Trends Map

Baskit • Iuri Reves

Autonomous shopping

RFID Product Tags

Uses special electronic tags to instantly scan multiple items at once. Does away with barcodes and the need to scan each item individually making it more convenient for customers. Retailer benefits from reduced checkout times. Additionally, RFID scanners can built into handheld devices that scan tags by hovering over products from a distance for more efficient inventory management and larger receivers in exit points to monitor theft.

- What is RFID and how does it work?
  RFID tagging involves small devices that are easy to apply to transfer...
  techtarget.com
- Radio-frequency identification - Wikipedia
  en.wikipedia.org
  RFID (Radio-frequency identification) works using radio waves to automatically identify and track tags attached to objects. Components: 1. Tag An RFID system utilizes a small radio device, called an RFID tag, that includes a microchip that stores identification data and an antenna to receive and respond to radio frequency signals. Tags can be passive (no battery, powered by the reader's signal) or active (have a battery for longer range and faster data ... Reader An RFID reader emits radio waves at a specific frequency through its antenna. Frequency: ...
- Report: Zara Delays Rollout of Security Tech After Shoplifters...
  fashionunited.com
  Zara's new anti-shoplifting system, announced in 2023, been RFID technology, has been delayed indefinitely. Despite initial setbacks, Inditex remains committed to its implementation, experimenting with different RFID tag placements, including a special thread embedding miniature RFID tags within the garment seams.
- RFID Case Study: Decathlon uses Tagsera RFID labels to ide...
  tagsera.com
  Decathlon, a global sporting goods retailer, implemented an RFID solution to improve product availability and customer satisfaction. The solution, integrated throughout their supply chain, enables real-time tracking, faster inventory management, and accelerated checkout processes. RFID tags, including paper-based and textile tags, are used to identify millions of items.
- UNIQLO Global Stores Applied RFID Tags
  UNIQLO's RFID reform is in full swing, including smart dressing room ...
  fashionsh.com
- https://www.wsj.com/articles/uniqlos-secret-company-...
  UNIQLO is a leading fast fashion retailer that successfully implemented RFID technology in its global stores, enhancing operational efficiency and customer experience. HUAYUAN, a prominent RFID tag supplier, played a significant role in providing the RFID tags used in UNIQLO's stores. The implementation of RFID technology in UNIQLO's stores has resulted in significant benefits, including improved inventory management, reduced checkout times, and enhanced customer engagement.
- https://corporate.asda.com/blog/2019/05/31/introduction-...
- Asda introduced Scan & Go on mobile in 2019 as an additional checkout option for customers. Offering the ability for customers to scan products using their personal smartphone and checking out at a designated till.

Scan-As-You-Shop

Allows customers to scan items using a handheld scanner. This allows the customer bag while they shop and to track their spending before they checkout at self-service kiosk or designated till. In return, this retailer benefits from reduced checkout times and tracking of in-store behaviour.

- Morrisons launches scan and go trial at six stores
  Morrisons wasn't even carrying out a trial when it announced ...
  grocerytv.co.uk
- Morrisons - a late comer to this technology - launched scan and go at six stores in 2024 as part of a nationwide trial of the new technology.

Bring your own device

Store-provided handheld scanners

App Checkout

Shoppers scan items and pay directly through a retailer's mobile app, skipping checkout lines. Exceptionally convenient for customers as they get the all the benefits from Scan-As-You-Shop technology with the addition of being able to checkout directly on their phone without needing to queue or pay at a till.

- Sainsbury's
  Skip the queue, scan & go: Sainsbury's launches till-free ch...
  about.sainsburys.co.uk
- Case Study: M&S's Mobile Pay Go App
  We partnered with Mastercard and Sainsbury's to develop the Mobile Pay Go service, a ...
  softwat.com
- Sainsbury's was the UK's first supermarket to trial app-checkout technology. They started with a smaller store in London in 2018 and have been expanding it across the UK.
- M&S launched Mobile Pay Go service in 2018 in their new store at Pride Waterside Head Office. They partnered with the company Valtech to modernise their Sparks app - where the checkout service is one of many additional features and functionality. They have since expanded this across all of their stores in 2020.

