

From Floor to Boardroom:

The Warehouse KPIs That Matter, and How to Read Them

A joint white paper from Made4net and Keith Swiednicki International (KSi)



The number everyone watches, and why it can't tell you much:

Most distribution centers produce more numbers than anyone can act on. Yet the one number executives watch most closely, total cost per case, is a lagging indicator. It's the net result of labor rates, productivity, volume, and hundreds of daily decisions on the floor. When it moves, it tells you something has changed, but it doesn't tell you what.

Most operations measure well at one end and poorly at the other. Floor supervisors track picks per hour and dock-to-stock times. Finance tracks cost per case and distribution cost as a percentage of sales. The two rarely meet on the same screen, so nobody can trace a cost problem back to the process that caused it, or prove that a process improvement actually reached the P&L.

The Floor



Function-by-function metrics, from receiving to shipping, that show how each part of the operation performs on its own.

The Dashboard



How those metrics roll up into end-to-end cost per case and percentage of sales.

The Boardroom



Which KPIs matter most, and how to read them without being misled.

The reference ranges in this paper draw on KSi's 40+ years of supply chain consulting and distribution benchmarking expertise, combined with Made4net's experience supporting warehouse operations of all sizes. All reference ranges are consolidated into one table at the end of this paper.

About KSi: Keith Swiednicki International (KSi) is a global supply chain technology consulting and engineering firm specializing in distribution optimization, industrial engineering, material handling design, and operational performance improvement.

With more than 40 years of industry expertise and experience across 1,000+ supply chain projects, KSi delivers data-driven, customized solutions that help organizations improve productivity, reduce costs, and optimize distribution operations.

Learn more about KSi: <https://ksinternational.me/>



Layer 1 - The floor: where performance is actually made

Floor metrics are the leading indicators. They move first, they're measured in hours and shifts rather than months, and they're the only numbers a supervisor can change today. Not every metric applies to every operation. A DC shipping full pallets of air conditioners and one shipping toothbrushes by the sleeve will measure differently. But every operation needs coverage at each stage below.



Inbound: Where inventory accuracy starts:

Receiving looks routine, but it's where inventory management begins. A mistake at the dock follows the product all the way to the customer. Start by classifying inbound work correctly (new stock, customer returns, damaged goods) so each type lands in the right metric. Then choose the unit that fits your operation: receipts, lines, or loads per hour.

- **Dock-to-stock:** the time from receipt to put away and recorded in the system. For fast movers, every hour here is an hour the product can't be sold.
- **Returns rate and reason codes:** a service metric as much as a warehouse one. Profiling why goods come back points to quality, specification, or picking problems upstream.



Replenishment: The link between storage and picking

Replenishment moves inventory from reserve storage into pick faces. When it lags, pickers wait or short orders. Track replenishment timeliness and the number of picks delayed by empty locations. It matters most in high-SKU operations: omnichannel, retail, and e-commerce.



Picking and Outbound: Where most of the labor goes

Selection consumes roughly 56% of all direct-labor hours, and travel can account for a third of selection time. That makes picking the single biggest lever on labor cost.

- **Picks (or units) per hour:** the primary productivity measure. Pick one unit of measure and hold it. Pieces, cases, and lines aren't comparable, and mixing them distorts every benchmark.
- **Total Throughout:** a key measurement to capture the overall improvement across all functions.
- **Order fill rate:** the percentage of each order filled complete. A persistent drop usually traces back to inventory accuracy or replenishment, not to the pickers.
- **Order accuracy:** the right items, in the right quantity, to the right customer. Many operators consider it the most important metric they measure daily.
- **On-time shipment and order cycle time:** a complete, accurate order still fails if it ships late. Measure from order placement to dispatch.



Storage: Space is a cost too

Storage utilization compares occupied space, in square feet, pallet positions and cubic feet, against usable capacity. An overutilized facility will have a negative effect on productivity as will an underutilized facility. A good statistic to utilize is when a facility exceeds 85% utilization, there is a direct loss of 7.8% in productivity.

Layer 2 - The dashboard: where floor metrics become dollars

Cost per case stops being a black box once you break it into parts and trace each part to a floor metric. That's the job of the executive dashboard: not to report the result, but to show what produced it.



Break cost per case into its parts

One operator's executive view shows how. Total cost per case is about \$0.42, split into roughly \$0.04 fixed and \$0.38 variable, with direct cost per case near \$0.22. The same dashboard shows distribution cost at 4.26% of sales, warehouse cost at 2.32%, and labor at 1.23%.

Both views matter. Cost per case exposes operating efficiency. Percentage of sales shows the burden the business carries. An operation can improve one while the other gets worse, for example when volume drops and fixed costs spread over fewer cases.



Do the math on productivity

Labor cost per case is loaded labor rate divided by cases per hour. That simple formula is what connects a picking supervisor's shift report to the CFO's cost line.

