SPRING 2015

WAREHOUSING EDUCATION AND RESEARCH COUNCIL

WERC

THE ASSOCIATION FOR LOGISTICS PROFESSIONALS

WATCH®

A Periodic Assessment of Industry Trends

PROVIDED BY AND FOR THE WAREHOUSING PROFESSIONAL

Findings of a survey of benchmarking measures among WERC members and *DC Velocity* readers.

DC Measures 2015

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- Are we headed in the right direction?
- Are we able to show that logistics provides value to our company?
- How do we communicate that warehousing and distribution are achieving the goals our company has set?

These are the questions we ask ourselves to better understand our role in contributing to our company's performance. For many, the answers begin with the performance measures we are using.

How does a baseball player show his contributions to the team? Examples include a thousand runs batted in, batting average on balls in play, and defensive runs saved. When taking a holistic view, these metrics provide managers, owners, the public, and scouts with information on current and long-term performance for each player.

What about a DC or warehouse? The value-add begins with understanding the strategy our company is using, aligning to the overall goals of the organization, and taking action to improve performance. Our long-term success is paramount for a performance management program in any organization to succeed. Therefore, we must select the most appropriate metrics to lead our improvement efforts. What are those metrics? Do they significantly differ by strategy?

> "We must select the most appropriate metrics to lead our improvement efforts."

We began this study in 2003. The goal was to help practitioners gain a better understanding of key distribution metrics and how performance has changed over time. Each year has focused on a different aspect of the data we gathered from Warehousing Education and Research Council members, *DC Velocity* readers, and other industry professionals. We've highlighted the most important metrics to the industry according to respondents, underscored the importance of the perfect order, better understood the definition of "on-time," measured the softer side of performance, and tracked significant changes in measures.

This year begins a new decade of research for our team. Performance measures play a pivotal role for every company, and we want to better understand how factors such as collaboration, process innovation, risk, sustainability, safety, and talent affect logistics performance. In addition, we looked at those metrics that have had significant changes over the past year as well as any shifts in metrics that warehouses consider important.

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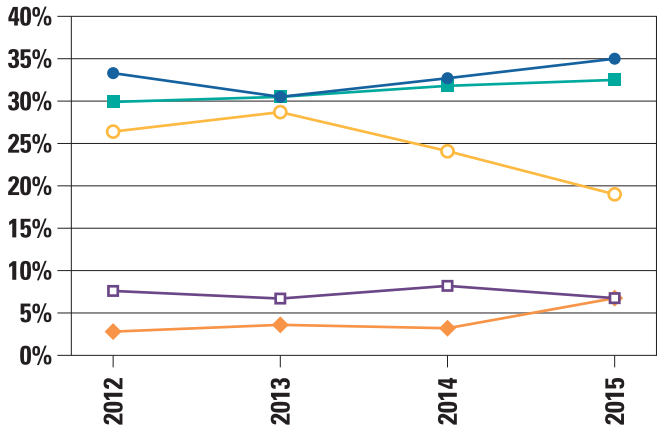
The report, in particular, will delve into how the measures are defined and calculated, and what measures, based on strategy, are critical to watch. This is followed by a summation of what all of these differences mean for DC professionals. Finally, we'll share next steps as we continue into 2015.

Senior Management Interest in Performance Measures

The board of directors and executives set the vision for an organization. Senior management's role is to set a course to achieve the vision. The execution of that vision is left for the operational folks – directors, managers, supervisors, and shop floor employees. There is no doubt that senior management is very interested in how well the vision is being executed. As we see in Figure 1, senior management's interest in metrics remains quite high as the number of respondents who report directly to the C-Level and/or the Board of Directors has slowly increased over the last four years. Over 32% of respondents said they report directly to the C-Level and/or the Board of Directors compared to just 29.9% of respondents in 2012, 30.49% in 2013, and 31.8% in 2014.

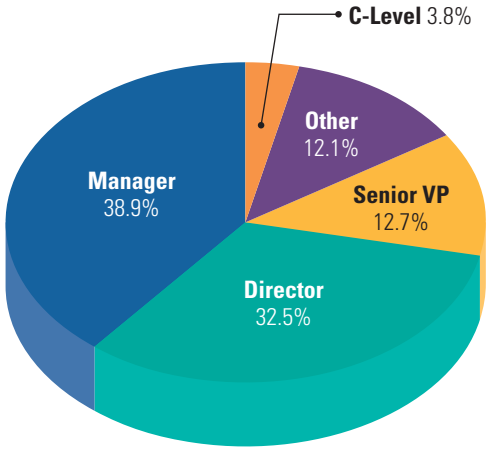
FIGURE 1. REPORT TO TITLE



Respondents

Total of responses for 2015 was 470 individual responses. Due to time cut-offs, 460 were used in the analysis. Since not every question was answered, and to increase the predictive powers of the benchmarks, responses from 2014 were added to this year's data set after validating that there were not significant differences between the two years. The largest group of respondents reported their title as Manager (38.9%), while Director (32.5%) and Senior VP (12.7%) were the second and third largest groups. Executives represent 3.8%. See Figure 2.

FIGURE 2. RESPONDENT TITLES



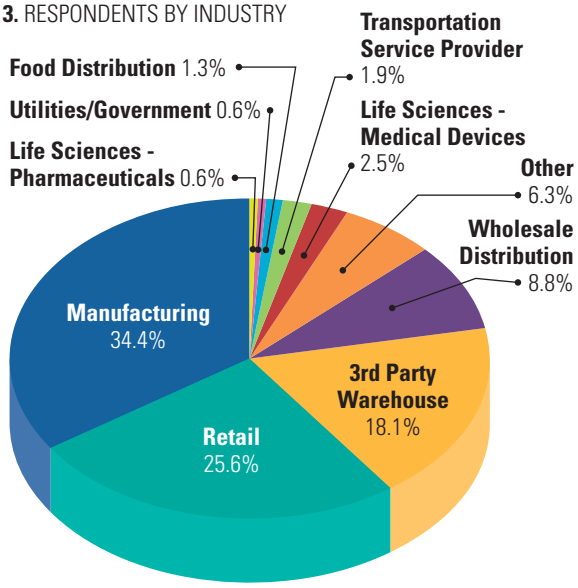
Diversity

In addition, we reviewed five unique demographic areas, including types of industries, operations, customers, business strategy and company size.

Industry Type

The Manufacturing segment remains the largest demographic base for the study. See Figure 3.

FIGURE 3. RESPONDENTS BY INDUSTRY



Because the Manufacturing segment is so large, a further breakdown and explanation of the types of industries falling under the manufacturing segment is in Table 1.

TABLE 1. MANUFACTURING INDUSTRY BREAKDOWN

Business Segment	Further Industry Breakdown	Percent
Manufacturing	Consumer Products	13.7%
	High Technology	3.8%
	Aerospace/Defense	0.6%
	Automotive	5.0%
	General	11.3%

DC Operation

In addition to industry, respondents were asked how goods moved through their DC. Table 2 shows that a majority of facilities (66.8%) are picking cases rather than pallets. In calculating percentages for the type of work performed, we only used responses where a majority of the respondents activity was in one of the four classifications.

TABLE 2. RESPONDENTS BY DC OPERATION

Operations	2015 % of Total	2015 % Cases vs. Pallet	2014 % Cases vs. Pallet
Broken Case Picking	36.6%	66.4%	66.8%
Full Case Picking	29.8%		
Partial Pallet Picking	13.8%	33.6%	33.2%
Full Pallet Picking	19.8		

Respondents categorized as primarily a case picking operation decreased for a third year. Both Broken Case and Full Case picking dropped—from 69.2% in 2013 to 66.4% in 2015. This year's respondents moved away from broken case picking, ever so slightly which is represented by a shift to partial pallet picking operations, with a 6.97% increase from last year's study.

