DELMIA WORKS

3DEXPERIENCE®

EIGHT ESSENTIAL VALUES OF MANUFACTURING ERP

Whitepaper

DASSAULT SYSTEMES

INTRODUCTION

Almost everyone in business today understands the concept of Enterprise Resource Planning (ERP) software. Some are expert in ERP and some know it only as concepts of accounting, planning and reporting.

This article is for the latter group. It explores eight fundamental value drivers of ERP in a manufacturing environment and how they materially improve the profitability of a manufacturing operation. There are of course many additional impactful features and benefits of ERP systems, but understanding these eight benefits will provide the reader with the knowledge they need to evaluate their own business performance and consider if ERP software would be good investment for their business.

ACCOUNTS RECEIVABLE

A typical manufacturer will carry $4 million dollars in outstanding accounts receivables (A/R) at any one point in time. If half that amount is past due, then the carrying cost of that past due money is $100,000 per year. By following best practices in accounts receivable billing and collections, manufacturers can save that $100,000 in A/R carrying costs.

ERP manufacturing software brings the following tools to bear in operating efficient billings to collection department:

- Automatic billing upon shipment
- Electronic invoicing and receipts
- Aging reports and alerts
- Matching invoices and applying payments
- Ability to re-email invoices and invoice copies during collections efforts
- Knowledge of customer and payment history

The single database approach to the DELMIAWORKS ERP system provides the accounts receivable department with a holistic view of customers, including their purchase history, size, profitability, payment history, terms, discounts, delivery times, and proof of delivery. A 360-degree view of the customer makes billing timely and collections cash efficient.

INVENTORY CONTROL AND EVALUATION

The typical manufacturer carries an inventory of $6 million in raw and finished goods and has a 2X inventory turn ratio. If the inventory turn ratio is improved to 4X, which is considered minimum best practice, then $150,000-per-year in inventory carrying cost will be avoided, and a $2 million in cash freed up for investment in other parts of the business.

ERP manufacturing software's contribution to inventory control savings are made possible by providing the ability to:

- Forecast raw material needs based upon accurate Bill of Materials and sales orders
- Relieve and re-order raw material only as they are consumed
- Build finished goods based upon historical demand and sales orders
- Account for finished goods as soon as they are produced
- Relieve finished goods as soon as they are shipped
- Identify slow-moving and excess inventory items

The single data base approach of the DELMIAWORKS ERP provides the inventory and purchasing team end-to-end visibility of demand, consumption, and stock levels of both raw materials and finished goods. With knowledge of the entire demand, build, and ship production cycle, inventory levels can be optimized far beyond what manual and/or disparate systems can achieve.

Inventory value is one of the hardest major cost factors to track. Manual methods almost always result in a significant difference between the evaluation of inventory in the accounting system and the actual value of the inventory on hand. Annual physical counts are insufficient to accurately manage inventory value, while frequent physical counts are expensive to execute. However, since inventory is a major cost factor for any manufacturer, accurate accounting of inventory evaluation is critical and must be determined. The key is using ERP for inventory control to achieve accurate daily inventory value. Automated inventory tracking typically calculates inventory investments plus or minus 2%. This enables accurate inventory value reporting for financial and tax purposes.

The advantages of ERP manufacturing software in accurate inventory evaluation are:

- Automatic recording of inventory purchases (in-flows)
- Timely relieving of raw materials and updates to quantity on hand as they are consumed by production (consumption)
- Accurate tracking of finished goods quantity and value (conversion)
- Tracking of scraped or spoiled raw materials (waste)

Inventory is a constantly flowing movement of money. Money out for purchasing, money tied up in quantity on hand, money freed up as finished goods ship to the customer. Manual tracking of inventory is extremely difficult and time consuming. Inventory control lends itself very well to automation. In particular end-to-end automation that is aware of in-flow, consumption, conversion, waste, and shipment in real time.

QUOTES AND ESTIMATES

Accurate quoting is fundamental to manufacturing profitability. Like standard costs, which are discussed below, a mis-quoted item is an automatic deduction from profitability. Consistent mis-quoting, even in the 5% range, will cost a $20 million manufacturer $350,000 per year in lost profitability.

Advantages that ERP manufacturing software brings to quotes and estimates include:

- Quote/estimate history as starting points and points of comparison
- Price management, including pricing optimization and price control
- Proven accurate Bills of Materials that can be building blocks for new quotations
- Accurate and current raw material costs
- Documented machine and labor costs
- Proven production rates and costs

The single database approach of IQMS/DELMIAWORKS ERP system allows the quoting team to produce estimates that take into account all of the factors and actual history that go into producing accurate and timely quotations. You cannot accurately quote in an information vacuum. Quotes require a broad and accurate collection of information flowing together into a single document that can be delivered to prospects and used as a benchmark throughout the product lifecycle.

