Daisy Intelligence; Edgecase; Impira; Irisys; Lily AI; Newmine; Outlier.ai; True Fit; Vidado; Vue.ai; Zebra Technologies

Intelligent automation tools

Definition
These tools combine AI building blocks — such as computer vision, text analytics, and machine learning — with the strength of robotic process automation (RPA), digital process automation, and other platforms to manage and improve retail business processes.

Maturity rationale
Maturity is low, as retail hasn't adopted any type of RPA to the degree that it is possible. Today many retailers are still doing most repetitive tasks by hand.

Business value rationale
The opportunities for smart automation in retail are countless. These solutions would likely enable merchants to divert associates from low-value tasks to higher-value solutions such as competitive intelligence monitoring and retaining one's best shoppers.

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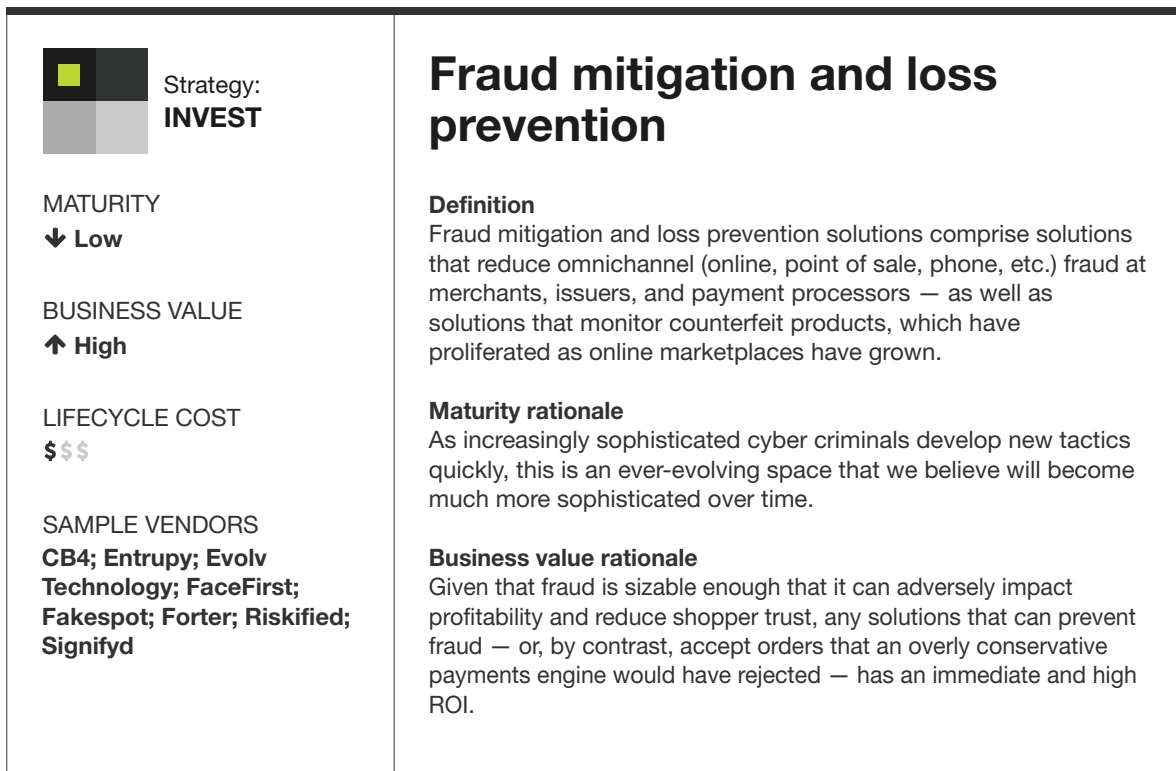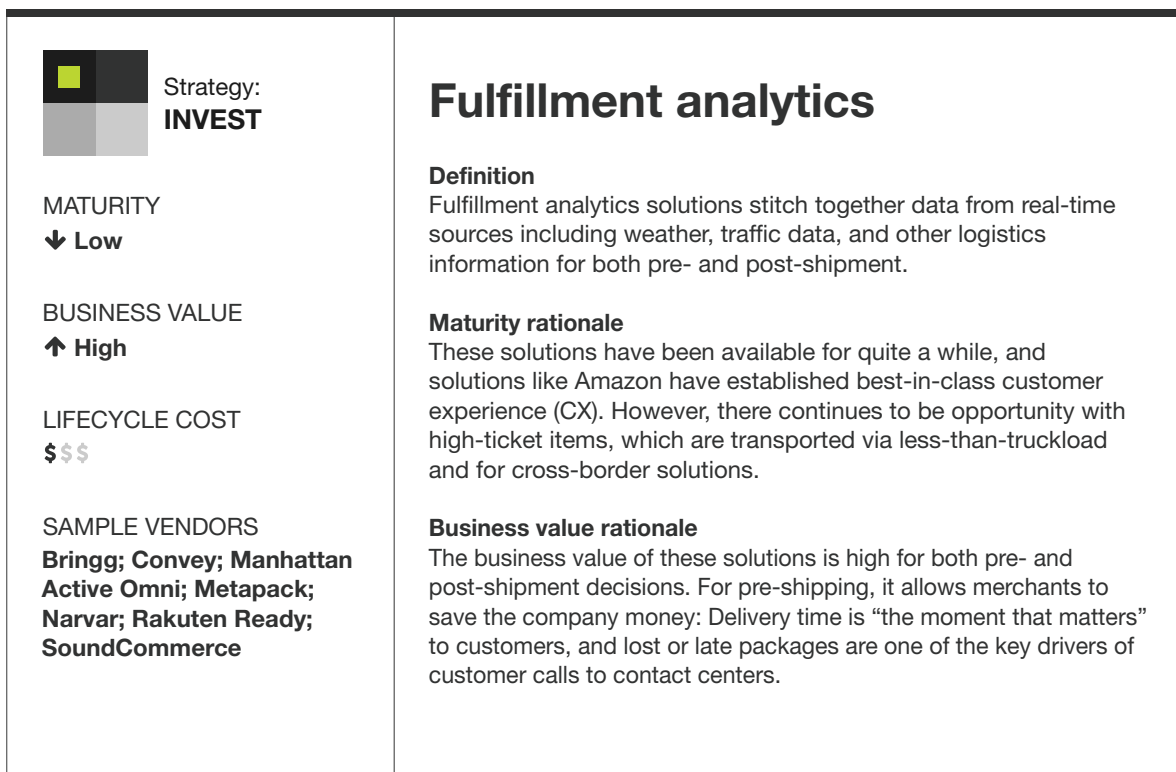
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IoT And Sensors

RFID has been around for decades — but with modest adoption due to high cost and limited uses (it works best in some types of environments such as apparel stores). Now, new internet of things (IoT) use cases are being developed to manage cold chain and other transportation. Many of these are back-office-facing solutions, but electronic shelf labels are one of the consumer-facing tools that already exist. Today, the value of IoT is high: Understanding when items or people (staff) are incorrectly situated is valuable to retail managers. There are also strong IoT use cases around asset tracking for inventory, as well as expensive associate devices like handheld scanners. Some sensor devices are even being used to reallocate labor in a store or to replenish shelves when there is a signal that many shoppers are waiting to checkout or a shelf is empty (see Figure 11).

