The Technology Solution:

Using Shop Management Software to Recover Lost Productivity

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Introduction

In 2013, the U.S. labor force will stop growing. Though a shortage of employable skills affects the entire world, the deficiency is acute in the U.S. The shortage has spurred immigration, outsourcing, and also driven technological development.

Though the manufacturing sector suffers from a shortage of skilled labor more acutely than other industries, technology lessens the problem in the form of shop management, customer relationship management (CRM), and material requirements planning (MRP) software systems that enable a company to maintain productivity with fewer workers. Investment in shop management software among manufacturers is slated to rise dramatically in 2007.

This paper describes the labor shortage as it affects the contract/make-to-order manufacturing sector, and illustrates how the right shop management software system enables manufacturers to recover lost productivity in order to counteract the shortage of skilled labor.

Selecting the right software package provides powerful capabilities to merge and strengthen processes. The optimal shop management software makes every employee more valuable, alleviates labor intensive processes, and fortifies communications. It streamlines reporting, compresses cycle times, and gives a manufacturer a fighting chance in the battle against today's demographics.

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Demographic Realities Impacting Manufacturing

A survey of 800 manufacturers conducted by the National Association of Manufacturers (NAM) in 2005 showed that more than 80% of them were experiencing a shortage of skilled workers.

"I'd give my eye teeth for five brake operators or welders," says Matt Kaufmann, in February of '07. Kaufmann is Vice President at Precision Metalcraft, Inc., in Winnipeg, Manitoba. "In the area of expertise that we need, there doesn't seem to be enough people that take pride in the job they do, or understand the importance of the job they do. Young people today look at our industry as a stepping stone rather than a career move, nothing more than pumping gas. Nor do they consider our industry high tech, despite all the robotics and computers used in manufacturing today."

According to a recent article in USA TODAY, the dilemma is common all over the country. The shortage of skilled workers results from several factors:

- Manufacturing in the U.S. has grown more high-tech and skill-based as repetitive, less skilled work moves abroad
- Baby boomers with years of experience are retiring
- Youth avoid manufacturing jobs, which they view as repetitive and lacking in opportunity.

According to the Bureau of Labor Statistics, there were 10.2 million manufacturing production works in the USA in October of 2006, down 19% from 10 years ago and 28% fewer than 40 years ago. For fifty years, the percentage of all workers in the USA employed in manufacturing has been declining. In fall of 2005, 10% of U.S. workers were employed in the manufacturing sector, an all time low.

In 1950, skilled workers made up about 20% of the workforce. That number rose to more than 65% by 2000, and the trend continues upward in 2007. On the other hand, the number of jobs requiring a four-year college degree such as law, teaching, medicine and accounting, remains consistent with 1950, at 20 percent. Despite the lack of growth, today's youth are directed to pursue careers in the professional sector due to misperceptions about manufacturing.

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Technology as a Solution

But the loss of jobs does not mean manufacturing is disappearing. Instead, manufacturers have invested in technology to produce more with fewer workers. The lack of skilled labor has spurred American technological development like never before. Thanks to technological advances, the U.S. still reigns as the world's most productive manufacturer despite declining employment within the sector. Manufacturing GDP continues to rise at historic levels.

Americans are good at turning disadvantages into advantages. Thanks to new business models, computerization of manufacturing, and the supply chain revolution, more technology has led to lower cost of production.

Therein lies the only continued solution to the labor shortage in the manufacturing sector — technology that provides both control and flexibility. In the manufacturing sector, business management software is fast becoming a requirement for survival.

Market Drivers Spurring Reliance on Technology

According to Managing Automation magazine's Jeff Moad, in a posting December 28, 2006, on ManagingAutomation.com, spending by manufacturing companies on technology—particularly ERP (business management software) and manufacturing software and integration tools—will accelerate through 2007. The impetus is globalization and the need to recover lost productivity and operational efficiency, coupled with shortages in the labor supply.

Shop management application budgets will grow an average of 12.3% in 2007, according to a recent survey of manufacturing and services companies by AMR Research. Manufacturing applications will attract high spending levels in 2007, the report predicts. While only 43% of companies surveyed by AMR have deployed manufacturing software so far, 20% of those surveyed said they plan to do so over the next twelve months.

