
Retail
Inventory
Distortion
the GOOD the BAD the UGLY
IHL
GROUP

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Introduction

Inventory distortion worldwide is a critical issue that continues to plague retailers worldwide, causing significant financial losses and operational challenges. When IHL measures inventory distortion, we look at out-of-stocks from the customer perspective (what did they come ready to buy but did not because they couldn't find it in stock) and the retailer perspective on overstocks (excess discounts or spoilage). We titled the report Inventory Distortion – The Good, the Bad, the Ugly as progress has been made in many areas (the Good), huge issues remain for optimization (the Bad), and still other issues that are getting worse (the Ugly).

In 2023, the total cost of inventory distortion is projected at $1.77 trillion, down $172 billion from 2022 with out-of-stocks accounting for $1.2 trillion and overstocks totaling $562 billion. Without question a huge problem remains, one greater than the combined retail GDP of Latin/South America.

To be fair, the last few years could be said to be the most challenging years in modern retailing, starting with COVID lockdowns that caused massive shortages, causing retailers to overstock merchandise as economies reopened only to have an unexpected war that created millions of refugees, rapid energy price inflation and the largest supplying country remaining in lockdowns.

WORLDWIDE 2023
INVENTORY DISTORTION

Source: IHL Group

$1.77 Trillion

(More Than The Entire Retail GDP of LATAM)

SOME MAJOR IMPROVEMENTS IN
INVENTORY DISTORTION WORLDWIDE

Source: IHL Group

$172 Billion

(Roughly Equal to The Home Depot's Annual Sales)

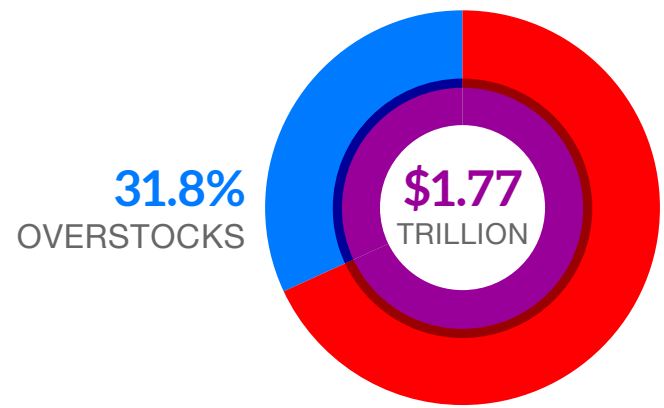
Despite these issues, retailers who have been sufficiently focused on the items within their control continue to make significant improvements. And while there may be a disconnect between retailers' perception of their inventory position and the reality experienced by customers, it is important to recognize that the systems being deployed to address inventory distortion are working.

Comparing these numbers to previous years, it is evident that inventory distortion has been a persistent issue. In 2022, the total cost of inventory distortion was $1.9 trillion, indicating a slight improvement in 2023. This suggests that retailers have made some progress in addressing the issue, despite the ongoing challenges.

There are many causes of inventory distortion, but who is to blame in 2023? Vendor issues remained as the primary driver of out-of-stocks and overstocks, contributing $418 billion to the inventory distortion problem in 2023, but down $174 billion and after 2022 showing tremendous improvement in product availability. Theft both by employees and consumers, accounts for $379 billion in 2023 with consumer theft nearly $203 billion and employee theft about $175 billion.