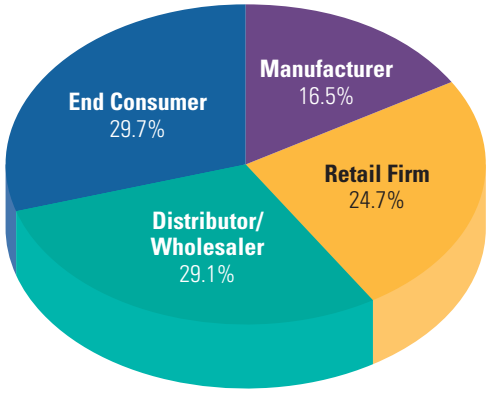
Customer Served

Another important consideration is the location of the company within the supply chain. Do companies that are upstream suppliers use a similar set of measures to that of their customers or their customers' customers? Respondents were asked to classify who their primary customers are in the supply chain (Figure 4).

As seen in previous studies, the majority of respondents (over 54%) reported that they were at or near the end of the supply chain with customers as either an End Consumer or a Retail Firm. Having a Retail Firm is up 10.7% and an End Consumer as a primary customer is up 33.1% from 2014.

Those reporting Distributor/Wholesaler decreased almost 21% from the 2014 study, even though they continue to hold a sizeable number of respondents. Manufacturers, as a primary customer, continue a slow decline.

FIGURE 4. RESPONDENTS BY TYPE OF CUSTOMER

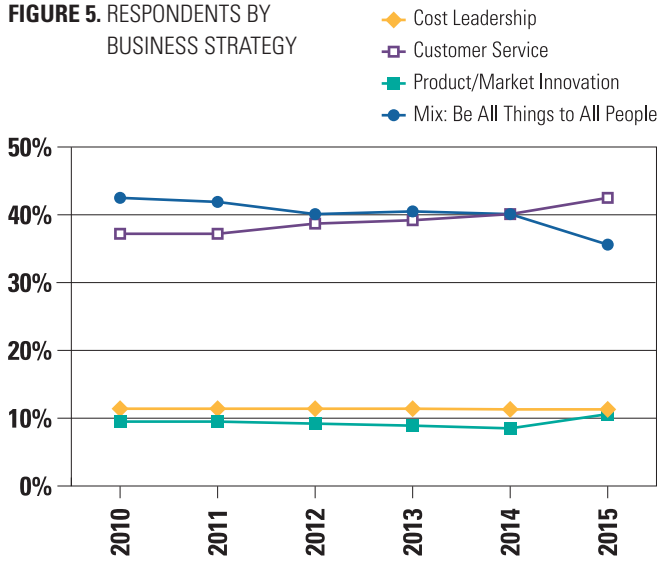


Business Strategy

Strategy is another area that some suggest could impact measures in this year's survey. Do different strategies place a higher emphasis on some measures and not on others? And at what level in the organization can these differences be seen or noticed?

To answer these questions, we asked respondents to indicate the overall business strategy for their business unit or division with respect to Cost Leadership, Customer Service, Product/Market Innovation or simply Being All Things to All People (Figure 5).

FIGURE 5. RESPONDENTS BY BUSINESS STRATEGY



The movement among strategies over the years has been interesting to watch. Business strategy allows us a glimpse into the minds of executives and boards and how large a net they are trying to cast. Cost Leadership has been able to maintain a steady pace over the years, whereas Product/Market Innovation saw an increase of 24.7% for the first time since 2011.

Two strategies are still vying for the title of "best." Customer Service continues its steady rise increasing almost 6% from last year. The loser – Be All Things to All People – lost over 11%. These may be short-term changes and only time will tell if this losing streak for Be All Things will become more pronounced. We believe once the economy stabilizes and begins to improve more respondents will revert course and focus their attention back to Being All Things.

Respondents were also asked about their operational management strategy with respect to outsourcing. They indicated whether their global, domestic, and regional operations were managed internally or by a third party (Table 3).

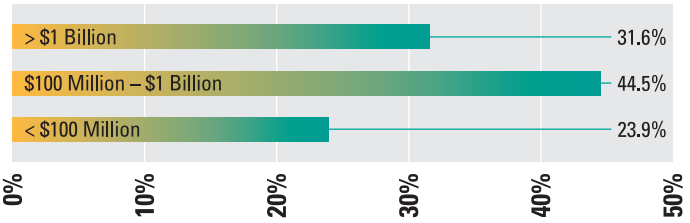
TABLE 3. HOW DCS ARE MANAGED

Who Provided Responses	Percent
Solely 3PL Results	17.9%
Mix of Both 3PL and Internal Results	11.4%
Solely Internal Results	70.7%

Company Size

Each year respondents indicate the relative size of their company by reporting annual sales. The purpose of this question is to help determine what effect size had on the kinds and number of metrics used, changes in performance, and to creating additional benchmarks based on size (Figure 6).

FIGURE 6. RESPONDENTS BY COMPANY SIZE

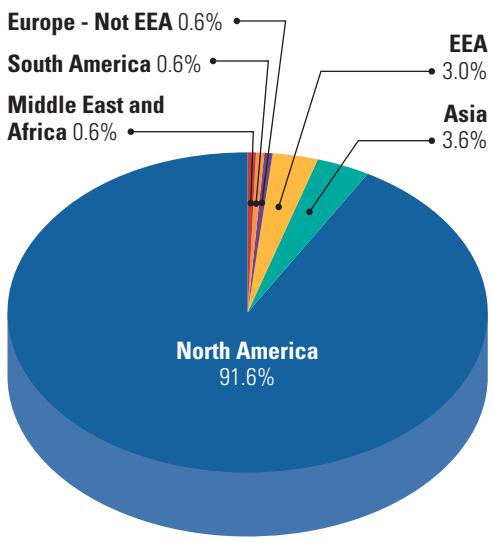


Once again, companies of all sizes are participating in the study supporting our philosophy that companies should benchmark and focus on performance regardless of their size. Companies with annual sales less than $100 million comprised 23.9% of our total respondents, while participants having greater than $1 billion in annual sales comprise 31.6% of the respondents. Those companies reporting annual sales between $100 million and $1 billion represent the largest group at 44.5%. The study continues to be a good representation of the industry.

Location, Location, Location

We continue to have a number of respondents from outside North America who are quite interested in their performance. This naturally leads us to want to make comparisons based on location as well. As more warehouses and DCs outside of North America report their findings, we will be able to provide statistically viable benchmarks based on location. This year 91.6% of the respondents reported North America as their location, while the remaining 8.4% of respondents are from countries outside of North America (Figure 7). This is the largest showing since we first asked about location in the 2012 study.

FIGURE 7. YOUR WAREHOUSE'S LOCATION



Which Metrics Really Matter?

Each year we identify 12 of the most popular measures based on the number of results for each metric. And there is strong agreement among DCs and warehouses about which metrics are critical to measuring performance. Essentially, survey participants still favor the basic metrics they've been using since the beginning of the study. Table 4 shows the top 12 most popular metrics used and how that has changed since the 2013 study.

The order changed for this year, and a newcomer has joined the list – Backorders as a Percent of Total Lines. This year's most frequently employed metrics were On-time Shipments, Internal Order Cycle Time, and Dock-to-Stock Cycle Time suggesting that customer service and velocity are top concerns for warehouses and DCs.

Last year we mentioned the intense focus on operations. That focus appears to have slightly shifted, as only 4 of the top 12 are Operations-based measures. The best-in-class performers were able to improve or maintain their prior year's performance on 9 of the Operations-based measures. Median and major opportunity performers were not too far behind, as their performance on these critical measures improved 7 and 6, respectively, out of the 13.

The change of focus to Customer Service metrics is coming at a good time, especially for the major-opportunity performers. Currently, the median performers have improved or maintained performance on 7 of the 8 Customer Service measures. Best-in-class performers were not too far behind by improving or maintaining performance on 6 of the 8 measures. As their name suggests, major-opportunity performers have the most to gain as they have lost ground on 5 of the 8 Customer Service measures.