FIGURE 11 Invest: IoT And Sensors

Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
**Avery Dennison; Cisco;
Impinj; Pricer; Samsara;
Theatro; WiseShelf; Xenio;
Zebra Technologies**

IoT and sensors

Definition
These are manufactured products with integrated or attached electronic computing and communications that enable sending data and/or receiving commands in retail environments.

Maturity rationale
Today, new use cases are being developed to manage cold chain, tracking, and other transportation and logistics issues.

Business value rationale
Sensor data feeds a new breed of digital retail store customer analytics that informs teams across the enterprise, including professionals across e-commerce, CX, customer insights, loss prevention, marketing, merchandising, and store operations. These insights can improve the shopper experience with better allocation of both store associates and in-stock products.

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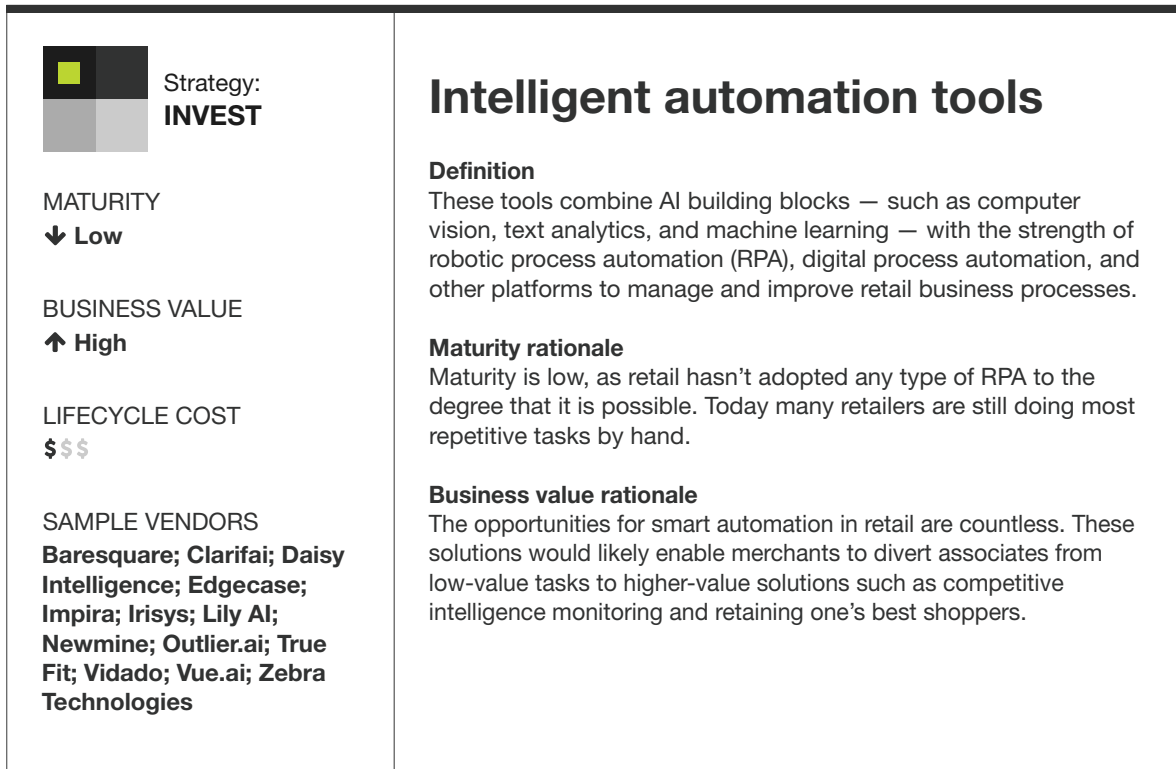
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Returns Optimization

For 46% of US online adults, a retailer's return policy is influential in their decision to shop with that retailer. Returns optimization solutions help merchants to reduce costs related to returns by identifying why certain products have higher returns than others. Additionally, these solutions have intelligence to identify which products can be resold and which should be destroyed. Some of the most innovative solutions provide ways for retailers to give shoppers instant return credit and even decide which e-commerce shoppers can be allowed to simply keep items they want to otherwise return (see Figure 12).

FIGURE 12 Invest: Returns Optimization

Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Inmar Intelligence; INTURN; Metapack; Narvar; Newmine; Optoro; Returnalyze; Returnly; True Fit

Returns optimization

Definition
Returns optimization solutions enable merchants to mitigate costs associated with returns, including best means of disposition, the root causes of a return (across products, suppliers, or customers), or continuous monitoring of returns to identify issues that could lead to poor CX or high merchant costs.

Maturity rationale
Surprisingly, there has not been much investment in this area — likely because it is behind the scenes. Over time, we expect companies to recognize that they can save money with intelligent returns solutions and drive a better CX in the process.

Business value rationale
Returns costs will grow as e-commerce grows. The business value for these solutions is high, as it is an easy way for retailers to grow their top and bottom lines. Returns are costly, and long delays in processing returns lead to additional customer calls to contact centers, which can further reduce margin.