STANDARD AND ACTUAL COSTS

Most manufacturers operate their businesses on a standard cost model, and price their products based on standard costs. So, accurate standard costs are at the very core of manufacturing profitability. If standard costs are understated by only 5%, profitability is severely impacted. A $20 million business with a 5% average error in its standard cost will lose profits of up to $700,000 per year.

ERP manufacturing software determines accurate standard costs by knowing:

- Actual raw material usage
- Actual labor consumption
- Actual machines time
- Actual production rate
- Actual scrap rates

As with quotes, standard costs are based on a range of inputs, from materials to production rates to labor consumption. Moreover, these factors will change over time. Therefore, knowing actual production costs and how they compare to standard production cost is essential to managing core manufacturing profitability. By measuring production in real time, e.g. production rates and resource consumption, actual costs are documented job by job and can be compared to standard costs, allowing for adjustments to be made based upon actual events and updating standard cost for actual profit margins and/or revealing issues that have crept into the production process that need to be corrected.

SCHEDULING

The availability and capacity of machines ultimately determine a plant's capacity to produce revenue. Underutilized machine capacity due to scheduling inefficiencies and unplanned downtime often reduces a plant's effective capacity by 25%, potentially leaving a typical business with some $3 to $5 million a year in unrealized revenue.

ERP manufacturing software drives utilization through:

- Automatic scheduling that takes into account all production factors (orders, raw materials, machine availability, and labor) performed in minutes instead of days or hours
- Rescheduling to accommodate unexpected events in real time
- Minimizing lost machine and labor hours
- Providing the ability to expedite with minimal disruption of normal production
- Running best predictive use of select tools and equipment

Scheduling is a complex, constraint-based exercise. Key factors—including demand, availability of raw materials, availability of tools and equipment, required delivery time, production rates—all become part of a complex calculation, that when done manually becomes a rough estimate of optimization in the very best case. Often even best-case scheduling is beyond the capabilities of the production management team, and companies have to settle for just good enough scheduling. This is entirely unnecessary in an automated environment where the constraints can all be considered quickly and accurately. Here, the scheduling system is aware of all constraints, such as when an order is due, what machines are available to do the work, and when the raw material can be dispositioned to the equipment enabling full utilization of plant and equipment.

QUALITY CONTROL

Defective parts created in the production process result in a 100% lost profit. Catching defects early in the process curtails the production of defective parts and dramatically increases profitability—in addition to reducing downstream customer satisfaction issues. Creating a defective part and then producing a new part to replace it effectively doubles production costs. A part with a 25% profit margin quickly becomes a part with a minus 50% profit margin. For a typical $20 million producer with a 2% defect rate, this can amount to $600,000 per year in the cost of poor quality.

Quality management is the institutionalization of inspections and the documentation of measurements and results. Material reviews, process monitoring, and inspections are at the heart of quality management.

ERP enables repeatable quality programs by building inspection procedures into the day-to-day operation of the business.

- Workflows ensure inspection takes place before downstream process steps occur
- Process trends are monitored, and alerts are triggered before they become issues
- The results of inspections are recorded for root cause analysis and customer documentation
- Corrective action programs are documented and enforced
- Statistical process control (SPC) analysis allows increased production rates without introducing quality issues

Quality management requires end-to-end knowledge of multiple elements of the operations. Are the raw materials in compliance? Is the tooling and equipment in tolerance? Is the rate of production slow or fast? Did in-line inspections take place as required? Did a properly trained operator conduct the inspection? The list is long, and the information comes from all corners of the business. Like all the essential disciplines of the manufacturing operation, quality management requires broad access to information and a holistic view of the business to be comprehensive and preventative.

WAREHOUSE MANAGEMENT

Effective warehouse management has a positive impact on multiple aspects of the manufacturing business. Is raw material easily located and dispositioned to jobs? Are raw material inventories accurate? Is spoilage or waste occurring due to haphazard storage? Are finished goods inventories accurate, can orders be fulfilled from stock? Are orders being accurately filled?

There are concrete savings and efficiencies that create ROI from warehouse management. Paperless warehouse management (RF scanning), directed picks and put-away all save time and insure accuracy. It is not unusual for a $20M business to invest 120-160 hours per week in manual warehouse operations. Automated warehouse operations easily cut that time in half, creating labor savings of $80-100K per year. In addition, the prevention of raw and finished good spoilage and QOH inaccuracies can easily save the same business another $100K per year.

Warehouse management software (WMS) fosters inventory and operational best practices:

- Directed put-away insure raw and finished goods are stored in optimized locations
- Scanner based physical cycle counts are quick and accurate
- Scanner based directed pick, pack and ship make fulfilment activities fast and accurate
- Trusted inventory values quickly identify and prevent spoilage and waste

Accurate warehousing operations are at the core of efficient manufacturing operations. Knowing inventory locations and levels provides an end-to-end ERP solution with the ability to plan, purchase and schedule in advance of actual needs. It allows planners to trust in the availability of resources and it allows sales staff to commit with full confidence to delivery dates. As noted earlier in this document, inventory is one of a manufacturers top investments and managing its movement, storage and final disposition is an essential value of manufacturing ERP.

