

White paper

**Time is Money – How to Save
Both with Mobile Printing**

*Calculating the Value
of Mobile Printing in
Manufacturing, Warehouse
and Retail Environments*

Most of the obvious cost-cutting moves for manufacturing, warehouse and retail operations have already been made. Companies have to look harder to find ways to reduce operating costs without sacrificing performance or making major capital investments. Increasingly, they are finding an answer in mobile printing.

Even as companies are restricting their spending and trying to squeeze extra years out of their legacy printers and other equipment, mobile printing investments are on the rise, with thousands of new units being installed every week in factories, warehouses and retail locations. The mobile printer category is experiencing 9.2 percent compound annual growth according to VDC Research¹, which found the percentage of end users who consider return on investment (ROI) an obstacle to adopting mobile printers had fallen nearly in half since a previous study. Once seen as a barrier to mobile printer implementation, ROI is now a driver.

Mobile printers cost effectively complement other automation and mobility investment and are a resource for reducing labor requirements and errors. Today's mobile printers have the durability, speed, connectivity and security support that enterprises need to support their in-premise mobile workers, and are becoming a common component of industrial and retail operations.

This white paper will help you understand the return on investment potential for mobile printers by showing how mobile printing processes can make operations more productive and accurate. The paper explains common mobile printing processes for receiving, cross docking, product and component identification, picking, shipping, shelf labeling and price marking, presents real-world examples that document cost savings and operational improvements, and provides guidelines for calculating the potential productivity and cost-saving impacts on your operations.

Productivity Benefits

The basic value proposition of mobile printing is easy to understand: saving steps saves time, and time is money. Measuring it is more challenging. The value of mobile printing depends heavily on the distance between a stationary printer and its users, average hourly labor costs, and the importance of keeping operations on schedule.

Businesses print hundreds of thousands of pick tickets, shipping labels, item tags and shelf labels each year. Even if only a second was wasted each time something is printed, the lost productivity would be noteworthy. But much more than a second is wasted each time someone walks to and from a printer to pick up output and bring it where it is needed. Over time, inefficient print processes cost businesses thousands of hours of lost productivity and the associated labor costs. As the example in the sidebar shows, a moderate-volume operation could save \$2.33 per pallet shipped by saving time with mobile printing processes.

Here's a formula you can use to calculate the potential cost impact by using a mobile instead of stationary printing process:

$$[\text{Time difference between mobile and stationary process}] \times [\text{\# of transactions per day/week/year}] = \text{Mobile time savings (T)}$$

$$[T] \times [\text{average labor rate}] = \$ \text{value of time savings (Y)}$$

$$Y \div [\text{\# of transactions per day/week/year}] = \$ \text{savings per transaction}$$

Measuring the Value of Time Savings

Here's an example that illustrates the excess labor costs that stationary printing processes can build into a mid-volume operation. Assume a distribution center (DC) ships eight pallets per day, with 12 individually labeled cartons per pallet. The DC operates five days a week, 50 weeks per year, and the average hourly labor cost for employees who pick orders and prepare pallets for shipment is \$15/hour. Stationary printers are placed at the ends of storage aisles and other tactical locations so users can collect labels to identify the items they have picked. Pallet labels are produced on a printer in close proximity to where cartons are packed onto pallets for shipment.

After completing a pallet build, assume it takes the worker 20 seconds to pick up the shipping label and return to the pallet to apply it. Performing this process for eight pallets a day results in 2.67 minutes spent walking to and from the printer, which multiplies to 11.1 hours a year. At the average labor rate of \$15/hour, the process adds \$167 annually to operating expenses.

Cost is more of a concern for picking operations, which are higher volume and would typically require longer travel distances. Assume workers take an average of 45 seconds (0.75 minute) to make the round trip to get and apply pick labels. At the stated volume of just 96 picked items per day (12 items each for eight pallets), 72 minutes per day (96 items x 0.75 minute) would be spent in transit. The transit time multiplies to six hours per week, and 300 hours per year. The associated labor cost is \$4,500 (300 hours x \$15/hour).

The picking cost calculation does not include the expense of running power and network cables to stationary printers throughout the facility. The cost could be reduced by changing the process so workers pick up labels less frequently and apply them in batches. This process would be more time-efficient for the picking portion of operations, but also greatly increases chance items will be mislabeled, which often leads to mis-shipments and other accuracy problems that would cost more to resolve than the offsetting labor savings.