Self-Service Kiosk

A self-service kiosk is a digital touchscreen system that allows users to perform transactions, access information, or complete tasks without direct interaction with a human employee. These kiosks are widely used in retail, restaurants, banking, transportation, healthcare, and other industries to improve efficiency and enhance user experience.

- Walmart
  Company specializing in mobile self-checkout, self-checkout kiosks, RFID self-checkout and mPOS (mobile device that allows staff to make transactions) technology for physical retail stores.
- Valtech: Consultancy company specializing in business transformation, focusing on experience design, technology, and marketing.
- Mobile, Pay, Go: We're enabling more customers to experience...
  M&S is a leading British retailer bringing quality, great value food, cloth...
  corporate.marksandspencer.com
- M&S ROLLS OUT 'MOBILE PAY GO' PAYMENT SERVICE TO...
  M&S is a leading British retailer bringing quality, great value food, cloth...
  corporate.marksandspencer.com
- MLU Deploy MishiPay's Self-Checkout Kiosks in Metro...
  Joint press release MLU Deploy MishiPay's Self-Checkout Kiosks in Metro Cash & Carry Stores
  mishipay.com
- Mul starter deploying self-service kiosks from MishiPay in their London stores in 2021.
  They also introduced Mobile Checkout functionality in 2020 allowing users to scan and pay for products using their personal mobile phone. Initially starting from customers could use it from a web browser instead of needing to download an app.
- The Benefits of McDonald's Self-Service Kiosk - Restaurant Self...
  Discover the benefits of McDonald's self-service kiosks. Learn how ...
  apowtec.com
- How McDonald's Self-Service Kiosks Changed the Customer...
  McDonald's invested in self-service technology to achieve even greater p...
  apowtec.com
- McDonald's Says Goodbye Cashiers, Hello Kiosks
  Rising labor costs have contributed to the immediate trend that reduce the ho...
  thrillist.com
- History | McDonald's UK
  mcdonalds.com
- McDonald's first introduced digital touchscreen kiosks in the UK in 2015. Since then, many customers and possibly responsible for popularising this technology. This was in line with the goal to improve the experience of customers by reducing staff to areas that the company deemed more important such as the drive-thru or front-of-house. The goal was not to reduce the amount of staff
- Ingenico | Home
  Power smart checkouts for a cloud-based payments platform and end-to-end t...
  ingenico.com
  Ingenico
  Huge global company best known for its POS systems, where it leads the market. The company expanded into self-service in 2021 with a comprehensive suite of secure electronic payment solutions, encompassing software, online payment gateways, mobile payment solutions, and terminals for merchants across diverse sectors like retail, hospitality, and transportation.
- ATM

Self-Checkout

Vending Machines

- Toy & Capsule Machines (Gacha)
- Beverage makers
- DVD or Book vending
- Beverage makers
- Electronics & Tech Accessories
- Photo Booth
- Office Supplies

