VDC Research
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white paper

2014 | Enterprise Mobility & Connected Devices

Voice-Enabled Warehousing Solutions

Achieving Voice Optimization While Lowering Cost of Ownership

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Executive Summary

Optimizing warehouse performance is critical for organizations involved in the manufacturing, distribution, or sale of goods. Older systems with lower levels of automation are more reliant on paper-based systems for warehousing that leave companies vulnerable to human error. Improving warehouse performance means improving on-time shipment and receipts, reducing errors, and ultimately operating at a higher level of performance. Changes to supply chains in recent years are placing a greater strain on warehouse performance, with retail having been particularly affected. Scaling e-commerce and omni-channel shopping for more traditional brick-and-mortar businesses and retail has stepped up pressure to ensure greater speed and accuracy in warehousing, especially where individual picking is concerned. Reducing the cost of errors and increasing productivity have become the primary drivers for optimizing warehousing solutions. Labor remains the single highest cost for these businesses, both in regards to accuracy and labor flexibility.VDC research indicates that as long as the human element continues to play a central role in warehousing, any technology that optimizes workflows and improves accuracy will add tremendous value. Voice-directed warehousing technology provides the means for companies to tangibly increase accuracy while improving overall speed and productivity for many warehouse workflows. Next-generation voice solutions are breaking down many existing adoption barriers to voice, such as long deployment time frames and relative inflexibility of legacy solutions. Moreover, a more modular approach to technology allows a more fluid labor force that is not constrained by a single area. Next-gen voice technology's modular design enables a heightened level of flexibility that is increasingly critical in today's market. However, the chief barrier often lies in explaining the value proposition of voice-based warehousing technology to supply chain executives.

Key Findings

- 50% of enterprises surveyed reported customer demand for faster orders exerting strong pressure on warehouse operations
- Reducing the cost of errors (freight, labor and lost customers) remains a top priority
- Improving worker productivity and picking accuracy are key in adoption of voice-based warehousing technology
- Rapid deployment is the top criterion of functionality when considering voice solutions
- Cost of ownership and ease of support are key factors in the successful implementation of voice technology
- VDC research revealed consistent significant gains in productivity from the adoption of voice technology

Meeting customer demand puts premium on speed and accuracy

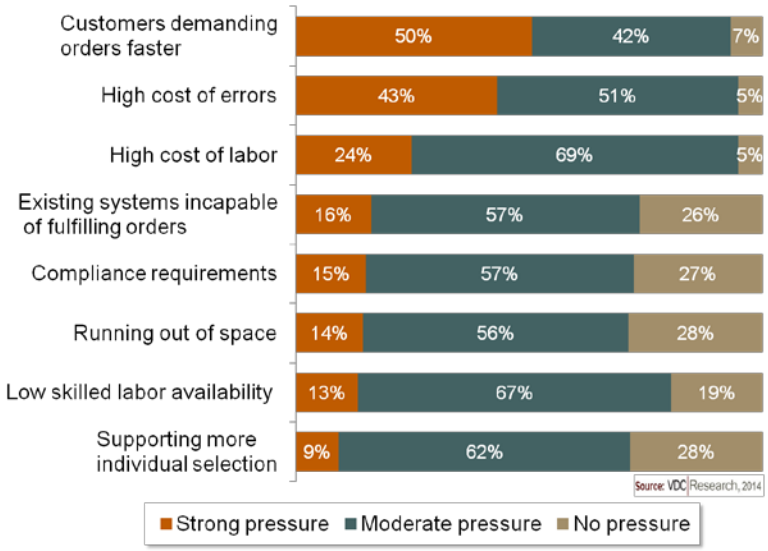
The increasingly central role that e-commerce plays in retail has raised customer expectations in product availability, delivery times, and costs. These expectations were taken to new heights last year when Amazon announced the introduction of same-day delivery within certain parts of the United States. Traditional brick-and-mortar companies seek to maintain market share by offering omni-channel shopping to counter purely online competition. These changes have had a profound impact on warehousing.

