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# Inventory Management
# Delivering Profits through Stock Management

Aarti Deveshwar and Dhawal Modi

*Today's business environment is a competitive market with every organization aligning its resources towards achieving a niche position in the marketplace, and in the minds of its customers. With the entry of more and more companies in the market offering similar products, the market share of existing organizations has reduced. Every new entrant comes with new ideas, techniques and technologies. The market then witnesses competition in every function of the organization. Growth and survival depends on microscopic analysis of Operational Process and Marketing Effectiveness. Many Organizations are now directing their efforts towards retaining existing customers to increase profits. To achieve this objective, companies are chalking out strategies to reduce any instances of Customer dissatisfaction. Inventory Analysis has, therefore, attained limelight considering the investments involved in maintaining and managing Inventories. It has been observed that an increase in the profits is possible through reduction of losses due to Stock Mismanagement. The highlighting of Stock Management has opened numerous avenues of profits realization with negligible investment. This paper focuses on these techniques, intended to help organizations achieve Increased Profits and an Enhanced Customer Service Experience.*

**Field Of Research:** Management, Supply Chain Management

## 1. Introduction

Any stock that a firm keeps to meet its future requirement of production and sales is called "*INVENTORY*". The basic reason for holding *inventory* is to keep up to the production activities unhampered. It is neither physically possible nor economically justifiable to wait for the stock to arrive at the time when they are actually required. Therefore, keeping of *inventory* is a must for the efficient working of a business unit. Raw materials represent goods kept by a manufacturing firm prior to their being utilized in the production process. Supplies generally include tools and consumables which are consumed in the production of goods and services. Goods in process represent the semi-finished goods; they include those materials that have been

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committed to production process but have not yet been converted into finished goods.

Finished goods are completed goods awaiting sale in a manufacturing concern; they are the final output of the production process. The nature of *inventory* depends upon the type of activity carried on. In the case of a manufacturing unit, *inventory* will generally include all types of inventories mentioned above, while in the case of a trading concern, it will comprise only finished goods or stock-in-trade owned by it for sale to customers in the normal course of business. *Inventory* needs proper control as it is one of the largest assets of a business.

Inventories should neither be excessive nor inadequate. If inventories are kept at a high level, higher interest and storage costs would be incurred; on the other hand, a low level of inventories may result in frequent interruption in the production schedule resulting in under utilization of capacity and lower sales. The objective of inventory management is therefore to determine and maintain the optimum level of investment in inventories which help in achieving the required objective.

Inventory management software helps create invoices, purchase order, receiving lists, payments receipts and can print bar coded labels. An inventory management software system configured to your warehouse, retail or product line will help to create revenue for your company. The Inventory Management will control operating costs and provide better understanding.

## Objectives of the study

- To study the awareness level of Inventory Management Fundamentals in various Organizations
- To analyze the organizational effectiveness in handling their respective inventories
- To highlight the key reasons causing Inventory losses in an Organization
- To focus on Basic Inventory Management Techniques for Organizations not following SOPs in IMS

## Research Methodology

Well defined questionnaire has been prepared and various parameters of inventory management were discussed with personnel involved in handling inventory. Data for this study was collected by means of a mail questionnaire distributed to two hundred selected firms from Automobile, Auto Ancillary Industry.

A comprehensive literature review of articles appearing in logistics and SCM journals is conducted in order to identify the practices relevant in the Inventory Management domain. An analysis of these theories in Inventory Consumption Data and

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Warehousing Techniques is presented to explain the focus areas for Organizational Improvement in their Inventory Management System.

