



April 2009

strategic insight | Metrics & KPIs

best practices make (nearly) perfect

By Peter Bradley

Our sixth annual survey of DC and warehouse metrics shows that the skillful use of measurements leads to better operations.

An old business adage has it that you can't manage what you don't measure. The flip side of that might be, you can manage what you do measure, and, if the results of our annual survey of DC and warehouse metrics are any indication, you're likely to see performance improve as a result.

Trends in metrics use and DC performance were the subject of our sixth annual survey, an online study conducted earlier this year. Jointly sponsored by *DC VELOCITY* and the Warehousing Education and Research Council (WERC), the study was performed by Karl Manrodt, associate professor of logistics at Georgia Southern University, and Kate Vitasek, managing partner of consultancy Supply Chain Visions.

The 783 individuals participating in the study—with 684 responses actually used—graded the 2008 performance of their DCs and warehouses against 50 key operational metrics. Manrodt and Vitasek analyzed the results by industry, type of operation (pallet picking, partial pallet picking, fullcase picking, or broken-case picking), business strategy, type of customer served, and company size. What they found was that the use of metrics in the nation's DCs is on the rise. They also concluded that the growing use of metrics is leading to higher performance levels at the best companies and, oftentimes, among those trying to catch up.

Still, the researchers did not see performance improvements across the board. In some cases, those playing catch-up have actually fallen further behind the leaders than in the past, according to the survey. "The gap continues between the good and the rest," says Vitasek. "For some of the metrics, the gap is actually widening, while some are narrowing."

Overall, Vitasek says she is heartened by the results. "We are seeing steady improvement in the performance of DC and warehousing performance across a wide variety of measures. The entire profession is lifting. When the gap between the median and best-practice companies narrows, that suggests everyone is getting it. It is really wonderful to watch it happen."

Which metrics matter most?

DC VELOCITY REPRINTS

This copy is for your personal, non-commercial use only. It is protected by copyright laws and is the property of AGiLE Business Media, LLC. To order customized, presentation-ready copies for distribution to your colleagues, clients or customers, contact Ed Kane, FosteReprints, at (866) 879-9144 or ekane@fostereprints.com.

Despite the general upward trend, not all of the news this year was good. For example, the survey found that, when compared with last year's results, performance against some of the metrics deteriorated slightly. Whether that's due to the impact of a weak economy or a change in the survey participant mix from year to year, or whether it's because managers raise the performance bar upon seeing signs of improvement is uncertain, the researchers say.

As for the metrics themselves, the survey results showed that respondents still tended to favor the same basic metrics they've been using since the survey was launched. As in the past, "order picking accuracy" and "on-time shipments" topped the list of the most popular measures. (For a list of the 10 most commonly used metrics, see Exhibit 1.)

Manrodt and Vitasek grouped the metrics into several categories: customer service, operations (both outbound and inbound), financial, capacity and quality, and employee. (The classification is indicated for each of the top 10 metrics listed in Exhibit 1.)

What's telling, they say, is that managers appear to rely heavily on operational metrics ("order fill rate," for example) or numbers derived from operational performance (like "order picking accuracy"). Only one of the top 10 metrics, "on time shipments," is a customer-facing measure, they found.

The not-quite-perfect order

That's not to say companies aren't keeping a close eye on customer service, however. The fact is, the majority are indeed tracking their operation's performance against the metrics most commonly associated with the "Perfect Order" and that are used to compute the Perfect Order Index (POI).

The Perfect Order Index is a widely recognized measure that incorporates four critical customer service elements: order completeness, timeliness, condition, and documentation. In other words, to be considered perfect, an order must arrive complete, be delivered on time, arrive free of damage, and be accompanied by the correct invoice and other documentation. To calculate a company's score on the index, you simply take each of the four metrics and multiply them together. For example, a facility that ships 95 percent of its orders complete, 95 percent on time, 95 percent damage-free, and with the correct documentation 95 percent of the time would earn a score of 81.5 percent (0.95 X 0.95 X 0.95 X 0.95).

Exhibit 2 shows the median and best-in-class scores for each of the four POI measures. The researchers chose to use the median score (the exact mid point of the range—the point above which half the values are higher and half lower) rather than the average because it is less likely to be skewed by statistical outliers—very high or very low numbers. "Best in class" is defined here as responses from the top 20 percent of companies— that is, those who are performing best against each of the metrics.