Dynamics impacting warehouse and supply chain operations has meant that enterprises are looking to a more multi-modal approach in their warehousing solutions. Current solutions revolve around automatic data collection technologies: barcode scanning, RFID, and voice. These technologies are pervasive in most modern warehouses and have contributed significantly to the performance gains experienced over the past decade. Voice-based warehousing in particular provides a tangible benefit to companies looking to optimize warehousing operations and has been proven to provide an exceptionally strong ROI. Research conducted by VDC revealed that organizations employing voice-based technology have consistently cited gains of more than 20% in both picking accuracy and worker productivity.

However, there have been limitations to many legacy solutions in the context of high adoption costs and proprietary design. VDC research shows that while firms are generally satisfied with their existing solutions, particularly in regards to accuracy, support, and ease of use, they cite costs of implementation and maintenance, limited compatibility with non-proprietary hardware, and training times as the top weaknesses of the current technology.

VDC research shows trends toward a greater use of e-commerce and omni-channel retail by revealing that nearly all warehousing systems are facing moderate to strong pressure to support more individual piece picking. Existing physical and technological limitations also are major motivating factors to optimize: 56% of those surveyed reported that lack of space exerts moderate pressure on their operations, and 57% noted similar pressures from existing systems being incapable of keeping up with order volumes. However, the pressure to meet customer demands for faster order delivery and associated cost of errors are firmly at the top of the list as a motivating factor. A full 50% of companies surveyed reported that customer demands exerted strong pressure on their operations, while 43% acknowledged similar levels of pressure in reducing the cost of errors. As a result, there is an ever-increasing need for process efficiencies to boost both productivity and accuracy.

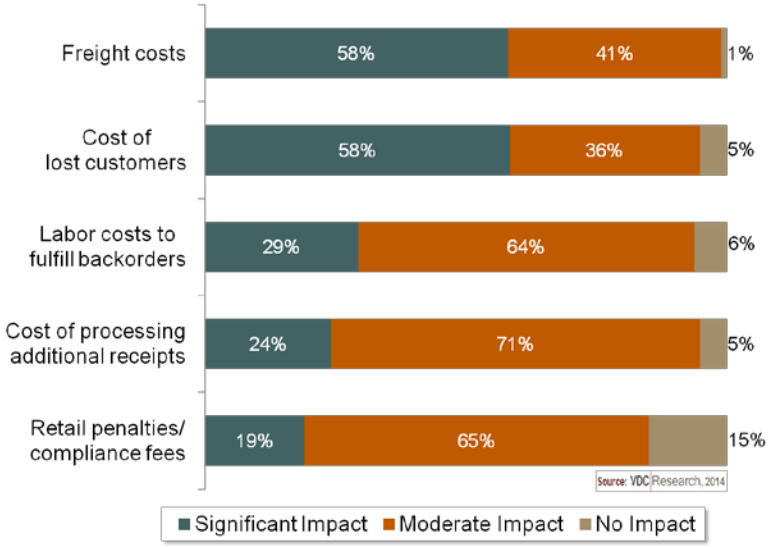
Exhibit 1: End user reasons for pressure on warehouse operations



