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Cost Justifying an Automatic Identification System

Basics of Calculating Return on Investment Should be the Same for Bar Code, RFID

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Last week, SCDigest and Wright State University announced a "Smackdown" challenge between RFID and bar code, in which we would help one or more companies evaluate the potential incremental benefits of RFID on the shop floor (and it appears now also in one distribution center) versus bar codes.

The RFID versus bar code issue raises the broader question of cost justification of any type of automatic identification system. Those basic principles and approach should be useful regardless of the type of automatic identification technology or combination of technologies that are used.

Surprisingly, there seems to be relatively little in the way of quality models or templates for building an ROI for auto ID system improvements. The issue can be complicated by the scope of the proposed system. For example, is it a data collection system that will be added to existing software systems, or a new software system that just happens to make heavy use of bar code/RFID/mobile technologies?

For this article, we are focusing on the former type of system, in which some form of automatic identification technology will be added to an existing environment, without any new software other than that required to make the new data collection system work (transaction mappers, integration software, data collection applications on stationary or mobile terminals, etc.).

The list of common cost savings areas below are meant to provide a list of "four-wall" savings opportunities, not those in the broader supply chain. For example, much of the promise of RFID relates better visibility that will allow consumer goods manufacturers and retailers to reduce stock outs and hence improve sales.

There are a lot of other assumptions that can be applied to this analysis and calculations that may need to be made, such as whether all of the theoretic time savings will truly result in actual labor cost savings. it is very easy to "double count" savings, since different categories can sometimes overlap.

Below is a list of cost savings areas that are typically considered when companies look at adding auto ID systems to manufacturing or distribution operations.

Category: Labor Savings

- Reduction of manual data entry (key entry time or time manually scanning)
  - Shop Floor (Detail savings in time for each area: receiving, production lines/ cells, putaway, shipping, etc).
  - Back Office/clerical
- Reduction in time required for or through elimination of physical inventories
- Reduction in materials handling/process inefficiencies: paper handling, counting, etc. in each area
- Impact of inaccuracy: Time spent looking or waiting for materials due to errors in accuracy
- Reduced overtime

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Category: Inventory Reduction

- Reduction in inventory levels due to greater confidence in overall accuracy when planning
- Reduction in inventory shrinkage/write-offs/ obsolescence
- Reduction in lost inventory due to shipping errors

Category: Overhead Savings

- Reduced costs of mis-shipments
- Improved space utilization
- Reduced costs of scrap/rework
- Improved overall productivity from better material flow/Lean
- Reduced Expediting costs

Other Savings

- Improved management effectiveness
- Costs of printed forms/labels
- Reduced costs for returns processing
- Better cost data for bidding/pricing
- Reduced costs for recalls

There are potentially a number of other "soft" benefits that nonetheless can be very real and important elements of an overall system justification. Those include things such as improved customer service, increased sales, improved management effectiveness, etc.

Example Calculation

Below, we look at a specific example from the above list, the potential savings from reductions in manual data entry, and will use a potential new bar code system as the basis for the example.

So, let's look at a hypothetical receiving area, and assume (based on analysis) that the average worker currently spends about 33 minutes per shift dealing with manual data entry and forms. Let's further assume there are 8 receiving associates, each averaging $25.00 per hour including benefits, and that if shipments from the factory were bar coded, the time it takes to

process the receipts through scanning would shrink per employee per shift from 33 minutes for manual data entry to 7 minutes for scanning.

Total Time Savings Per Employee Per Shift: 26 minutes (33 – 7).

Total Time Savings Per Shift: 208 minutes (26 x 8)

Total Times Savings per Year: 52,000 minutes or 866 hours (208 x 250 days/60 minutes per hour)

Total Annual Savings from Receiving: $21,666.00 (866 x $25.00)

This would be repeated for each area of the Distribution Center or factory, and along with other savings from other categories to develop an overall savings estimate. That would need to be compared to upfront and any recurring costs to determine an overall return on investment or payback period.

Obviously, there are a lot of other assumptions that can be applied to this analysis and calculations that may need to be made, such as whether all of the theoretic time savings will truly result in actual labor cost savings.

Also, it is very easy to "double count" savings, since different categories can sometimes overlap.

Nonetheless, this model is a good place to start in calculating the potential benefits of adding any automatic identification system, and looking at the incremental benefits of moving from bar code to RFID.