In the 2004 IT Toolbox ERP Implementation Survey, 72% of small sized companies surveyed (100 employees or less) already used ERP or shop management software. Thirty-seven percent of small sized companies were planning to purchase a new or replacement system, and 58% were considering adding new modules to their existing system.

Industry analysts say manufacturers must focus on processes, people, and seamless data sharing. Organizationally, everything is interdependent. Therefore, finding better ways for people to share information regardless of department or function is high priority for manufacturers over the next 12 months. According to AMR Research, ARC Advisory Group and Electronic Data Systems, manufacturers' specific priorities this year are Enterprise Resource Planning (ERP), Supply Chain Management (SCM), and manufacturing operations applications.

With high tech shop management software, accountability, responsibility, and communication increase, turning every employee into a source of information and equipping them to take action.

The Benefits of Technology to Manage the Business

Contract manufacturers require a system designed specifically for the custom manufacturing environment. This type of management software supports almost every kind of job including one-off, blanket orders, complex multi-level assemblies, and split jobs. It manages workflow from quoting, order processing, scheduling, purchasing and labor tracking to real time data collection, job costing, quality, shipping, and accounting.

Its powerful capabilities include detailed part histories to speed quoting of repeat jobs. Its calculators automate the computation of material requirements. Its advanced scheduling manages the complexity of changes and dependencies inherent in contract manufacturing.

Enterprise Resource Planning for contract manufacturers and job shops, often referred to as business management software or job shop manufacturing software, has been around so long, many take its benefits for granted. But its highest value lies in its ability to integrate all departments and functions across the business. Shop management software imparts broad information, from the status of a job on the floor, to the tracking of a receipt in receiving, to materials needed on a repeat job in estimating. It shows work in process at a specific workcenter, invoices following shipments, keeps detailed job history for repeat work. Will we meet our ship dates? Do we have the necessary materials on hand? Shop floor managers who used to track jobs in their heads or on a white board now keep that information online. If they don't, office and support staff can not keep customers informed.

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Shop Management Software as a Labor Saver

Shop management software is a high tech tool allowing custom manufacturers to do more with less. The system functions like a pit crew, ensuring every job stays on track from order to invoice and revenue. Referred to as back-office software, it doesn't handle the up-front selling process. Instead, shop management systems take a customer order and provide the direction for automating the steps on the way to shipping the parts. When an estimator completes a bid using the system, he has just included all the information needed to finish the order. With the press of a key, that estimate transfers to an order and begins moving to completion. People in different departments see the same information and can update it.

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To find out where the job is at any point, they need only log into the system. The job moves like a cresting wave through the shop. Customers receive their parts on time and with fewer quality issues than before. System automation and depth of functionality apply speed and maneuverability to a range of business processes including tracking, scheduling, and financial reporting.

The Time is Now

ERP systems and their MRP predecessors have been around for almost three decades. Since then, customer relationship management (CRM) and supply chain management (SCM) have come on the scene to keep customers closer and deliver to them faster.

Despite all the options, manufacturers are making efforts to cut costs and work smart. As of the past decade, the business solutions market has witnessed changes; many software vendors have dealt with losses and/or vanished. Users big and small are adopting phase-wise models with realistic formulas for return on investment. Today, shops can work with a solution provider that has weathered these market forces.

A recent report by the Aberdeen Group and commissioned by various ERP software suppliers, revealed that manufacturers with management software systems don't always use all the features designed into their software. According to the study, called "The ERP in Manufacturing Benchmark," two thirds of the manufacturers surveyed said they made their choice of which enterprise management software to use based on features but then, on average, used only 28% of the functionality in that software.

The key is to find a system that aligns with your business processes and provides concrete advantages. With current levels of competition, manufacturers can not afford mistakes or even a slow learning curve. Nimble shops and midrange manufacturers have learned from the mistakes of their larger brethren and are adopting shop management software that supports them with competitive advantages.

Top Ten Competitive Advantages of Shop Management Software

Following is a list of ten advantages that your shop management software system should provide. The list is not geared to specific features but instead, to broad capabilities.

The goal is to find the optimal system that aligns to your business processes and your vision for the future — one with flexibility and control to speed ROI, stave off obsolescence, recover lost productivity, and do more with less. Demanding the following advantages will help you achieve that:

Streamline preparation of an estimate and also eliminate bottlenecks, delays and communication gaps.