Cost is a Key Factor

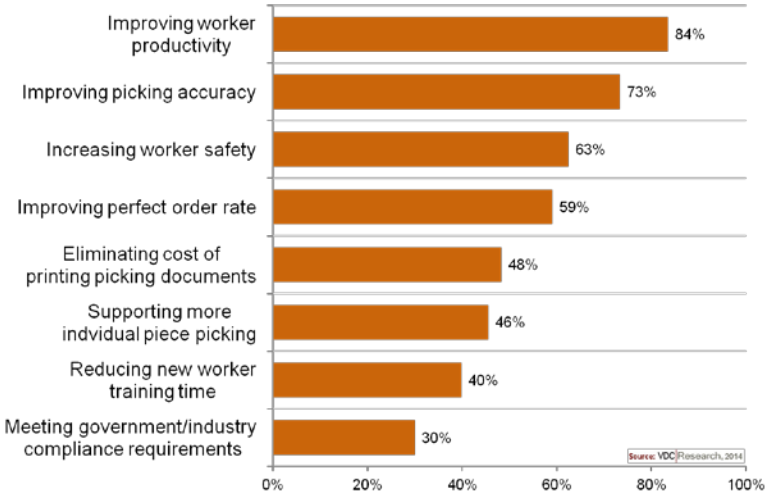
As companies like Amazon, Wal-Mart, and Staples continue to expand their scope and major brick-and-mortar firms look to increase sales and offset the pressure from e-commerce by turning to omni-channel retail, the pressure for warehousing to increase productivity and cut costs will only continue to grow. This heightens the need to reduce warehousing errors, and picking errors in particular, as organizations strive to optimize the perfect order. Cost of freight, labor, and lost customers are the three factors that have the greatest financial impact when errors are made (see Exhibit 2). External factors such as fuel prices mean that errors that require additional freight are particularly costly (in addition to time lost and labor needed to rectify the mistake). Customer retention is critical for many businesses, especially in the more commoditized areas of retail. Customer loss due to warehousing errors is particularly pernicious, since it affects not only future sales from the dissatisfied customer but risks further erosion of sales from negative word of mouth.

Exhibit 2: End-user-rated financial impact of warehouse errors



Voice technology presents enterprises with an opportunity to lower costs through increased worker productivity and accuracy. Customer demand for goods to be delivered faster and for less has led to significantly decreased tolerance for delays and inaccuracies. Amazon has thrown down the gauntlet to other retailers by offering same-day deliveries, making productivity and accuracy absolutely critical. Not surprisingly, VDC research shows that these two categories are the primary factors driving the evaluation and adoption of voice technology. Other factors motivating decision-makers to adopt voice-based warehousing solutions include lowering labor costs and improving worker safety (see Exhibit 3).

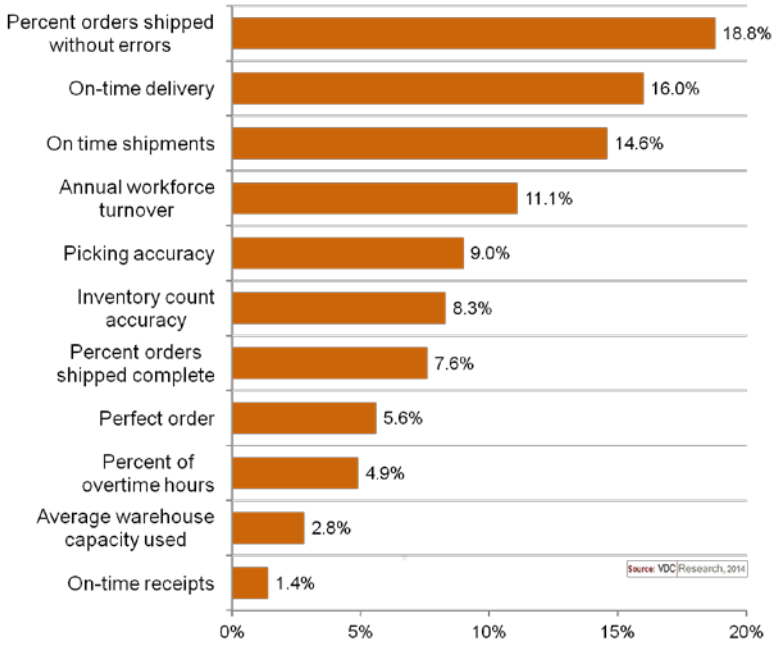
Exhibit 3: Primary factors driving adoption/evaluation of voice technology



Speed and accuracy play another important role for companies looking to optimize their warehousing solutions. The ability to increase the percentage of orders without errors was the single-largest metric that would provide the greatest economic benefit at 19%, followed by on-time delivery at 16% (see Exhibit 4).

This bears out, as the top three initiatives include storage utilization, reducing order errors, and improving perfect order rates.