| Inventory Management System Evaluation Questionnaire - Organizational Review | | | |
|---|---|---|---|
| 1 | Is there a SOP document for IMS? | Yes | |
| | | No | |
| | | Comments | |
| 2 | Is it communicated to the staff responsible for inventory management? | Yes | |
| | | No | |
| | | Comments | |
| 3 | Are there different types of Inventory your company carries? What is the average Value of Inventory Held? | Yes | |
| | | No | |
| | | Comments | |
| 4 | Does management review and follow up reports of inventory turnover, ageing, and inventory adjustments? | Yes | |
| | | No | |
| | | Comments | |
| 5 | Is there a proper layout plan of the inventory storage facility? | Yes | |
| | | No | |
| | | Comments | |
| 6 | Is there a separate area for receiving and distributing inventory? | Yes | |
| | | No | |
| | | Comments | |
| 7 | Are tags placed on goods after they are placed in storage indicating details of shipment? | Yes | |
| | | No | |
| | | Comments | |
| 8 | Is there a defined process and documents involved in distribution of Goods? | Yes | |
| | | No | |
| | | Comments | |
| 9 | Are there controls in place ensuring all inventory leaving the premises have a valid invoice? | Yes | |
| | | No | |
| | | Comments | |
| 10 | Is there a documented procedure for stocktaking? If yes, is it shared during stock taking? | Yes | |
| | | No | |
| | | Comments | |
| 11 | Is the frequency of Stock taking defined by the management? Is the cycle adherence checked? | Yes | |
| | | No | |
| | | Comments | |
| 12 | Is the an SOP defined for various types of Inventories identified during the counting process? | Yes | |
| | | No | |
| | | Comments | |
| 13 | Is there an SOP for making adjustments in Inventory after the counting process is completed? | Yes | |
| | | No | |
| | | Comments | |
| 14 | Are inventory locations customizable? | Yes | |
| | | No | |
| | | Comments | |
| 15 | Are pick lists used for picking? Comment on the pick list generation? | Yes | |
| | | No | |
| | | Comments | |
| 16 | Is adequate provision made for obsolete and inactive items in inventories? | Yes | |
| | | No | |
| | | Comments | |
| 17 | Are perpetual inventory records updated promptly? | Yes | |
| | | No | |
| | | Comments | |
| 18 | Are discrepancies between physical and perpetual records | Yes | |
| | | No | |

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|---|---|---|---|
| | investigated and resolved? | Comments | |
| 19 | Does internal control appear adequate for the inventory system overall? | Yes | |
| | | No | |
| | | Comments | |
| 20 | Is there a formal Training Curriculum for Inventory Management Personnel? | Yes | |
| | | No | |
| | | Comments | |

## Inventory Management System Evaluation Questionnaire - Staff Review

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | Inventory control is the activity which… | a | Organizes availability of items | 11 | The Maximum SKUs per location can be | a | 1 |
| | | b | Balances conflicting requirement | | | b | 2 |
| | | c | Reduces stock levels | | | c | 4 |
| | | d | Reduces lead time | | | d | Customized |
| 2 | Ordering cost consists of… | a | Stationery, typing | 12 | Obsolete or Dead Stock needs to be… | a | Destroyed illegally |
| | | b | Advertisements, tender costs | | | b | Destroyed legally |
| | | c | Travel Costs, telephone bills | | | c | Sold at lower costs |
| | | d | Rent, depreciation on space | | | d | Removed from System & liquidated |
| 3 | Inventory Turn Ratio is a ratio of… | a | Cost of Sales vs. average stock | 13 | What is the frequency to conduct Wall to Wall Inventory? | a | Minimum once a Year |
| | | b | Annual Consumption | | | b | Minimum once a Quarter |
| | | c | Total Inventory vs. Total Assets | | | c | Minimum once a Month |
| | | d | Cycle Count Frequency | | | d | Minimum once a Week |
| 4 | ABC and FMS analysis is possible in DMS? | a | Yes | 14 | What are the two primary analysis which are done on Inventory? | a | ITR |
| | | b | No | | | b | ABC |
| | | c | Not Applicable | | | c | SKU |
| | | d | Don't Know | | | d | FMS |
| 5 | What is the Purpose of Wall to Wall Inventory? | a | Match Physical & System Stock | 15 | Perpetual Inventory System create a schedule of… | a | Parts to be counted everyday |
| | | b | Accuracy of on-hand stock | | | b | Regular Orders to suppliers |
| | | c | Regular check of selected items | | | c | Continuous increase in SKUs |
| | | d | Create sequential pick lists | | | d | Monthly Management Review |
| 6 | What are the two goals of inventory management? | a | Customer Satisfaction | 16 | Inventory Classification is based on | a | JIT |
| | | b | Profitability | | | b | Kanban |
| | | c | Minimum Inventory | | | c | Pareto Analysis |
| | | d | Maximum Inventory | | | d | EOQ |
| 7 | Effective stock control depends on… | a | Reorder level | 17 | What are the advantages of Cycle Counting? | a | Helps organize inventory better |
| | | b | Safety Stock | | | b | Reduce inventory carrying costs |
| | | c | Delivery Quantity | | | c | Increases Work Load |
| | | d | Lead Time | | | d | Curbs pilferage |
| 8 | What are A Class items? | a | Fast Moving Items | 18 | What fill rate should we provide? | a | 90% + fill rate |
| | | b | 10% items giving 70% revenue | | | b | 95% + fill rate |
| | | c | 70% items giving 10% revenue | | | c | 100% fill rate |
| | | d | High Value items | | | d | 100% + fill rate |
| 9 | Supply lead time includes… | a | Transport time | 19 | Low Inventory Turnover Ratio indicates… | a | More Dead Stock |
| | | b | Goods Inwarding time | | | b | More Fast moving Items |
| | | c | Order review time | | | c | Good Rotation of Funds |
| | | d | Demand Analysis | | | d | Poor Rotation of Funds |
| 10 | Inventory Check is done for | a | Fast Moving Items | 20 | Excess inventory causes | a | Increase in Interest incurred |
| | | b | Slow Moving Items | | | b | Low parts maintenance |
| | | c | All the items | | | c | High Labor costs |
| | | d | A Class items | | | d | High Customer Satisfaction |

