

SMARTER CHECKOUT STARTS HERE

RETHINK
RETAIL

Diebold Nixdorf



THE NEXT ERA OF GROCERY EFFICIENCY



Checkout is more than just the final step in the shopper's journey—it's **a critical touchpoint** that directly impacts customer satisfaction, store efficiency, and the bottom line.

As consumer expectations shift toward fast, intuitive experiences, grocery retailers face increasing pressure to modernize checkout processes to keep pace with the shopper's demands.

Despite the rise of online grocery shopping, nearly 80% of transactions still happen in-store. That means retailers must focus on creating seamless, self-directed checkout experiences that reduce friction, streamline labor demands, and minimize losses that can occur from shrink or process inefficiencies. At the same time, staff shortages, rising operational costs, and evolving shopper behavior are compounding the complexity of managing front-end operations, making it harder for grocers to deliver a brand-appropriate checkout journey.

Enter AI-powered self-checkout. More than a technology trend, it's a transformative opportunity for grocers to reimagine checkout as a strategic lever for performance. From accelerating transaction times and automating age verification to improving shrink detection and predictive maintenance, artificial

intelligence is redefining what's possible at the front end, providing grocers with new opportunities to optimize throughput and create better consumer experiences.

To unlock the value associated with addressing these key pain points, grocery retailers must hone their knowledge of how intelligent automation and self-service innovations can drive measurable improvements. By examining the practical applications of AI in checkout environments, showcasing real-world success stories, and offering guidance for building a checkout strategy that's both efficient and future-ready, this whitepaper provides a clear path forward

WHY CHECKOUT **EFFICIENCY MATTERS**

While online grocery adoption has grown in recent years, approximately 80% of grocery transactions still take place in physical stores. This statistic highlights the importance of prioritizing checkout efficiency



as an essential component of in-store operations. Traditional checkout processes can no longer keep up with the increasing volume of customers who expect speed and convenience.

Nearly 40% of grocery store checkout lanes in the U.S. are now following a self-checkout journey, a clear indicator that frictionless retail is a top priority for grocers. However, operational inefficiencies continue to pose challenges.

Retailers are grappling with labor shortages, making it difficult to staff checkout lanes adequately. In 2024, retail associates had the highest number of job vacancies, with over 1.7 million open positions. These ongoing hiring challenges reinforce the need for AI-supported self-service journeys that reduce labor dependency while improving overall efficiency.

Long checkout lines contribute to cart abandonment and lost sales, while self-checkout system failures

impacting the ability to manage self-checkout lanes effectively. These challenges cause longer intervention times, higher error rates, and inconsistent service delivery.

To move forward, retailers must rethink how they design the self-checkout journey—not just from a technical standpoint, but from a workflow and human-centered perspective. The next section explores how AI-powered solutions like automated age verification, fresh produce recognition, and real-time shrink detection are helping grocers address these challenges while delivering the seamless experience shoppers expect.

OPTIMIZING CHECKOUT EFFICIENCY
WITH AI AND SELF-SERVICE INNOVATIONS

The demand for fast, intuitive self-service continues to rise, with 66% of U.S. shoppers preferring self-checkout over traditional staffed lanes. AI-powered self-checkout technology is addressing long-standing inefficiencies, such as shrink, by improving both speed and accuracy, enhancing the overall customer experience.

Shrink, or inventory loss, has been a long-standing issue for retailers, particularly in the food industry, as grocers are susceptible to spoilage as well as the traditional culprits of shrink, including internal and external theft, administrative or operational errors, and throwaways. The National Retail Federation noted that there was a small rise in shrink from 2021 to 2022, but their recent announcement to stop publishing after three decades and move to analyzing theft and violence rates comes due to relatively steady rates over previous years. One key innovation to combat this is intelligent item recognition and automated scanning, which solves common barcode scanning errors and eliminates the need for manual lookups. By utilizing multi-item recognition technology, AI automatically detects multiple products at once, reducing scanning time while minimizing shrink rates caused by missed scans or frustration driven shrink when products are unable to be found in the item catalogue.