Interestingly, with the intense focus on customer service and operations, the balanced use of measures doesn't apply again to this year's top 12. This is a trend over the past three years. Many DCs and warehouses are continuing to focus on customers and processes rather than employee or financial metrics.

In previous studies we've pointed out that the gap in performance (the difference between best-in-class and major opportunity performers) continues to narrow. Unfortunately for this year, the pace at which the gaps are narrowing has slowed. This year's best-in-class performers outpaced the major opportunity performers, who failed to maintain the improvement gained in last year's study. Major opportunity performers maintained their performance on only 21 of the 44[1] metrics compared to 29 of the 44 for best-in-class performers. This further validates our theory that when performance is lost, best-in-class performers are able to minimize their overall losses better than major opportunity performers.

TABLE 4. TOP 12 MOST POPULAR MEASURES USED

Metrics	2015 Rank	2014 Rank	2013 Rank
On-time Shipments – **Customer**	1	1	1
Internal Order Cycle Time, in Hours – **Customer**	2	2	2
Dock-to-Stock Cycle Time, in Hours – **Inbound Operations**	3	4	4
Total Order Cycle Time, in Hours – **Customer**	4	3	3
Order Picking Accuracy, Percent by Order – **Quality**	5	5	5
Average Warehouse Capacity Used – **Capacity**	6	8	9
Peak Warehouse Capacity Used – **Capacity**	7	9	12
Backorders as a Percent of Total Orders – **Customer**	8	11	-
Backorders as a Percent of Total Lines – **Customer**	9	-	-
Percent of Supplier Orders Received Damage Free – **Inbound Operations**	10	7	8
Lines Picked and Shipped per Person Hour – **Outbound Operations**	11	6	6
Lines Received and Put Away per Hour – **Inbound Operations**	12	10	11

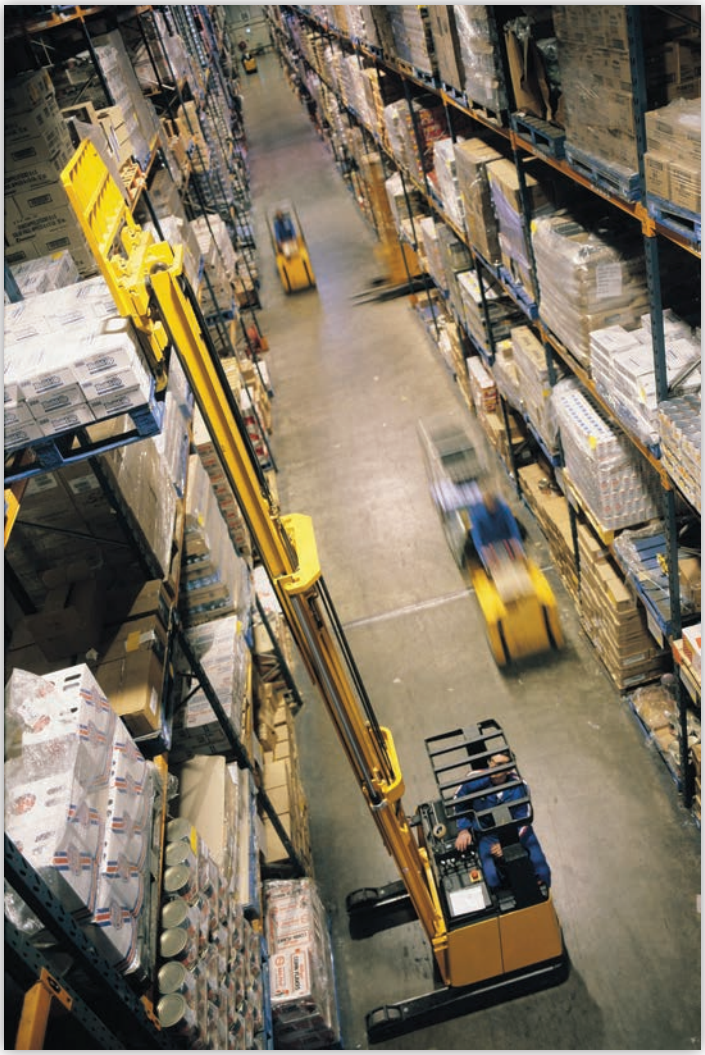
1: Based on performance of those metrics we provided quintile performance benchmarks for in the 2014 study. Does not include the three new safety metrics.

Answering the Big Question
We hear many of these statements all the time: "Our industry is unique." "We're different." "We're special." "Your metrics don't apply to us because…"

The list goes on, but here is the quick answer. In the majority of cases, when it comes to DC performance, we don't see statistically significant differences among firms based on any of the demographics listed above. **Quantitative performance is quantitative performance.** Are there differences? No doubt. These differences are primarily **qualitative** in nature. This is why we stress using both quantitative and qualitative benchmarking.

Interpreting the Benchmarking Results
In this study, we primarily look at two benchmarks: **median performance** and **best practice performance**. We chose the median as it is not easily swayed by outliers.

The benchmarking data is reported using a "quintile" format which presents the data on a five-point maturity scale that reflects the journey toward "best practice." It gives readers a tool for judging their own performance and what constitutes best practice. *To be considered best practice, the level of performance has to fall within the top 20% of all respondents.*



How Good is the Data?
Given that this group of respondents are members of a premier warehousing and distribution association and/or readers of a leading distribution magazine, the benchmarks may be better than the general population of DCs. These organizations and publications tend to attract high performers who are continually improving their operations.

It is also important to compare your performance with an appropriate set of partners. While not as important for comparing overall service level and customer-oriented key performance indicators, it is especially true when comparing productivity and cost metrics. Ideally, partners would be firms similar in size and in the same or similar business segment.

This Year's Data
Table 5 summarizes all of the metrics from this year's study presented in seven columns.

- **Column 1: Metrics**
  Metric definitions can be found on pages 12-15.

- **Columns 2 – 6: Quintile Rankings**
  Data responses equally divided into five groups. Each quintile ranking indicates 20% of the responses.

> **Major Opportunity:** Represents the lowest 20% of responses.

> **Disadvantage:** Represents the responses ranging in the 20-40th percentile.

> **Typical:** Represents responses ranging in the 40-60th percentile.

> **Advantage:** Represents responses ranging in the 60-80th percentile.

> **Best Practice:** Represents top 20% of all responses.

- **Column 7: Median**
  Actual median performance of all respondents.