INVENTORY DISTORTION WORLDWIDE

Source: IHL Group

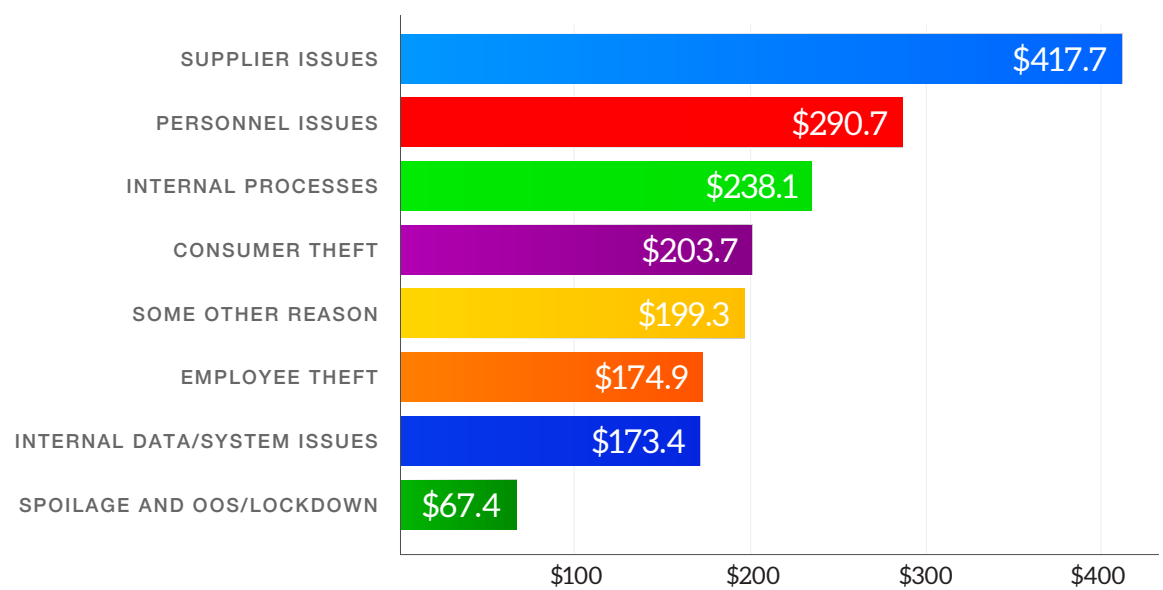


Personnel issues, including a lack of training and trust in systems, are also a significant issue, contributing another $291 billion. Internal process issues contribute $239.1 billion to the problem and bad data systems issues another $173.4b.

Spoilage and lockdown issues have seen major improvements in the last 3 years. While still a huge issue at $67.4b this pales in comparison to the nearly $570b in losses in 2020 and $238b in losses in 2022. While governments opening and China abandoning the zero COVID policy was the lion share of the progress, we must give credit to better forecasting and systems like fresh item management for reducing a portion of this as well.

BLAME FOR INVENTORY DISTORTION
Worldwide ($ in Billions USD)

Source: IHL Group



Regional Differences

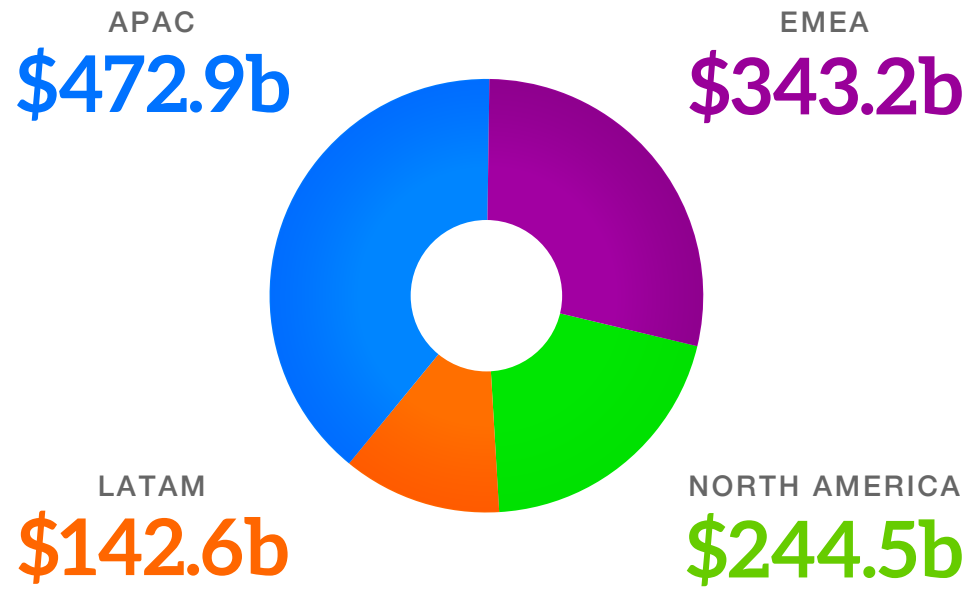
Overall, we saw improvements in total inventory distortion in all 4 major regions. In North America, the total inventory distortion decreased by 1.6% from 2022, thanks to a significant drop in overstocks as retailers worked through excess inventory. However, the cost of out-of-stocks increased by 17.7%, mainly due to a sharp uptick in organized retail crime. Overstocks decreased by 21.6%, primarily due to supply chain chaos becoming resolved and improved systems performance.

In Europe/Middle East/Africa (EMEA), there was a 10.0% improvement in inventory distortion from 2022. In spite of more goods moving through the industry, retailers experienced a 3.9% decrease in out-of-stocks and a 20.9% improvement in overstocks. As retailers adjusted to the new realities of population shocks from millions of refugees from conflict areas, they began to normalize inventory levels. These numbers also seem to indicate that the investment in IT systems for these retailers is having a positive effect.

In Latin/South America, out-of-stocks declined 4.3% and their overstocks declined by 22.7%. Overall, there was a 9.7% reduction in inventory distortion in the region. Despite rapid inflation, the region has not suffered the same “shocks to the system” we have seen in EMEA and North America.

