

MAKING ERP OPERATIONAL

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INTRODUCTION

Enterprise Resource Planning (ERP) systems do not fail because of problems with the application software. This is because computers and ERP system application software systems do not solve problems, humans do. From my experience in the field, it does not take very long for humans to mess up a perfectly good system. This includes humans on both sides of the equation (i.e., humans working for the software suppliers and humans working for the user organization).

From the software supplier side, humans often write implementation plans to support the implementation of modules instead of focusing on solving business problems. Granted, there are fundamental processes and disciplines in the software that must be learned in order for the metrics discussed in this paper to be effective, but the overall success of the system, and the humans involved in its implementation, depends on how well we can develop those processes and disciplines to run the organization.

From the user organization side, management often insists on formulating implementation plans that attempt to make the system match the company instead of learning how to properly use the system. How effective this approach is depends on how well existing processes and disciplines are implemented and how well the new system emulates the old. Very often however, the old systems lack discipline and documentation and the new system is not programmed to think, behave or operate exactly like the old system.

No matter which side of the equation you find yourself, losing sight of running the business makes implementation ineffective and is a recipe for failure. This paper is therefore for both the humans providing consulting services to help user organizations implement effective processes and the humans in the user organizations trying to improve their business process and organization.

In this paper we assume that your ERP system is in place and operating, thus it does not focus on implementation issues. Instead, we are looking to how "world class" organizations use their system to run their businesses. Believe me, if your organization has not mastered fundamental processes and disciplines at the software level then it will be loud and clear in these performance metrics.

The Key Performance Indicators (KPI's) reviewed in this document are fundamentals as taught by APICS, the Society for Operations Management. Many of these performance measures were implemented in the small bio-medical electronics company where I was employed as an ERP system user. This basic set of numbers was then expanded while working with several additional organizations during my 27 years as a manufacturing control systems consultant. These are the fundamental measures that I would employ should I ever have the opportunity to run the operations of a manufacturing organization again. They should be the fundamental measures you are employing as well.

¹ APICS can be found at www.apics.org.

ABOUT THE MEASUREMENTS

Performance measures must encourage the humans to take action to solve problems – the right problems. This statement implies that focusing on the wrong metric may not allow the humans to solve the right problem, and worse, actually create additional problems. In this paper, we are concerned with three types of metrics; current values, trend analysis and Pareto analysis.

Every ERP system contains a reporting system that provides current values. Current values report where we are right now. For example, Inventory Analysis reports the value of inventory as of the last transaction. The same is true for Work In Process (WIP) Analysis, Sales Order Analysis, etc. Because current values are in fact “current,” the metric is not available for any other time period.

Plotting current values over time not only shows the current value, but how that value is changing over time. It helps us answer where we have been and where are we going. This is critically important to knowing if we are making improvements or not.

Finally, we must know the significance of the data. Pareto Analysis is very commonly used for stratifying or ranking data so that the most significant category can be focused on. Pareto Analysis is accredited to 18th century Italian Economist Vilfredo Pareto who noticed that 80% of the land was owned by 20% of the land owners. Often referred to as the “Rule of 80/20,” Pareto Analysis is still a very effective way to analyze data in today’s systems.

All three types of metrics should be employed, where required, in your implementation.

Are these metrics for every business?

Yes, and no. Those that study manufacturing control systems know that the KPI’s used will vary with the manufacturing environment declared by the management of the organization (i.e., Make to Stock, Assemble to Order and Make to Order) often at a product line level. For example, the success of a Make to Stock organization is highly dependent on the management of finished goods inventory where a similar Make to Order organization would be highly dependent on the management of sales backlog. Both of these metrics (e.g., inventory and backlog analysis) are included in this paper as they are “fundamentals” but they will be utilized differently depending on the environment declared. There are also some metrics such as Projected Inventory Analysis that will not help those organizations that have not yet developed visibility and work in very short time horizons.²



² Visibility is the amount of lead-time beyond your cumulative manufacturing lead-time.

ANSWERING FUNDAMENTAL QUESTIONS – THE SIXTEEN KPI'S

The sixteen KPI's can be divided into many different aspects of operations management, but within these sixteen are two fundamental groups. The first group provides fundamental data for how well we are using the system to manage the flow of material from our suppliers and through the internal supply chain. The second group provides fundamental data for how well we are making and keeping promises to our customers and the resulting profit for our stakeholders. These are fundamental values that businesses should be tracking, but I find that many are not. These metrics will identify what you should be monitoring, why you should be monitoring them and ultimately how.