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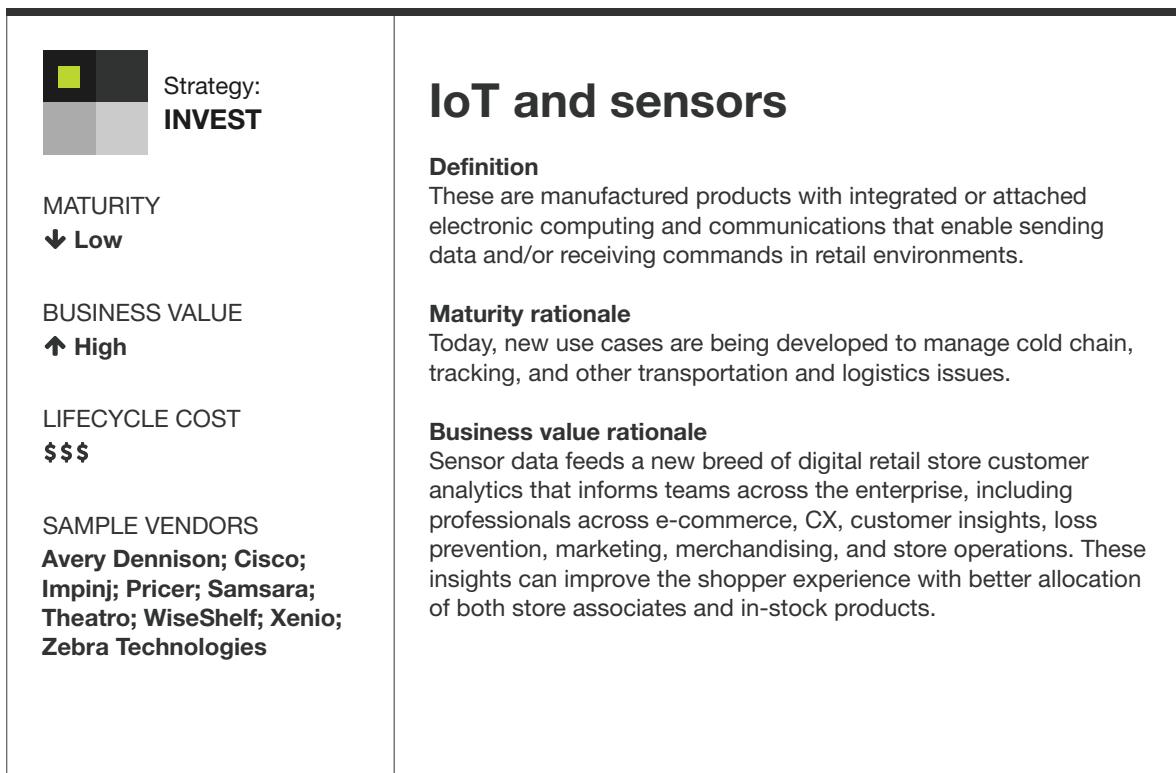**The Forrester Tech Tide™: AI And Analytics For Retail, Q2 2021**
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Store Labor Optimization

Store labor is extremely costly — both in terms of wages and turnover — and only promises to be more so over time as governments legislate higher wages for blue collar workers. Store labor optimization platforms help retailers decide how to use their labor resources optimally and even how to staff stores more dynamically. The most creative solutions share labor pools across different stores and brands. Only 11% of data and analytics decision-makers in retail and wholesale expected their organization to use workforce optimization in 2020 (see Figure 13). However, the efficacy of the solution is crucial for ROI; some early-generation solutions primarily focused on allocating the cheapest labor available for all tasks versus generating more productivity or higher levels of customer satisfaction.

FIGURE 13 Invest: Store Labor Optimization

Strategy:
INVEST

MATURITY
↓ **Low**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
**Blue Yonder; Jyve; Mi9
Retail; Scandit; Shyft;
WorkJam; Zebra
Technologies**

Store labor optimization

Definition
Retail store platforms are designed to optimize labor decisions. These solutions engage algorithms that use associate enablement tools and task management solutions that help retailers decide how to use their labor resources optimally.

Maturity rationale
This technology only became more automated and commonplace in the last few years. While some large retail chains have adopted some of these solutions, we believe they hold promise, particularly if vendors can provide better data on ROI (including higher Net Promoter Scores or customer satisfaction levels).

Business value rationale
Optimizing store talent can have a large return on investment, as it enables the most effective resources to be deployed against the most critical tasks — rather than leaving it to store managers to decide what to focus on.

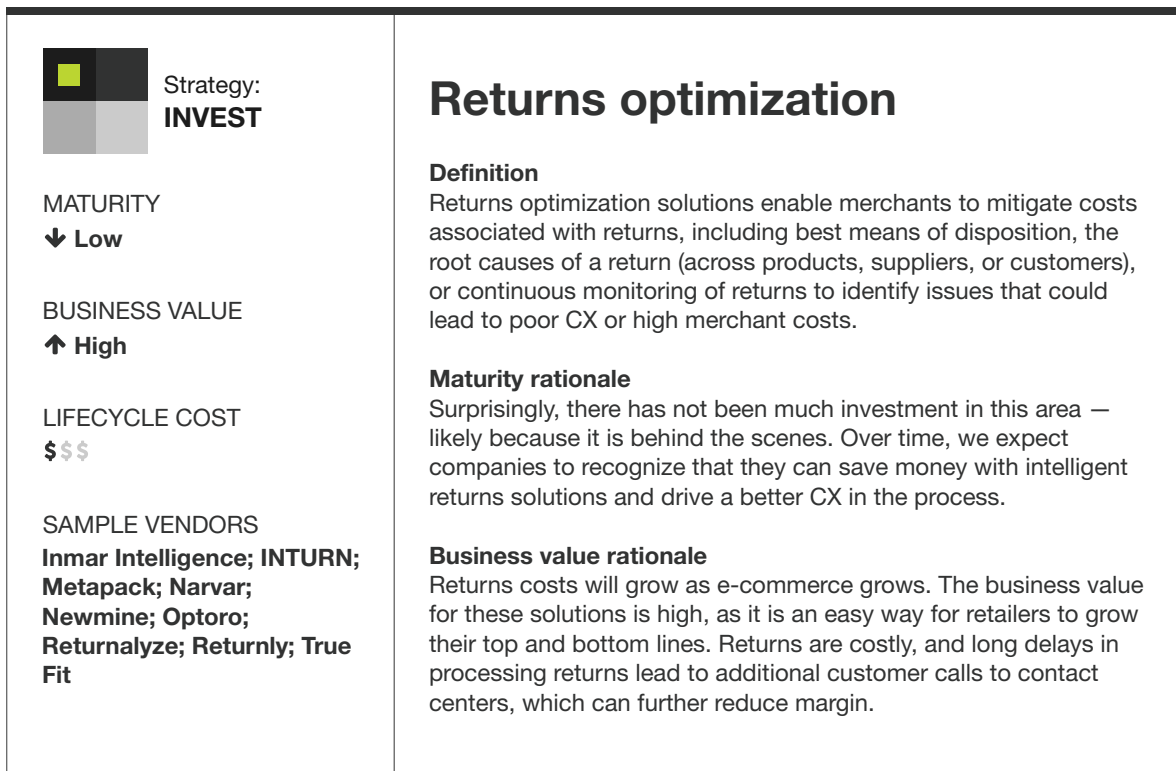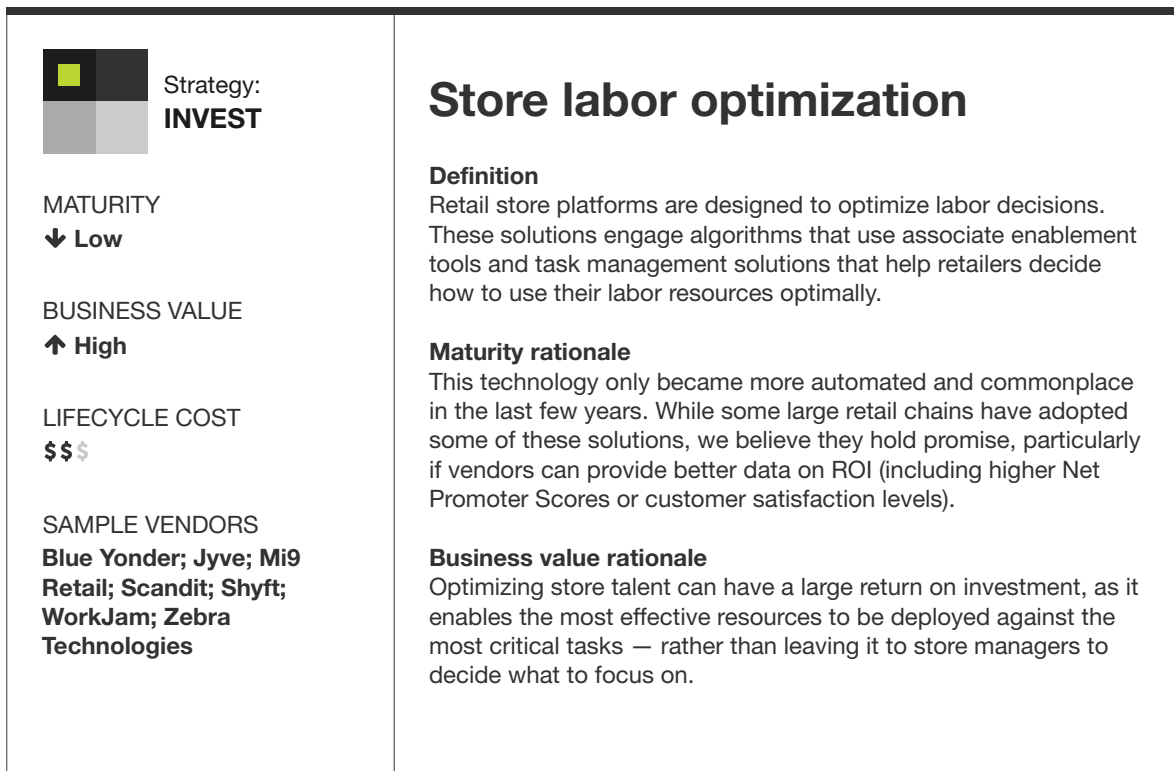FOR EBUSINESS & CHANNEL STRATEGY PROFESSIONALS   May 26, 2021