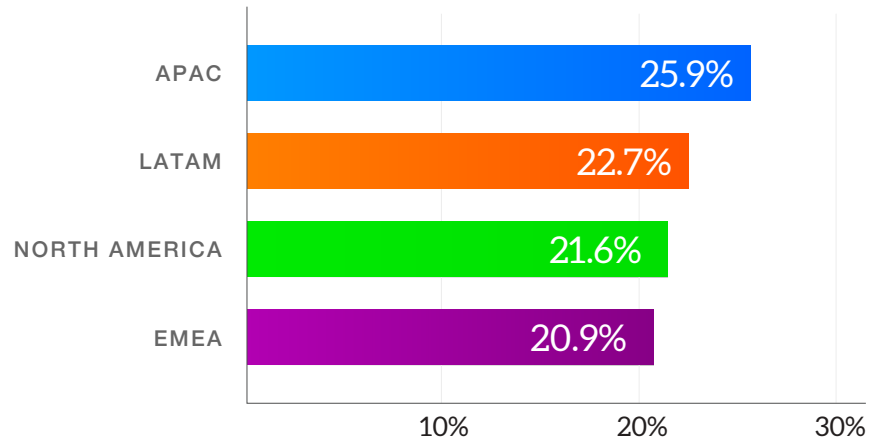
COSTS OF OUT-OF-STOCKS BY REGION

Source: IHL Group



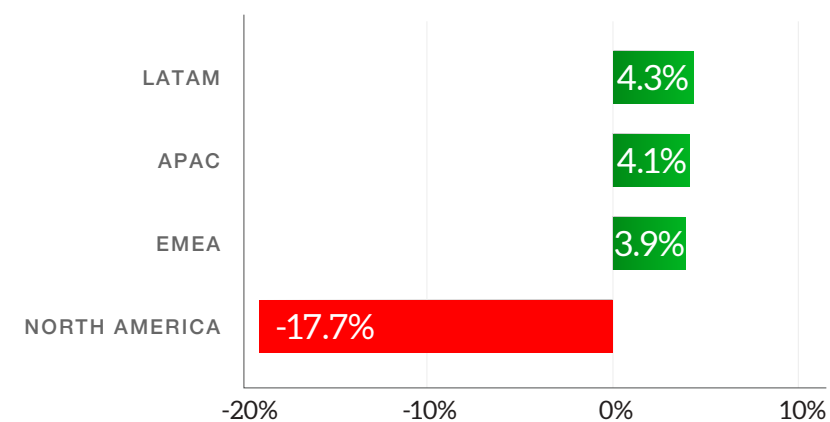
In the Asia/Pacific region the previous decade showed annual sales growth in the double digits, mainly due to the rising middle class and changing consumer spending patterns. This has slowed significantly as China's tepid consumer recovery from lockdowns has depressed sales. Overall inventory management practices are becoming more disciplined, which resulted in a 4.1% improvement in out-of-stocks and a 25.9% improvement in overstocks. The disruptions in supply chains and imbalances in demand for essential and discretionary products have settled out some.

In conclusion, while inventory distortion remains a challenge for retailers globally, there have been improvements in managing the issue in all regions. While worldwide economic growth has slowed, we see a more resilient supply chain and better systems attacking the issue worldwide. As long as we don't experience additional "shocks" we should see continued progress.



OVERSTOCK IMPROVEMENT 2022 to 2023 by Region

Source: IHL Group



OUT-OF-STOCK IMPROVEMENT 2022 to 2023 by Region

Source: IHL Group

The Good

There have been some very positive developments in managing inventory distortion this year. Across all four regions, we see an average improvement of 8.9%. This is a clear indication that retailers are taking proactive steps to address their inventory challenges and improvements in the supply chain.

One of the key areas of improvement is in the reduction of overstocks. Worldwide overstocks improved to the tune of a 23.1% reduction (reductions are good). The radical shock to the world economy from Russia's invasion of Ukraine in 2022 found many retailers who had stocked up for post-COVID "revenge buying" stuck with the wrong merchandise for a tighter consumer and higher energy prices. This has mostly been worked through and demonstrates that retailers are becoming more effective in managing their inventory levels and avoiding excessive stockpiling in 2023.

21.6%

Improvement in Overstocks Worldwide from 2022.

Source: IHL Group

GMS retailers (Department and Specialty Hard and Soft Goods stores) especially have been the most improved here, as their "Vendor Issues" and "Buying / Planning Issues" have improved by 27.9% and 24.0% respectively. Expanded use of unified commerce technologies along with enhanced demand forecasting solutions and a move back to more normal inventory levels helped this issue. Those retailers who have embraced these technologies are not only more efficient in their operations, but they also benefit from consistently better margins.