Exhibit 4: Metrics providing greatest economic benefit to end user's organization



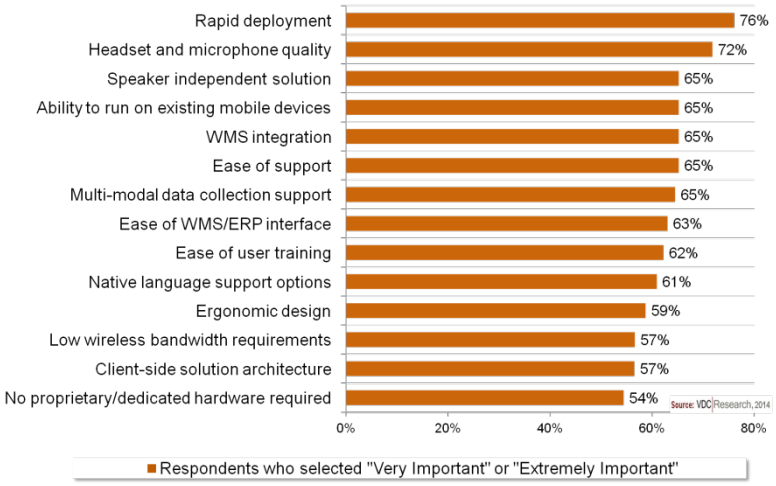
Voice-based technology taking a central role in warehousing systems

Though voice-based technology has been used in warehouse solutions for several decades, its success was limited to specific environments such as picking applications in the grocery segment. The cost and complexity of voice technology prohibited a broader adoption. Additionally, the proprietary purpose-built nature of initial solutions limited some of the appeal of voice-based warehousing. However, key recent voice technology developments have significantly altered the cost profile of these solutions – in terms of adoption and deployment, as well as management, support, and ownership, making the technology available to a broader user base. The ability today to voice-enable existing warehouse applications and workflows (as opposed to deploying a dedicated solution requiring substantial middleware, coding, and integration overhead) represents one of these significant advances. In addition, the ability to seamlessly modify or alter a voice application after it has been deployed without substantial coding/recoding introduces a significantly more attractive and flexible ownership and support model relative to legacy solutions.

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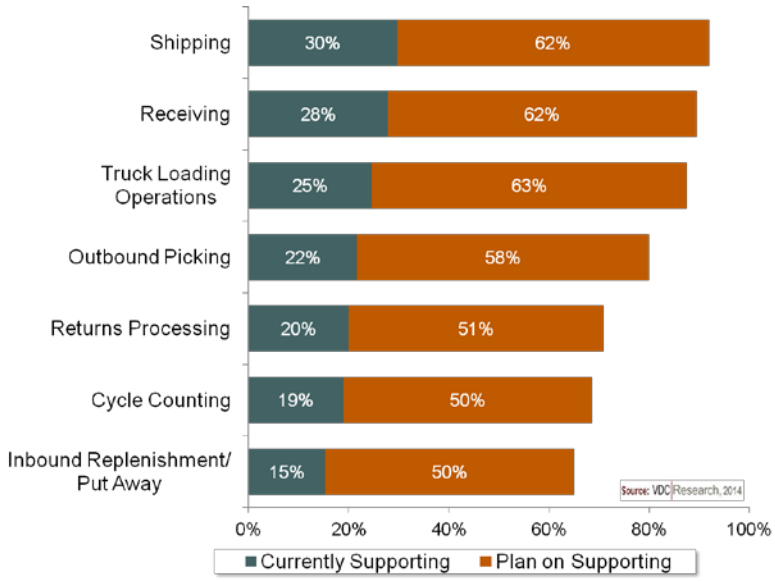
Many of these capabilities were identified by organizations currently using or planning to deploy voice solutions for their warehouse operations (see Exhibit 5). Rapid deployment was identified by respondents as the most important technology selection criteria, with more than three in four respondents rating that capability as “very” or “extremely” important. The ability to run voice on existing mobile devices and ease of support were both classified as top-three requirements

Exhibit 5: Importance of functionality when evaluating voice solutions



Moreover, the modular design of next-generation solutions, which leverages existing mobile terminals used in warehouses and does not require dedicated hardware investments, provides an increased breadth of usage within a warehouse that increases overall labor and system flexibility. In addition to supporting individual picking, enterprises have embraced voice-based warehousing solutions to support a number of other applications (see Exhibit 6). For example, nine out of 10 enterprises surveyed either currently use or plan to support shipping and receiving with voice technology.