Additionally, fresh produce identification streamlines classification, eliminating the delays caused by manual price lookups.

Another critical area of optimization is age verification, which historically requires cashier intervention and slows down the checkout process. AI-powered facial recognition and ID scanning now automate age verification for restricted items, significantly reducing wait times. Real-time alerts notify employees only when necessary, ensuring a smooth and uninterrupted transaction flow for the majority of shoppers.

AI-powered queue management is also transforming checkout efficiency by dynamically adjusting lane availability based on real-time traffic predictions.

Proactive monitoring plays a key role within seamless checkout experiences; detecting potential bottlenecks, such as low receipt paper or system maintenance needs, and alerting employees

before these issues impact customers. As a part of Diebold Nixdorf’s Managed Services, predictive monitoring detects predictive capabilities that allow retailers to reduce downtime and ensure self-checkout systems remain fully operational during peak shopping periods.

AGE
VERIFICATION

leads to a reduction of transaction time per age check to less than 10 seconds and an 80% reduction of interventions involving age verifications, resulting in better staff availability, shorter checkout lines, and improved checkout efficiency

The Imperative of Frictionless Retail: Nearly 40% of grocery store registers in the U.S are now self checkout systems

according to Kiosk Marketplace

lead to customer frustration. Additionally, balancing security and convenience is becoming increasingly difficult, as retail shrink was projected to rise from \$112 billion in 2022 to \$132 billion globally in 2024. To mitigate these challenges, particularly in self-checkout, retailers must identify process and technology solutions that help with reducing shrinkage, improving age verification, and enhancing item recognition to continually optimize the efficiency of the checkout process - without compromising the shopping experience.

UNDERSTANDING THE FRICTION:
CUSTOMER & RETAILER PAIN POINTS

Even as self-service adoption accelerates, checkout remains one of the most frustrating and operationally complex areas of the grocery store, as both shoppers and retailers alike encounter growing friction across multiple touchpoints.

For customers, the pain points are tangible and frequent. Nearly 90% of shoppers say that a smooth checkout experience is a make-or-break factor when deciding where to shop. Yet, 4 in 5 consumers actively avoid businesses with long lines, and slow or confusing checkout workflows only exacerbate that dissatisfaction. Common frustrations include waiting for assistance with age verification, dealing with unscannable or unbarcoded items, and navigating inconsistent interfaces. According to the Time and Motion study by Incisiv, in partnership with Diebold Nixdorf, even a 10-second delay per transaction across 2,000 stores can result in over 1.6 million hours of lost time annually, time that could otherwise be invested in customer service or operational improvements.

Retailers face a parallel set of challenges. Labor shortages are compounding the strain on front-end operations, with retail job vacancies continuing to rise, and high turnover and lack of training directly

**BALANCING SECURITY AND SHOPPER EXPERIENCE
AT SELF-CHECKOUT**

Retailers face the challenge of implementing effective loss prevention measures without alienating customers. Theft and fraud at self-checkouts have risen, but excessive security measures can negatively impact customer satisfaction, amidst increasing concern from shoppers; becoming increasingly skeptical of self-checkout due to concerns over fraud monitoring causing false accusations and persecution. As retailers move to more innovative theft prevention techniques, such as AI behavior-tracking technologies or locked up products, shoppers also display a potential to switch retailers upon encountering locked up products, opting to order online instead. In 2024, 43% of shoppers said they would not wait for assistance when attempting to purchase a product, 17% saying they will switch retailers due to this.

Retailers often make mistakes in their approach to loss prevention by over-relying on static security cameras, which offer limited visibility and fail to provide actionable, real-time insights. In contrast, AI-powered monitoring tools allow store associates to proactively detect suspicious activity and intervene with the right level of interaction, reducing both shrink and customer friction.

Intermarché, for example, a leading grocery chain that implemented AI-driven self-checkout monitoring across select stores, experienced a 2% reduction in erroneous transactions and a 15% decrease in staff interventions, allowing associates to focus on more valuable customer-facing tasks. Most notably, the system helped lower theft rates without compromising the speed and convenience of the self-checkout



Germany’s Edeka Jäger, one of the country’s largest grocery cooperatives, is also embracing innovation in this space by introducing AI-powered age verification at self-checkout terminals. This system automatically detects items requiring age confirmation—such as alcohol or tobacco—and uses intelligent algorithms to validate customer age without employee intervention, ensuring compliance while maintaining a seamless self-service experience.