The metrics are presented in a series of fundamental questions that every Operations Manager should have, and should have answered by their staff. As you will see, some of these questions have many sub-questions. Having the right information will often cause further questioning and analysis as you drill down into what is really going on in your business organization.

Where is your production plan taking you?

Metric: Projected Inventory Analysis

A production plan establishes the rate of production for the period of time defined by your cumulative manufacturing lead-time.³ It is the summation of all the supply orders for manufactured parts [i.e. planned, approved and released] in your system, which should only exist for the purpose of offsetting demand in the system regardless if that demand was forecasted, actual customer orders or dependent requirements [i.e. parts at a lower bills of material level to satisfy higher level orders].

How well supply and demand is balanced in a period of time [i.e. day, week, month, etc.] will determine the direction of inventory change in that period. Which is larger [i.e. supply or demand] for a period of time will determine the direction of the inventory change in that period. For example, if supply and demand are equal, then beginning inventory should equal ending inventory, assuming that the plan will be executed. If supply is greater than demand, then inventory will increase and vice versa.

Projected Inventory Analysis takes a big picture look at your system using a common Four Walls Test. The Four Walls Test allows us to calculate ending inventory for future periods of time based upon the following formula:

Beginning Inventory (Stockroom and Work in Process)
 Less Requirements (forecasts, customer orders and dependent demand)
Plus Receipts (make and buy supply orders)
 Ending Inventory

Plotting the ending inventory values across future monthly periods allows you to make a quick assessment of the reality of your production plan. In other words, if everyone followed the plan, where would the inventory value be at the end of the next quarter, or the end of the next two quarters? What does the trend of projected inventory values look like [i.e. increasing, decreasing or static]? Projected inventory analysis is based upon cash flow calculations, so it also allows you to see future cash requirements. It provides the most complete picture of how you are driving your ERP system and how your people are following that plan.⁴

Your production plan is the primary driver of inventory investment, thus it is the most effective way to manage the build-up or reduction of inventory resources. Projected inventory verifies the integrity of your production schedule, your part data policies and ordering processes. Are they aligned with your stated inventory goals? The purpose of this graph is to calculate the ending inventory balances, driven by the production plan and then hit that number "x" periods later, where "x" is typically 3 to 6 months. To be able to accomplish that you need 1) a realistic plan and 2) a team trained in using ERP to follow that plan.

What parts are really driving your inventory?

Metric: ABC Analysis

The purpose of ABC Analysis is to find the parts that are most significantly effecting inventory and cost of goods sold values. ABC Analysis therefore measures inventory velocity. It is based upon Pareto Analysis, also known as the Rule of 80/20, which we introduced earlier. When applied to operations, this rule states that 20% of the items will result in 80% of the inventory value. The process is named "ABC" analysis by the

³ The first rule of planning is that you must cover your cumulative lead-time. Not covering your cumulative lead-time tends to increase overhead costs and shortages. This is where most demand driven strategies fall short. If you are driving your MRP system directly with sales orders, then your Sales Order Processing people are creating your Production Plan. Are those people trained as planners or order takers?

three typical codes used to stratify the parts (e.g. A, B and C). Stratification is achieved by using descending extended cost (i.e. usage times standard cost) of each item in your system. Class A parts, those that contribute the most to these measures, appear at the top of the report while Class C parts, those that contribute the least, at the bottom. Class A and B parts should therefore be clearly identified and then micro managed. The other Class C parts (e.g., the 80% of the parts that make up 20% of the inventory value) should be managed less stringently.⁵

Stratifying all parts based upon the ABC code allows for the establishment of Planning policies to effectively manage each class and maximize inventory velocity. Target values for how much of each class should be specified and then managed. The fundamental behind ABC Analysis is to keep Class A and B parts moving so that their inventory levels are minimized. This is a proven technique for controlling inventory costs and maximizing inventory velocity.

ABC Analysis looks at the distribution of your inventory based upon your current stratification and then calculates a recommended distribution based upon standard levels for Class A, B and C parts. It also introduces a Class D, which represents parts in stock that did not show on the analysis. These parts are potentially obsolete as they have not been used in the specified period.

How much inventory should you have?