Autonomous Stores

- **Store**
  - Sainsbury's is launching a new in-store digital innovation with a contactless, checkout-free way to shop. Building on the success of SmartShop, which grew 101% last year, Sainsbury's Pick & Go is using Amazon's Just Walk Out technology. The technology is in use in Sainsbury's convenience store at Holborn Circus.
  - DAO and Sensai opened Italy's first autonomous store in Verona in 2023, offering a seamless shopping experience with no checkout lines, with real-time basket tracking, no checkout lines. The store features a wide range of products, including fresh produce, bakery items, frozen food, beverages, and personal care items. Customers can enjoy portion customisation, bulk buying, and real-time basket updates for a hassle-free shopping experience.
  - Sonae and Sensai have opened Continente Labs in 2023. Europe's first autonomous store, offering a seamless shopping experience powered with real-time basket tracking. The store, located in Lisbon, features a diverse selection of products and integrates AI-powered technology for a seamless shopping experience.
  - Muffets Group, a leading Brazilian retailer, opened Muffatto Go in 2022, the first autonomous supermarket in Brazil, leveraging Amazon's Just Walk Out AI technology. The store offers a frictionless shopping experience with real-time basket updates for a seamless checkout, eliminating the need for queues or scanning. This innovative concept provides Muffato with valuable data on customer buying patterns and stock needs, enabling better inventory management and customer service.
  - Teaco opened its first checkout-free store in London in 2021, allowing customers to shop and pay via the Teaco.com app. The store uses cameras and weight sensors to track purchases and charge customers directly through the app. This aligns with Amazon's initiatives by Amazon and reflects the industry's shift towards till-free technology.
    In 2023, the company introduced a scan-free technology on self-service tills as an additional option for customers who don't use their app.
- **Store-in-a-store**
  - Brisa, a Portuguese motorway operator, partners with Sensai to introduced autonomous shopping experiences at its service stations in 2023. The Colibri brand offers 24/7 access to a wide range of items, providing a seamless, real-time shopping experience for travelers. These units, equipped with real-time stock management, offer a hassle-free, grab-and-go experience for travelers on the go.
  - In 2023 Excel, London's largest event venue, launched Market Express; the first checkout-free convenience store in the Royal Docks UK. Powered by Amazon's Just Walk Out technology allowing visitors to purchase items without queuing.
  - Excel becomes first UK venue to introduce checkout-free store, power...
  - excelcentre.com
  - Just Walk Out technology introduced by Amazon in 2018 in the US as part of their now store concept named Amazon Go. Later introduced in the UK in 2021 with Amazon Fresh stores. It aims to create a checkout-free shopping experience. Shoppers can enter a store, take the items they want off the shelves, and simply leave without having to wait in line or scan items at a traditional checkout counter or self-checkout station. The system automatically detects what items they took and charges their linked Amazon account (or other payment method) after they exit.
    The main goal driving Just Walk Out technology is to provide unparalleled convenience for shoppers by completely eliminating checkout lines, which results in a faster and potentially more enjoyable shopping trip. This system significantly reduces friction in the retail experience, streamlining the entire process from entry to exit. Additionally, the technology enables retailers to gather the retailers implementing the technology, a major benefit stems from potential operational efficiencies, as it can lessen the need for staff, although employees are still crucial for stocking, customer service, and age verification. Additionally, the technology enables extensive data collection, providing valuable insights into customer shopping habits, product popularity, and store traffic flow.
    It uses 3 key technologies:
    - Computer Vision: Numerous cameras mounted throughout the store ceiling track shoppers and the items they interact with. They identify individuals (without using facial recognition typically, but rather tracking movements and distinguishing features) and monitor which products are taken from or returned to shelves.
    - Sensor Fusion: Data from cameras is combined with information from other sensors, such as weight sensors on shelves (though Amazon has downplayed the primary reliance on shelf sensors in later iterations). This fusion helps to cross-reference and validate the visual data.
    - AI Complex algorithms process the vast amounts of data gathered by the cameras and sensors. These algorithms are trained to understand shopping behaviours, associate items taken with the correct shopper, and manage a "virtual cart" for each person in the store.

    Customer shopping:
    - Entry: Shoppers typically identify themselves upon entering. This can be done by scanning a QR code in their Amazon app, tapping a linked credit/debit card, or using Amazon One (palm recognition service, not available in the UK).
    - Shopping: They browse and take items off the shelves as usual. If they change their mind, the system is designed to recognise this and remove it from their virtual cart.
    - Exit: They simply walk out of the store through designated gates. There's no need to stop or interact with a payment terminal.
    - Payment & Receipt: Shortly after leaving, their linked payment method is charged for the items the system determined they took. A digital receipt is usually sent to their app or email.

    Controversy
    In early 2024, reports emerged (and Amazon confirmed) that despite the advanced AI claims, the system often relied significantly on remote human reviewers (reportedly over 1,000 workers in India) to watch video feeds and manually tag shoppers' actions when the AI was uncertain, contradicting narrative of a fully automated system. At the same year Amazon announced it was removing the Just Walk Out system from its larger Amazon Fresh grocery stores in the US. Instead, they are focusing on implementing "Dash Carts" (smart shopping carts that scan items as they are placed inside) in these locations. However, Amazon stated it will continue to offer the Just Walk Out technology to smaller format stores (like Amazon Go or Amazon Fresh in the UK) and importantly, sell the system to third-party retailers for use in their own stores.