An illustrative example: at a loaded rate of \$25 an hour and 159 direct cases per hour, direct labor runs about \$0.157 per case. Lift productivity 10%, to about 175 cases per hour, and it falls to \$0.143. That's 1.4 cents a case, or roughly \$286,000 a year for an operation shipping 20 million cases.

The gap is usually much bigger than 10%. Best-of-breed operators run nearly twice the productivity of the average, and gaps of 3.5 to 4 times persist between departments. Laggards could cut labor hours by up to 60% by matching top performers.



Give every productivity KPI a cost twin

A percentage on its own rarely earns a spot on the executive dashboard. Dead time and delay should each carry a dollar figure, not just a rate. "Pickers lost 6% of the shift to empty pick faces" is a floor problem. "Empty pick faces cost \$4,100 last week" is a business problem, and it gets fixed.



Watch volume, not just headcount

Wage rates vary widely across regions, which makes cost per case hard to benchmark between sites. Automation adds another wrinkle: it makes variable cost more sensitive to volume than to headcount. A drop in volume can raise cost per case even when the operation is running well.

The reverse is the opportunity. With spare capacity, an automated operation can lower cost per case as volume ramps, improving cost and service at the same time. For 3PLs, where cost and service are the whole business, that matters most.

Floor Metric	Dashboard Impact	Boardroom KPI
Picks per hour, travel time	Direct labor cost per case	Labor \$ as % of sales
Replenishment timeliness	Picker idle time, shorts	Throughput, fill rate
Inventory accuracy	Shorts, rework, emergency counts	Service level, lost sales
Dock to stock	Product available to sell, overtime	On-time departure, overtime %
Order accuracy	Returns, re-ships, claims	Service level, cost per case
Storage utilization	Travel and lift time, space cost	Cost per case, total DC \$ as % of sales
Dead stock, days of supply	Carrying cost, blocked space	Working capital, total DC \$ as % of sales

Layer 3- The boardroom: and how to read KPIs without being misled

At the executive level, the goal is a short list. A dozen well-chosen metrics, read together, beat fifty reported in isolation.

The SPIQE framework

Best-of-breed operators organize distribution KPIs under five areas of focus: **Safety, People, Improvement, Quality, Efficiency (SPIQE)**. Within that framework, seven KPIs consistently rank as the ones that matter most, tracked separately for warehouse and transportation.

Rank	Warehouse Operations	Transportation Operations
1	DART rate	Accidents per million miles
2	Employee engagement	Employee engagement
3	On-time departure %	On-time delivery %
4	Throughput	Cost per mile
5	Labor \$ as % of sales	Labor \$ as % of sales
6	Overtime %	Overtime %
7	Total DC \$ as % of sales	Total DC \$ as % of sales

Safety and people rank first for a reason. An injury, or a floor that turns over every six months, undermines every productivity number beneath it.

Each area also carries supporting metrics:

- **Safety:** days without an OSHA recordable, employee injury cost as % of sales; for transportation, CSA score.
- **People:** turnover, tenure, absence %.
- **Improvement:** tracked through key current initiatives and projects rather than a fixed metric.
- **Quality:** food safety score, inventory adjustment \$ and %, warehouse-caused load damage, pull-from-line errors; for transportation, driver-caused product damage and driver courtesy based on retailer feedback.
- **Efficiency:** \$ per case, department expense \$ as % of sales; for transportation, \$ per ton-mile and miles per gallon.

Service, inventory, and transportation belong on the same screen

Three domains round out the executive view. **Service level** is the sharper read on the revenue line because it ties to lost sales, not just to what shipped. A slipping service level is an early warning that productivity gains are being bought at the customer's expense. **Inventory** measures capital efficiency and freshness. **Transportation** is half or more of total distribution cost: cost per mile and per case, cases per stop, and stops per route. Outbound freight can rival warehouse labor as a cost center, so it belongs on the same dashboard, not in a separate silo.

A number alone isn't a KPI. It becomes one when it's paired with a target and a trend.

1. **Pair lagging with leading indicators.** Never review cost per case without the productivity, service, and inventory drivers behind it. Know your fixed-versus-variable cost split.
2. **Segment by department or unit of measure.** A consolidated rate hides the differences between pallet, case, and each operation, and that's where the real opportunities are.
3. **Benchmark on two axes.** Internally, against your own best results: cost per case, cases per worked hour, dead-time and delay costs, and transportation cost per case or per mile. This strips out regional noise. Externally, against best-in-class operators: distribution cost as % of sales, service level, shrink, inventory accuracy, and turns. The gap to the top is the size of the prize.
4. **Refresh continuously.** Volumes, assortment, and wage rates shift all the time. A dashboard updated once a year is a rear-view mirror.
5. **Tie every KPI to a dollar figure.** A metric with a cost attached gets an owner and gets watched. One without gets reported once and forgotten.

Timely data is the difference between reporting and managing

Automation and real-time systems don't replace this framework. They change how fast you can act on it, and they raise the stakes of reading it correctly.