Advantage #1

Compress the Estimating Process

A shop management software system geared to small and midrange contract manufacturers will streamline preparation of an estimate and also eliminate bottlenecks, delays and communication gaps. Automated estimating requires advance clarification of pricing policies and responsibilities. Efficient estimating also affects bottom line profitability. In some cases, it enables a shop to reduce labor costs and overhead.

Additionally, what about orders lost to a faster bidder? A system will foster quick response, and once a job is won, transfer it to an order with the press of a key.

Pre-production activities such as order entry, production planning and scheduling, purchasing, and materials management are initiated and coordinated by the system. Once entered, the estimate info is translated to a router and communication with production planning, engineering, purchasing and material management is taken care of, all moving the job towards its ship date and better customer service with a minimum of steps or delays. In other words, the job is underway the moment it is awarded.

Advantage #2

Reduce Lead Times

In a custom manufacturing environment, forecasting material requirements is crucial to reducing lead time. The solution is having material on hand when you're ready to start a job, enabling you to serve your customer quickly. According to Vincent Bozzone in Speed to Market, shop management software aids greatly "in deciding the mix and quantities of raw materials to inventory by balancing the cost to carry vs. the value of being able to fill orders quickly."

Your shop management package should measure on-time performance of your vendors during pre-production just as it measures on-time delivery to customers. Managing raw materials inventories is a critical competitive factor. According to Bozzone, "it doesn't

make sense to release an order to the floor when tooling is not available or routings are being revised, or materials are not in yet, thereby increasing WIP and adding costs."

Your system should manage these efficiencies, arranging orders by ship dates, and back scheduling through the various production steps to determine release dates to the floor. This will prevent release dates from being missed, thereby providing as much production time as possible. All the while, paperwork will be virtually eliminated.

Studies show that orders released to the shop on time have an 80% chance of shipping on time.

Orders	Release to Shop	Shipped to Customers
% on time	60%	80%
% late	40%	20%

Source: Speed to Market, Vincent Bozzone

Examples of inventory capabilities your shop management software should provide are:

- Comprehensive, perpetual inventory control of raw material, finished goods, components and part overruns
- Pricing at standard, average, or last cost as well as status of stock within the plant, and automatic reorder capability to vendors
- Inventory valuation reports for accounting
- Inventory activity for the year, month, day or hour for management

Advantage #3

Realistic Scheduling

Your system's scheduling should coordinate capacity, customer requests, production schedules, and purchased materials/components during the time span of the schedule. It will accommodate engineering, tooling, testing, quality needs, and requirements. The end benefit is control over lead time and improved on-time ship performance.

Many shops tend to over schedule leading to loss of credibility in order completion dates and/or expensive expediting. During a demo using your shop data, ask to see how the shop management software system being demonstrated relates production capacities and lead times to offer you greater predictability and control.

Be sure to purchase a fully integrated system that offers the ability to affect change and bring all resulting dependencies with it. You need fully integrated routing because when the user reschedules a job, everything including purchasing of materials and outside services change with it. The entire shop must be updated to make decisions based on current data. **Make sure:**

■ Scheduling drives purchasing
■ Routings can change while the job is in process
■ Sub-assemblies and components change along with parent requirements
■ Automatic notifications, red flags and exception reports signal problems along the way

Activity based costing (ABC) will allow a shop to be as competitive as possible.

"Scheduling is the heart of our shop software for what we're doing here," says Joe Glenn, President of Glenn Metalcraft, Inc., in Princeton, Minnesota. "We've got twelve-month visibility of customers' needs. The system allows us the flexibility to break up our monthly production and delivery for each customer into manageable lots—one month three lots, next month the entire lot. Our scheduling software breaks those lots up so we're able to ship JIT."

Advantage #4

Activity Based Costing from Bid to Ship

Even before an estimate goes out, manufacturers need to know whether they should accept a job or let it go. Built-in activity based costing (ABC) will allow a shop to be as competitive as possible and to recognize jobs that will lose them money.

Your shop management system or job costing software will automate ABC calculations, eliminate paperwork and legwork, and shave hours off the study of spread sheets for labor saving in the costing arena.