Worldwide, out-of-stocks also saw improvement (0.3%) barely. While three out of the four regions have experienced a decline in out-of-stocks, North America saw an increase of 17.7% due to increased theft. Positive outcomes in EMEA, APAC, and LATAM, with improvements ranging from 3.9% to 4.3%, indicate that these retailers are making strides in ensuring product availability for their customers without growing overstocks.

Among the key inventory visibility-related solutions responsible for these improvements are order management systems (usually part of a unified commerce transformation), inventory visibility software with RFID tags (which enable running many store-level inventory counts vs once or twice a year) and computer-aided ordering into more categories that have reportedly added between 3-9% increase in sales through better stock positions and faster reactions. These are in addition to directed spending on systems like cameras (in the aisles, the POS, and the docks), enhanced customer counting and tracking systems, computer vision and RFID solutions.

Overall, there were many improvements that qualified for The Good. Let's move now to the more challenging areas.

The Bad

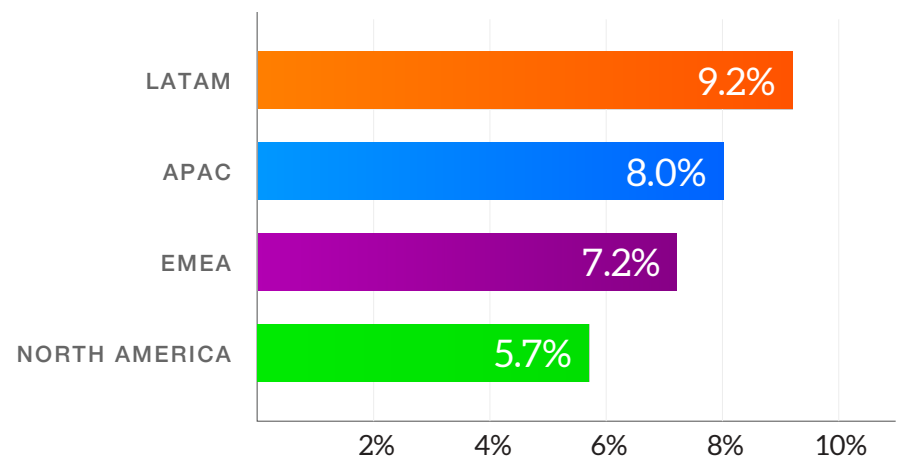
Despite progress inventory distortion continues to be a huge issue equivalent to 7.2% of retail sales (or the equivalent of the annual revenues of the top 10 retailers on the planet).

The first step in tackling inventory distortion is identifying the main contributors. Empty shelves remain the largest component of inventory distortion with $707.4b in costs. As mentioned earlier, we have seen improvement in EMEA (-7.3%), Asia/Pacific (-7.6%) and Latin/South America (-4.4%) with better forecasting tools and more consistent product availability. It is North America, specifically certain major US cities, that caused a $30b increase in empty shelves with theft issues overwhelming systems and process improvements.

Labor issues remain the other major issue that must be discussed. Worldwide we saw a $17.7b increase in problems either due to lack of people to help or poor training. North America leads the issue here, being the cause of 80% of the total. Although the retail labor issue is improving in North America, retailers remain being challenged with doing more with less.

