

Special Report

Growth Path for Warehouse Optimization



Distribution Group

Managers have been improving distribution centers haphazardly although effectively for decades. In this manner, logistics operations have been lifted to higher levels of performance. However, progress is difficult and slow. Many initiatives, in particular those involving either IT or supply chain integration, have only experienced minor successes or have failed completely. This probably has nothing to do with the initiatives or the systems themselves. They may have been excellent. The problem has been that they were introduced when the organization was not yet ready for them. Hence, if initiatives are introduced in the correct order, then they become more successful. This is comparable to building a house. First we lay the foundations, then we build the walls and the roof, and eventually we finish the interiors. If we do this in any other sequence, the result would be disastrous.

In this special report, consultant, educator and author, Jeroen van den Berg introduces a new approach to warehouse optimization, which is detailed in his recently released book, *Highly Competitive Warehouse Management*. In the book and below, he explains the four stages of maturity, presents data from his research on where different types of companies fall on the grid, and explains who the leaders and laggards are.

The first stage of the maturity grid, reactive warehouse management, serves as the baseline. It is a distribution center where processes are unstructured and ill defined. Performance is unreliable. The manager constantly needs to react to the same events that occur in the distribution center on a daily or even hourly basis. Individual heroics and “working around the system” are what make things happen in this type of distribution center.

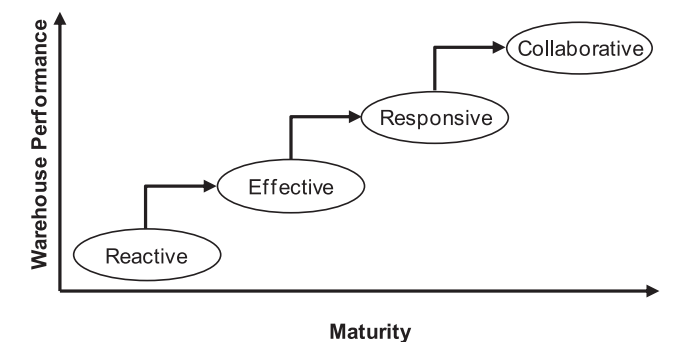
The second stage is effective warehouse management. In this stage, we standardize the management of the distribution center. We systematically structure the organization, set goals and identify the cost and performance levels. These efforts not only simplify day-to-day management, they also facilitate a transparent analysis of the bottlenecks. The distribution center becomes an effective link in the supply chain.

The third stage is responsive warehouse management. In this stage we utilize information technology to increase performance. IT is a powerful enabler of logistical improvements. However, existing logistics models hardly address the use of intelligent information systems. We introduce new planning and control principles that respond in real-time to events.

The fourth and final stage is collaborative warehouse management. In this stage we reconsider the role of the distribution center in the supply chain. We look beyond the four walls of the distribution center. In other words, in the previous stages we sought to do things right in the distribution center, without considering if we were doing the right things. In this stage we demonstrate how to improve the performance of the entire supply chain through better collaboration.

Accordingly, highly competitive warehouse management is a growth model. The model guides the manager along the four stages in the maturity grid. Stage 2, effective warehouse management, structures the organization, then stage 3,

Warehouse management maturity grid



responsive warehouse management, introduces intelligent controls and finally stage 4, collaborative warehouse management, realigns the supply chain. Each stage enables the distribution center to act successfully in the subsequent stage.

Is it a strict rule to obey the sequence of the maturity stages? In principle yes, but exceptions are possible. If a quick-win is observed in supply chain collaboration, i.e., a stage 4 optimization, while the distribution center is still muddling in stage 1, then the manager should not hesitate to implement it. Go ahead and pick the low hanging fruit! However, remember that the operation should be ready for it and realize that the project would be easier and more successful after mastering stage 3. In any case, be aware that you are dealing with a subsequent level.

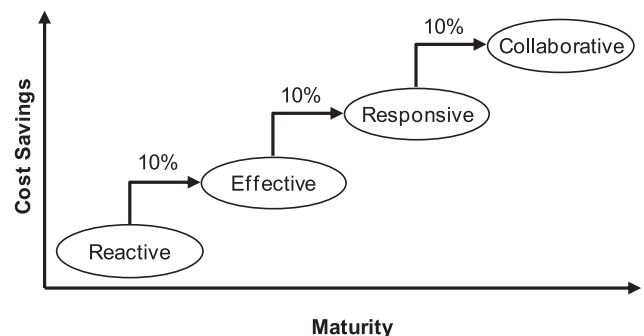
Warehouse maturity scan

Based on international studies together with empirical evidence from a large number of warehousing projects, we assert that we can reduce overall costs by 10 percent as the organization moves to each successive maturity stage. Hence, highly competitive warehouse management could save as much as 30 percent, depending on the initial state of the distribution center.