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Maintain Customer Analytics, Pricing Optimization, And Others

Seven of the AI and analytics for retail technologies fall into the Maintain quadrant of the Tech Tide, with high maturity and high current business value. All seven of the categories have been around for years, but they continue to deliver business value and are becoming increasingly sophisticated due to machine learning and AI.

Customer Analytics

For retailers without a team of data scientists, customer analytics solutions democratize advanced customer analytics with a do-it-for-me approach, employing automated machine learning to generate insights like propensity scores and customer segments for nontechnical users (see Figure 14). Customer analytics technologies are highly technical tools that data scientists use to craft custom models into solutions that empower business users with prepackaged analytical models such as churn propensity and lifetime value analysis. In 2020, 52% of data and analytics technology decision-makers in retail and wholesale said their firm had implemented customer analytics; a further 26% were in the process of implementing it.

FIGURE 14 Maintain: Customer Analytics

Strategy:
MAINTAIN

MATURITY
↑ **High**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Acoustic; Adobe; Algonomy; FICO; Periscope by McKinsey; PreciseTarget; Salesforce; SAP; SAS; Teradata; Treasure Data

Customer analytics

Definition
Customer analytics technologies extract the value in customer data by turning it into meaningful insights that allow companies to understand their customers, anticipate their needs, and deliver contextually relevant experiences at scale.

Maturity rationale
The market is consolidating, fueled by the democratization and commoditization of many core analytical capabilities. However, new and existing vendors are differentiating through model management capabilities and the optimization of the next best experience.

Business value rationale
These technologies drive intelligent, optimized interactions with customers throughout their journeys. In addition, these solutions can embed insights directly in sales and customer service workflows.

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Digital Experience Optimization

Digital experience optimization engines are the evolution of earlier versions of product recommendation engines — the latter is a category that we now recommend retailers divest from. Instead of "black box" or standalone modules, these are smarter solutions that belong in a larger suite of products and can support a rich customer experience across multiple touchpoints. Some of the newest solutions of this type use augmented reality and recommendations based on what a shopper is sharing in real time (see Figure 15). Because of the plethora of solutions and the competition in the space, these tools are relatively affordable.

FIGURE 15 Maintain: Digital Experience Optimization

Strategy:
MAINTAIN

MATURITY
↑ **High**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
**$$**$

SAMPLE VENDORS
Adobe; Attraqt; Bloomreach; Capillary; Dynamic Yield; IBM; Kibo Personalization; Microsoft's Intelligent Recommendations; Namogoo; Rokt; Watson; ZineOne

Digital experience optimization

Definition
Compared with older standalone recommendation engines, digital experience optimization engines use richer data integration and more sophisticated pages, outputs, and renderings.

Maturity rationale
In contrast to some of the original recommendation solutions, these solutions are personalization engines on steroids. Today's solutions continue to leverage more data from more sources and deploy them in more outputs than traditional standalone recommendation engines — many of which were relegated to product detail pages.

Business value rationale
These sophisticated solutions are able to ingest more data in real time from different inputs (including consumer behavior, external information such as weather, and merchant data points such as in-stock levels).