    Iuri Reves
  - Continente Labs - Stories - Sensai
  - Muffato Go - Stories - Sensai
  - Teaco opens its first checkout-free store
    The supermarket's new GetGo format lets customers shop without ...
    bbc.co.uk
  - https://www.teaco.com/news-by-category/teaco-to-introduce-new-...
- **Cabinet**
  - Gap, a leading energy company, has partnered with Sensai in 2024 to create an autonomous retail experience at its new headquarters, ALLO. The partnership includes Cabinet units dispensing snacks and meals 24/7, providing employees with convenient access to food and beverages. This autonomous solutions, powered by Sensai's real-time stock technology, aims to enhance employee satisfaction and efficiency.
  - Gap - Stories - Sensai
- **Lane**
  - The O2 venue in London, introduced self-serve bars in 2024, powered by Amazon's Just Walk Out technology. This innovation aims to reduce queues and enhance the guest experience by offering a frictionless food and drink experience without checkouts. The O2 plans to expand this technology to additional locations in the future.
  - Sensai also markets this concept for use in cinemas or offices and train stations to serve coffee and pre-packaged meals.
  - Lane - Solutions - Sensai
  - Coffori - Stories - Sensai
  - The O2 Unveils Self-Serve Bars Powered By Just Walk Out Tech...
    The O2, the world's most popular live music venue, bars, stores, and retail stori...
    crowdfox.co.uk
  - Just Walk Out technology has been deployed at London's O2 venue in the coming months, with plans to expand to other locations in the UK.
    alphaomega-jv.co.uk

Smart Carts

- Smart shopping cart introduced by Amazon in 2020 to streamline grocery shopping, specifically aiming to eliminate checkout lines and leverage Just Walk Out technology. The cart uses sensors, cameras, and artificial intelligence to automatically detect and identify products as shoppers place them in the cart. Customers can connect to display the running total, items scanned, promotional discounts, and shopping lists, in real-time on the cart's integrated screen, recommendations while shopping, personalized offers based on purchase history, and proceed to automatically processed the payment upon exiting the store, with the purchase amount deducted or they been through designated lanes.
  Limitations
  - Complexities: No need for traditional scanning or manual checkout.
  - Real-Time Feedback: Shoppers see their running total, promotions, and recommendations, reducing uncertainty at checkout.
  - Reduced Wait Times: Significantly cuts down on checkout lines, improving overall store flow.
  - Accuracy: The cart must reliably identify every product and accurately charge the correct standard items.
  - Lost Sales: Errors or initial customer adjustment to interaction with a larger cart can rather than a familiar checkout process might lead to lost sales.
  - Account Friction: Needing to create an account for new customers might be mistaken them to abandon.
  - Privacy Concerns: Cameras and sensors might raise privacy issues for some shoppers.
  - Walmart's Amazon's Just Walk Out cashierless checkout, and it rev...
    Walmart is testing Amazon's Just Walk Out technology in its first cashier-less checkout system ever in a few stores in the coming months. The system allowed shoppers to start and pay for their purchases without waiting in a traditional checkout line. However, customers encountered difficulties in accurately scanning their purchases, with the system sometimes failing to correctly assign items to the correct shopper's virtual cart, leading to inaccurate charges. The system also required shoppers to download the Walmart app and navigate a complex process involving scanning barcodes, adding items to a virtual cart, and then proceeding to a self-checkout station to complete the payment. The system's technologies that customers encountered difficulties in accurately scanning their purchases, with the system sometimes failing to correctly assign items to the correct shopper's virtual cart, leading to inaccurate charges. The system also required shoppers to download the Walmart app and navigate a complex process involving scanning barcodes, adding items to a virtual cart, and then proceeding to a self-checkout station to complete the payment. The system's technologies that customers encountered difficulties in accurately scanning
  - What could Asda and Morrisons move away from self-checkout...
    Supermarkets are beginning to question the obvious technology ...
    bbc.co.uk
  - Sainsbury's ditches Amazon's Just Walk Out' tech at London s...
    Sainsbury's has removed Amazon's Just Walk Out' technology from its Pi ...
    employeetimes.co.uk
  - Self scan stores in Sainsbury's: And why don't UK...
    Allow us-sign-in/register-required Comments issued with supermarket p...
    businessfocus.co.uk
  - Self-Scan systems (more specifically Sainsbury's Just Walk Out) Amazon's "Just Walk Out" is a quasi-cashless system that allows users to enter a store, take items, and leave without stopping at a checkout. The process highlights that while such systems aim for convenience, they introduce new friction points for the customer, such as ensuring their actions are correctly tracked by the system and resolving discrepancies if an error occurs. The process highlights that while such systems aim for convenience, they introduce new friction points for the customer, such as ensuring their actions are correctly tracked by the system and resolving discrepancies if an error occurs.
  - H&M Group: Taking steps to grow the customer experience through tech - H&M Group
    hmgroup.com
  - Types of Autonomous Stores & How to Choose the Best One...
    Explore the world of autonomous stores. Find out what they're about, ...
    mitrais.com
  - The next evolution of the Dash Cart: New features and expand...
    The new version of the Dash Cart carries more groceries and gives an ...
    developerauto.com