Metric: Inventory Turns Analysis

Effective operations management says that the amount of inventory (stockroom plus work in process) carried in total should be specified. Without this target, how will operational people know how much is too much? The best practice for specifying inventory levels is in relation to the annual Cost of Goods Sold (COGS), the value of items shipped at standard cost. The higher the COGS the more inventory is warranted, and vice versa. Well-managed organizations turn inventory faster than those not so well managed, thus their turns are higher.

The relationship between COGS and inventory values is referred as Inventory Turns. It is a financial ratio that is calculated as follows:

Inventory Turns = Annual COGS / Average Inventory

Inventory turns is the primary metric for inventory velocity and will vary by the industry you compete in. For example, an organization building electronic instrumentation may have an industry average of 6 turns annually. If that was the case, and if the organization strived to be better than average, a target of 8 to 10 turns may be established.

A metric often used in conjunction with Inventory Turns is Days of Supply (DOS). DOS Analysis attempts to answer the following question: If you did not purchase another item, how long will your inventory last? It is based upon the principle of consumption. The annual COGS divided by 365 sets a consumption rate. Dividing inventory value by the consumption rate provides the number of days of supply.

DOS and inventory turns are two different ways of looking at the same issue. The higher the turns, the faster your inventory is moving and the smaller the DOS. The lower your turns, the slower your inventory is moving and the higher your DOS. DOS results, like Inventory Turns, should therefore be viewed as a trend line and not just a static value.

Working backwards with grounded assessments, the total investment in inventory equal to the inventory turns objective sets the overall inventory budget. From there, total inventory should be broken down into the two major parts: stockroom and Work in Process (WIP) inventory. We will discuss both of these components later in this paper. Once established, your future projected inventory balances will let you know if your current production plan is taking you there or not.

This approach to inventory management is termed "Aggregate Inventory Management." Aggregate inventory management is concerned with determining the overall level of inventory that is required for a given level of COGS and then breaking that inventory into smaller groups (i.e., stockroom, WIP, safety stock, obsolete, surplus and active, etc.). Management programs are then designed to manage the current state of your inventory.

⁴ Following the plan in this context relates to how part data requirements are specified.

⁵ A common argument found is whether or not Class C parts should even be planned via MRP. Many of these parts should be planned and controlled under a Re-Order Point (ROP) system which consumes much less overhead.



What is the current state of your inventory?

Who decides key inventory policies such as determining the right level of inventory for each type? Whether inventory exists in finished goods, semi-finished goods or raw material depends on the manufacturing environment you operate in, and may vary by product line. Establishing the right level of inventory according to your strategy is therefore a critical step in the process. Only those with insights to the whole supply chain, to customer and manufacturing lead-times, should be involved in specifying inventory budgets. Where Operations Managers can do the work and make recommendations, the final decision must rest with senior executives. It is important to have company-wide agreement when it comes to balancing target service levels and to avoid making decisions within departmental silos.

Metric: Inventory Analysis

Inventory is what is left on the shelf after the orders have shipped. Inventory Analysis looks at the levels of stockroom inventory. While this can be analyzed many different ways, the most common is by inventory type (i.e. finished goods, semi-finished goods and raw material). Raw material is designated as purchased material (i.e., material at the bottom of the bills of material). Semi-finished goods are sub-assemblies that are not stored in finished goods locations. Finished goods are goods ready to be sold.

These areas are typically displayed using a pie chart. Static inventory values are not the only metric in this

area. These values should be captured and plotted over time so that trends can be established. You need to be able to see how the distribution of the inventory is changing to know if you are making progress or not.

Metric: Safety Stock Analysis

Safety Stock Analysis looks at the extra investment of inventory driven by safety stock values. Safety stock increases minimum balances of selected parts to buffer from forecast errors, uncertainties in lead times, and desired service levels. Without a safety stock quantity set, the MRP algorithm will plan around a zero projected available balance. When safety stock is added, it plans the projected available balance around that value.

Safety stock levels by design inflate inventory and if left unchecked will cause more investment than needed. The effects of safety stock should therefore be monitored continuously and be updated to reflect changes in supply chain conditions. The overall percentage of safety stock to total inventory should be monitored. The parts that drive the safety stock value need to be identified and closely managed.