■ Quoting sets costs in motion. A direct link between the quote and the job order should provide an accurate picture of estimated costs versus performance

■ Data collection (bar coding) guarantees more accurate time reporting and collecting, and is the source of real time cost feedback

■ Linking or in-process costing is imperative on long running and complex assembly jobs with many components

■ Work should be tracked by job, by individual, by rework costs, by delivery date to show whether the job is making or losing money while there is still time to make adjustments

A system incorporating activity based costing, today's most prevalent method of costing for manufacturers, asks users to make distinctions and breakdowns that supply information where it is truly significant to the cost of the job. This occurs as the system

queries the user for information about jobs, machines, operations, and labor. Automating the process of tracking costs and divvying them up accurately among various jobs, i.e. activity based costing, pays big dividends.

Advantage #5

Built for ISO

ISO takes time and people and paper. As manufacturers stay compliant with ISO standards, they rely on their job shop software to link, communicate, document, cost, and manage their quality activities. Some of the best manufacturing software packages include a module devoted to processing non-conformances (NCs) and other ISO activities electronically. This aids in achieving swift, paperless quality management.

Your system should incorporate quality management data into your company metrics, and provide data for setting quality goals.

Lisa Prokopchuk, Quality Assurance Associate at Precision Metalcraft Inc., in Winnipeg, says, "Having a quality management system for ISO 9001-2000 ensures we have the ability to obtain controlled documents through a one-step search. It gives us the ability to link quality issues and continuous improvement with everyday production. And it provides statistical analysis on business goals such as on-time delivery, quality costs, and labor efficiencies."

Your shop management system should also facilitate external audits by including an audit schedule and other ISO related reports. Non-conformance can be handled electronically and be integrated into your system for speed, convenience, and total communication.

Advantage #6

Bullet Proof Implementation

You and your shop management software vendor play major roles in this endeavor.

Make sure the vendor you choose offers a proven implementation methodology and consultants on staff to help you accomplish it. Vendor-affiliated consultants are highly trained and knowledgeable about their own software. Their job is to ensure that you implement for maximum ROI. They are experts at tailoring their methodology to your parameters, environment, and goals. Non-affiliated consultants offer a lower rate of success in most cases.

Incorporate quality management data into your company metrics, and provide data for setting quality goals.

Find a system that aligns with your business processes and provides concrete advantages.

Eliminate guesswork by defining your own business objectives for implementation of the new system. Then assess your vendor both on how the software performs and their ability to execute your goals.

■ Start by assessing their sales approach. Can they provide a preliminary implementation plan even before you buy? Does it look compatible with your culture and your goals?

■ Check their references carefully. Come up with your own implementation questions. Network if necessary to find users of the system beyond the customers they give you.

■ Understand their methodology and make sure your team has a grasp of the steps, expectations, roles and responsibilities proposed. Be sure to ask about the experience level of their consultants.

■ Assemble a team and commit the necessary resources to keep the process focused and moving forward.

■ Break your implementation into phases to begin right away using a subset of the system's overall features. This leads to more progress in the long run.

Most systems can be implemented within six months, and many inside of three or four months. Adhere to your vendor's methodology, anticipate some snags along the way, and soon your new shop management package will be part of your routine and your vision.

Advantage #7

Scalability, the Backbone of Success

If you're about to invest in new software to enable your business to use critical data more fully, you'll want it to be scalable — designed to accommodate future work in your business. Scalability indicates a system's ability to handle growing amounts or complexity of work and its ability to be readily enlarged.

To accomplish this, ask the right questions:

■ How often is the software retooled to stay current? Some vendors choose not to re-invest in the architecture of their products because it's expensive. A system that appears current could be operating based on old fashioned and outmoded technology.

■ What percent of current customers are using the system's latest release? This figure should be between 50% and 70%.

■ How many users have relied on the system longer than five years? Longer than ten years? Long term customers are proof of the usefulness and ease of the system's upgrades.

■ How many upgrades per year? Your vendor should offer at least one to two per year to keep the software a step ahead of your needs. Inquire about functions incorporated for specific customers or industries based on customer requests for change.

■ Taking time to learn this information up front ensures you choose a system with longevity.

Advantage #8

Interoperability: Tying your Systems Together

The underlying design of your shop management software will determine its ability to communicate with other systems in your business. As a contract manufacturer, you probably run multiple applications, from job control systems to CAD and engineering systems. Your strength lies in tying together those systems and their information to achieve interoperability.