Relevant Articles

- Amazon insists Just Walk Out isn't secretly run by workers wat...
  Amazon calls these claims "artificial"
  theverge.com
- From concept to creation: How Just Walk Out technology is gro...
  Shopping is a highly personal experience — for the whole different ...
  aboutamazon.com
- So, Amazon's AI-powered cashier-free shops use a lot of...
  This is how these bosses get rich by making underpaid, unrecognised ...
  theguardian.com
- Inside the lab where Amazon is reimagining retail
  Take a tour through the Just Walk Out test lab in Seattle, Washington, where ma...
  aboutamazon.com
- Amazon's Just Walk Out technology relies on hundreds...
  Amazon promoted Just Walk Out as AI-powered, but the technology ...
  businessinsider.com
- How generative AI helps Amazon eliminate checkout lines and rev...
  Discover AI and other technologies behind Amazon's Just Walk Out techn...
  aboutamazon.com
- Amazon Fresh opens first 100-less grocery store in UK
  Amazon's Just Walk Out tech is available to app users who must ...
  theguardian.com
- Why Amazon is walking back on Just Walk Out technology
  After tweaking its Just Walk Out technology as a development that wo...
  theverge.com

Drivers

Political

- Political debates around gig work, independent contractors, and other non-traditional employment structures can influence staffing models. Where government policies increase the complexity or cost of hiring human workers, automation may become more attractive.
- In regions where labor unions are strong, political discourse around collective bargaining and job security can create tensions. Some retailers might seek partial automation to mitigate the risk of unionized labor disruptions or negotiations.
- Politicians sometimes campaign on protecting small businesses against large retailers and tech giants. The shift to autonomous shopping could be seen as favoring big players with resources to develop and deploy these solutions.
- Governments that mandate or encourage reduced physical interaction (e.g., during COVID-19) indirectly boosted autonomous shopping technologies. Self-checkout and cashierless solutions alone contactless, which can align with public health guidelines.
- Potential job displacement and increase in unemployment may motivate politicians and policymakers to focus on the potential negative impacts of automation on employment. As a result retailers may face scrutiny or public pressure if they adopt autonomous checkout systems.
- Policymakers may view automation in retail as part of a broader strategy to foster technological leadership. By supporting advanced retail concepts, governments can showcase innovation to attract foreign investment and technology partnerships.
- Political pressures around workers' rights—like paid sick leave and enhanced benefits—may push some companies toward automation as a cost containment strategy.
- Brexit made it more difficult for business to trade with other countries in the EU, resulting in increased costs and additional complexity.
- The protectionist movement and increased scrutiny of immigration have resulted in reduced availability of cheap labor and staffing shortages.
- Minimum wage increases, and labor shortages in many markets have put upward pressure on staffing costs.

Economic

- Realocating staff from repetitive checkout tasks or customer-facing roles can enhance service quality while boosting profits.
- Integrations with smartphone apps, loyalty programs, and digital payments (including mobile wallets) allows retailers to provide a more tailored experience and increase revenue.
- High upfront costs for installation and higher rates of shoplifting both and accidental and intentional have led to some retailers scaling back on the use of autonomous shopping technologies - particularly with self-checkout lanes.
- Waiting the Case for Better Self-Checkout...
  Waiting the Case for Better Self-Checkout Self-Checkout ...
  bbc.co.uk
- Self-service: Booths supermarket puts...
  Booths was rebranding its self-service checkouts to ...
  bbc.co.uk
- Automation can allow stores to operate with fewer staff members, potentially lowering labor costs by transfering in smaller location and making them as space efficient as possible.
- Increase in land, rent and lease costs means retailers are looking for ways to operate lower these costs by transfering in smaller location and making them as space efficient as possible.
- Automated solutions can reduce long-term maintenance make it unaffordable for smaller business.