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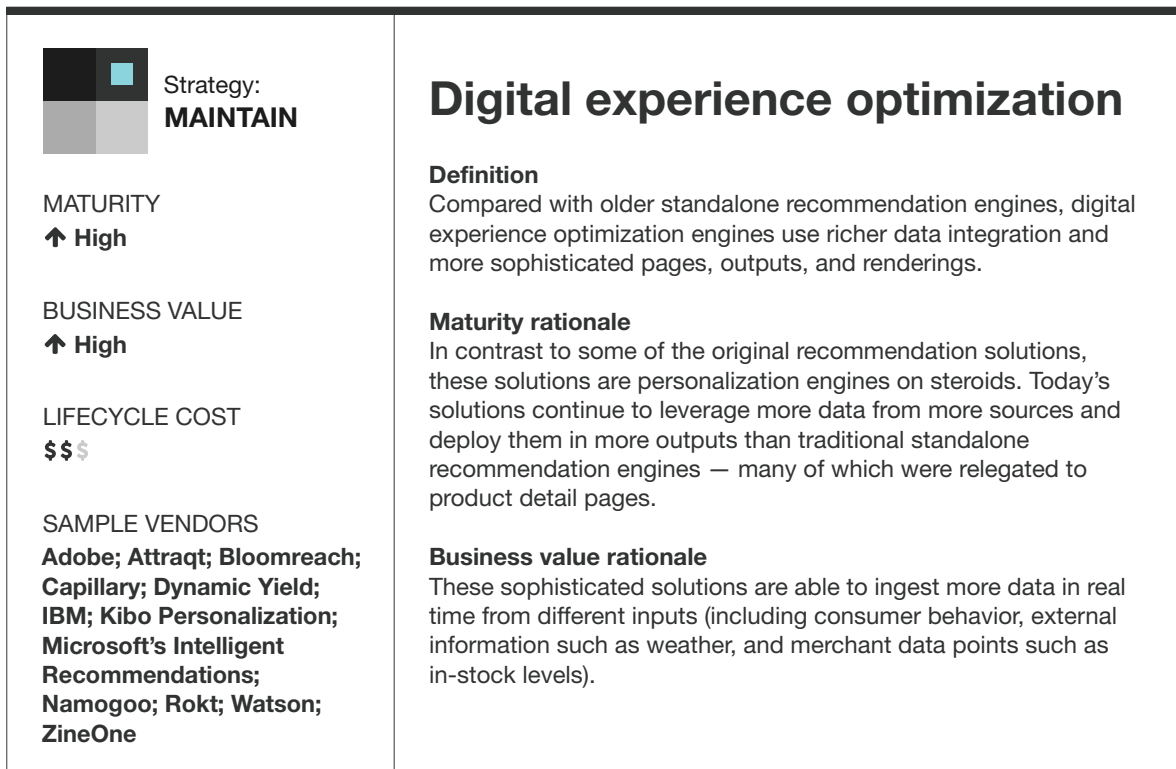
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Inventory Optimization

Buying and planning of inventory are the oldest functions within retail. Retail planning vendors have migrated their solutions to the cloud to embed artificial intelligence to synchronize merchants, marketers, and supply chain professionals to deliver prompt availability of compelling assortments across more fragmented markets. AI helps retailers to scale the art and experience of merchants so that they can plan a much wider range of short lifecycle merchandise in more varied stores and channels (see Figure 16).

FIGURE 16 Maintain: Inventory Optimization

Strategy:
MAINTAIN

MATURITY
↑ **High**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Bamboo Rose; Joor; Le New Black; Microsoft Dynamics D365 Supply Chain Management; NuORDER; Symphony RetailAI

Inventory optimization

Definition
Inventory optimization tools leverage rich rendering capabilities to enable buyers and planners to make smart merchandising decisions — both when initially determining assortments and through replenishment. In some cases, these are virtual trade shows and showrooms.

Maturity rationale
Inventory optimization has been done manually for years, but this level of automation is relatively new. In the post-pandemic era, we expect fewer in-person merchandising and planning trips, which makes digital buying tools yet more crucial.

Business value rationale
These tools enable buyers and planners to see more items, more quickly, and in a more holistic way. These capabilities enable faster development of seasonal choices, which should reduce some retail overhead over time.
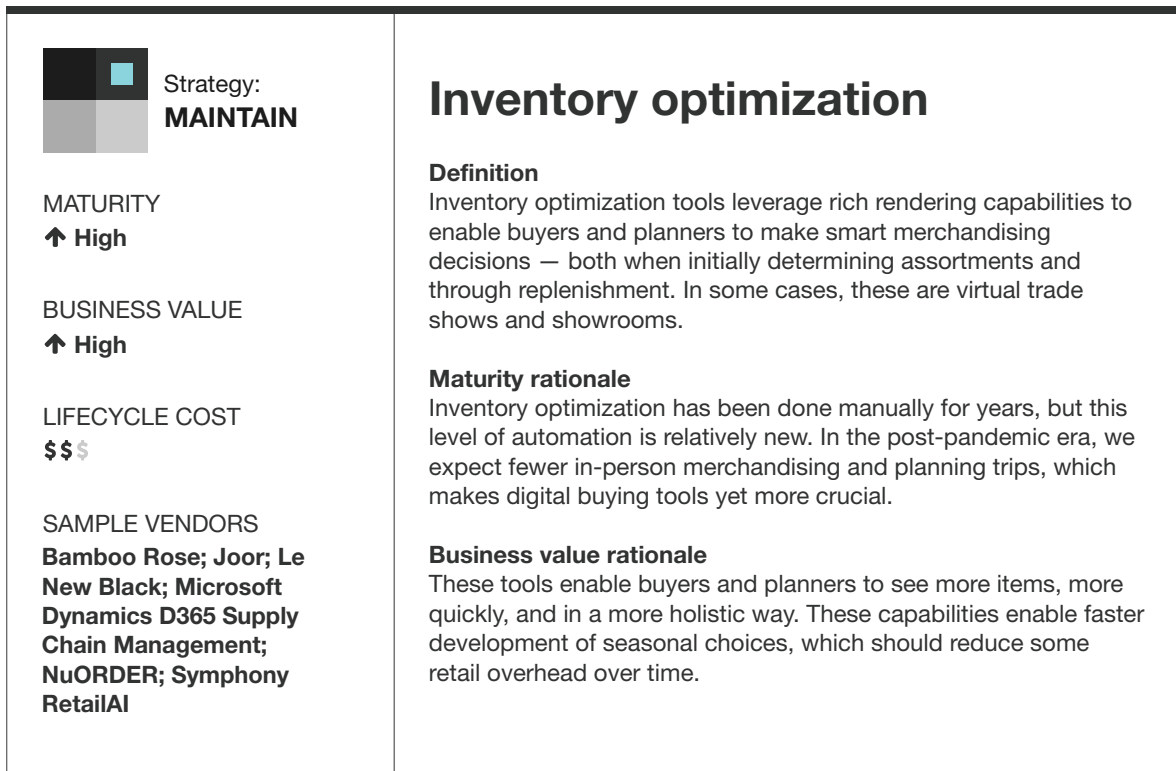
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Marketing And Adtech Optimization Solutions

Senior global retail and wholesale marketing decision-makers estimate that on average, 21% of their marketing budget is allocated to marketing technology. Marketing optimization solutions automate digital marketing — which is an ever-increasing part of marketing spend. Many of these solutions are as old as the internet and will need to integrate retailer and brand data in a world where "third-party cookie" information dies (see Figure 17).