Metric: Work in Process Analysis

The purpose of Work in Process (WIP) is to show the current values of inventory controlled by released shop orders. Controlling the level of WIP is extremely important as too much WIP will “choke” your internal supply chain. This is because as WIP increases, throughput decreases. As throughput decreases,



inventory builds at lower levels and is starved at upper levels of the bills of material, thus customer service levels fall.

WIP must be managed to cover your internal build times. Orders should be released at the proper time, run through shop floor processes and be closed (i.e. keep moving). Order management must therefore include aging the order like a receivable and killing those orders that have been in WIP too long.⁶ WIP reporting should not only look at the total value, but also the percentage of each aging bucket (i.e. 30, 60, 90 days) to the total WIP value.

Metric: Obsolete, Surplus and Active (OSA) Analysis

OSA Analysis is necessary because projected inventory analysis and ABC analysis can only deal with the active portion. Obsolete and surplus inventory must be dealt with as, until disposed of, they hold inventory values at an inflated level. OSA Analysis breaks on hand inventory into one of three categories:

Obsolete stock is “dead” because it has not been transacted in the past x days, where you define the value of “x”. Typically, we start with a year or two.

Obsolete stock also has no known future requirements in the system. Obsolete stock needs to be disposed of.

Surplus inventory is a condition where the part has been transacted within the obsolete timeframe, but

there is more on hand than known future requirements. A portion of the surplus stock needs to be dispositioned.

Active stock is your working inventory (i.e. on hand inventory that has been issued or shipped within the cutoff period, but on hand is less than future requirements). The target for this category should be 100% of your inventory, but things happen, plans change and the inventory grows.

These areas are typically displayed using a pie chart.

Ideally, your business is only carrying active stock or “healthy” inventory items to meet your production plan. Typically, obsolete and surplus stock stems from ineffective demand forecasting, poor methods for deciding safety stock levels and out dated replenishment parameters in the Planning system. Inventory planners and managers should establish processes to determine why excesses are being created and then develop a plan of action to dispose of it. In most cases, the execution of the Engineering Change Order (ECO) process needs to be analyzed. Unless the change is a major threat, the change should be phased in in order to use existing inventories.

In some instances, the fear of the write-off has led to a large buildup over time of obsolete inventory. Senior executives and CFOs must be actively involved in this Planning process to ensure this type of situation is avoided.

⁶ This is counter intuitive to most MRP based systems that try to maximize the efficiency of the entire system by pushing work to the shop floor and building queues in front of all work centers. The existence of this queue provides the ability to combine setups and increase efficiency. There is therefore a fine line between maximizing efficiency and slowing down throughput.



Are your suppliers meeting their delivery promises?

Metric: Supplier Performance Analysis

Overall supplier performance is determined using both a timing analysis (are they shipping on time) and a quantity analysis (are they shipping complete). The primary purpose of Supplier Performance Analysis is analyzing how well suppliers are delivering based upon their quoted delivery date. The actual date a Purchase Order (PO) line was received is compared against the promise date provided originally by the supplier. The analysis then determines if the supplier was early, on-time or late.⁷ A bar chart showing the rank of each supplier's performance in a period should be used. Where possible, supplier's consistently showing up in the bottom tier are candidates for replacement.

Delivery performance based upon timing is not the only consideration. Delivery performance based upon quantity should also be performed. This analysis compares the actual quantity received on a line with the quantity ordered. The analysis then determines if the supplier shipped a partial quantity, complete quantity or over shipped the line. Partial shipments must be controlled as every receipt increases overhead costs in the receiving and sometimes inspection areas. Over shipments must also be controlled as they contribute to surplus inventory, and over time, obsolete inventory.

Is the Planning system treating suppliers fairly?

Metric: Lead Time Analysis (Incoming)

Where supplier performance is concerned with the supplier's ability to provide material on a given promise date it does not take the amount of advance notice into consideration. For example, the supplier could promise four weeks and hit it exactly, but the system needed it in two weeks (i.e. we ran two weeks with a shortage). This is often the case where improper forward planning does not cover short term customer orders. As a result, we constantly launch new orders with less than the planned lead-time remaining. We must therefore also review actual versus planned lead-time.

Lead-time Analysis is therefore a measure of how well the system is planning. Well run Planning systems will provide suppliers with the full lead-time a high percentage of the time. Poor Planning systems will constantly task suppliers with expediting inside of their normal quoted lead-time. This metric should always be included with supplier performance in order to keep the process fair. Given the total lead-time, suppliers should be close to perfect.