The savings potential applies to all distribution centers, big or small, simple or complex, across all industries and supply chains. In addition, the changes in the distribution center may also lead to savings in transportation, production, order processing and holding inventories. In that case, the overall savings can be substantially higher than 30 percent of the warehousing costs. Moreover, many of the principles of highly competitive warehouse management may also be applied to other disciplines in the value chain, i.e., transparency to create efficient processes, intelligent IT for effective capacity utilization, and collaboration for aligning services. These applications may be used to unleash the 30 percent savings potential on overall logistics costs.

How can highly competitive warehouse management achieve such performance breakthroughs in each of these stages? Effective warehouse management, the second stage, makes the operation more transparent. The responsible staff can use the improved transparency to analyze bottlenecks in the distribution center and make processes more efficient. The subsequent stage, responsive warehouse management, introduces intelligent planning and control mechanisms, which help to improve the utilization of people and resources in the distribution center. Finally, collaborative warehouse management, the ultimate stage, re-evaluates the services provided by the distribution center and attempts to better align them with supply chain objectives. The table to the right characterizes the four maturity stages.

Anticipated cost savings from highly competitive warehouse management



Characterization of the maturity stages

#	Maturity	Cost Level (%)	Key Element	Savings
1.	Reactive	100	Individual heroics	Baseline
2.	Effective	90	Transparency	Process efficiency
3.	Responsive	80	Planning and control	Resource utilization
4.	Collaborative	70	Collaboration	Service alignment

In the book *Highly Competitive Warehouse Management*, we present the warehouse maturity scan that estimates the maturity of a distribution center. The scan computes the facility's maturity level at the effective, responsive and collaborative stages and it estimates the savings potential. According to the previous discussion, the savings potential is between 0 and 30 percent. Another indicator computed by the scan is the complexity of the distribution center. This indicator relates to the size and variability of the distribution center operation.

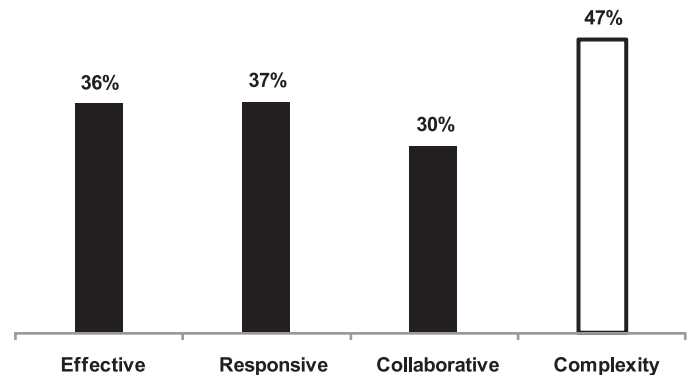
How mature are distribution centers?

In total, 500 participants responded to the online warehouse maturity scan between 2008 and 2011.

The black bars below show the average maturity scores of survey participants. We see a 36 percent compliance with the effective stage, 37 percent with the responsive stage and 30 percent with the collaborative stage. Note that there is no score for the reactive stage, since there are no practices associated with it. It only serves as a baseline.

The online warehouse maturity scan reveals an average savings estimate among all participants of 20 percent – a substantial amount. The scan also asks participants how much they expect can be saved in their distribution centers by adopting best practices in processes, IT and collaboration. The participants expect that they can save 19 percent on average – nearly identical to the 20 percent average computed by the scan. Additionally, if we analyze the scores of individual participants, then we see a statistical correlation between estimates computed by the scan and participants' expectations. Therefore, we can conclude that despite the fact that the warehouse maturity scan has a limited set of questions, it gives a realistic estimate of the maturity and savings potential of a distribution center.

Average participant's score in online warehouse maturity scan



Average Maturity Scores

If we interpret the average maturity scores, one striking observation is the relatively low score of the participants at the effective stage. Since the effective stage lays the foundation for subsequent stages, one might expect that the maturity score on the effective stage is higher than the maturity scores on the other two stages. However, this is not the case. The average effective score at 36 percent is only slightly below the average responsive score at 37 percent.