TABLE 5. QUINTILE PERFORMANCE CLASSIFICATIONS FOR METRICS						
COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Customer Metrics*	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best-in-class**	**Median**
On-time Shipments	Less than 95.1%	>= 95.1 and < 98.2%	>= 98.2 and < 99.4%	>= 99.4 and < 99.875%	>= 99.875%	99%
Total Order Cycle Time	Greater than 72 Hours	>= 34.96 and < 72 Hours	>= 24 and < 34.96 Hours	>= 7 and < 24 Hours	< 7 Hours	24 Hours
Internal Order Cycle Time	Greater than 31.2 Hours	>= 18.8 and < 31.2 Hours	>= 8 and < 18.8 Hours	>= 3.8 and < 8 Hours	< 3.8 Hours	10 Hours
Perfect Order Completion Index	Less than 85.7%	>= 85.7 and < 95.1%	>= 95.1 and < 98%	>= 98 and < 99.13%	>= 99.13%	97.2%
Lost Sales (Percent of SKUs Stocked Out)	Greater than 6%	>= 3.02 and < 6%	>= 1 and < 3.02%	>= 0.05 and < 1%	< 0.05%	2%
Backorders as a Percent of Total Orders	Greater than 10%	>= 5 and < 10%	>= 1.74 and < 5%	>= 0.05 and < 1.74%	< 0.05%	2.4%
Backorders as a Percent of Total Lines	Greater than 5.6%	>= 4 and < 5.6%	>= 1 and < 4%	>= 0.042 and < 1%	< 0.042%	2%
Backorders as a Percent of Total Dollars/Units	Greater than 8.8%	>= 2.88 and < 8.8%	>= 1 and < 2.88%	>= 0 and < 1%	< 0%	2%
Operations Metrics	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best-in-class**	**Median**
INBOUND METRICS						
Dock-to-Stock Cycle Time, in Hours	Greater than 24 Hours	>= 8 and < 24 Hours	>= 4.5 and < 8 Hours	>= 2 and < 4.5 Hours	< 2 Hours	6.5 Hours
Suppliers Orders Received per Hour	Less than 1 per Hour	>= 1 and < 2.92 per Hour	>= 2.92 and < 6.2 per Hour	>= 6.2and < 14.6 per Hour	>= 14.6 per Hour	5 per Hour
Lines Received and Put Away per Hour	Less than 8.4 per Hour	>= 8.4 and < 15 per Hour	>= 15 and < 25 per Hour	>= 25 and < 45.6 per Hour	>= 45.6 per Hour	20 per Hour
Percent of Supplier Orders Received with Correct Documents	Less than 85.56%	>= 85.56 and < 95%	>= 95 and < 98%	>= 98 and < 99%	>= 99%	96%
Percent of Supplier Orders Received Damage Free	Less than 95%	>= 95 and < 98%	>= 98 and < 99%	>= 99 and < 99%	>= 99%	98%
On-time Receipts from Supplier	Less than 80%	>= 80 and < 90%	>= 90 and < 95%	>= 95 and < 98.68%	>= 98.68%	93.1%
OUTBOUND METRICS						
Fill Rate – Line	Less than 90.6%	>= 90.6 and < 97%	>= 97 and < 98.66%	>= 98.66 and < 99.7%	>= 99.7%	98%
Order Fill Rate	Less than 92%	>= 92 and < 97%	>= 97 and < 99%	>= 99 and < 99.71%	>= 99.71%	98%
Lines Picked and Shipped per Hour	Less than 14.36 Lines per Hour	>= 14.36 and < 25 Lines per Hour	>= 25 and < 44.48 Lines per Hour	>= 44.48 and < 70.6 Lines per Hour	>= 70.6 Lines per Hour	35 Lines per Hour
Orders Picked and Shipped per Hour	Less than 2.49 Orders per Hour	>= 2.49 and < 5 Orders per Hour	>= 5 and < 8.2 Orders per Hour	>= 8.2 and < 24 Orders per Hour	>= 24 Orders per Hour	6 Orders per Hour
Cases Picked and Shipped per Hour	Less than 30 Cases per Hour	>= 30 and < 60 Cases per Hour	>= 60 and < 100 Cases per Hour	>= 100 and < 180 Cases per Hour	>= 180 Cases per Hour	75.6 Cases per Hour
Pallets Picked and Shipped per Hour	Less than 5 Pallets per Hour	>= 5 and < 14.94 Pallets per Hour	>= 14.94 and < 23.2 Pallets per Hour	>= 23.2 and < 35 Pallets per Hour	>= 35 Pallets per Hour	20 Pallets per Hour
On-time Ready to Ship	Less than 95%	>= 95 and < 98.5%	>= 98.5 and < 99%	>= 99 and < 99.9%	>= 99.9%	99%
Financial Metrics	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best-in-class**	**Median**
Distribution Costs as a Percent of Sales	Greater than 11.2%	>= 6.6 and < 11.12%	>= 3.68 and < 6.6%	>= 2.4 and < 3.68%	< 2.04%	5%
Distribution Costs as a Percentage of COGS	Greater than 18.8%	>= 9.1 and < 18.8%	>= 4.978 and < 9.1%	>= 1.6 and < 4.978%	< 1.6%	6.05%
Distribution Costs per Unit Shipped	Greater than $5.00	>= $1.41 and < $5.00	>= $0.72 and < $1.41	>= $0.30 and < $0.72	< $0.30	$1.04
Days on Hand Finished Goods Inventory	Greater than 83.8 Days	>= 45 and < 83.8 Days	>= 30 and < 45 Days	>= 15 and < 30 Days	< 15 Days	40 Days
Inventory Shrinkage as a Percent of Total Inventory	Greater than 2%	>= .05 and < 2%	>= 0.1 and < 0.5%	>= 0.02 and < 0.1%	< 0.02%	35 Days

TABLE 5. QUINTILE PERFORMANCE CLASSIFICATIONS FOR METRICS - CONTINUED						
Capacity/Quality Metrics	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best-in-class**	**Median**
Average Warehouse Capacity Used**	Less than 75%	>= 75 and < 80.8%	>= 80.8 and < 88%	>= 88 and < 92.8%	>= 92.8%	85%
Peak Warehouse Capacity Used**	Less than 88%	>= 88 and < 93.88%	>= 93.88 and < 98%	>= 98 and < 100%	>= 100%	95%
Honeycomb Percent	Less than 13.8%	>= 13.8 and < 49.6%	>= 49.6 and < 79.2%	>= 79.2 and < 90%	>= 90%	65%
Inventory Count Accuracy by Location	Less than 92%	>= 92 and < 97.12%	>= 97.12 and < 99%	>= 99 and < 99.9%	>= 99.9%	98.4%
Order Picking Accuracy (Percent by Order)	Less than 98%	>= 98 and < 99%	>= 99 and < 99.5%	>= 99.5 and < 99.84%	>= 99.84%	99%
Material Handling Damage	Greater than 2%	>= 1 and < 2%	>= 0.09 and < 1%	>= 0.01 and < 0.09%	< 0.01%	0.3%
Equipment/Forklifts Capacity Used	Less than 67%	>= 67 and < 80%	>= 80 and < 87%	>= 87 and < 97%	>= 97%	84%
Employee Metrics	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best-in-class**	**Median**
Annual Workforce Turnover	Greater than 19.9%	>= 10 and < 19.9%	>= 4.4 and < 10%	>= 1 and < 4.4%	< 1%	5%
Productive Hours to Total Hours	Less than 75%	>= 75 and < 85%	>= 85 and < 87%	>= 87 and < 92.5%	>= 92.5%	85%
OSHA Day Count Rate	Less than 0 Days	>= 0 and < 13.4 Days	>= 13.4 and < 151.6 Days	>= 151.6 and < 300 Days	>= 300 Days	77 Days
OSHA Recordable Rate (TRIR)	Greater than 5	>= 1.98 and < 5	>= 0.622 and < 1.98	>= 0 and < 0.622	< 0	1.15
OSHA Days Away From Work Cases Rate (DAWC)	Greater than 5.42	>= 1 and < 5.42	>= 0 and < 1	>= 0 and < 0	< 0	0
Perfect Order Metrics	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best in Class**	**MEDIAN**
Percent of Orders with On-time Delivery	Less than 95%	>= 95 and < 98%	>= 98 and < 99.1%	>= 99.1 and < 99.8%	>= 99.8%	98.5%
Percent of Orders Shipped Complete	Less than 93.5%	>= 93.5 and < 96.2%	>= 96.2 and < 98.8%	>= 98.8 and < 99.7%	>= 99.7%	98%
Percent of Orders Shipped Damage Free (Outbound)	Less than 97.82%	>= 97.82 and < 99%	>= 99 and < 99.6%	>= 99.6 and < 99.9%	>= 99.9%	99%
Percent of Orders Sent with Correct Documentation	Less than 99%	>= 99 and < 99%	>= 99 and < 99.78%	>= 99.78 and < 99.994%	>= 99.994%	99.5%
Cash-to-Cash Metrics	**Major Opportunity**	**Disadvantage**	**Typical**	**Advantage**	**Best-in-class**	**Median**
Inventory Days of Supply	Greater than 90 Days	>= 55.8 and < 90 Days	>= 30 and < 55.8 Days	>= 17 and < 30 Days	< 17 Days	39 Days
Average Days Payable	Greater than 60 Days	>= 45 and < 60 Days	>= 31 and < 45 Days	>= 30 and < 31 Days	< 30 Days	35 Days
Average Days of Sales Outstanding	Greater than 54 Days	>= 37 and < 54 Days	>= 30 and < 37 Days	>= 5 and < 30 Days	< 5 Days	32 Days

* **Note:** Additional customer metrics can be found under Perfect Order Metrics Section.