In the fresh produce category, grocers such as Wegmans and Albertsons are leveraging AI-powered image recognition to identify fruits and vegetables at checkout, minimizing the risk of mislabeling high-value items. Similarly, Instacart is using AI to scan fresh produce in stores and warehouses before delivery, improving quality control and reducing waste. These innovations demonstrate how AI can support a more secure, efficient, and shopper-friendly self-checkout experience when implemented strategically.

While AI and advanced technologies are playing an increasingly critical role in minimizing shrink and enhancing self-checkout experiences, they are only one piece of the equation. A truly effective self-checkout strategy must combine multiple layers of optimization. Smart store layout and product placement can reduce bottlenecks and make self-service stations more intuitive and accessible. Operational processes—such as clear signage, streamlined user interfaces, and well-defined intervention protocols—help prevent confusion and errors. Equally important is staff engagement. Empowering associates to provide on-the-spot assistance and maintaining a welcoming, service-oriented presence ensures that technology complements, rather than replaces, human interaction.

Ultimately, balancing loss prevention and customer convenience requires a holistic approach. By aligning AI-driven monitoring with thoughtful store design, efficient processes, and proactive staff support, retailers can create self-checkout environments that minimize shrink while still fostering trust, ease, and satisfaction among shoppers, ensuring self-checkout remains a viable and attractive option for retailers.

43%

of shoppers said they would not wait for assistance when attempting to purchase a product, **17% saying they will switch retailers due to this**