FIGURE 17 Maintain: Marketing And Adtech Optimization Solutions

Strategy: **MAINTAIN** MATURITY ↑ **High** BUSINESS VALUE ↑ **High** LIFECYCLE COST $$$ SAMPLE VENDORS **Adobe; Affirm; Bloomreach; Criteo; Launchmetrics; MikMak; Persado**	**Marketing and adtech optimization solutions** **Definition** Marketing and adtech optimization solutions automate digital marketing processes and media creation and placement, including which customers are targeted, in what channels, and with which message. **Maturity rationale** To support ad creation and placement, most retailers and brands have a broad ecosystem of marketing and adtech optimization vendors. The next generation of value-add will be highly specialized, such as supporting retailer media networks or using bots to create text ads, copy, or even images. **Business value rationale** Across product categories, marketing optimization tools are essential because of the high volume and variability of digital ads, as well as the importance of marketing to acquire and retain customers. In the future, the value will be in further reducing the cost of content creation.

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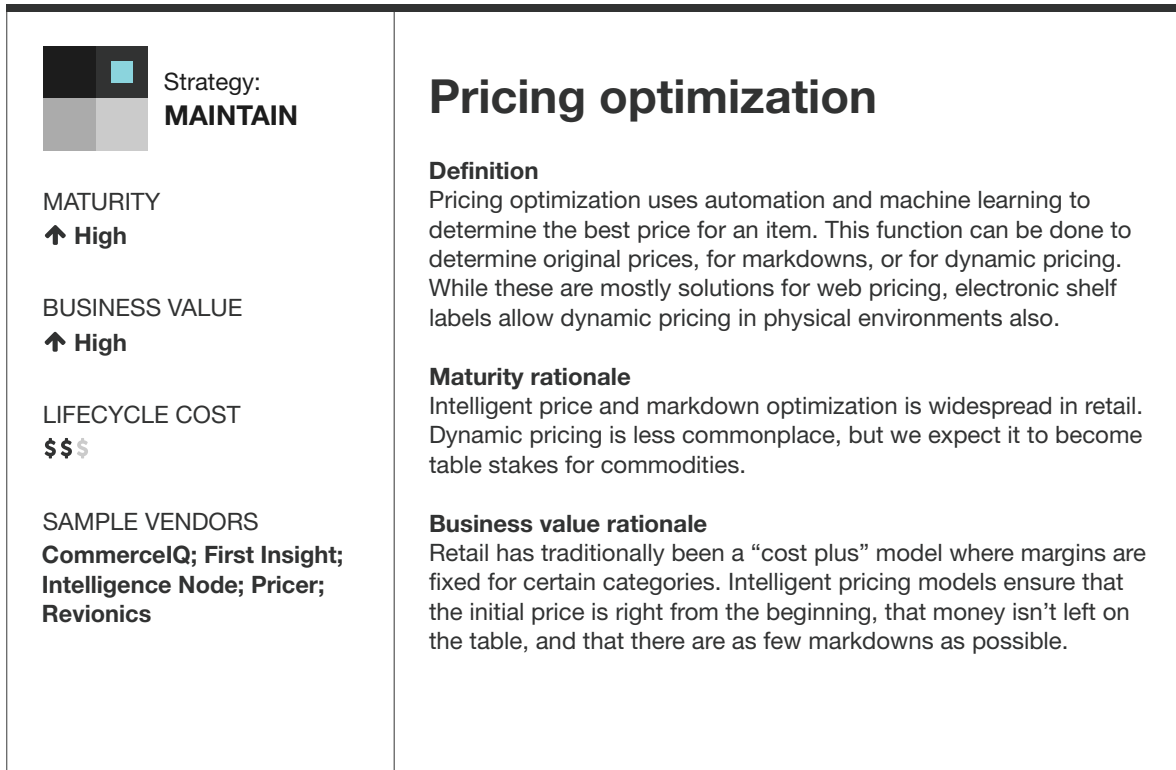**The Forrester Tech Tide™: AI And Analytics For Retail, Q2 2021**
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Pricing Optimization

Pricing engines historically have been about markdown optimization but now must respond to changes to comparable prices on other e-commerce websites. In 2020, 55% of data and analytics technology decision-makers in retail and wholesale said that their firm had implemented pricing analytics; a further 24% were implementing it. Pricing decisions are one of the oldest challenges of retail, but the internet and constantly changing prices that are easily visible to shoppers make it tremendously difficult to rely on manually fixing prices. Automation and intelligence around pricing promise to make the jobs of retail buyers and planners faster than ever and should enable them to focus on higher-value tasks like selecting and crafting better assortments or pricing new products more effectively (see Figure 18).
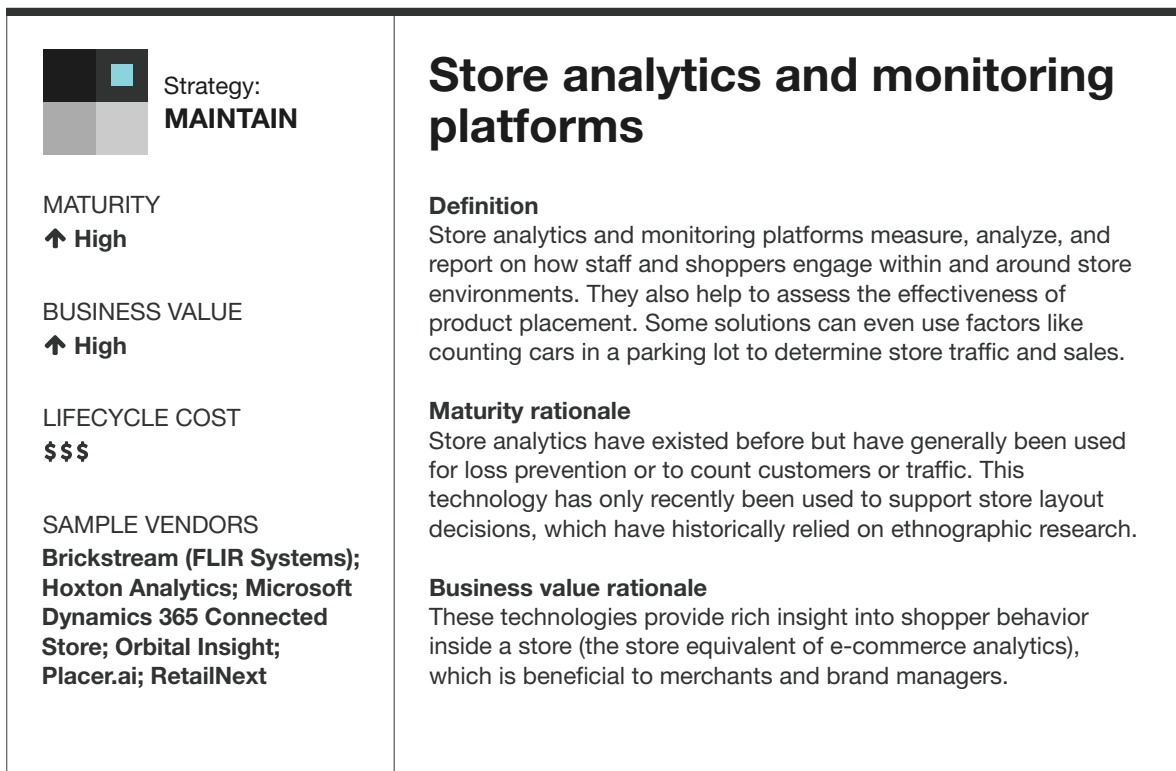
FIGURE 18 Maintain: Pricing Optimization