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| 1 | What are the primary goals of the Inventory Team? |
| 2 | How is the fresher acquainted with the IMS in your organization? |
| 3 | Is there a target schedule for completing cyclic counting and Wall to wall Inventory check by management? |

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| | |
| 4 | How are lost sales handled? Kindly point out steps taken, if any? |
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| | |
| 5 | How many physical location number are updated in the system? |
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| | |

## Literature Review

Brent D. Williams and Travis Tokar, (2008) in their study “A review of inventory management research in major logistics journals: Themes and future directions", discussed that logistics researchers have focused considerable attention on integrating traditional logistics decisions, such as transportation and warehousing, with inventory management decisions, using traditional inventory control models. Logistics researchers have more recently focused on examining inventory management through collaborative models.

C. Clifford Defee, Brent Williams, Wesley S. Randall, Rodney Thomas, (2010) in their research paper "An inventory of theory in logistics and SCM research", analysed the theoretical categories and presented to explain the type and frequency of theory usage. They concluded that over 180 specific theories were found within the sampled articles. Theories grouped under the competitive and microeconomics categories made up over 40 per cent of the theoretical incidences. This does not imply all articles utilize theory. The research found that theory was explicitly used in approximately 53 per cent of the sampled articles.

Vikram Tiwari, Srinagesh Gavirneni, (2007) in their article**“**ASP*,* The Art and Science of Practice: Recoupling Inventory Control Research and Practice: Guidelines for Achieving Synergy” *focused on* the widening disconnect between inventory-control research and practice, people debate the value of incremental theory building. While practitioners make decisions in a complex and uncoordinated environment, researchers often adopt a simplistic environment for the sake of rigorous analysis. The stakeholders’ mismatched objectives and motivations may cause this lack of synergy. Controlling and reducing this disconnect would benefit both practitioners and researchers. The existing empirical analysis of companies’ business improvements based on academic inventory-management theories is inconclusive. Even so, some businesses have successfully implemented inventory theory; however, in most cases, they have greatly modified the inventory models developed by academics.

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Richard Pibernik, (2004) in his study “Advanced available-to-promise: Classification, selected methods and requirements for operations and inventory management” gives the theoretical framework for the development of models and algorithms supporting order quantity and due date quoting. At first, alternative generic AATP systems will be identified on the basis of relevant classification criteria. Based upon this classification, the AATP planning mechanisms will be detailed for two generic AATP types. On the basis of the introduced AATP types and the description of selected models we finally derive requirements, which operations and inventory management have to meet in order to ensure a successful application of AATP.