Here is the summary of the seemingly benign time lost to stationary label printing processes for the hypothetical example.

Stationary Printing Process Cost Summary

Pallets shipped annually:	2,000
Annual labor cost for pallet labeling transit time:	\$167
Annual labor cost for carton labeling transit time:	\$4,500
Total labor cost for label transit time:	\$4,667
Cost per pallet shipped:	\$2.33

¹ "Mobile Transaction Printers: Global Market Demand Analysis," March, 2008. VDC Research.

ROI in the Real World

Slot machine maker Bally Technologies moved beyond formulas and hypotheticals and changed to mobile printing processes that it credits with helping save real money – \$600,000 annually. As part of a warehouse management systems upgrade, Bally introduced mobile printers for the first time so workers could create shipping, receiving and product tracking labels wherever and whenever they're needed. Doing so helped raise productivity enough for Bally to reduce its warehouse headcount by 15 percent. Despite operating with a smaller staff, Bally Technologies increased its inventory accuracy by approximately 70 percent, which eliminated additional inefficiencies and error resolution costs.

"The mobile printers are convenient and allow employees to focus their time on completing tasks rather than walking back and forth to a fixed printer. Also, if a pallet is missing a label, employees can print the appropriate tag on the spot, thus eliminating the additional time it takes to put aside the pallet and fix the error," said Bally Technologies Director of Logistics Tony Evans. "Since upgrading our Intermec solution, we are very pleased with how our inventory accuracy rate has dramatically improved. We look forward to continuously increasing the \$600,000 annualized return on investment that has already been achieved."

Use Cases

While Bally Technologies provides an excellent example of the value of mobile printing, it is not an unusual one. Similar results are common at organizations that have created mobile printing processes to reduce travel distances for workers or to shorten the time it takes to complete repetitive, high-volume printing and labeling operations. The following sections describe how mobile printers can take time, cost and errors out of common printing processes in production, distribution center and retail environments.

Receiving & Putaway

Bottlenecks commonly develop when workers unload incoming shipments and create the necessary labels and forms for tracking the goods with internal inventory control systems. Often, lines form at stationary printers while workers wait for their labels in the queue. An effective alternative is to use mobile printers to distribute the printing workload and eliminate congestion and waiting in the receiving area. Printers can be mounted on forklifts so incoming materials can be immediately cleared from the receiving area and labeled at the putaway location.

Cross Docking

Mobile printing at receiving is especially effective in cross-docking environments and other situations where incoming goods must be quickly redistributed, such as delivering materials to production cells to support just-in-time manufacturing, or getting sales-ready merchandise to retail store floors. In time-sensitive environments where delivery windows and production schedules are kept to the minute, saving just seconds provides valuable protection against work stoppages.

A major express freight carrier proved the value of mobile printing in cross docking during a trial at several of its hubs. The company continually tries to improve its operations to distribute shipments as quickly as possible. The standard

process when shipping containers arrive at a hub is for a worker to open the container, remove any high-priority parcels (which are designated with a special color label) and relabel them for shipment on the next available truck or plane. The facility and processes are all built for speed, and workers only had to carry high-priority parcels a short distance to a stationary printer for relabeling before walking them to a nearby transfer area.

Now, instead of walking the parcel to a printer, workers identify each high-priority parcel with a wearable bar code scanner. The scanner is interfaced wirelessly to a wearable mobile printer with LCD screen, which displays a list of label options based on the parcel scan data. The operator then hits a control button to select the needed format and the label is printed as the worker carries the parcel to the transfer area. No separate trip to a printer is required, and the parcel is labeled and ready for redistribution in seconds. Despite the close proximity of stationary printers to the receiving and transfer areas, the mobile printing process has reduced the time needed for relabeling by 60 to 70 percent at different hubs.

Picking & Shipping

The benefits to using mobile printers to support picking and shipping are very similar to the benefits for receiving and putaway. In both cases, bottlenecks can be prevented by distributing the printing workload. Businesses go to great lengths to improve their picking efficiency, often investing heavily in warehouse management systems with sophisticated algorithms to optimize pick routes. Using mobile printers to optimize labeling and eliminate wasteful, deadhead trips to a central printer is a logical way to protect and enhance investments in picking productivity. Because picking is a high-volume operation, the aggregate result of reducing the time needed to produce each label can add up to significant time savings and productivity improvement. Labeling items immediately after they are picked has the added benefit of preventing misidentifications that lead to order errors.