Strategy:
MAINTAIN

MATURITY
⬆ **High**

BUSINESS VALUE
⬆ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
CommerceIQ; First Insight; Intelligence Node; Pricer; Revionics

Pricing optimization

Definition
Pricing optimization uses automation and machine learning to determine the best price for an item. This function can be done to determine original prices, for markdowns, or for dynamic pricing. While these are mostly solutions for web pricing, electronic shelf labels allow dynamic pricing in physical environments also.

Maturity rationale
Intelligent price and markdown optimization is widespread in retail. Dynamic pricing is less commonplace, but we expect it to become table stakes for commodities.

Business value rationale
Retail has traditionally been a "cost plus" model where margins are fixed for certain categories. Intelligent pricing models ensure that the initial price is right from the beginning, that money isn't left on the table, and that there are as few markdowns as possible.

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Store Analytics And Monitoring Platforms

In 2020, 58% of data and analytics technology decision-makers in retail and wholesale said that their firm had implemented store analytics; a further 20% were implementing it (see Figure 19). Store analytics track and measure how shoppers engage with each other, the store, and a retailer's surroundings. These solutions then analyze and report on this data to help executives make marketing, operation, store layout, and product decisions. In some cases, these solutions can identify who is in a store by using facial recognition or other markers. Earlier versions of this technology were implemented for the benefit of loss prevention teams. During the pandemic, they were used to flag crowds and social distancing issues. The more sophisticated solutions become shopper monitoring tools but also risk being shut down by privacy advocates and regulation.

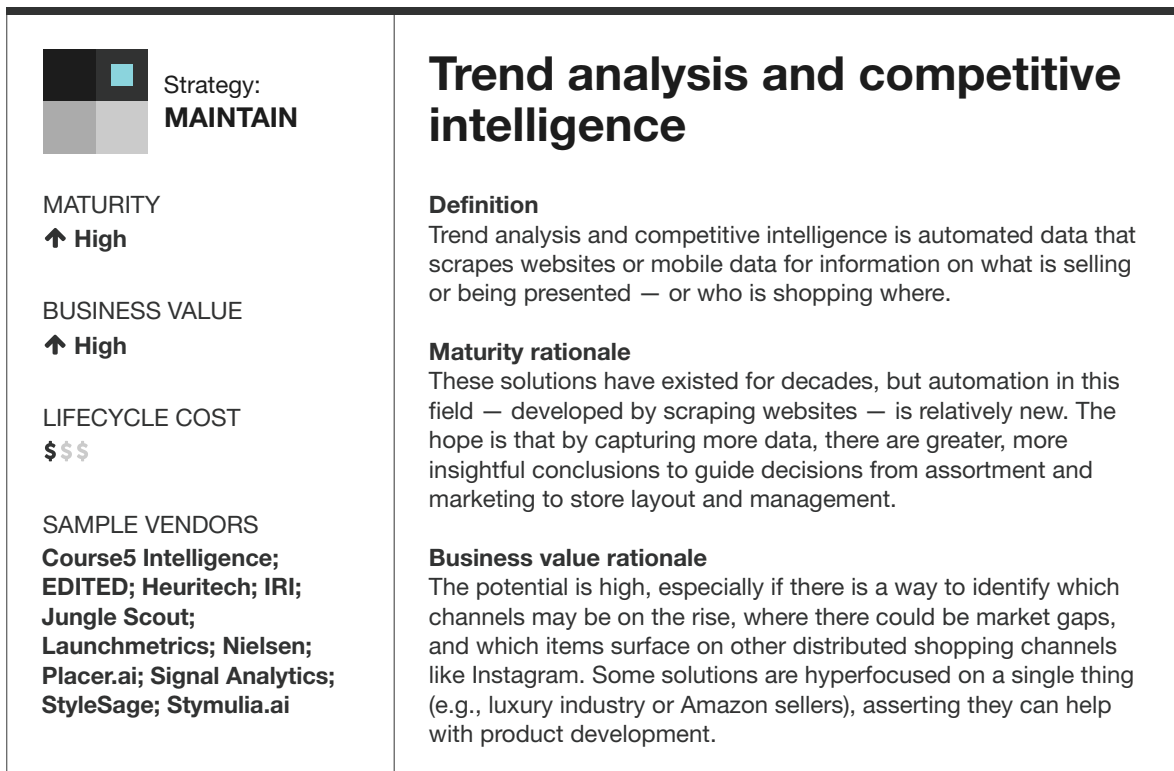**FIGURE 19** Maintain: Store Analytics And Monitoring Platforms

Strategy:
MAINTAIN

MATURITY
↑ **High**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Brickstream (FLIR Systems); Hoxton Analytics; Microsoft Dynamics 365 Connected Store; Orbital Insight; Placer.ai; RetailNext

Store analytics and monitoring platforms

Definition
Store analytics and monitoring platforms measure, analyze, and report on how staff and shoppers engage within and around store environments. They also help to assess the effectiveness of product placement. Some solutions can even use factors like counting cars in a parking lot to determine store traffic and sales.

Maturity rationale
Store analytics have existed before but have generally been used for loss prevention or to count customers or traffic. This technology has only recently been used to support store layout decisions, which have historically relied on ethnographic research.

Business value rationale
These technologies provide rich insight into shopper behavior inside a store (the store equivalent of e-commerce analytics), which is beneficial to merchants and brand managers.

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Trend Analysis And Competitive Intelligence

Retailers can use this data to see what is trending in a category like fashion or even consumer packaged goods (CPG). These solutions have existed for decades, but many of them involved intense integrations into point of sale (POS) systems to truly capture market share. By contrast, using website data on what products are available and selling is relatively new. We believe the potential for this solution is high, as there are now numerous web signals (e.g., social networks and marketplaces) that can suggest what is selling and what new products are most promising. While the older POS-based solutions were generally only available to the largest brands and retailers, new web-based solutions are much more accessible to smaller companies (see Figure 20).