Exhibit 6: Warehouse applications supported with voice technology



Key requirements for successful voice-technology implementation

While data collection solutions supporting warehouse automation continue to improve, there is no single technology that is ideal in all situations. There is no perfect solution for any particular technology, and it is important to pair workflow with the appropriate technology. With greater pressure being applied to optimize workflows, increase productivity, and improve accuracy, there is a premium placed on greater flexibility. The ability to have labor move from one area to another depending on fluctuations in warehousing needs can help maximize labor productivity, but this depends on technology that is not task-specific. This need for flexibility extends to voice technology, too, in a firm's ability to make changes within a system and not needing to modify data flows or requiring significant periods of time for validation. Having the capacity to augment existing mobile solutions and data collection solutions with voice solutions, as opposed to acquiring purpose-built solutions, provides a significant cost and deployment benefit to enterprises. These benefits become further increased when the system is flexible enough to change according to business needs and be modified down to the individual level when required.

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For the successful implementation of voice technology, VDC's research into voice-based warehousing solutions revealed the following key criteria:

- Cost of adoption and ownership
- Ease of support
- Ability to integrate voice with existing solutions
- Rapid deployment and WMS integration capabilities
- Technology quality (especially in regards to headset/microphone quality and noise cancellation technologies)
- Adaptation to different accents and speech patterns
- Avoid complexity and the expense that goes with extra servers, middleware, and other cost-increasing system components
- Simplified updates and revisions to user workflows and costs of application modifications

While cost of adoption and ownership and ease of support are understandably at the top of the list of key criteria, other factors such as technology quality and adaptation to speech patterns are often just as important. The success of a warehousing solution can hinge on the workforce's willingness to adopt the new technology. Taking into consideration elements such as ergonomic design, ease of use, and language support facilitates adoption and improves productivity. Training warehouse employees to use different kinds of technology enables them to become comfortable with different workflows, which improves overall labor flexibility. Voice-based technology provides a hands-free solution that can be easily integrated into WMS solutions to create greater efficiencies in inbound/outbound, inventory, and cross-docking functions.

Conclusion

The benefits of voice-directed warehousing solutions are clear and have been well documented in terms of their impact on overall worker productivity, and more specifically, picking accuracy. While voice-based warehousing solutions offer considerable gains to productivity and accuracy, legacy solutions are limited by adoption costs and proprietary design. Among the top weaknesses associated with voice-based warehousing were cost, training times, and need for dedicated hardware/limited compatibility with off-the-shelf hardware. This is also reflected in survey takers' overall satisfaction with the same criteria in evaluating existing solutions. Bandwidth requirements and client-side solution architecture also suffered lower overall satisfaction ratings. In light of these concerns and the expense of implementing voice-based technology solutions, it can be difficult to explain the value proposition to upper-level management.

Decision-makers must bear in mind that the adoption of voice-based technology cannot be considered in a vacuum. Voice technology exists as one of many tools in today's warehouse. When looking at voice solutions, the need for flexibility, multi-modal data collection, and multifunctional technology are integral factors at play. When viewed in this light, voice-based warehousing offers tremendous potential in regards to improving productivity, flexibility, and accuracy to help minimize cost and warehousing errors. These efficiency gains are improved further by the technology's ease and speed of deployment and are a powerful tool in the multi-modal data collection that today's warehouses require.

About this Report

To support this research, VDC Research fielded a web-based survey among technology decision-makers supporting warehouse operations and voice solutions. The survey was fielded in August/September 2013 and was completed by 176 qualified respondents in the US and Europe, representing a mix of industries. The objective of the survey was to measure the benefits and barriers of voice technology to support warehouse operations.

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