Not many vendors discuss this issue because it often constitutes a weakness. During an in-depth live demo, ask about ease of integration with other business applications, such as your financial or CRM system. Inquire how data can be passed back and forth between this system and others you use. See how the application supports integration with your current applications.

Because the underlying architecture of your new software is invisible, make sure it will grow with your business by asking questions:

- Does it have a standard, fully supported interface? A standard interface enhances current and future reliability and often rules out the need for a hired consultant to understand the business logic of the system.

- How will this system take advantage of emerging technologies? For example, can it accept information from or communicate with internet PDAs or hand-held wireless devices.

No system is an island. You may be wowed by its intuitive look and feel and its depth of functionality, but be sure to investigate how it integrates with your other systems.

Advantage #9

Outstanding Customer Service

Your shop management software vendor's customer service team should display a similar dedication and enthusiasm.

- Their support offerings should be wide ranging and their support staff highly informed. Look for more than on-site consulting and technical support. Ask about educational offerings such as solution webinars and web-based training taught by experienced instructors on a range of topics.

- Your plant may run three shifts, seven days a week. You'll need fast answers and should be able to find them through 24/7 access to an online self-help knowledgebase.

- Ask about remote consulting via telephone or internet to provide a cost effective option for special initiatives. The same holds true with on-call web conferencing user assistance. This is valuable when a phone call isn't enough and you need to see and solve the issue online.

Manufacturers have invested in technology to produce more with fewer workers.

Though neither glamorous nor headline grabbing, your software vendor's reputation for fast, knowledgeable support will impact your long term success.

Advantage #10

Maximum ROI

If you find a software provider committed to your success, one that has the robust system, years of experience, and implementation methodology to foster that success, then you should realize maximum return on investment.

Additionally, ROI results from searching out a system with the deep functionality of an expensive tier one size business solution, but priced far lower. Finding a company focused on development to meet the needs of contract manufacturers is also key. The vendor should have a strong development staff that builds in comprehensive functionality, interoperability, and scalability. With a lower cost to buy, expect a lower cost to maintain for more return on investment. And last, with sound architecture and a straight forward database, less time, money and resources are needed to maintain the system for added savings during the life of the software.

Conclusion

As you read this, a demographic revolution progresses around the world, population drives economic growth, and a resurgence of growth is driving Asia.

China and India represent 40% of the world's population as they have for the past 200 years. What is changing is, China's and India's populations are young; America's is not.

People, particularly young skilled people, have become the most precious resource in the U.S. economy. Manufacturers, no matter their size, location, or industry, report a serious shortage of them. Welders, machinists, assemblers — workers that have developed skill but does not possess a four-year degree — are needed to meet current demand at plants nationwide. The void threatens to damage the viability of U.S. manufacturing at a time of intense global competition.

No wonder manufacturers are looking to technology for some relief. It can not compensate fully for output lost due to lack of personnel. But it enhances the efficiency of those on the job, and recovers lost productivity with added competitiveness.

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About Exact JobBOSS

JobBOSS is the most widely used shop management software designed specifically for job shops, custom manufacturers, and high-tech shops. Today over 4,300 shops and more than 23,000 users rely on JobBOSS shop management to give them the visibility and control they need to manage all the changes their businesses experience on a daily basis. Whether you are a high-volume production shop or a quantity one proto-type, machine builder, tool builder or assembly shop, JobBOSS can increase your productivity and profitability. It's a system that manages workflow from quote to cash — quoting, order processing, scheduling, purchasing, labor tracking, real time data collection, quality, shipping, job costing, and integrated accounting. Users know what jobs cost, can compare estimated to actual labor, material, and outside service costs, and isolate problem jobs while in process.

About Exact Software

Established in 1984, Exact Software is one of the world's leading providers of business software solutions. Its integrated solutions comprise traditional Enterprise Resource Planning (ERP) as well as related software solutions such as Human Resource Management (HRM), Customer Relationship Management (CRM), Project Management, Business Intelligence/Analytics (BI/BA), and Electronic Workflow. Exact is headquartered in Delft, the Netherlands and has offices in Europe, the Middle East, North and South America, Asia, Australia and Africa. With over 2,700 employees, subsidiaries in more than 40 countries, solutions available in 40 languages, Exact currently serves customers in more than 125 countries across all five continents. Exact Holding N.V. (EXACT) has been listed on Eurolist by Euronext Amsterdam since June 1999.

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