The initiatives required in the effective stage, such as creating transparency and streamlining processes, are relatively easy to achieve and less costly than those in subsequent stages. One expects that managers would be interested in this low hanging fruit. However, the outcome of the scan suggests otherwise. Instead, managers attempt to solve their operational problems through IT. Apparently, managers have heavily invested in IT systems in recent years, thereby

neglecting the basics of warehouse management. Subsequently, they find out that new systems are ineffective due to the immaturity of the organization.

Another observation from the survey is that the absolute scores on all three maturity stages are relatively low. Although the practices which the scan addresses in each of the maturity stages are generally accessible, an average distribution center only adopts 30 to 40 percent of them. As a result, distribution centers could still attain an average savings potential of 20 percent. This is a substantial amount. Nonetheless, most managers struggle to close the performance gap. *Highly Competitive Warehouse Management* will show how to move forward successfully.

Maturity Scores by Vertical Market

Next, we look at the maturity scores of various vertical markets. Here we see that the most mature verticals (i.e., verticals with the lowest savings potential) are high-tech, fashion, consumer goods and office equipment (see table). What these four verticals have in common is that their products have relatively short lifecycles. Consequently, companies are forced to keep limited inventory levels to avoid the risk of obsolete stock. Satisfying customers with limited inventories imposes heavy demands on logistics operations. Thus companies in these verticals need mature logistics operations to remain competitive in their markets.

In particular, the high-tech industry outperforms all other verticals in warehouse maturity. This finding is in line with many international studies, which show that supply chain performance is essential for business success in the fast-paced high-tech market. For instance, the 2011 Supply Chain Top 25 by analyst firm Gartner lists five high-tech companies in its Top 10: Apple, Dell, Research in Motion (Blackberry), Cisco Systems and Samsung. The analysts started publishing the list in 2004 and it has been dominated by high-tech companies ever since.

On the other end of the scale, we find the least mature verticals: do-it-yourself products, chemicals and spare parts. Contrary to the mature verticals, these businesses sell products with long lifecycles. As such, these companies experience less pressure on their logistics operations.

Average savings potential by vertical market

Vertical Market	Savings Potential (%)
High-tech	17.2
Fashion	18.6
Consumer goods (non-food)	18.7
Office equipment	18.8
Healthcare	19.1
Cold storage	19.4
Multi-media	19.6
Food	19.9
Automotive	20.1
Industrial products	21.1
Do-it-yourself	21.3
Chemicals	21.3
Spare parts	22.5

Maturity Scores by Supply Chain Position

Next, we look at the results by position in the supply chain. The table on page 5 shows the average savings potential for companies across the supply chain. Here we see that retail distribution centers are the most mature (i.e., they have the lowest savings potential), followed by e-commerce operations and third party logistics providers. The least mature distribution centers are typically found at manufacturers (of both components and finished goods).

In fact, the table shows that companies tend to have increasingly mature distribution centers once we move from upstream to downstream in the supply chain. At the end of the supply chain, where companies deliver to end customers, logistics operations typically are more complex due to broad product ranges and small, frequent orders. Moreover, their out-of-stock risks are more serious. For example, if a retail distribution center cannot supply its stores, this rapidly leads to empty shelves and lost sales. For upstream companies this is less crucial. Their products are held by companies downstream in the supply chain, which serve as buffers for their supply interruptions. Hence, if supply is disrupted upstream, there may still be sufficient inventory in the supply chain to serve demand so that end-customers do not immediately have to face out-of-stocks.

Another reason for the maturity gap between upstream and downstream companies lies in the fact that manufacturers traditionally have higher profit margins than retailers. This implies that cost efficiency is more relevant at the end of the supply chain.

We can conclude that logistics complexity, out-of-stock risks and smaller profit margins mean that downstream companies in the supply chain need more mature distribution centers in order to be competitive in their markets.

Average savings potential by supply chain position

Position in Supply Chain	Savings Potential (%)
Retailer	16.9
E-commerce	18.3
Third party logistics provider	18.4
Wholesaler/distributor	20.8
Finished goods manufacturer	21.0
Components manufacturer	22.2