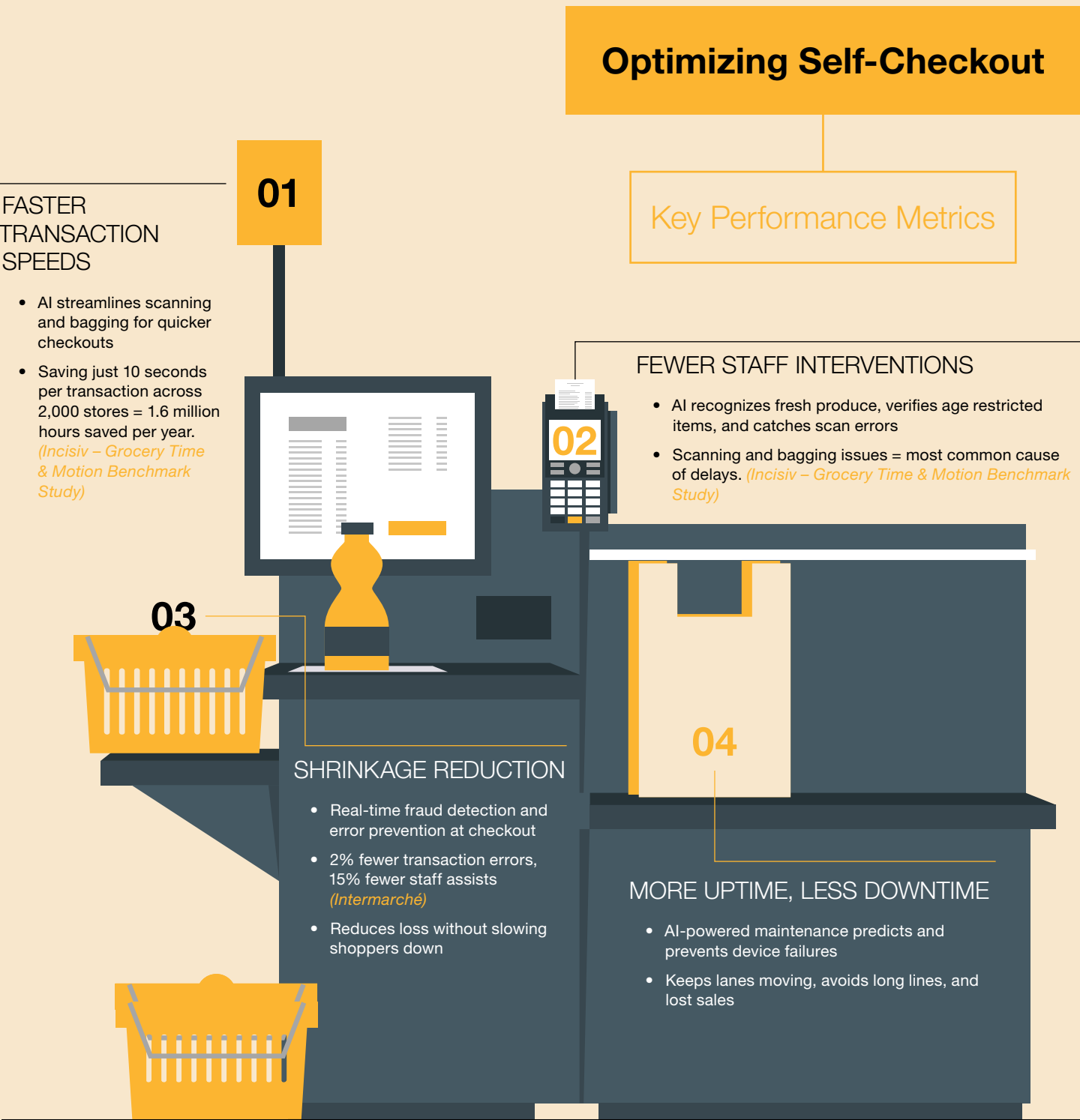
according to a Numerator report



experience, reinforcing the importance of using real-time, intelligent monitoring over reactive security approaches.

Across the industry, retailers are experimenting with a range of AI-driven tools to reduce loss while improving the shopper experience. For instance, some stores have adopted smart shelves with RFID tracking and weight sensors, which can detect when items are removed but not properly scanned, prompting instant alerts. Others, like Amazon, have introduced palm recognition technology for age verification, allowing customers to link their ID to a contactless biometric scan and verify their age without manual checks. In parallel, select grocery and convenience chains in both the U.S. and U.K. are piloting facial recognition tools to streamline age-restricted purchases.

Future-Proofing AI-Driven Checkout and Measuring Success



Retailers that monitor and optimize these KPIs can enhance efficiency, reduce losses, and create a seamless checkout experience. Grocery checkout is pillared on efficiency, security, and seamless customer experience. This balance requires intelligent and deliberate solutions, such as integrating AI-driven solutions that enhance efficiency, security, and scalability while ensuring continuous performance improvements.

Beyond efficiency gains, long-term success in grocery retail hinges on adaptability and consistency. AI-powered checkout systems must be designed to scale with shifting consumer behaviors and evolving retail trends.

One of the key aspects of this ability to scale is the ability to finetune campaigns and investments; always keeping established KPIs at front of mind to quantify success and provide agility to realign and refocus on achieving measurable success.

Long-term success in grocery retail hinges on **adaptability and consistency.**

AI-driven analytics play a critical role in this; allowing retailers to adeptly and quickly refine their operational strategies. As the grocery landscape continues to evolve, retailers that embrace innovation and agility through AI, automation, and scalable self-service solutions will be best positioned to meet customer expectations while maintaining operational efficiency. Investing in flexible, future-ready checkout solutions is no longer optional—it is a necessity for retailers aiming to stay ahead in an increasingly digital and automation-driven marketplace.

ABOUT DIEBOLD NIXDORF

Diebold Nixdorf is a global leader in self-service and automation technologies for the retail and banking industries. Their AI-powered solution Vynamic Smart Vision optimizes self-checkout processes, reduces shrinkage, and improves overall efficiency. With offerings like the DN Series EASY Self-Service

Family and their comprehensive consulting approach Storevolution™ Advisory Services, Diebold Nixdorf helps retailers seamlessly integrate automation into their operations, ensuring a streamlined and future-ready approach to retail transformation.



rethink.industries