** **Note:** Average and Peak Warehouse Capacity does not always reflect best practices. Due to the calculations for quintiles, we have continually reported that best-in-class is above 90%. A high average warehouse capacity is not beneficial; studies have shown that an average warehouse capacity between 80 and 85% allows the warehouse to respond to shifts in demand.

Legend: > greater than; >= greater than or equal to; < less than

Metrics Measuring Strategy

It's important to understand the strategic direction the company is headed and for everyone in the organization to better understand how logistics, distribution and supply chain managers can support the strategy.

Strategy determines how we are to approach answering the question "How are we going to compete?" It determines the services to provide and at what level the service will be delivered. It defines the policies that will be used and how resources will be allocated. Essentially, it's how a firm will make real decisions to differentiate themselves in the market.

Understanding the strategy and ensuring our metrics are aligned to the strategy is the foundation from which we build a performance program to communicate how we are supporting the overall goals of the organization. There are three basic strategies a firm can employ, and one hybrid strategy.

1. The first strategy most people think about is **Cost Leadership**, where a firm decides to compete on price. In these cases the primary driver in the purchasing decision is the price of the goods sold. Therefore, reducing and eliminating costs are absolutely critical. Walmart is an excellent example of a firm focused primarily on Cost Leadership.
2. The second strategy a firm may use is being **Customer Service** focused. Here the primary goal is to satisfy customer requirements. The goal is to make the experience as positive as possible, and have customers willing to pay a slightly higher price because the experience is so good. Target stores have worked hard to be very customer focused.
3. The third strategy is to have a **Product or Service So Unique** and compelling that customers are willing to pay higher prices for the product. One only has to think of Apple, and the lines that formed at the introduction of the iPad, iPhone or even more recently AppleWatch.

It should be noted that all three strategies are interested in having unique products, a focus on the customer experience and costs. What makes the strategies different is the emphasis they place in each area. Note the language we used: it is the *primary driver* or decision criteria.

The **Hybrid Model** is a mixed model, in that a firm tries to **Be All Things to All People**. This strategy has continued to grow in popularity, despite the difficulty in actually executing it. The best example of a company following a mix strategy is Southwest Airlines.

What Does This Have to Do With Metrics?

Metrics are a communication tool for employees, upper management and, when extended, to supply chain partners. Metrics explain how effective and efficient our efforts are at achieving organizational goals. When used appropriately, they allow us the ability to head off disasters, correct issues and plan ahead, and ensure we are going in the right direction.

Think about losing weight, running a marathon, or winning a gold medal at the Olympics. If you wanted to lose weight you might measure caloric intake, daily weight, or pant/dress size. Running a marathon would be based on your time to complete or number of minutes per mile.

For Bryan Clay, winning a gold medal in the decathlon during the 2008 Olympics was based on his performance in 10 different events, each event representing a different metric. He "won the 100 meter race, the long jump, and the discus throw. He was second in the shot put and the 110 meter hurdles. He was third in the pole vault and javelin throw. After doing so well in so many events, it did not matter that he was 23rd in the 1500 meters race, as his point total of 8,791 was enough to win the gold medal."[2] Bryan developed a strategy that played to his strengths and exceeded expectations during his performance on those areas he was strongest.

In the same way, each strategy should have a set of metrics to determine performance. In this part of the study, we identify which are the most popular measures used by strategy type—which led us to the House of Metrics in Figure 8.

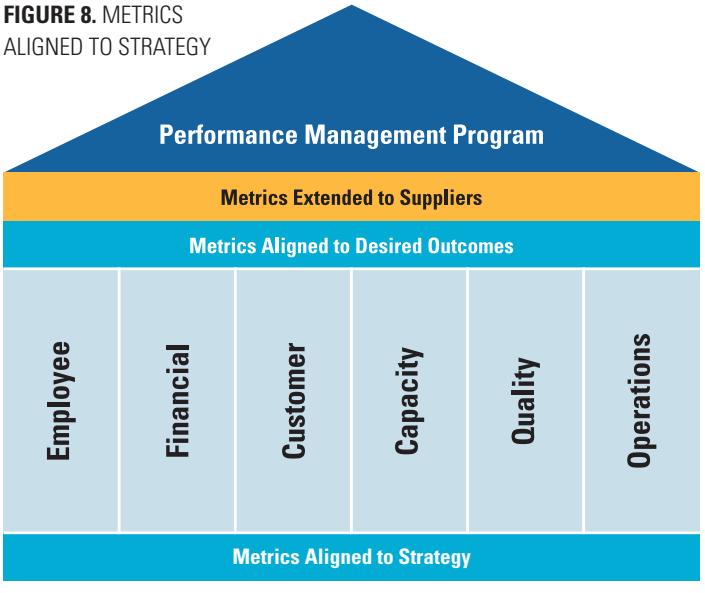
The House of Metrics is built upon the foundation of one of the four strategies – Cost Leadership, Customer Service, Product/Market Innovation, or Be All Things to All People. The strategy your company employs will determine the pillars (categories) and mix of metrics, you should be using.

To determine the metrics for each strategy, we divided the number of responses to each metric by the total number of respondents who selected the strategy to calculate the percent of respondents using each metric. We then ranked the metrics to determine what are the top 10 metrics being used in each strategy. (In some cases, there are more than 10 metrics.)

Those metrics that are used by 70% or more of respondents are in black. It was our determination that those metrics being used by 70% or more of the respondents have a high level of consensus that these metrics are important to determine performance for that strategy. Those in blue (less than 70%) suggest there is room for debate as to whether these are the best metrics to use for the strategy.

Remember we are looking at logistical measures and we may not be able to see the bigger picture for strategy deployment. Our goal is provide you with a framework about which metrics align best to each strategy.

FIGURE 8. METRICS ALIGNED TO STRATEGY



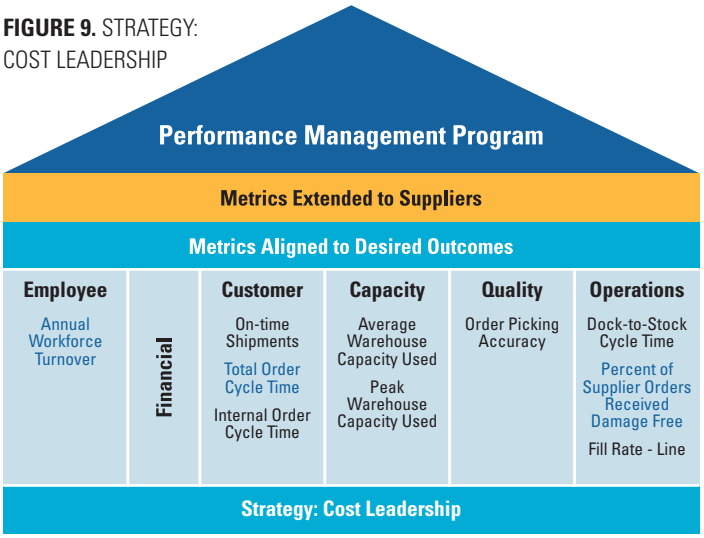
2: Source: http://www.associatedcontent.com/article/1028768/bryan_clay_olympic_decathlon_winner.html

Strategy: Cost Leadership

Those respondents adhering to a Cost Leadership strategy are very clear on the set of metrics that should be used (Figure 9). Of the top 10 metrics for Cost Leadership, 70% or more of the respondents use 7 of the metrics.

Overall, the mix of metrics used for Cost Leadership aligns to our expectations. It is interesting to note that a strategy where decisions are typically driven by eliminating and reducing costs fails to have financial metrics in their top 10. The first cost metric, distribution costs as a percent of sales, ranks 24th (58% of respondents use the metric).