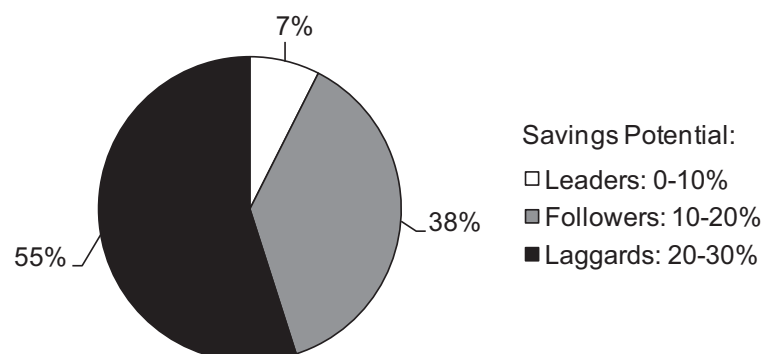
Leaders and Laggards

Next, we compare the leaders and laggards across all participants. Since the warehouse maturity scan computes a savings potential that lies between 0 and 30 percent, we distributed the participants into three segments:

- The leaders with mature operations who have a savings potential of 10 percent or less.
- The followers who have a savings potential between 10 and 20 percent.
- The laggards with immature operations who have a savings potential between 20 and 30 percent.

The chart below shows the sizes of the three segments. Over 50 percent of the distribution centers are laggards according to our definitions. Warehouse operations in this segment are still struggling in the Reactive stage of the warehouse maturity model. Next, we see a large group of followers who constitute almost 40 percent of the total. These distribution centers achieve adequate performance levels and managers have a grip on the operation. Finally, there is a small group of leaders comprising just 7 percent of the distribution centers. These operations have outstanding performance levels and strongly contribute to the competitive strength of the company. Note that the international studies,

Participants by savings potential



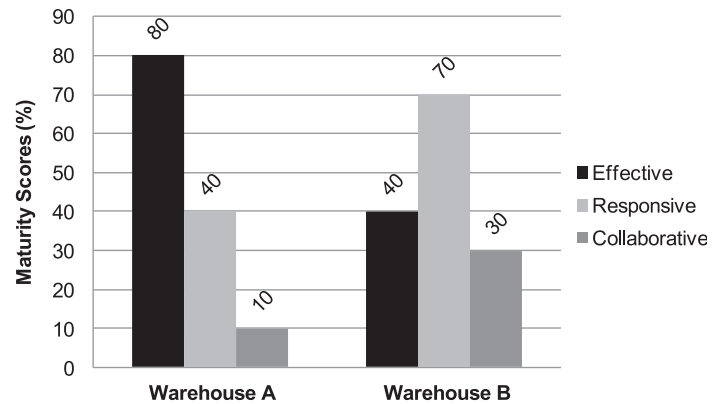
which we discussed earlier also identified small leader groups that were well ahead of the pack.

The chart to the right, plots the maturity scores computed by the warehouse maturity scan for two arbitrary warehouses A and B. Warehouse A estimated an 80 percent compliance with the effective stage, 40 percent with the responsive stage and 10 percent with the collaborative stage. This is a healthy pattern, since each stage has a lower maturity score than its predecessor. Conversely, Warehouse B heavily invested in stage 3, responsive warehouse management, without adequately mastering stage 2, effective warehouse management. We see this regularly when managers attempt to solve their operational problems through IT. It turns out that the new systems are ineffective due to the immature nature of the organization.

Reviewing the survey results of the online warehouse maturity scan, we see that only 25 percent of participants have a balanced growth pattern. In other words, three quarters of the companies have an imbalance in their growth path.

They have at least one stage (responsive or collaborative) with a maturity score that is higher than the score in a preceding stage. In such situations, we suggest that the manager focuses on re-establishing the balance. For instance, the manager of warehouse B should invest in transparency and process optimization to increase the effective score before he continues with improvements in the subsequent stages.

Maturity Score examples for two warehouses



Summary

Excellent warehouse performance helps companies to create competitive advantage by reducing logistics costs, by increasing internal and external customer service levels, and by aligning business activities. Research shows that best-in-class companies realize competitive customer service levels while achieving logistics costs advantages of 20 to 30 percent over their laggard peers. Moreover, these companies are financially more successful.

About the Author

Dr. Jeroen P. van den Berg is a well-known expert in warehouse management. In his work as a consultant, author, teacher, speaker and researcher, he challenges people to see the big picture and overcome the obstacles that prevent progress.

He has a unique talent for giving structure to complex issues so that they become easy to understand.

Dr. van den Berg earned a Ph.D. from the University of Twente in The Netherlands with his thesis Planning and Control of Warehousing Systems. He holds a master's degree in Applied Mathematics from the same university.

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About the Publisher

The Distribution Group is committed to providing the highest quality management information on warehousing and distribution through its newsletters and books. The Distribution Group is the publisher of Dr. van den Berg's groundbreaking book, *Highly Competitive Warehouse Management*.



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