Manufacturing & Quality Control

There are many ways to use mobile printers to enhance manufacturing and quality control operations. For example, quality control personnel can use mobile printers and printers to produce documentation (e.g. pass, reject or rework labels, test results, reports) right where the inspection occurs. Mobile, on-demand printing provides an advantage over using preprinted materials because labels and reports can include variable information such as the date and time of inspection, lot code, special conditions, etc. When production samples are taken for QC testing, creating sample ID labels in real time when the sample is taken rather than at the test station promotes accurate sample identification, and thus protects the integrity of test results. If problems are detected it is important to isolate affected products (by batch, work cell, etc.), so accurate identification is essential for minimizing rework.

Mobile printing provides the same benefits for work-in-process tracking. Workers with mobile printers can produce WIP tracking labels wherever they normally handle assemblies, without having to interrupt the process to get labels from a stationary printer.

Retail Operations

When store associates are in a back room printing or picking up labels, it not only costs the retailer in lost productivity, but also in customer service because associates are not available

and visible to assist customers. Fortunately, mobile printers are suitable for many retail printing tasks, so retailers can raise the productivity and visibility of their staff. Mobile printers are ideal for a variety of inventory and shelf management operations (e.g. shelf labeling, price labeling, markdowns) that keep associates on the selling floor and help ensure labels are applied to the right items and locations. Wireless printing applications can ensure the price on a shelf or item label matches the price that will be charged at the point-of-sale, which helps retailers comply with consumer protection regulations and avoid fines.

The same mobile printers used to mark products can also be used for customer-facing operations, such as to provide rain checks, coupons, registry lists, returns authorizations, receipts for portable POS, and more. Considering low retail profit margins and increasing competition from online and other channels, mobile printing processes that can reduce labor costs and/or help increase sales deserve careful consideration, as the following calculation illustrates.

If retail associates can leave their aisle or shelf location, pick up labels from a back room, and return to where the labels are needed in only three minutes (a conservative estimate if the labels need to be printed), and the process is repeated five times per day for various printing needs (price labels, shelf labels, markdown and other special tags), 15 minutes of productivity and access to customers are lost each day. If stores operate seven days a week, the time wasted adds up to 89.5 hours per store per year (15 minutes/day x 7 days/week x 51 weeks/year). If the average labor cost is \$8/hour, the direct labor cost for time lost for printer travel is \$716 annually.

The dollar cost doesn't seem high, but retailers operating at a healthy 25 percent profit margin would require \$2,864 in sales to offset the labor cost. At 10 percent profit margin, \$7,160 in sales would be needed to offset the cost; a 2 percent profit margin would require \$35,800. Not surprisingly, best-in-class retailers are more than twice as likely to use mobile printers in their operations as lagging performers, according to an Aberdeen Group study².

Process Benefits

Mobile printing enables many process improvements besides labor savings and is especially effective for reducing several types of errors. In general, time is the enemy of accuracy. The more time that passes between when a label is printed and when it is applied, the greater the chance it will be put

in the wrong place. If items are mislabeled during receiving, subsequent inventory counts will be inaccurate. If the error occurs in retail item marking or shelf labeling, the retailer is at risk for non-compliance with price integrity regulations. In manufacturing, misidentifying parts or components can lead to assembly or sequencing errors that cause costly rework. Mobile printing provides a way to build quality into processes by promoting accurate identification at the point of activity.

Mobile printing can provide these benefits by leveraging other automation systems, not replacing them. For example, most automated warehouse management systems already rely heavily on bar code scanning. Creating bar code labels on demand where they're needed doesn't require any modifications to the WMS, but will result in better data in the system. In fact, this is the type of enhancement that may be needed for WMS and other automation systems to provide a competitive advantage, since many businesses already have at least basic bar code systems in place. In a research report³, consulting firm Aberdeen Group discussed the competitive importance of optimizing sub processes in warehouse management operations:

"To truly break through the 99% accuracy barrier, companies need to realize that accuracy starts with putaway, returns processing and replenishment – the right item must be placed in the bin location to be begin with to ensure that it is selected correctly later in the process."