SIZE OF INVENTORY DISTORTION PROBLEM
Region as % of Retail Sales

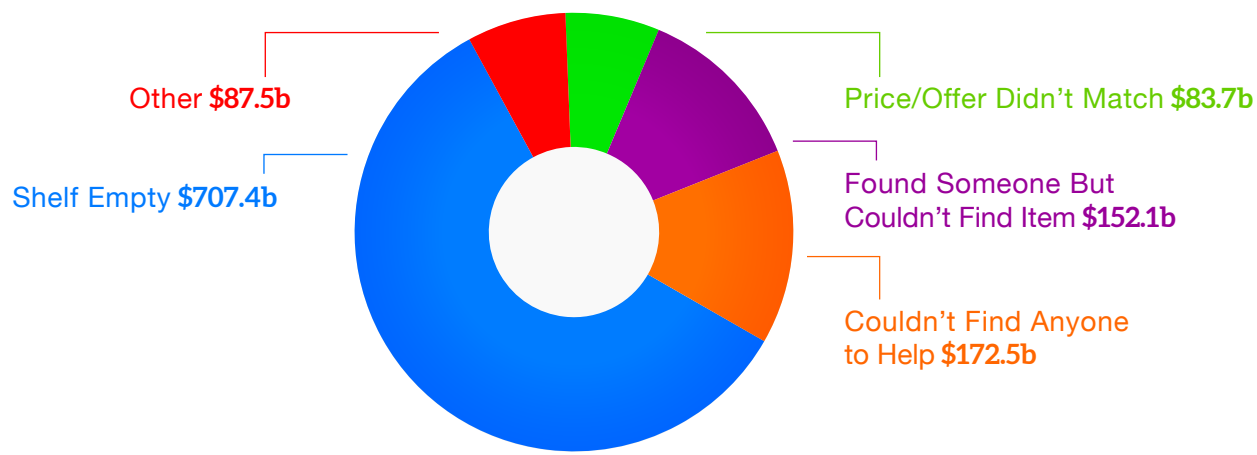
Source: IHL Group



Pricing problems continue to cause lost sales. While we are seeing the rapid adoption of electronic shelf labels, the lack of labor has led to nearly $84b in lost sales due to pricing mismatches to either advertisements or from differences in online pricing verses the store leading to lost sales.

Finally, while we have seen a $174b reduction in issues related to supplier issues, it remains a $417.7b issue worldwide. We expect this to continue to improve and thankfully many of the issues are targeted at specific products and not as systemic as they have been during the last 3 years. That being said, this remains an enormous potential area for improvement where retailers have the opportunity to leverage workforce management and shelf edge technology improvement.

REASONS FOR OUT-OF-STOCKS WORLDWIDE
In Billions
Source: IHL Group



The Ugly

The Good is very good, the Bad is pretty bad, but the Ugly is really, really ugly. There is no way to sugar coat it. In North America, Out-of-Stocks have increased by a staggering 17.7% from 2022. The primary drivers of this increase are empty shelves, which have risen by 22.8% ($29.6 billion). The supply chain has stabilized, but now a new (well, not really new) problem has reared its ugly head in the form of an increase in organized retail crime (ORC) that has more than negated other improvements. While a problem across the US, the issue is particularly acute in major cities in California, Oregon, Washington, and New York, leading to retailers locking up most, if not all merchandise or removing stores altogether.

In some of these locations, crimes of less than $900 in theft are not prosecuted or not prosecuted at all, let alone as felony crimes and retailers reportedly losing as much as 10% of sales from certain stores due to theft.

To put this issue into perspective, if a company averages a 25% gross margin and 5% net profit per item, it takes them 15 additional sales to make up for lost profit or shrink. So, when retailers choose to lock up merchandise, they are making a bet that 14 lost sales from customers simply not buying something because it is locked up is better business financially than 1 of that item being stolen. It is no wonder retailers are abandoning high theft areas altogether or those where laws favor the criminals rather than the retailers and honest shoppers.

17.7%

Growth in Out-of-Stocks in North America 2022-2023

Source: IHL Group

Organized Retail Crime is estimated to now be as high as

$100,000,000,000

problem in the US. *(Larger than the annual sales of Lowe's Home Improvement)*

Source: IHL Group

Another significant contributor to the problem is when a customer "Couldn't Find Anyone to Help," which has increased by 36.3% in North America ($10.6 billion) and 10.0% worldwide ($15.7 Billion). Between rising labor costs and labor shortages the labor challenge remains a crucial issue for retailers. Even when a store associate is available, customers who "Found Someone but Couldn't Find the Item" increased by 17.6% in North America (1.4% worldwide, or $2.1 Billion) in the past year. This situation where assistance is available, but the inventory visibility, system reliability, and training of associates have proven to be subpar.

The implications of these labor issues cannot be understated... the inability to meet customer demands due to empty shelves, the lack of available assistance, and the challenges in locating desired items can lead to a significant decline in customer satisfaction and loyalty. The only way retailers can meet the demands of consumers and also increase their sales in the future is to critically look at their availability of labor and systems to optimize where that labor is used, deploying systems and processes to make improvements.

THE COST OF THEFT

Source: IHL Group

Retailers must make

15 additional sales

of an item (at 25% gross margin and 5% net profit) to break even on the loss of theft of one of the same item.

Key Technology Solutions That Greatly Improve Results

Looking into solving the issue of Inventory Distortion there are several steps required to optimize the process and reduce losses. Without them, retailers can be off in their real inventory counts of over 25% from what their systems say.

GET TO ACCURATE INVENTORY DATA

Perhaps the most important part of reducing inventory distortion is to get to accurate data and a single version of the truth. A single, enterprise view of all inventories (and they can be fed from multiple sources) is crucial. New enhancements with microservices can be built on a foundation of APIs and data streaming technology enabling integration with all inventory sources, platforms and solutions delivering a real-time enterprise-wide view of inventory with status (pickable and non-pickable, etc.) across all sources, including warehouses, stores, drop-ship suppliers, and fulfillment centers.

Once your data house is in order, some key solutions that help get to and maintain accurate inventory levels are the following:

RFID, Computervision and Inventory Visibility software – These can be used to improve the number of inventory counts. These solutions can improve inventory accuracy at the store level to 95% or higher depending on the number of reads and if things are done correctly.