B.J. Grablowsky, (2005) in his paper “Financial management of inventory” surveyed small business inventory management practices and compared with techniques commonly employed by large corporations. It appears that smaller firms rely on simple controls. Large businesses rely more on quantitative techniques, such as EOQ and linear programming, to provide additional information for decision-making, while small firms are more likely to use management judgment without the quantitative back-up. Of those small firms which did not use quantitative methods for determining inventory order and stock levels, the most common qualitative methods were "past experience" and "executive judgment,".

S. M. Disney and D. R. Towill (2003) in their research “The effect of vendor managed inventory (VMI) dynamics on the Bullwhip Effect in supply chain” compares the expected performance of a vendor managed inventory (VMI) supply chain with a traditional “serially linked” supply chain. The emphasis of this investigation is the impact these two alternative structures have on the “Bullwhip Effect” generated in the supply chain. We pay particular attention to the manufacturer's production ordering activities via a simulation model based on difference equations. VMI is thereby shown to be significantly better at responding to volatile changes in demand such as those due to discounted ordering or price variations. Inventory recovery as measured by the integral of time×absolute error performance metric is also substantially improved via VMI. Noise bandwidth, that is a measure of capacity requirements, is then used to estimate the order rate variance in response to random customer demand. Finally, the paper simulates the VMI and traditional supply chain response to a representative retail sales pattern. The results are in accordance with “rich picture” performance predictions made from deterministic inputs.

Julius A. Sharma, Dinesh K. Sharma, Hari P (2004) discussed Supply Chain (SC), which involves the configuration, coordination, and improvement of sequentially related set of operations in establishments, integrates technology and human resource capacity for optimal management of operations to reduce inventory requirements and provide support to enterprises in pursuance of a competitive advantage in the marketplace. This paper addresses the structures of supply chain management (SCM) and the activities involved in SCM decisions that help promote profound improvement in efficiency and effectiveness in business operations. In broader context, the paper examines the types of activities involved in SCM

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decisions; the dynamics of the traditional SCM, the complementarities of technology in achieving effective management of operations through enablers of electronic data interchange (EDI) and quick response (QR) disciplines to implement Just-in-Time (JIT) management techniques; and integrated SC and inventory control as it relates to capacity imbalances and transaction costs.

## Findings

Inventory Management system provides information to efficiently manage the flow of materials, effectively utilize people and equipment, coordinate internal activities and communicate with customers. Inventory Management does not make decisions or manage operations but provides the information to managers who make more accurate and timely decisions to manage their operations.

A successful business relies on many factors, one of which is a reliable inventory management system. Inventory management consists of everything from accurate record-keeping to shipping and receiving of products on time. An Inventory management that is properly maintained can keep a company's supply chain running smoothly and efficiently.

Inventory management problems can interfere with a company's profits and customer service. They can cost a business more money and can lead to an excess of inventory overstock that is difficult to move. Most of these problems are usually due to poor inventory processes and out-of-date systems.

There are a number of problems that can cause havoc with inventory management. Some happen more frequently than others. Here are some of the more common problems with inventory systems.

Some Common Challenges faced by organizations in Inventory Management are:

1. Unqualified employees in charge of inventory. Too many companies put people in charge of their inventory distribution who either don't have enough experience, are neglectful in their job, or don't have adequate training.

2. The processes they use are not wide enough and do not encompass all the aspects and factors in the company.

3. A flawed or unrealistic business plan for a business for the future. To predict how well a company may do in the future, you have to collect enough data and accurately analyze it. This affects inventory management because if a company predicts more growth than they actually experience, it can lead to an overstock of inventory.

4. A supervisor in charge of inventory management failed to look over their inventory on a regular basis to make sure enough products are in stock. Identifying shortages ahead of time is an important factor in achieving Customer Satisfaction.

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Waiting for the shipment to come in can slow down the supply chain process. Not having enough products in stock to meet customer demand can lead to bad customer relations.

5. Bottlenecks and weak points can interfere with on-time product delivery. This means that if too many orders come in for outgoing shipments and do not get handled in an efficient manner, they can build up, or 'bottleneck'.