EXHIBIT 1
the top 10: the most commonly used DC metrics

Metric and category	% Using	2008 Rank
1. Order picking accuracy (% by order) (Capacity/Quality)	84.9%	2
2. On-time shipments (Customer)	84.7%	1
3. Average warehouse capacity used (Capacity/Quality)	74.1%	7
4. Order fill rate (Outbound operations)	69.2%	5
5. Annual workforce turnover (Employee)	68.9%	3
6. Fill rate - line (Outbound operations)	66.3%	4
7. On time ready to ship (Outbound operations)	64.7%	-
8. Peak warehouse capacity used (Capacity/Quality)	64.2%	6
9. Dock-to-stock cycle time, in hours (Inbound operations)	59.4%	9
10. % of supplier orders received with correct documents (Inbound operations)	56.2%	-

EXHIBIT 2
perfect order metrics

Metric	Best in class	Median
% of orders with on-time delivery	≥ 99.3%	97.6%
Shipped complete per customer order	≥ 99.7%	98.0%
Shipped damage-free (outbound)	≥ 99.9%	99.0%
Correct documentation	≥ 99.9%	99.0%

It's important to note that there are other ways to calculate the Perfect Order Index besides the method described above. For example, the Grocery Manufacturers Association and the Food Marketing Institute use a seven-element formula to calculate the Perfect Order Index. (The elements are percentage of cases shipped vs. cases ordered; percentage of on-time deliveries; percentage of data synchronized SKUs; order cycle time; percentage of unsaleables (damaged product); days of supply; and service at the shelf.) As part of their study, the researchers analyzed the survey responses using the GMA/FMI criteria. The results are shown in Exhibit 3. Given the low rates of usage for some of these metrics, however, the researchers urge readers to use the results in this table with caution.

Continuous improvement?

One of the hopes of anyone conducting research over time is that trends will begin to emerge. And when the object of the study is business performance, the hope—if not the expectation—is that those trends will indicate improvement. In the case of this study, the results have largely been what the researchers had hoped—we have seen steady improvement in DC and warehousing performance across a wide variety of measures.

EXHIBIT 3
GMA/FMI perfect order index usage and performance

Measure	% Using	Best practice	Median
% of cases shipped vs. cases ordered	25.4%	> 99.9%	99.0%
% of on-time delivery (retail)	36.2%	> 99.5%	97.9%
% of data synchronized SKUs	10.9%	> 100%	100%
Order cycle time	47.5%	< 13 hours	42 hours
% of unsaleables (damaged product)	16.5%	< 0.04%	2.0%
Days of supply (forward coverage)	23.0%	< 15.7 days	30 days
Service at the shelf	3.7%	< 99.8%	95.0%

Whether this momentum can be sustained in a dismal economic climate, only time will tell. In the meantime, the researchers invite readers' comments, suggestions, and insights into the research and their own use of measures. They can be reached via the links at the bottom of this page.

about the study

The annual benchmarking study began in 2004 as a collaborative effort between *DC VELOCITY* and Georgia Southern University. The initial study focused on what metrics DCs were using rather than on how they performed against whatever measures they used. That study found that while there was no single set of universally accepted metrics, most respondents were using metrics from at least one of three broad categories: time-based measures, financial measures, and service quality measures.

In 2005, the Warehousing Education and Research Council and Supply Chain Visions joined the research effort. The survey shifted to a formal benchmarking study designed to provide data not just on what metrics were most widely used in warehouses and DCs, but also on performance against those metrics—data managers could then use to benchmark their own operations. That has remained the focus of the study ever since.

As for the 2009 survey, the respondents came from varying disciplines. Half identified themselves as working in manufacturing, 16 percent in third-party logistics services, 13 percent in retail, and the remainder in life sciences, transportation, and other segments. As for the types of operations represented, 39.7 percent said their operations performed broken-case picking, 27 percent full-case picking, 20.6 percent full-pallet picking, and 11.8 percent partial

pallet picking.

The survey respondents also represented companies of various sizes: 31.5 percent said annual company revenues were under \$100 million, 39.4 percent came from companies with revenues of \$100 million to \$1 billion, and the remaining 29.1 percent worked for companies with revenues exceeding \$1 billion.

A more extensive report, written by researchers Karl Manrodt and Kate Vitasek, is [available through WERC](#).

© Copyright 2009 DC Velocity, a publication of Agile Business Media, LLC. All rights reserved.