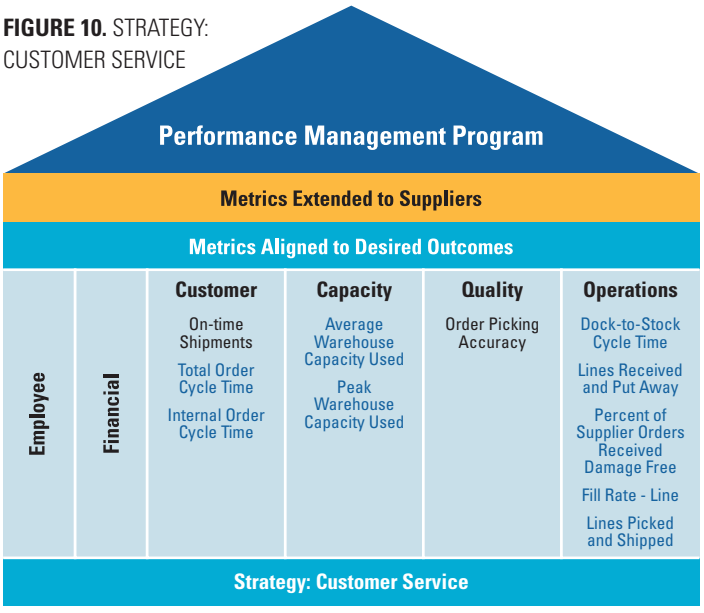
FIGURE 9. STRATEGY: COST LEADERSHIP



Strategy: Customer Service

Customer Service caters to the requirements that each customer presents (Figure 10). The goal is to make sure the experience is as positive as possible so the customer will return time and again regardless of cost. Clarity on the mix of metrics that a Customer Service strategist should be using remains somewhat cloudy. Only 2 of the top 10 metrics are being used by over 70% of respondents (On-time shipments and order picking accuracy).

FIGURE 10. STRATEGY: CUSTOMER SERVICE



Emphasis for Customer Service is on the operations side of the warehouse, with 5 of the 10 metrics focused on inbound and outbound operations. Ensuring products are in stock and picking locations can be quickly replenished is a priority for which operational metrics will provide a good indication when things head south.

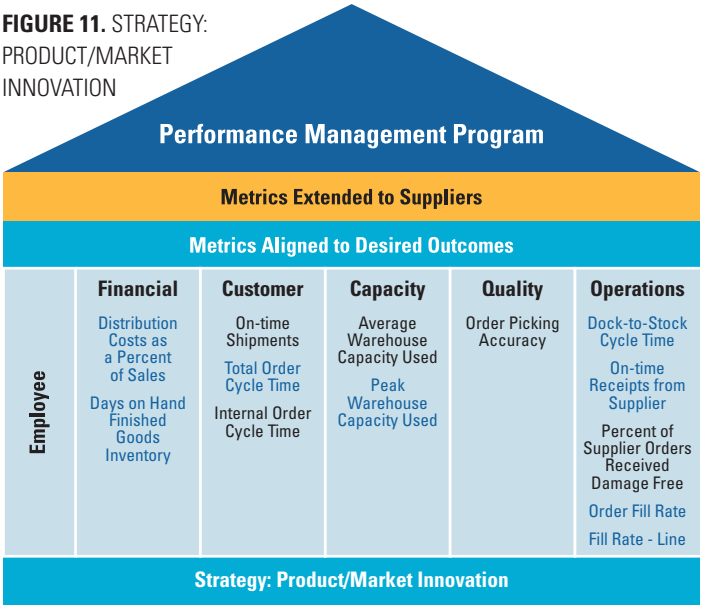
Strategy: Product/Market Innovation

Respondents employing a product/market innovation strategy are focused on developing a unique experience or product that commands a higher price. The biggest concerns are around the speed at which products move and changing demographics that could shift the market in an unexpected way. Again there remain clarity issues on what metrics best measure performance to a Product/Market Innovation strategy (Figure 11).

The mix of metrics aligns to our expectations, as these respondents would be interested in their obsolescence rate of finished goods.

Note that only 1 quality metric is part of the top 10. This suggests interest may lie in the quality of the logistical processes versus quality of the product being shipped.

FIGURE 11. STRATEGY: PRODUCT/MARKET INNOVATION



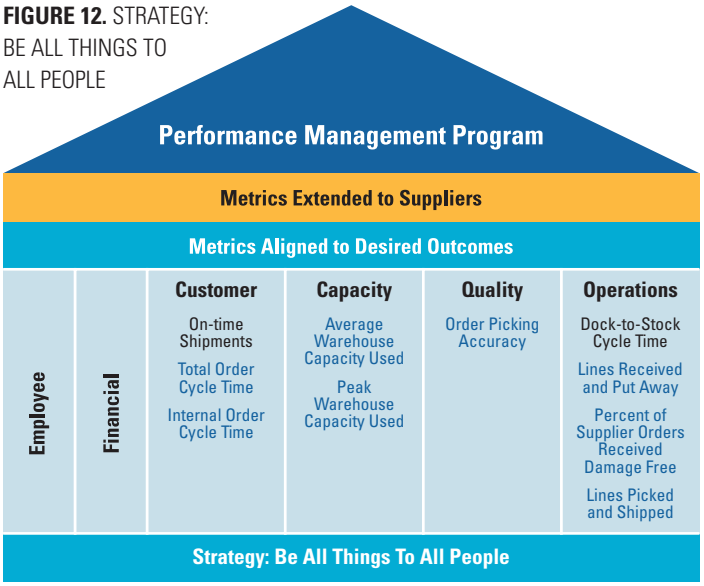
Strategy: Mix: Be All Things To All People

The hybrid strategy, trying to Be All Things to All People, is one of the hardest strategies to execute. This strategy balances costs against the experience. And respondents remain unclear on what metrics are best to manage performance to a mix strategy (Figure 12).

The caveat to this strategy is that there is no balance of measures. It was our assumption that the mix strategy would use the most diverse set of measures since they need to balance service with cost. In addition, having metrics about employee engagement and understanding of the balancing act they must perform would be beneficial in the long term and these metrics should measure the softer skill sets these employees would need.

It is interesting to note that the importance and mix of the measures only varies slightly among the top 10 for each strategy. For logistics professionals, the next question is obvious… does strategy matter to logistics performance?

FIGURE 12. STRATEGY: BE ALL THINGS TO ALL PEOPLE



Does Strategy Matter?

We looked to see any differences or commonalities in the metrics used to measure performance in each strategy (Table 6). To increase the power of the analysis, we used performance data from the past five years. What is interesting is the fact that 7 metrics are identified by each strategy as one of their top 10 metrics. Additionally, 1 of the 3 metrics NOT in the top 10 is still considered by three strategies as a primary metric. In light of this, the question that must be asked is if all of the firms employing different strategies focus on the same metrics, how are they differentiating themselves? Five trends stand out.

TABLE 6. TOP 10 METRICS UTILIZED BY STRATEGY

Top 10 Metrics - Performance	Cost Leadership Strategy	Customer Service Strategy	Product/ Market Innovation Strategy	Mix: Be All Things To All People
On-time Shipments	✓	✓	✓	✓
Average Warehouse Capacity Used	✓	✓	✓	✓
Dock-to-Stock Cycle Time, in Hours	✓	✓	✓	✓
Order Picking Accuracy (Percent by Order)	✓	✓	✓	✓
Internal Order Cycle Time	✓	✓	✓	✓
Peak Warehouse Capacity Used	✓	✓	✓	✓
Total Order Cycle Time	✓	✓	✓	✓
Fill Rate - Line	✓	✓	✓	–
Lines Received and Put Away per Hour	–	✓	–	✓
Lines Picked and Shipped per Hour	–	✓	–	✓

1. **No Differentiation Among Strategies**
   It was expected that companies using different strategies would use different metrics to support their goals. This was not the case, which leads us to ask whether or not it matters which strategy you are employing when determining which metrics are the most significant to your firm.