6. Falling victim to the "bullwhip effect". This is an over-reaction by a company to changes in the market. As the demand of a market changes, a company may panic and order an overstock of inventory, thinking the new market conditions will move the inventory.

7. Too much distressed stock in inventory. Distressed stock is products or materials in inventory that has or will soon pass the point where it can be sold at the normal price before it expires. This happens all the time in grocery stores. As a particular food product nears its expiration date, the business will discount the item in order to move it quickly before it expires.

8. Excessive inventory in stock and unable to move it quickly enough. This is probably the most common problem for most businesses. Cash-flow comes from moving inventory. If a company buys an amount of product for their inventory and they do not move it, the company ends up losing money.

9. Computer assessment of inventory items for sale is inaccurate. Nothing is more frustrating than going to a business that says it has a product, but it turns out that they do not. The quantities are off and the actual items are not available. Too many people assume that the computer records are infallible. Inaccurate inventory records can easily result in loss of money and strained customer service.

10. Computer inventory systems are too complicated. There are many inventory software programs available for business use. The problem is that many of these programs are not user-friendly. A company does not always have the time and money to invest in training of personnel to use software effectively.

11. Items in-stock gets misplaced. Even if the computer accurately shows the item as in stock, it may have been misplaced somewhere at the warehouse, or in the wrong location within a store. This can lead to a decrease in profits due to lost sales and higher inventory costs because the item must be re-ordered. Plus, the company must spend the time for employees to track down the misplaced item.

12. Not keeping up with the rising price of raw materials. This falls more into the accounting end of inventory management. By not keeping current with the rising price of raw materials, a company will lose profits because they are not adjusting the price of their finished products. Finished items in inventory must be relative to the cost of raw goods.

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## Impact of Improper Management of Inventory

Inventory Management has emerged as a focal point in organizational efforts to reduce losses. The management of capital within an organization has a substantial contribution towards profits and Inventories are usually an organization's largest asset.

Inventory Management activities impact the following:

- Sales Forecasting or Demand Management
- Sales and Operations Planning
- Production Planning
- Material Requirements Planning
- Inventory Rotation

The emphasis on each area varies depending on the company and how it operates, and what requirements are placed on it due to market demands. Each of the areas needs to be addressed in some form or another to have a successful program of Inventory Management and Inventory Control.

Organizations are not satisfied with the contribution inventory makes towards the overall success of their business. The many reasons cited for this are:

- Wrong quantities of the wrong items are often found on warehouse shelves. Even though there maybe a lot of surplus inventory and dead stock in the warehouse(s), backorders and lost sales are common. The material a company has committed to stock isn't available when customers request it.

- Computer inventory records are not accurate. Inventory balance information in the organization's expensive computer system does not accurately reflect what is available for sale in the warehouse.

- The return on investment is not satisfactory. The company's profits, considering its substantial investment in inventory, are far less than what could be earned if the money were invested elsewhere.
- Many companies take an inventory of their supplies on a regular basis in order to avoid running out of popular items. Others take an inventory to insure the number of items ordered matches the actual number of items counted physically. Shortages or overages after an inventory can indicate a problem with theft or inaccurate accounting practices.

- Possessing a high amount of inventory for long periods of time is not usually good for a business because of inventory storage, obsolescence and spoilage costs.

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However, possessing too little inventory isn't good either, because the business runs the risk of losing out on potential sales and potential market share as well.

- Changes in the market demand, new opportunities due to worldwide marketing, global sourcing of materials and new manufacturing technology means many companies need to change their Inventory Management approach and change the process for Inventory Control.

## Ideas for Improvement

Inventory management simply means the methods you use to organize, store and replace inventory, to keep an adequate supply of goods while minimizing costs. Each location where goods are kept will require different methods of inventory management. Keeping an inventory, or stock of goods, is a necessity in retail. Customers often prefer to physically touch what they are considering purchasing, so you must have items on hand. In addition, most customers prefer to have it now, rather than wait for something to be ordered from a distributor. In manufacturing, inventory management is event more important to keep production running. Every minute that is spent down because the supply of raw materials was interrupted costs the company unplanned expenses.