There are solutions that are hand-held as well as perpetual solutions with cameras or readers down to the shelf level. Data management and managing by exception are best practices to allow item-level inventory analytics to manage the current in-stock position. They can also tell associates which items should be moved from the stock room to the sales floor in time to avoid preventable out-of-stocks and deliver a positive customer experience.

While audit rules require 3rd party inventory counts at least once a year, many retailers are also seeing significant sales lift and improvements by using self-scan inventory counting solutions. These solutions enable retail employees to greatly improve the accuracy of inventory levels and create savings of 25-50% compared to using 3rd party vendors. This allows retailers to focus on problem stores to get an overall higher level of true inventory counts. This can reduce shrink, increase on-shelf availability and lift sales in a more cost-effective way.

IMPROVED SOLUTIONS ACROSS THE SUPPLY CHAIN

Improving the inventory distortion issue is broader than just at the local store or distribution level, it requires an enterprise view across the supply chain that includes both sellable and non-sellable inventory as well as when the next shipments are coming in. Some key solutions that are helping retailers optimize their overall supply chain include the following:

At the top level, optimizing forecasts and assortment planning solutions that leverage an enterprise view of inventory is a critical table stakes set of solutions. But the process of driving value doesn't stop there. Tied to the enterprise data is the use of a single enterprise distributed order management system. Leveraging a single version of the truth in the data enables top-level control of the inventory, customer and order process. New enhancements include providing full visibility, the velocity of sell-through, and availability to the customer location (down to the zip code).

Next are solutions that optimize visibility of product across the entire value chain. These include optimizing not just the stores, but using the same store-level technology to bring highly accurate item-level inventory to the warehouses and distribution centers, transportation management solutions that optimize truck load management, routes and delivery times can all improve inventory visibility and lower costs. Leveraging technologies such as blockchain, 2d barcodes, RFID, real-time cloud-based analytics and others provide insight and visibility while verifying authenticity, improve traceability, availability to promise, and improve transactional trust.

Further, leading retailers are now beginning to link customer preferences and behaviors with a range of acceptable products within acceptable time frames in the supply chain. This new way of thinking reduces lost sales and results in higher conversion rates, revenues, profits, inventory turns, and customer satisfaction. This concept considers the customers' desired product, pickup time flexibility, and openness to substitution. It's not just about the product on the shelves, but the customers and how they acquire the product. It means directing orders and fulfillment based on maximum localization of customer service levels and margins.

Finally, the most advanced retailers are now also deploying optimized reverse logistics solutions. Merchandise returns have jumped to over $1 trillion in costs in 2023, with particular issues in apparel due to inconsistent sizing and the increase in returns fraud. Overall, up to 15.4% of merchandise is returned depending on the segment, where some items such as women's dresses purchased online have a return rate as high as 90%. We delved into a number of solutions in a recent study specific to returns (you can find here), but needless to say inventory optimization is not limited to forward-facing logistics but returns and reverse logistics as well.

OPTIMIZING KEY PEOPLE RESOURCES

A major area of focus to improve inventory levels is freeing your limited staff to focus on this issue versus others within the stores. The most prevalent solutions already deployed in recent years include self-checkout or allowing customers to order and checkout on their mobile devices, reducing labor in the checkout process.

Less visible has been the use of electronic shelf labels and other IoT sensors to remove the labor hours required to change prices and monitor systems. Some advancements now include computer vision at the shelf- or robot-level to reduce the number of issues that staff must focus on each day. These solutions allow retailers to automate up to 35% of their inventory management tasks.

Fully integrated forecasting allows for market-based demand forecasting to determine how many associates are needed for in-store execution, how many orders should be expected so as to plan for the number of bags, scanners and carts to get the job done.

And finally, critical to improving employee productivity in inventory and getting associates aligned to corporate goals is the use of a modern task management solution on a centralized platform that simplifies execution and communication while prioritizing and allocating tasks. Retailers have seen sales improvements of 1-3% and some research has shown that up to 50% of retailers could see as much as a 10% uptick in sales by deploying task management properly. Workforce management technology is also essential to aligning scheduled associates to in-store workload. Retailers have seen up to 50% improvement in scheduling effectiveness and up to 6% in payroll savings by optimizing scheduling with workforce management.

MITIGATING LOSSES AND SHRINK

As we have already discussed, the exponential increase in theft and organized retail crime is challenging retailers of all types. While retailers cannot change local government policies, there are several technical solutions that can provide better insight and mitigate losses.