CUSTOMER SERVICE

Timely and accurate customer service drives the ability to charge full price for products. Being able to quote accurate delivery times, meet customer delivery dates, and deliver quality products ensures repeat business. But in addition to on-time, quality delivery, a business must be easy to do business with. Readily available information, flexibility in scheduling, and accurate labeling and packaging are all part of delivering top-grade customer service.

Low service levels result in customer turnover, and customer turnover is very expensive. Having to replace just 10% of existing business with new customers can cost a $20 million manufacturer 5% of its annual profits in the form of sales-related expenses, re-tooling, and learning curves for producing new products versus established production.

In addition to the advantages ERP manufacturing software brings to the inventory availability, scheduling, and quality that are essential to customer service, it also provides a host of tools to enable the last mile of customer service. These include:

- CRM for 360-degree view of the customer
- Accurate shipments and invoices
- Production status to answer delivery and availability questions in real time
- Electronic data interchange (EDI) to conduct business electronically
- Automated labeling to provide value-added product information

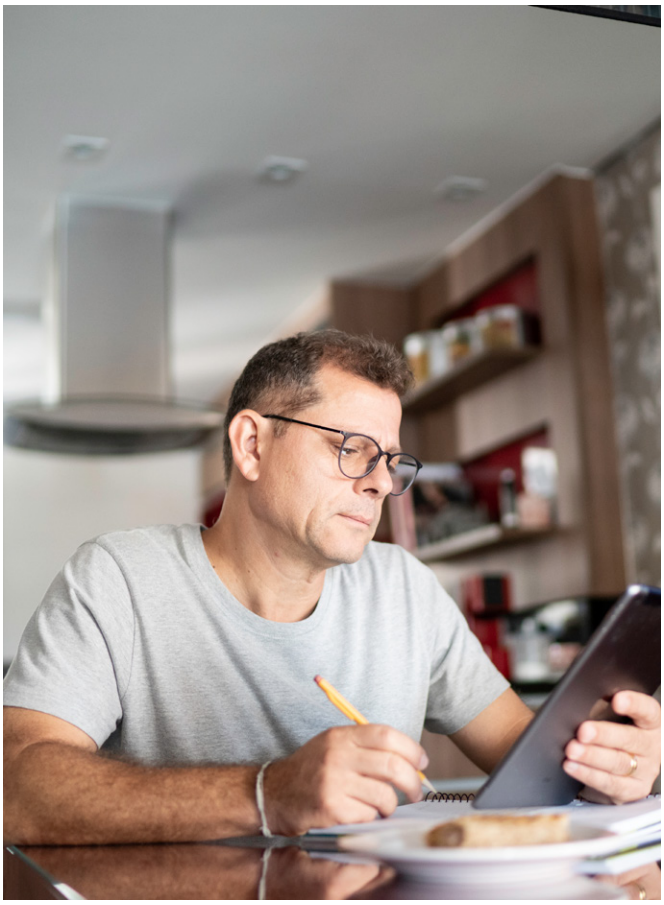
Customer service is the ultimate measure of the value of a single-database manufacturing software solution. Did we quote it right? When will it be delivered? Is it built to specification? Was it labeled correctly? Was it invoiced correctly? All are interrelated questions and illustrate how all the operations of the business need to come together to deliver the customer satisfaction that generates profitable and repeat business.

BUSINESS RESILIENCY

The COVID pandemic of 2020 has pushed manufacturers to rapidly shift gears, from addressing work-from-home requirements to managing extreme swings in demand and uncertain supply chains. In the process, it has highlighted an aspect of manufacturing ERP that was not as visible in more normal times— business continuity and resiliency.

Manufacturers without ERP systems, those relying on manual processes or even QuickBooks, were left without the basic tools of resiliency:

- Remote system access for visibility and control. Being able to have broad groups of employees continue productive work from home
- Automated planning and scheduling to operate effectively in situations where production needs can change daily, and even hourly, because of outside supply and demand factors
- Real-time production monitoring to provide machine performance visibility with as few on-site operators as possible
- Alert and workflow capabilities to enforce new and more stringent operating protocols



End-to-end visibility and control of the entire manufacturing operation is never more important to the success of a manufacturing business than when outside factors disrupt every routine. Times when agility, the ability to re-focus, re-plan and execute new plans become essential to the survival of the business. In this sense, ERP has in fact become the new face of business continuity and resilience.

CONCLUSION

ERP, at its core, is a tool for automatically capturing data and organizing information, which builds best practices—and very importantly, best practices enforcement—into the everyday operations of a manufacturer's business. In doing so, it empowers management with the information and tools to execute profitable and predictable business strategies.

For more information, please visit goengineer.com/delmiaworks or call 800.688.3234

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