Sociological

- Demand for convenience and speed as modern consumers are looking to reduce wait times and streamline their shopping journey. Autonomous shopping models eliminate queues at checkouts, giving customers a seamless experience.
- The COVID-19 pandemic accelerated demand for touch-free transactions, further pushing retailers to adopt technology-driven experiences that reduce physical interactions.
- Large online retailers—most notably Amazon—have launched physical retail experiments (e.g., Amazon Fresh) to offer frictionless checkout systems. This has created pressure on traditional retailers to innovate or risk losing market share.
- Quick-service restaurants and convenience stores are similarly exploring self-checkout and mobile-based ordering and payments to meet consumer demand.
- Early adopters of autonomous shopping can position themselves as technology-forward and customer-focused. This image can attract tech-savvy shoppers and boost loyalty, and generate media attention, strengthening competitive standing.
- Over-reliance on high-tech solutions can alienate those with accessibility needs who require more human support. Homeless and low-income shoppers, who often lack bank accounts or smartphones, making it harder for them to buy essentials.
- Overwhelming frustration can arose due to poor implementation or maintenance of the hardware systems, particularly when shops are heavily reliant on them. Such technical shortcomings can severely damage the company's reputation with their employees and negatively impact customer's perception of the brand.
- Understaffing can overburden employees, affecting their health and leading to mistakes and poor retention. Staff must be properly trained to handle technical issues and customer queries, ensure them and assist customers when technology falls short. No system is infallibe, no matter how advanced.

Technological

- AI-driven demand forecasting, shopper behaviour analytics, and inventory management are becoming increasingly popular.
- Significant innovations in Artificial Intelligence and Machine Learning technologies enabled algorithms that interpret real-time data from cameras and sensors to identify products taken, returned, or moved within the store.
- Advances in image recognition, object tracking, and deep learning have significantly improved accuracy, making it possible to automatically detect and track shoppers
- Widespread smartphone adoption and increased present of technology in individuals daily lives means that it's easier to target specific demographics and track spending habits both inside and outside the retailers space. This helps
- High upfront costs for installation and higher rates of shoplifting both and accidental and intentional have led to some retailers scaling back on the use of autonomous shopping technologies - particularly with self-checkout lanes.

Legal

- Labor unions and worker rights put in in place to protect employees means there can be less flexibility for companies to adapt to shifting demand through traditional means (lower wages, firing, larger working hours. This could push business to seek technological solutions to make their existing workforce more efficient.
- The technology that enables autonomous shopping, especially camera tracking and facial recognition, can raise privacy questions. Retailers must navigate data protection laws (e.g., GDPR, CCPA) and ensure transparency about data usage.

Ecological

- RFID has proven to be an effective way to accurately manage and trace inventory across the supply chain, reducing waste. It helps in scanning all items even when they're inside boxes with minimal interference. This could help make businesses more efficient and reduce unnecessary shipments due to human error.
- Autonomous shopping solutions often incorporate sophisticated inventory management and real-time data analytics, reducing food waste or excess stock.
- Focus on product traceability (e.g., for food safety or ethical sourcing) may encourage RFID and other tracking technologies, which can integrate with self-checkout or autonomous shopping environments.

Reflection

A common misconception with autonomous shopping technologies is that they're designed to reduce staff. While this might be true in some cases, the main goal is increase efficiency both for customers and staff. This means the retailer can redistribute staff to more customer-facing roles without needing to increase the size of the store or hire additional staff, this can translate in cheaper prices for products. Employees are usually redirected into alternative tasks such as customer assistance, stocking, or roles needed for lifts and queues means there's more space for product shelves, increasing the variety of products available to the customers. This also addresses one of the main pain-points of customers: queues. But sometimes aids have challenges such as random bag checks, the system failing to recognise items, or the system requires individual items to be scanned with readers; poor accessibility or availability of staff. This becomes even more prevalent when these technologies are poorly implemented.

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