⁷ Early in a system implementation, suppliers are not penalized for being early. As your organization improves, shipping too early can negatively effect of metrics such as inventory analysis, turns and days of supply, therefore a small amount of early days should be specified and measured.

Are costs being maintained?

Metric: Purchase Price Variance Analysis

The purpose of Purchase Price Variance (PPV) Analysis is to determine how well we are purchasing according to our standard cost and staying within our material budgets. PPV is defined as:

$$\text{PPV} = \text{Invoice cost} - \text{standard cost}$$

Where, the standard cost is the estimated cost for the part at the time of the receipt.

PPV's are either favorable (i.e., we paid less than the standard cost) or unfavorable (i.e., we paid more than the standard cost). The assessment of whether these are good or bad depends upon how the standard cost was set in the first place. For example, an organization that sets the standard cost annually may have used a "midpoint" cost and not the cost of the part at the beginning or end of the year. This means that for a part whose cost is decreasing due to an expected volume increase over the course of the year will generate unfavorable variances in the first half of the year and favorable in the second half. Observing when the change in PPV occurs (i.e. unfavorable to favorable) will provide an indication on how well we are meeting our anticipated volumes. If the volume increase is delayed, then the change will occur much later in the year.

PPV should be viewed as a trend and then by supplier. In many cases, the PPV by supplier joins the supplier performance and lead-time analysis to become the third metric in a vendor performance system.⁸

What is the status of your backlog?

Metric: Sales Order Analysis

The dollar amount of open sales orders is referred to as backlog. How relevant backlog is dependent on your manufacturing environment. In Make to Order environments, backlog is a critical measurement and used to assess the overall health of the business. In Make to Stock environments, backlog plays a lesser role as the orientation is to Finished Goods inventory. Here, any backlog means that we had a stock out, or shortage.

Sales Order Analysis must be able to "slice and dice" open sales orders in many ways including by customer, product, geographic area, etc. The best method of reporting backlog is therefore in a Microsoft Excel Pivot table tool, where row, column and intersection (cell) data can easily be changed depending on the type of analysis required.

Metric: Aged Sales Order Analysis

Aged Sales Order Analysis allows management to monitor open sales orders in relation to their due dates. Like an accounts receivable analysis, open sales orders should be placed in aging buckets (i.e. past due, 0 to 30, 31 to 60 and Over 60 days). This allows effective action to be taken on past due orders, as well as, watching the sales horizon on future sales.

When data is captured daily, a stacked bar graph can be used to show the dollar amount of open sales orders (backlog) over time. Each bar on the graph shows the total backlog for that day and how the aging is distributed.



⁷ Early in a system implementation, suppliers are not penalized for being early. As your organization improves, shipping too early can negatively effect of metrics such as inventory analysis, turns and days of supply, therefore a small amount of early days should be specified and measured.

What is your current fill rate on outgoing sales orders?

Metric: Shipping Performance Analysis

Shipping Performance Analysis indicates how well you are meeting the promises made to customers on sales orders with respect to timing. It essentially reports a “fill rate,” which is the number of orders shipped in the right quantity at the promised time.⁹ Overall performance is determined using a timing analysis (i.e. are we shipping on time?). This is important in all manufacturing environments.

This report compares the actual date a normal or consignment sales order was shipped against the promised date provided originally to the customer. This comparison can be calculated two different ways: By entire order or by line. When the entire order is analyzed, if one line is late then the whole order is late. When the line item is analyzed, each line stands on its own. Of the two, the entire order is more encompassing.

Fill Rate by Order is calculated in two steps as follows:

Fill Rate = # of Lines Shipped On or Before the Date Promised / Total # of Lines on the Order.¹⁰

If this returns less than 100% than the order is considered late.

Fill Rate = # Orders with 100% / Total # of Orders Shipped

It is usually expressed as a percentage.

Fill Rate by Line is calculated as follows:

Fill Rate = # of Lines Shipped On or Before the Date Promised / Total # of Lines Shipped.¹¹

The overall fill rate should be plotted as a trend over time. For more detailed analysis, a stacked bar chart should be used. Each daily bar should show the breakdown of no shipments, late, on-time, early and too early.