2. **Little Agreement Within Each Strategy**
   While we can clearly see that the 7 of the top 10 metrics are utilized by all of the strategies, with the exception of Cost Leadership, there seems to be disagreement among strategies concerning the most important metrics that support the firm's goals. For example:
   - Participants employing the Customer Service strategy, only 2 of the top 10 metrics are utilized by over 70% of the firms.
   - The mix strategy only has 2 of the top 10 metrics utilized by 70% or more of the respondents.
   - Product/Market Innovation has 5 out of the top 10 metrics utilized by over 70% of the respondents.
   - Respondents employing the Cost Leadership strategy are much clearer about which metrics are relevant to their firm, as 7 of the top 10 are utilized by over 70% of the respondents.

3. **Metric Utilization Versus Importance**
   One observation is that just because a strategy utilizes a specific metric, it doesn't mean that they emphasize or weight a particular metric as being more important than others. For example, all of the strategies utilize dock-to-stock cycle time as 1 of the top 10 metrics. However, this metric may be more important to the Customer Service strategy than the Mix strategy. In other words, in the data, quantity of use may not infer quality of use—which leads us to the next observation.

4. **Little Differentiation In Performance**
   Of the top 10 metrics, there was only 1 whose performance was statistically different by strategy (Product/Market Innovation Strategy – internal order cycle time). What does this mean? In our estimation, companies are not differentiating themselves according to their performance on the basis of the metrics they utilize to evaluate their operations or compare themselves with others in the industry. This brings up an interesting question.

5. **Does Strategy Matter?**
   Are companies utilizing logistics capabilities to truly differentiate themselves in the market place? Because the respondents—*DC Velocity* readers and WERC members—are considered leaders in the industry who utilize metrics to evaluate and benchmark performance, you would expect there to be greater variation by strategy. Since you can't be the best at everything, shouldn't you choose to be the best at only those metrics that help you achieve your strategic goals?

Our results suggest that this may not be the case. There is a surprising level of agreement as to what measures strategies use, and the similar performance of the respondents on these top measures. This leads us to one final consideration. **Why?** Perhaps this is the question we should focus on answering in the year to come. ■

Metric Definitions

One ongoing goal of this study is to help practitioners link key measures to various demographics to help companies better compare themselves to organization similar to their own.

Over the past five years we have been told that companies have adopted these definitions and calculations across their organizations in an attempt to develop a consistent approach to reporting performance at each location. Use of an agreed upon standard and definition will go a long way in assisting firms to understand and compare internal performance. ■

CUSTOMER METRICS	DEFINITION	CALCULATION
On-time Shipments	The percentage of orders shipped at the planned time (shipped means off the dock and in transit to its final destination). NOTE: The time to ship may be defined by the customer, or it may be determined by the shipper in order to accommodate an on-time delivery.	Number of orders shipped on-time / Total number of orders shipped
Total Order Cycle Time	The average end-to-end time between order placement by the customer and order receipt by the customer.	Excluding non-working days: sum of (Time order received by customer – Time order placed) / Total number of orders shipped
Internal Order Cycle Time	The average internal time between when the order was received from the customer and order shipment by the supplier. NOTE: Order shipment is defined as off of the dock, onto the shipping conveyance and ready for transit.	Excluding non-working days: sum of (Time order shipment – Time order received from the customer) / Number of orders shipped
Perfect Order Index	A compilation score which measures the result of each of the 4 major components of a perfect order: • Delivered On-time • Shipped Complete • Shipped Damage Free • Correct Documentation	The Perfect Order Index (POI) is established by multiplying each component of the perfect order to one another. For example, if a company is experiencing a measure of 95% across all 4 metrics of the perfect order (on-time, complete, damage free and correct documentation), the resulting perfect order index would be 81.4%
Lost Sales (Percentage SKUs Stocked Out)	An important risk indicator: the percentage of sales lost due to stock outs.	Dollar sales that were lost (i.e., they did not become backorders) / Total sales
Backorders as a Percentage of Total Orders and/or Backorders as a Percentage of Total Lines and/or Backorders as a Percentage of Total Dollars / Units	The portion of total orders that are held and shipped late due to lack of availability of stock. Can be measured by lines or by PO, by units or by dollar value.	Number of orders held and not shipped / Total number of orders Number of order lines held and not shipped / Total number of order lines Number of order dollars or units held and not shipped / Total number of order dollars or units

OPERATIONS METRICS	DEFINITION	CALCULATION
INBOUND METRICS		
Dock-to-Stock Cycle Time, in Hours	The dock-to-stock cycle time equals the time (typically measured in hours) required to put away goods. The cycle time begins when goods arrive from the supplier and ends when those goods are put away in the warehouse and recorded into the inventory management system.	For a given time period: sum of the cycle time in hours for all supplier receipts / Total number of supplier receipts
Supplier Orders Received per Hour	Measures the productivity of receiving operations in supplier orders processed per person hour.	Total supplier orders processed in receiving / Total person hours worked in the receiving operation
Lines Received and Put Away per Hour	Measures the productivity of receiving operations in lines processed and put away per person hour.	Total lines received and put away / Total person hours worked in the receiving operation
Percent of **Supplier** Orders Received With Correct Documentation	The number of orders that are processed with complete and correct documentation as a percentage of total orders. Documentation includes packing slips, case and pallet labeling, certifications, ASN, carrier documents or other documents as required by the purchase order.	Number of supplier orders that are processed with complete and correct documents / Total supplier orders processed in the measurement period
Percent of **Supplier** Orders Received Damage Free	The number of orders that are processed damage free as a percentage of total orders.	Number of supplier orders that are processed damage free / Total supplier orders processed in the measurement period
On-time Receipts From **Supplier**	Percent of orders received from a supplier on the date requested.	Number of supplier orders received on-time / Total number of orders received
OUTBOUND METRICS		
Fill Rate – Line	Measures percent of orders lines filled according to customer request. NOTE: A single customer order line can request multiple shipments. In this case each shipment would be tracked as a separate request.	Percentage of orders lines filled to customer request / Total number of order lines filled
Order Fill Rate	Measures percent of orders filled according to customer request. NOTE: A single customer order can request multiple shipments. In this case each shipment would be tracked as a separate request.	Number of orders filled to customer request / Total number of orders filled
Lines Picked and Shipped per Person Hour and/or Orders Picked and Shipped per Person Hour and/or Cases Picked and Shipped per Person Hour and/or Pallets Picked and Shipped per Person Hour	Measures the productivity of picking and shipping operations in lines per person hour. Measures the productivity of picking and shipping operations in orders per person hour. Measures the productivity of picking and shipping operations in cases per person hour. Measures the productivity of picking and shipping operations in pallets per person hour.	For a given time period: Total order lines picked and shipped / Total hours worked in the picking and shipping operation Total orders picked / Total hours worked in the picking and shipping operation Number of cases picked and shipped / Total hours worked in the picking and shipping operation Number of pallets picked and shipped / Total hours worked in the picking and shipping operation
On-time Ready to Ship	The percentage of orders ready for shipment at the planned time. NOTE: "Ready for shipment" typically means that packaging and shipping documents are completed and ready for pickup.	Number of orders ready for shipment on-time / Number of total orders shipped