Counting Current Stock
All businesses must know what they have on hand and evaluate stock levels with respect to current and forecasted demands. You must know what you have in stock to ensure you can meet the demands of customers and production and to be sure you are ordering enough stock in the future. Counting is also important because it is the only way you will know if there is a problem with theft occurring at some point in the supply chain. When you become aware of such problems you can take steps to eliminate them.

Managing Small Items
Inventory control simply knows how much inventory you have. It is a means to control loss of goods. Businesses that use large quantities of small items often use an “80/20” or ABC rule in which they keep track of 20 percent of the largest value inventory items and use it to represent the whole. “A” items are the top valued 20 percent of the company’s inventory, both in terms of the cost of the item and the need for the item in the manufacturing or sales process. Controlling this top 20 percent will control 80 percent of their inventory costs. “B” items are those of mid-range value and “C” items are cheap and rarely in demand. The retailer or manufacturer can now categorize all items in the inventory into one of these three classes and then monitor the stock according to value. "A" items would be counted and tracked regularly, while "B" and "C" items would be counted only monthly or quarterly.

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Cyclical Counting

Many companies prefer to count inventory on a cyclical basis to avoid the need for shutting down operations while stock is counted. This means that a particular section of the warehouse or plant is counted at particular times, rather than counting all inventory at once. In this way, the company takes a physical count of inventory, but never counts the entire inventory at once. While this method may be less accurate than counting the whole, it is much more cost effective.

Controlling Supply and Demand

Whenever possible, obtain a commitment from a customer for a purchase. In this way, you ensure that the items you order will not take space in your inventory for long. When this is not possible, you may be able to share responsibility for the cost of carrying goods with the salesperson, to ensure that an order placed actually results in a sale. You can also keep a list of goods that can easily be sold to another party, should a customer cancel. Such goods can be ordered without prior approval.

Stock Control

Approval procedures should be arranged around several factors. You should set minimum and maximum quantities which your buyers can order without prior approval. This ensures that you are maximizing any volume discounts available through your vendors and preventing over-ordering of stock. It is also important to require pre-approval on goods with a high carrying cost.

Keeping Accurate Records

Any time items arrive at or leave a warehouse, accurate paperwork should be kept, itemizing the goods. When inventory arrives, this is when you will find breakage or loss on the goods you ordered. Inventory leaving your warehouse must be counted to prevent loss between the warehouse and the point of sale. Even samples should be recorded, making the salesperson responsible for the goods until they are returned to the storage facility. Records should be processed quickly, at least in the same day that the withdrawal of stock occurred.

Managing Employees

Buyers are the employees who make stock purchases for your company. Reward systems should be set in place that encourage high levels of customer service and return on investment for the product lines the buyer manages. Warehouse employees should be educated on the costs of improper inventory management. Be sure they understand that the lower your profit margin, the more sales must be generated to make up for the lost goods. Incentive programs can help employees keep this in perspective. When they see a difference in their paychecks from poor inventory management, they are more likely to take precautions to prevent shrinkage.

Inventory management should be a part of your overall strategic business plan. As the business climate evolves towards a green economy, businesses are looking for ways to leverage this trend as part of the “big picture”. It can also mean putting in place recycling procedures for packaging or other materials. In this way, inventory

management is more than a means to control costs; it becomes a way to promote your business.

## Implementation and Execution

Building a better solution from start to finish will yield results for Increased Inventory Management. More efficient operations provide bottom-line results.

Improving Inventory Management is an activity-based solution designed specifically to create maximum efficiency and optimum cost-control throughout your department, which will:

- Define inventory processes, activities and controls from a results-driven standpoint.

- Define tasks and inventory process parameters in measurable and verifiable terms that emphasize efficiencies to produce desired results.

- Validate task performance to attain the highest efficiencies in inventory processes through task monitoring, measurement and validation, put the right people in the right jobs.

- Continuously provide real-time, real-performance task and process data for efficiency as well as inventory micro-adjustments.

- Implement all activity-based management initiatives through to full execution in inventory for maximum efficiency, productivity, cost-containment and profitability.

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