Furthermore, automating put-away and returns processing is now the top predictor of excellence in On-Time Shipments. With faster order turn-around times, product often needs to be picked as soon as it is received. A fast and accurate system for getting that product to the right bin location can be a key factor in getting orders out the door on time."

The Bally Technologies operation profiled earlier is a good example of how mobile printing contributes to more accurate operations. Bally measured more than 70 percent improvement in inventory accuracy after implementing mobile printing processes with its WMS. Improved accuracy reduces out-of-stock situations, rush orders, re-shipments and other wasteful activity, which in Bally's case contributed to more than \$600,000 in annual, sustainable savings. See Intermecc's [white papers Using Technologies to Increase Perfect Order Metrics and Adopting Automated Data Collection for SMBs](#) for examples and calculations that show the impact of reducing errors in shipping and other common operations.

Flexibility Benefits

Mobile printers give users the flexibility to print wherever work needs to be done, not where the printer needs to plug in. This flexibility provides scalability – organizations can increase their printing workload without increasing their infrastructure because power sources and network connections do not have to be wired to enable printing. Rugged mobile printers are durable enough for use indoors and out, and thus can be used to meet delivery trucks in the receiving yard, or issue merchandise pick-up slips, return authorizations and receipts to customers outside the store. Therefore they are a good option for businesses that may reconfigure their work areas to support flexible manufacturing, for retailers and other businesses where work process and customer service commitments take workers all over the facility, and for organizations that set up temporary work areas as demand fluctuates.

² "Mobile Field Workforce in Retail: Strategies to Reduce Total Cost of Ownership." Aberdeen Group. August, 2009.

³ "What's Really Working For Pallet, Case, and Piece-pick Operations?" Aberdeen Group. January, 2007.

To be truly flexible, mobile printers need to easily integrate with enterprise systems and standards, and some models are more capable of this than others. Bluetooth and wireless LAN connectivity are common, but some mobile printers are more enterprise oriented and have Cisco Certified Extensions (CCX) and can support advanced 802.11-standard security. How well the printer integrates with a handheld computer is another differentiator – testing has found the mobile computer used with the printer can impact the print speed up to 27 percent. Integration issues to consider include: Are custom drivers or software development required? Does the mobile computer model slow printer output? Some mobile printers (“Smart Printers”) do not need to connect to a computer at all, but are programmable and provide user prompts on an LCD to guide users through all printing operations. While mobile printing in general brings flexibility to operations, the flexibility afforded to the IT staff responsible for implementing and maintaining the printers varies significantly and is an important selection consideration.

Conclusion

Today's mobile printers have the ruggedness, reliability, connectivity and security to fit enterprise IT requirements, and are also a strategic fit because of their proven ability to reduce operating expenses and raise productivity. Businesses increasingly recognize the value of mobile printers and the supporting role they can play in improvement initiatives, which is why adoption continues to grow even when investments in many other areas are being limited. Mobile printers provide value by immediately helping raise productivity and lower costs, while creating long-term flexibility for how organizations can use their workers and facilities. Return on investment was once seen as a barrier to mobile printer adoption, but now is a driver as many organizations can see the value mobile printing processes provide.

Intermec offers a complete range of mobile printers, including the industry's first “Smart” mobile printers, to meet enterprise needs in industrial, retail, distribution, field service and other environments that demand reliability and ruggedness. Intermec mobile printers are also designed to integrate with the mobile computers, data collection devices and enterprise IT systems used in these environments, and include native support for wireless security and mobile device management. Intermec mobile printers are extremely rugged and are available in a variety of form factors and configuration options to meet different needs.

Intermec has been developing ruggedized mobile computers and peripherals for more than 40 years and have successfully integrated hundreds of thousands of devices into demanding industrial, warehouse, field service, delivery, logistics, retail and other environments. Intermec mobile computers and mobile printers are rugged and are designed for use in challenging environments.

Intermec Inc. (NYSE:IN) is a leader in global supply chain solutions and in the development, manufacture and integration of wired and wireless automated data collection, RFID (radio frequency identification), mobile computing systems, bar code printers and label media. The company's products and services are used by customers in many industries to improve productivity, quality and responsiveness of business operations, from supply chain management and enterprise resource planning to field sales and service. For more information, visit www.intermec.com.

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