FINANCIAL METRICS	DEFINITION	CALCULATION
Distribution Cost as a Percent of Sales	The cost to run distribution relative to total sales. Activities included in the operate warehousing process are: management activities, track inventory deployment, receive, inspect and store inbound deliveries, track product availability, pick, pack and ship product for delivery, track inventory accuracy, track third-party logistics storage and shipping performance.	Total distribution costs / Total sales
Distribution Costs as a Percent of COGS	The cost to run distribution relative to COGS. Activities included as part of total distribution operating costs are: management activities, track inventory deployment, receive, inspect and store inbound deliveries, track product availability, pick, pack and ship product for delivery, track inventory accuracy, track third-party logistics storage and shipping performance.	Total distribution costs / Total COGS (based on corporate income statement)
Distribution Cost per Unit Shipped	The cost to run distribution relative to the units shipped through distribution. Distribution costs include: management activities, track inventory deployment, receive, inspect and store inbound deliveries, track product availability, pick, pack and ship product for delivery, track inventory accuracy, track third-party logistics storage and shipping performance.	Total cost of operating distribution / Total units shipped
Inventory Shrinkage as a Percent of Total Inventory	The amount of breakage, pilferage and deterioration of all inventories relative to total inventory. Usually stated in terms of value, not units.	Sum (value of breakage, pilferage, deterioration to all inventory) / Total value of all inventory
Days on Hand – Raw Materials	The number of productive days before raw material supply is consumed.	Gross raw material inventory value / Average daily value of raw material usage
Days on Hand – Finished Goods Inventory	Average sales days of finished goods inventory on hand in plants and warehouses.	Average finished goods inventory value ($) / Average daily sales $ per month
CAPACITY & QUALITY METRICS	**DEFINITION**	**CALCULATION**
Average Warehouse Capacity Used	The average amount of warehouse capacity used over a specific amount of time (month to month or yearly).	Average capacity used / Average capacity available
Peak Warehouse Capacity Used	The amount of warehouse capacity used during designated peak seasons.	Peak capacity used / Capacity available
Honeycomb Percentage	Measures how well actual cube utilization within the warehouse is managed. Especially important where slots may be only partially full. An example would be if 1 unit is in a location, and it has room for 10, the utilization for that slot/bin location is 10%.	Actual cube utilization / Total warehouse cube positions available
Inventory Count Accuracy (by **Units/Dollars**) and/or Inventory Count Accuracy (Percent by **Location**)	Measures the accuracy (by location and units) of the physical inventory compared to the reported inventory: If the warehouse management system indicates that 10 units of part number XYZ are in slot B0029, the inventory count accuracy indicates how frequently one can go to that location and find that the physical count matches the system's.	1 - (The sum of the absolute variance in units or dollars / The sum of the total inventory in units or dollars) 1 - (The sum of the number of locations containing an error / The total number of locations counted)
Order Picking Accuracy	This measures the accuracy of the orders picking process where errors may be caught prior to shipment such as during packaging.	Orders picked correctly / Total orders picked
Material Handling Damage	Measures the value of material damaged from handling/storage as a percentage of COGS.	The value of material damaged from handling/storage / COGS
Equipment/Forklift Capacity Used	The amount of up time logged for equipment/forklifts.	Total amount of time equipment is used / Total amount of planned available time for use

EMPLOYEE METRICS	DEFINITION	
Annual Workforce Turnover	The rate at which permanent employees are replaced (excludes casual or seasonal labor).	Number of NEW employees at the beginning of the period / Total number of employees at the beginning of the previous period
Productive Hours to Total Hours	Measures employee productivity against total hours (includes all hours—indirect and direct).	Hours charged to specific activities, tasks or projects / Total hours worked
OSHA Day Count Rate	Measures the number of days since your last OSHA recordable incident at your facility.	Count the number of days between OSHA Recordable Injuries and Illnesses
OSHA Recordable Rate (TRIR)	The number of OSHA Recordable Injuries and Illnesses cases. OSHA injuries and illnesses include all work-related deaths, illnesses, and injuries which result in a loss of consciousness, restriction of work or motion, permanent transfer to another job within the company, or that require some type of medical treatment other than first-aid treatment (as defined by OSHA).	(Number of OSHA Recordable Cases multiplied by 200,000) / Total number of hours worked for a specific time period (typically one year)
OSHA Days Away from Work Cases (DAWC) Rate	Occupational injury or illness cases that result in an employee being unable to work a full assigned work shift. That is the employee is off from work (lost workday). As defined by OSHA, a fatality is not considered a lost time case. The day of the injury is not included in the count. This is strictly a measure of "serious" cases broken out for comparison.	(Number of OSHA Lost Time Cases multiplied by 200,000) / Total number of hours worked for a specific time period (typically one year)
PERFECT ORDER METRIC	**DEFINITION**	**CALCULATION**
Percent of Orders with On-time Delivery	The percentage of orders that arrive at their final destination at the agreed upon time. NOTE: There are many definitions of "on-time," and that the "time" may be a specific hour or day, or a window of time. "Agreed upon" means that the customer and shipper have agreed to the delivery time as a general commitment or as a part of the purchase order or contract.	Number of orders delivered on-time / Total number of orders shipped
Shipped Complete per Customer Order	Measures the percentage of orders which shipped completely, meaning that all line/units ship with the order per agreement between the customer and shipper.	Number of orders shipped with all lines and units / Total number of orders shipped
Shipped Damage Free (Outbound)	This measures the percentage of customer orders shipped in good and usable condition. NOTE: Orders damaged in transit are not considered here.	Number of orders shipped damage free / Number of total orders shipped
Correct Documentation (ASN, Invoice, etc.)	The percent of total orders for which the customers received an accurate invoice and other required documents including ASNs, etc.	Number of orders with correct documentation / Number of total orders
CASH-TO-CASH METRICS	**DEFINITION**	**CALCULATION**
Inventory Days of Supply	Measure of quantity of inventory-on-hand, in relation to number of days for usage which will be covered. Total gross value of inventory at standard cost before reserves for excess and obsolescence. Only includes inventory on company books, future liabilities should not be included.	Current (or period ending) total inventory value / (Total annual COGS / 365)
Average Days Payable	Measure of the length of time required to pay suppliers; key element in cash-to-cash cycle time.	Average daily payables / (Total annual COGS / 365)
Average Days Sales Outstanding	The amount of time required to convert receivables to cash. To even out seasonality, this includes a rolling monthly average of AR (this is also known as "average collection period").	Average 5 month AR / (Total annual sales / 365)

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About the Researchers

An enthusiastic and dedicated young professional, **Joe Tillman** is the founder and lead instructor of TSquared Logistics, LLC, a boutique consulting firm specializing in supply chain strategy, education and dangerous goods training. His keen interest in all thing supply chain and his high-energy approach to life find him authoring articles for industry publications, a blog *The New Generation* for *DC Velocity* magazine and speaking at numerous industry events.

Joe is certified in transportation and logistics by AST&L and SCOR-Professional certified by the Supply Chain Council. He is a member of AST&L, CSCMP, and WERC.

Karl Manrodt, PhD, is a Professor of Logistics at Georgia College & State University and the Director of the Master of Logistics and Supply Chain Management online program. He has served on the Board of Directors for the CSCMP as well as other leadership roles with WERC. Dr. Manrodt has contributed to numerous academic and practitioner journals, is the co-author of five books, and has given over 150 presentations worldwide.

Donnie F. Williams, Jr., PhD, is an Assistant Professor of Logistics, Georgia College & State University. He teaches Master's students to think critically and strategically about Logistics Management and how the Supply Chain must be integrated in order to gain competitive advantages in today's global marketplace. For undergraduates, he presents the principles of Operations Management and Supply Chain Management, and works to help them discover the career in business that they will flourish in.

About the Study

2015 marks the 12th year of the DC Measures Study. The heart of this study is to eradicate bad warehousing practices. In January, the survey is launched via an email invitation to WERC members and *DC Velocity* readers. Survey participants are asked to report their actual levels of performance for 2014. The study captures 45 key operational metrics that are close to the heart of most distribution center professionals. The measures have been grouped into five balanced sets – customer, operational, financial, capacity/quality and employee/safety – plus the additional sets related to perfect order and cash-to-cash cycle measurement.

As in previous years, the study results and analysis are compiled and presented by our partners Joseph Tillman, Karl Manrodt, PhD and Donnie Williams, PhD.