There is a direct relationship between shipping performance to inventory levels. It is a well-known fact that sales and marketing people love excess inventory so that fill rates can remain high. Materials people, on the other hand are constantly pressured to keep inventory as low as possible. By tracking both the fill rate and inventory levels we can better understand how having the right inventory is more important than the dollar amount of the inventory.

Metric: Quoted Lead-time (Outgoing) Analysis

Where shipping performance analysis is concerned with your ability to ship orders on a given promise date it does not take the amount of advanced notice provided by customers into consideration. For example, you could promise two weeks because that is what the customer asked for and ship two weeks late because your lead-time was really four weeks and could not be compressed (the customer ran two weeks with a shortage). We must therefore also review actual versus quoted lead-time.

Quoted Lead-time (Outgoing) Analysis is therefore a measure of how well you are promising customer deliveries around your current lead-times. Well run planning systems will match both the needs of the customer with the ability to ship on time (i.e., respect your current internal lead-times). Your production system should be provided with the full lead-time a high percentage of the time. Poor planning systems will constantly provide bogus or “wish” dates inside of their normal quoted lead-time. Providing bogus dates in a demand driven system is one of the fastest methods of destroying the integrity of MAX Planning, thus should be avoided at all costs. This metric should always be included with shipping performance analysis in order to keep the process fair to your supply chain.

Quoted Lead-time (Outgoing) Analysis reports the actual lead-times on orders, which can be compared to the stated lead-time to customers. It is calculated by comparing the actual date a sales order was entered and the date the order was shipped to the customer. A Pareto chart should also be used to show the number of orders by lead-time group (5 days or less, 6 to 15 days, 16 to 30 days, 31 to 60 days, etc.).

⁹ This is different from a customer service rate. In inventory management a service level is the probability of not having stock outs. It involves setting values to cover specific demand fluctuations. The more demand fluctuation, the more inventory is required for the same service level.

¹⁰ The line must also be shipped complete (i.e., the order quantity = the shipped quantity).

¹¹ Ibid.

What is your actual “sales” level?

Metric: Invoice Analysis

The dollar amount of sales orders shipped and invoiced is referred to as sales. Sales are important to all organizations and is a critical measurement and used to assess the overall health of the business. Like sales order analysis, Invoice analysis must be able to “slice and dice” invoice information in many ways including by customer, product, geographic area, etc. The best method of reporting sales is therefore in a Microsoft Excel Pivot table tool, where row, column and intersection (cell) data can easily be changed.

Where are you making your money and where are you giving things away?

Metric: Profit Analysis

Profit is the difference between the invoice price of an item and the cost of the item. In other words, it is calculated by subtracting cost of goods sold from sales dollars. This report tracks the profit by period which is presented in a trend line.

Profit margin should also be analyzed by customer so that it is understood which customers are contributing, both favorably and unfavorably, to the bottom line. Customers are typically ranked by descending profit margin percentage.



IT IS AN ERP SYSTEM

Humans must implement the ERP **system**. In my practice as a manufacturing control systems consultant, I worked with many Small to Mid-Sized Enterprises (SME's) that relied on uncoordinated practices throughout their systems. Many of them failed to see the system as a whole and as a result, they seldom obtained the expected returns. While the metrics presented above can be cherry picked and implemented on a one by one basis, the real power of these KPI's is only received from using them as a "set" to drive improvement. Implement them all simultaneously.

To achieve systematic improvement, manage these KPI's as a group. As a result, inherent conflicts between individual metrics will be reconciled. Solving conflict between departments is an important part of a system implementation. It is the "E" in **Enterprise** Resource Planning and required to be successful.

As systematic improvement is achieved, the overhead associated with operating the system will be reduced. This is probably the number one reason why systems are purchased and therefore should be the number one goal for all SME's. Reducing overhead shows up with the humans being able to process more with less. In many cases, it postpones that next "new hire" to a future date. This is the "R" in Enterprise **Resource** Planning. Maximizing resource efficiency.

The "P" in ERP is for **Planning**.¹² Planning is an attempt to predict a future time period at least as long as your cumulative manufacturing lead-times. The better you become at planning, the more the system will work for you and the easier achieving these metrics will become.



¹² The word "Planning" has been used 16 times in this document.

SUMMARY

If your ERP system is not returning the value you expected you should realize that it is probably not the system, but rather how the humans are using the system. You must have skilled humans on both sides of the equation (i.e. software supplier and user organization).