Most operations already track some of these metrics. The harder questions are whether the data is current, and whether anyone can act on it during the shift, not in a report that's a week or two old. A warehouse management system that captures every transaction as it happens can push performance data to supervisors and front-line teams while there's still time to correct course. That's what turns the three layers into a working system instead of a monthly review.

Real-time capture also lifts the floor metrics themselves. System-directed processes with scan confirmation close the gap between system and physical inventory, which in turn protects fill rate and order accuracy. Technology such as voice picking can raise pick rates by up to 30% under the right conditions.

Where automation pays off, and where it quietly fails

Automation pays off when volume is there to absorb it. With spare capacity, cost per case falls as volume ramps, and service can improve at the same time.

It fails quietly in ways that a single headline KPI won't show:

- **Volume doesn't materialize.** Fixed and semi-fixed costs spread over fewer cases, and cost per case rises even though the equipment performs to spec.
- **Throughput rises while service slips.** Faster lines can hide growing shorts, damage, or late departures unless service level sits on the same dashboard.
- **The floor isn't measured around the automation.** Bottlenecks move to replenishment, putaway, or manual exception handling, and nobody sees it because those metrics were never instrumented.

The defense is the same as everywhere else in this paper: pair the lagging result with its leading drivers, and segment by area so a strong automated zone can't mask a weak manual one.

Benchmark Reference

Use these ranges as reference points, not targets. Scale, product mix, unit of measure, and regional wage rates all shift them. The trend in your own numbers, and the gap to comparable operators, matter more than any single figure.

KPI	Typical	Top performers	Source
Distribution cost as % of sales	About 4% to 15%, depending on what's included (warehouse only vs. warehouse plus transportation) and the industry	Trend and peer gap matter more than the absolute figure	KSi
Variable share of distribution cost	About 60% (but can run higher)	n/a	KSi
Productivity, best vs. average	n/a	Nearly 2x overall; 3.5 to 4x gaps between departments	KSi
Selection share of direct-labor hours	About 56%, with travel up to a third of selection time	n/a	KSi
Picks per hour (pieces or cases)	120 to 175	About 2x the average	Made4net, KSi
Order fill rate	Below 94% signals process problems	97% to 99%	KSi, Made4net
Inventory accuracy	94% to 98% with manual processes	About 99%	KSi, Made4net
Inventory turns	n/a	Low teens	KSi
Order accuracy	n/a	99.5% or better	Made4net
On-time shipment	98% to 99%	99.5% or better	Made4net
Dock to stock	8 to 15 hours	Under 3.5 hours	Made4net
Order cycle time (order to dispatch) for pick-pack operations	1 to 2 days	Under 6 hours	Made4net
Pick rate lift from voice picking	n/a	Up to 30% over paper or RF picking	Vendor-reported results

Conclusion: close the loop between floor and boardroom

The right KPI framework is small, balanced, and connected. Floor metrics tell you what's happening now. Dashboard metrics translate it into dollars. Boardroom metrics tell you whether the business is winning. Each layer is useful on its own, but the value comes from tracing a line through all three.

The operators who close the gap to best-of-breed treat their dashboard as a decision tool, not a report card. They measure in real time, tie every metric to a cost, and know which floor number to check when a boardroom number moves.

Go Deeper: The 2026 Supply Chain Benchmarking Report

The benchmarks in this paper come from KSi's 11th annual Supply Chain Benchmarking Report. This report draws on data from 55 distribution facilities, mostly food wholesalers and retailers. It covers productivity by department, workforce trends, inventory, service levels and the economics of automation.

Among this year's findings: over 11 years, productivity has risen 38% while wages have climbed 71%. And best-of-breed operators move nearly 70% more direct cases per paid hour than the average operation.



About Keith Swiednicki International (KSi) - Global Supply Chain Technology Consultants

KSi is a global supply chain technology consultancy firm with over 40 years of experience helping distribution operators optimize their operations and right size their facilities. KSi also performs industry productivity benchmarking surveys. "If you can't measure it, you can't manage it."

To learn more visit <https://ksinternational.me/>

M A D E 4 N E T

Made4net is a global leader in WMS (warehouse management system) and supply chain execution software, delivering best-in-class, cloud-based WMS and 3PL WMS solutions. Our adaptable and scalable platform empowers organizations of all sizes to improve efficiency, visibility, and control across their supply chain.

Made4net's end-to-end SCEExpert™ platform offers a robust WMS solution that enables real-time inventory visibility, labor management, and equipment productivity with performance analytics that drive faster, more accurate order fulfillment and improved supply chain efficiency. In addition to the best-of-breed WMS, the platform offers integrated yard management, dynamic route management, proof of delivery and warehouse automation solutions that deliver a true supply chain convergence. Made4net is proud to be recognized by analysts and industry experts as a global leader in warehouse management software, including the Gartner Magic Quadrant for Warehouse Management Systems.

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