FIGURE 20 Maintain: Trend Analysis And Competitive Intelligence

Strategy:
MAINTAIN

MATURITY
↑ **High**

BUSINESS VALUE
↑ **High**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Course5 Intelligence; EDITED; Heuritech; IRI; Jungle Scout; Launchmetrics; Nielsen; Placer.ai; Signal Analytics; StyleSage; Stymulia.ai

Trend analysis and competitive intelligence

Definition
Trend analysis and competitive intelligence is automated data that scrapes websites or mobile data for information on what is selling or being presented — or who is shopping where.

Maturity rationale
These solutions have existed for decades, but automation in this field — developed by scraping websites — is relatively new. The hope is that by capturing more data, there are greater, more insightful conclusions to guide decisions from assortment and marketing to store layout and management.

Business value rationale
The potential is high, especially if there is a way to identify which channels may be on the rise, where there could be market gaps, and which items surface on other distributed shopping channels like Instagram. Some solutions are hyperfocused on a single thing (e.g., luxury industry or Amazon sellers), asserting they can help with product development.

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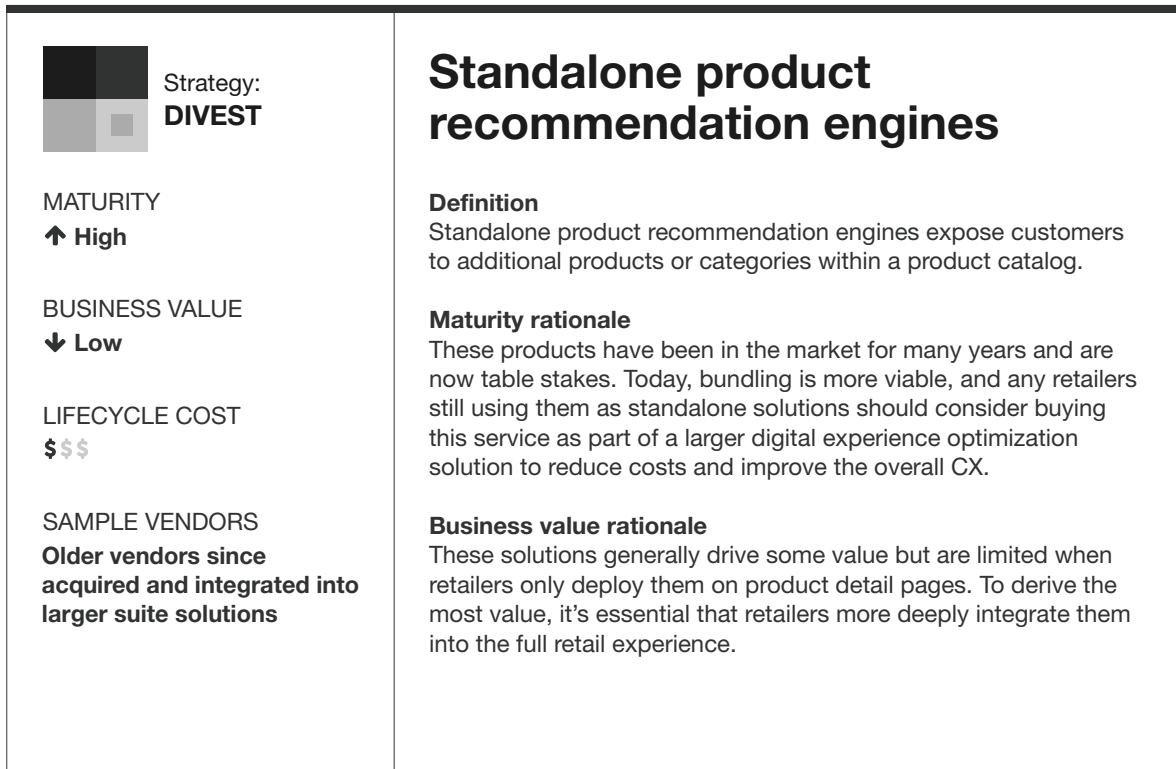Nineteen Technologies Underpin AI And Analytics For Retail

Divest From Standalone Product Recommendation Engines

One of the AI and analytics for retail technologies falls into the Divest quadrant of the Tech Tide, with high maturity and low current business value.

Standalone Product Recommendation Engines

Product recommendation engines are shopper-facing solutions on retail websites that drive consumers to additional products they may not have considered. Product recommendation engines have been around for decades and are now table stakes. We believe this solution still has value, but no retailer should purchase this as a standalone product — which is why we recommend divesting from them. Rather, product recommendations should be one part of a much bigger digital experience optimization solution that takes into account shopper needs, touchpoints, and even inventory availability for a more relevant customer experience across a variety of touchpoints (see Figure 21).

FIGURE 21 Divest: Standalone Product Recommendation Engines

Strategy:
DIVEST

MATURITY
↑ **High**

BUSINESS VALUE
↓ **Low**

LIFECYCLE COST
$ $ $

SAMPLE VENDORS
Older vendors since acquired and integrated into larger suite solutions

Standalone product recommendation engines

Definition
Standalone product recommendation engines expose customers to additional products or categories within a product catalog.

Maturity rationale
These products have been in the market for many years and are now table stakes. Today, bundling is more viable, and any retailers still using them as standalone solutions should consider buying this service as part of a larger digital experience optimization solution to reduce costs and improve the overall CX.

Business value rationale
These solutions generally drive some value but are limited when retailers only deploy them on product detail pages. To derive the most value, it's essential that retailers more deeply integrate them into the full retail experience.

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Research Methodology

The purpose of the lists of sample vendors we include in the figures about each category is to further clarify the nature of the category — not to serve as a vendor selection shortlist for readers seeking to choose a vendor in that category. The fact that a vendor isn't included in a list does not indicate that Forrester believes it isn't worth considering. For guidance about vendor selection, Forrester publishes separate research (Now Tech and Forrester Wave™ reports) in which Forrester analysts offer customized advice to our clients.

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Companies Interviewed For This Report

We would like to thank the individuals from the following companies who generously gave their time during the research for this report.

Amazon Web Services	Outlier.ai
CommerceIQ	Peak AI
Daisy Intelligence	Periscope by McKinsey
DynamicAction	Persado
Dynamic Yield	PreciseTarget
eBay	Revieve
EDITED	Salesforce
Evolv Technology	Samsung
Grabango	Signals Analytics
JD.com	StyleSage
Kibo Personalization	Vue.ai
Lily AI	Zebra Technologies

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