Implementation should be based upon business performance improvement, the processes and disciplines to effectively run your business – period. It is not about implementing software modules nor is it about making one system match the operation of another. Both of these implementation orientations are myopic and come with a high risk of failure.

Performance measures must encourage the humans to take action to solve the right business problems. To do so metrics should include current values, trend analysis and Pareto analysis. All three were introduced in the About the Measurements section and then used throughout the discussion of the sixteen metrics. Data analysis through the use of Microsoft Excel Pivot tables should also be employed.

The real purpose of this paper was to introduce sixteen KPI's that every Operations Manager should be focused on. These were presented in the form of answering fundamental questions about your business.

Sixteen KPI's were introduced and discussed. All of the metrics provide fundamental data for how well we are using the system to manage the flow of material from our suppliers and through the internal supply chain, and the second how well we are making and keeping promises to our customers and the resulting profit for our stakeholders. All of them also help answer fundamental questions about how well the business is operating. This question and answer dialog helps focus on the right action.

This document is an exercise in how to recognize and identify gaps in your internal supply chain processes and to show you that a set of proven, effective KPI's can help your humans reduce those gaps. Management policies when backed by sound data – and the ability to track improvement – sets your company up for significant opportunities to improve asset effectiveness. Customer service levels will improve, stockroom inventory will evolve to a higher percentage of active items, work in process will be reduced and the amount of overhead to “fire fight” issues will decrease. Your inventory velocity will also increase as will your profit margin.

For that to occur however, these KPI's must be treated as a group. Doing so keeps humans in one area of the business from taking actions that harm another area. In other words, sub-optimization must be avoided and the system must be managed as a whole. This is difficult for many organizations lacking strong, educated leadership in operations management.

What is not obvious in the discussion of these KPI's is the reduction of overhead. Making the most of these KPI's will require coordinated efforts and those efforts will help reduce overhead costs in your organization. This should be the most important driver to many of your management decisions and could have been a primary reason for your ERP implementation in the first place.

If you struggle with any of the assessment areas listed here, you are likely in need of help to support your current operations management processes and ERP system. We can help.

Where is your plan taking you?

APPENDIX A – SIXTEEN MEASUREMENTS – ACTUAL REPORTS



The following reports are readily available from Exact Software and operate on the SQL Server Reporting Services (SSRS) platform:

- Projected Inventory Analysis
- ABC Analysis
- Inventory Turns Analysis
- Inventory Analysis
- Safety Stock Analysis
- Work in Process Analysis
- Obsolete, Surplus and Active (OSA) Analysis
- Supplier Performance Analysis
- Lead Time Analysis (Incoming)
- Purchase Price Variance Analysis
- Sales Orders Analysis
- Aged Sales Order Analysis
- Shipping Performance Analysis
- Quoted Lead-time (Outgoing) Analysis
- Invoice Analysis
- Profit Analysis

Our Professional Services Organization can help you understand the sub-system components for each metric and help you establish a re-implementation plan that will really drive business performance.



Can these reports be used by any MAX user?

Yes, and no. All of these reports have been built on the MAX database, which for the most part is common to all user organizations.¹³ These reports will therefore install and operate for any MAX organization. These reports however are written to assume that MAX will be implemented using best practices for the software. The outcome of the data will therefore be directly based on how well your team has mastered these best practices. For example, the Purchase Price Variance analysis uses data from the MAX Vouchering sub-system. If you are electronically integrated to your accounting system, which is a best practice, then this report will function. If however, your team decided not to integrate electronically, then the report will not produce data until you adopt that best practice.

A very important, but maybe not so obvious lesson has just been introduced here. These KPI's/reports can be used to improve your business processes by paying attention to the best practices that matter. Taking action to improve these metrics will cause you to create an effective "re-implementation plan" that is directly tied to performance outcomes. The more problems that your humans can solve using the application software, the more business improvement can be achieved.

¹³ Where the major differences will appear will be in the User Designed Module.

MAX ERP software is an Exact product for manufacturers. Exact builds business software for SMEs and their accountants. Our innovative technology is aimed at specific business needs, providing an overview of today and insights into the opportunities of tomorrow. Exact inspires businesses to grow. Our 1,600 employees love, share and support our customers' ambition. Like them, we aim high. Like them, we aspire to lead the way. That's how we know it's a bumpy road to success. And that's why we build software to help smooth it out, enabling our customers from all over the world to grow.

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