The most obvious are traditional EAS item technologies and CCTV cameras, but today these have evolved to include AI-based facial recognition and benefit-denial products that make the products unusable until purchased. Reaching far beyond the traditional ink tags or destructive tags, these new tags now include Bluetooth tokens for electronics that require authorization to operate. These technologies are also being combined with other technologies like RFID to reduce theft. When RFID is combined with computer vision it provides insight into theft and when items disappeared, thus greatly reducing the speed to identify suspects and replenish missing merchandise. And some retailers are now leveraging these technologies to identify suspects the next time they enter one of their stores to alert law enforcement and store staff.

In recent years, predictive and prescriptive analytics to prepare for and reduce losses have made huge improvements to identify total retail loss and are getting better every day. These solutions help uncover more losses hiding in siloed data sets and identify the root cause of issues and which to tackle first. They also automatically prompt your front line to take course-corrective actions. Using prescriptive analytics, retailers have seen up to 27% waste reduction on high-margin items, as well as hundreds of thousands of dollars recaptured in shrink reduction through improving inventory accuracy.

How AI/ML & Generative AI Improve Distortion Problems

There has been a great deal of hype over the promise of Generative AI, but when it comes to inventory distortion improvements this year, it is the traditional Artificial Intelligence/Machine Learning (AI/ML) that is providing the greatest impact so far; Generative AI will only make this better. In fact, combined together IHL is predicting that retailers can improve their gross margins 25% or more from today's level by 2029 if they were able to fully take advantage of all the benefits that AI can provide. More detail can be found in our study "**Retail's $9.2t AI Revolution**".

One way AI helps tackle inventory distortion is through improved demand forecasting. Traditional forecasting methods often rely on historical data and manual analysis, which can be prone to errors and fail to capture real-time changes in customer behavior. AI algorithms, on the other hand, can analyze vast amounts of data from multiple sources, such as sales data, customer trends, social media, and external factors like weather and events. By identifying patterns and correlations, AI can generate more accurate demand forecasts, enabling retailers to stock the right products in the right quantities.

AI-powered inventory optimization systems can also help retailers streamline their supply chains. These systems consider multiple factors, including lead times, supplier performance, transportation costs, and demand fluctuations, to determine optimal replenishment schedules. By automating this process and considering real-time

WORLDWIDE RETAIL AI ECONOMIC IMPACT THROUGH 2029

Source: IHL Group

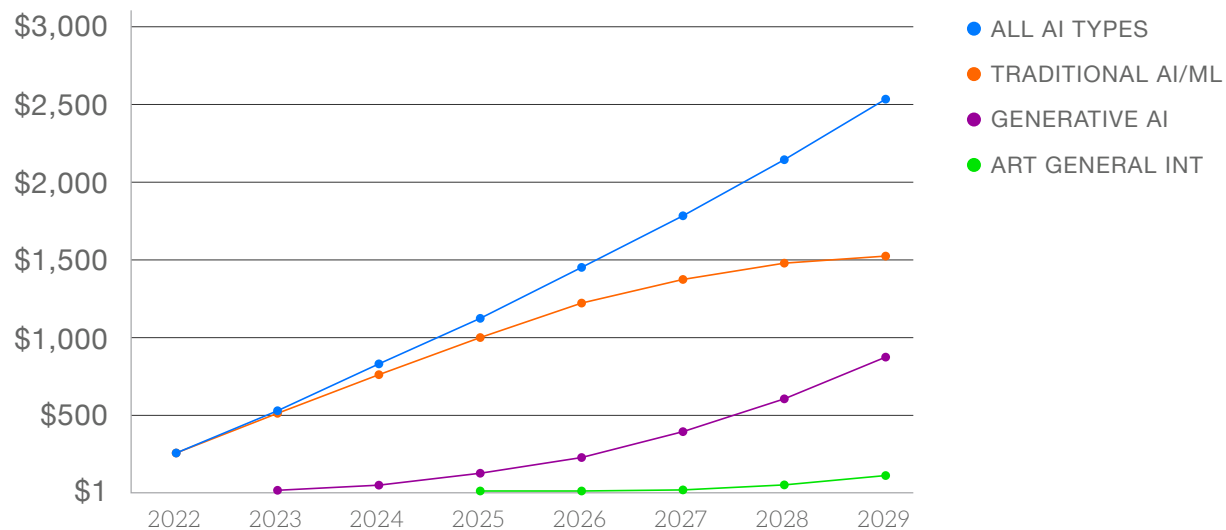
$9.2 Trillion USD

data, AI can minimize stockouts and overstocks, manage safety stocks, consider sellable and non/sellable supply buckets and reducing the likelihood of further inventory distortion.

Finally, the most advanced solutions now include analysis to realize savings using analysis to route online orders to stores with merchandise most likely to go on markdown while also considering the shipping cost. Similarly, these systems can optimize which stores can fulfill the complete orders to maximize margins and optimize sustainability rather than shipping from multiple locations.

