Getting more out of warehouse data without costly tools

Warehouses are the source of a wealth of data that is still severely under-utilized, according to Rob Wijnen, Senior Consultant and Data Specialist at Groenewout. He presents five steps to help companies get more out of their logistics data without needing cost-intensive and complex tools.

The importance of data in optimizing processes and performance needs no explanation nowadays. Most logistics managers realize that they can and should leverage more meaningful information from their data – but they struggle with the matter of how to do so. Their attempts are often limited to incidentally grappling with spreadsheets or standardized reports that are then barely given a second glance. In just five steps, these companies can move towards a situation in which data is structurally gathered, stored, validated, enriched and analyzed.

Step 1: data gathering

Most companies do this already, thanks in part to their warehouse management system (WMS). Each movement of goods is recorded, often in real time, including the time at which the movement occurred. The same holds true for the order lines, but it's even better to record the pick lines because these also include details of the locations that the order pickers have been to. Besides that, if you have one, remember to retrieve data from your warehouse control system that manages the mechanical systems. That system is often better than the WMS in terms of identifying which item comes from which aisle.

One thing that should be done more often is to make snapshots of inventory levels. If you record how much stock you have per item and per location at least once a month, the resulting data can form the basis for interesting analysis – such as the utilization rate of the various storage systems over time. In most WMSs, however, you can only see the current inventory levels rather than those of a few months ago. In such cases, it can be useful to set up a script so that the inventory level is saved at a fixed time each month.

Step 2: data storage

Data storage is less obvious than it sounds. A WMS is sometimes programmed to delete all data older than three months. After all, a WMS that has been implemented to manage the warehouse operation in real time must be highly responsive. If it would continue to store all the data gathered over the years, it would become progressively slower. Therefore a key piece of advice, and especially for large warehouses, is to regularly save all data in a data warehouse. Furthermore, a data warehouse enables you to analyze the data without placing a burden on the WMS and potentially disrupting the day-to-day logistics operation.

Step 3: data validation and improvement

This step revolves mainly around master data, such as the weights and dimensions of items, the number of units per box, the number of boxes per pallet, customer data, etc. If the data is incorrect, it will be difficult to conduct relevant analysis of factors such as the scope of goods flows.

Inaccuracy is often due to an underestimation of the importance of the data. Therefore, companies are advised to first record all master data for each new item as a matter of course. Thankfully that is increasingly a precondition for maximizing the

process-management and optimization opportunities offered by WMSs and mechanization systems. Master data is essential in order to make the right decisions when allocating items to storage systems, for example. It helps if you make the quality of the master data the responsibility of just one person, who must then ensure that the warehouse employees treat it with care.

Step 4: data analysis
We can distinguish between two types of warehouse analysis:
- analysis in the form of dashboards that visualize the current status;
- retrospective analysis to provide greater insight and evaluate opportunities for improvement.

Dashboards
Today's software market offers appealing dashboard solutions such as Qlikview and Tableau. The graphical representation of the desired information provides rapid insights into any bottlenecks in the current operation. The major advantage of these solutions over dashboards in Excel is the ease with which you can click through to more detailed information about the cause of problems.

Dashboards only have to be set up properly once and then they can be used every day. The set-up can be done by an external specialist, but it is preferable for someone from within the organization to do it; creating the right dashboard settings requires not only knowledge of data and the tool, but also an understanding of the logistics operation. An internal specialist can interpret information about order patterns or portfolios correctly and knows which indicators are important for a smooth-running operation.

Retrospective analysis
Most companies use Excel for retrospective analysis, but its possibilities are limited. In particular, Excel is slow when dealing with large volumes of data and when connecting files (via the vertical lookup function). I advise utilizing Excel to analyze files containing a few thousand lines at the most.

One extremely useful analytical tool is Access. In the case of larger files, and especially if you need to set up connections between files, this standard Microsoft tool is much faster and more efficient than Excel. However, Access looks different and is less user-friendly than Excel. It can take people a little while to get used to running the necessary analytical processes, which is why Access is not yet widely utilized.

The maximum file size for Access is around 2GB, which in practice often amounts to 15 to 20 million lines. In that case a different analytical tool is required, and preferably one that is directly linked to the data warehouse, e.g. SQL. This means that you no longer have to first export the data from the data warehouse and import the files into the analytical tool, as is (often) necessary when working with Excel and Access.

Step 5: data enrichment

If you would like to take things a step further, you can enrich the data from your WMS with data from other systems, such as data from a time-tracking system. The goods flow data from the WMS provides insight into the number of movements, while the time-tracking system registers the number of man-hours for those activities.

Another option is to set up a link with ERP or transport management systems (TMSs), with the latter being particularly interesting for companies that want to optimize their distribution network. Although the WMS itself also provides insight into the number of shipments to certain destinations, the TMS additionally reveals the extent to which multiple shipments have been consolidated into a single trip.

Linking shipments with postcode-based geographical information systems provides interesting insights into where customers are located and heat maps that show where the most deliveries are made.

Meaningful analysis

If you follow this five-step plan, you will meet all the criteria for conducting regular and frequently interesting analysis, largely without having to make extra investment in data and tools. But which analysis is meaningful? At Groenewout we make extensive use of Access to analyze flows of goods as the basis for comparing the investment costs and operational costs of different warehouse designs. Among other things, that gives us insight into whether a mechanized storage system would be preferable to a manual one.

Other examples of meaningful analysis include:

- **ABC analysis**. Which products are the fast-movers and which are the slow-movers? Storing these in the right locations minimizes walking and driving distances in the warehouse. It is wise to reassess the situation regularly.
- **Slotting**. Which items should be stored in which zone or in which storage system to keep the warehouse running optimally? The turnover rate of each item is important in this context, but so too are the product dimensions and order characteristics. It is advisable to create a decision tree for this process and to regularly check whether it is still fit for purpose.
- **Anticipating growth.** Does the warehouse still have sufficient capacity to cope with the growth plans? If not, in which areas is extra capacity necessary, when and how much?
- **Inventory parameters**. Procurement is often done based on fixed parameters: minimum inventory levels, optimal reorder quantities, etc. Those parameters should be evaluated regularly to ensure that there are no stock shortages or surpluses in the warehouse. Access is suitable for this purpose too.
- **Optimization of the distribution network**. How many warehouses are needed, and where should they be located? There are complex tools available to help you calculate this, but they need files which contain details of the number of transport movements per postcode area and per shipment type. Access makes that possible based on data from a TMS, for example.

In other words, there are plenty of possibilities. Even though circumstances are changing at an ever-faster rate, most warehouses have enough data to optimally align their operation with that pace of change. However, it is not enough to merely have data. Logistics managers will first have to safeguard the quality of the data within their organization, and then invest in the skills to analyze it. Standard tools that are available within every company are capable of generating a great many meaningful insights. So although a good tool is useful, a good data analyst is much more important.

More information
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