Moreover, AI-driven technologies such as computer vision and RFID enable real-time tracking and monitoring of inventory levels. By continuously monitoring stock levels on store shelves, in warehouses, and during transportation, combined-technology solutions can provide accurate visibility into inventory levels and promptly identify discrepancies.

GROSS MARGIN ECONOMIC IMPACT FROM AI TYPES
In Billions USD
Source: IHL Group

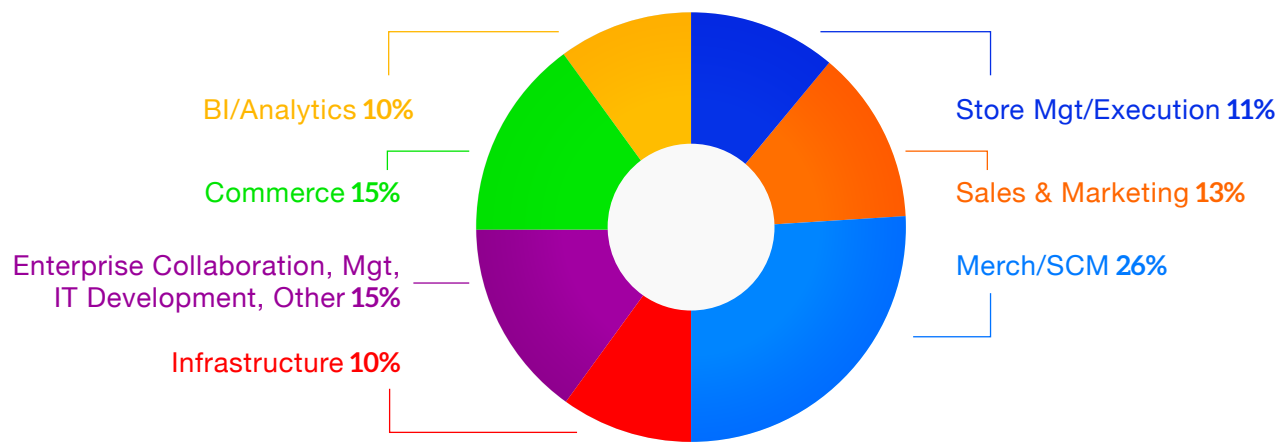


Additionally, AI can improve inventory accuracy by detecting and mitigating human errors. For example, AI-powered systems can analyze point-of-sale data and flag inconsistencies or anomalies that may indicate data entry errors. By automating these checks, AI reduces the reliance on manual audits and minimizes the chances of inaccuracies in inventory records.

AI can revolutionize inventory management in the retail sector by addressing the challenges of inventory distortion. But make no mistake, it is the steps and solutions we discussed in the previous section that must be deployed for retailers to get the benefit. Clean, accurate, and tagged inventory, product, and customer data – the kind that most retailers have been focused on for the last several years are absolute foundations to take advantage of AI improvements. Otherwise, you simply make bigger mistakes faster, whether it be forecasts, analysis, scheduling of employees or inventory assortments. There are no shortcuts, but enormous potential.

ECONOMIC BENEFITS OF AI BY RETAIL LINE-OF-BUSINESS CATEGORIES 2022-2029

Source: IHL Group



Final Thoughts

The consequences of inventory distortion in retail are significant but the industry has made major progress in many areas and continues to struggle in others. While retail sales were rapidly growing post-COVID the cost of overstocks and out-of-stocks could be put on the back burner due to even greater increases in sales. But as the world economy has slowed, fixing inventory issues is all the more critical to preserving or improving the bottom line.

The causes of inventory distortion are multifaceted and include supplier/vendor issues, personnel challenges, employee theft, and consumer theft. Additionally, external disruptions such as port shutdowns and geopolitical conflicts further exacerbate the issue. These factors contribute to the discrepancy between desired and actual inventory levels, leading to financial losses for retailers. Finally, the scourge of the rapid rise of theft and organized retail crime means dealing with a predicable unpredictable challenge in many locations, one that has been encouraged by many local laws in the US.

Addressing overstocks and out-of-stocks requires retailers to invest in systems, processes, and strategies to improve inventory management. Technology plays a crucial role in mitigating inventory distortion, but it is not a standalone solution. Retailers must also focus on improving supplier relationships, training personnel, and implementing effective loss prevention measures as well as lobbying governments.

The rewards are huge. With $1.77t in inefficiencies and losses today, there is enough potential impact to go around for everybody. Those retailers that maniacally focus on this issue, get their data in order, and that leverage both traditional and emerging AI tools will race ahead of their competitors to dominate their markets and improve their profits.

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