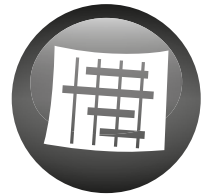


WHITE PAPER



**ENABLE
PROJECT-BASED
MANUFACTURING WITH
BUSINESS SOFTWARE**



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ENABLE PROJECT-BASED MANUFACTURING WITH BUSINESS SOFTWARE

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As manufacturers change the way they are doing business, moving towards outsourcing and global sourcing or expanding into multiple modes of manufacturing like engineer-to-order (ETO), they are placing new demands on their enterprise software. In this whitepaper, we will explore the different ways that enterprise software must change in order to accommodate the project-based business models that will continue to become more prevalent in the 21st Century.

Due to price and market pressures, manufacturing is moving away from traditional, long-run manufacturing. In the 20th Century, a manufacturer could rely on established, repetitive processes that, when well-managed, could ensure a profit. These processes could be refined in order to increase productivity, capacity (allowing for increased market share) and profitability.

But even in the 20th Century, manufacturers engaged in ETO have long found that traditional manufacturing business software like enterprise resources planning (ERP) was not a good fit for them. That is because ETO is a project-based business model. Rather than relying on repeatable processes to ensure success, ETO manufacturers found they needed to manage risk that arises in the administration of unique projects.

But now, as more manufacturers outsource part or all of the manufacturing process to either domestic or overseas suppliers, these manufacturers as well have found that ERP is not a good fit for them either for a number of reasons. Traditional ERP does not integrate tightly enough with project management functionality. It is not optimized for risk identification and risk management. It does not afford them any control or visibility into the activities of their supply chain partners.

Even traditional make-to-stock manufacturers that sell their products through channels of distribution are relying on more suppliers and contractors, and can therefore not help but become more project-based. In an age when manufacturing capacity can become commoditized, these manufacturers are relying on new and innovative designs to distinguish their products in the market. That means that product lifecycles are becoming shorter to make way for products that are revamped



more frequently. As design and technology change, so must manufacturing method and approach, which makes it more cost-effective to outsource rapidly-changing parts of the manufacturing process than it is to constantly re-invest in new and different capital equipment and expertise. Think of the MP3 player that gets smaller each year, the cell phone that is revamped each year with new features and a slimmer profile, or the paper converting machine that is altered regularly to comply with new environmental regulations and technologies. These changes have several basic implications for the enterprise applications that project-based manufacturers rely upon to run their business:

- Product development, engineering and design are becoming a larger part of the cost of finished goods. These activities, once considered overhead, now need to be tracked as direct costs. This is one challenge that traditional manufacturing business software is ill-equipped to handle.
- Traditional ERP products organize work flows by department, routing information and tasks from one functional area of the company to another. In a project-based application, data and tasks are arranged by project, and project managers can direct or allocate people from a variety of departments to satisfy the needs of the project.
- Contract and supplier management becomes a crucial element of a project-based enterprise application. While traditional ERP provides visibility to activities and the value added to a product within the company, a project-based manufacturing application must also provide insight into how vendors, partners and subcontractors are performing against their contract. The goal must be not to identify where contractors or vendors failed after the fact, but to identify variances and correct for them early enough in the process to protect profits.
- Suppliers in the manufacturing process often use a different language, currency and units of measure. An enterprise application that supports these differences can ease communications in a multi-national team of manufacturing and engineering professionals.

PROJECT-BASED BASICS

The technology used to manage a traditional manufacturing operation needs to be built on manufacturing basics like inventory management and production planning and control. An application designed for project-based manufacturing management must allow for all of the traditional manufacturing functions as well as help executives and managers handle five basic project dynamics: risk, cost, cash, resources and time.

- **Risk:** Manufacturing executives need to go into new projects fully aware of the risks involved. Risks will need to be costed so that managers know how to account for them in the planning of future, similar, projects.



- **Cost:** Each time a new project or product is planned, executives must be fully aware of total cost—not just in manufacturing, but in engineering or design, administrative duties like negotiating with suppliers, contract administration, chasing after invoices and other activities that previously might have been considered overhead or indirect expenses.
- **Cash:** Forecast the amount of cash coming in and out of the company on a period-by-period basis, daily, weekly or monthly. Financial analysts will be able to anticipate and allow for the cash flow dynamics of each project.
- **Resources:** Not a purely internal dynamic—need to manage both internal and external. Must have visibility of internal bottlenecks like overloaded plant/floor capacity as well as external bottlenecks such as a subcontractor that is experiencing a shutdown for a period of weeks. It is crucial to be able to determine how both internal and external resources impact the project timeline, cost and risk profile.
- **Time:** A fundamental measure because subcontractors need to be committed to delivering their portion of a project at a certain time so that the manufacturer can in turn deliver to their customers or distribution channel as promised.

IN A PROJECT-BASED APPLICATION, YOU CAN SET THE PROJECT UP INDICATING HOW MUCH THE ENTIRE PROJECT IS GOING TO COST, INCLUDING DESIGN AND FRONT LOADED COSTS.

So how does a project-based manufacturing application deliver these benefits within an enterprise?

Consider the contract manufacturer who receives an order for 10,000 of a specific product, to be completed within 10 months. In a project-based application, you can set the project up indicating how much the entire project is going to cost, including design and front-loaded costs. This can help you negotiate staged payments so that design processes and other preliminary

work can be paid for separately from the delivery of individual items under the contract. The application should also allow a project manager to access real-time reporting of design progress as well as data on reports of how many completed items and how much scrap are reported on an ongoing basis. This allows the project manager to in turn report to his customer on progress against the budget and timeline in the contract.

A manufacturer using subcontractors will benefit because the application will create a project timeline that encompasses the lifecycle of the project—regardless of whether that project is a 10-month contract manufacturing job or a four-year product lifecycle. That timeline will include work performed by subcontractors; so for example, as product in the manufacturing process is sent to subcontractors who provides an anodized coating service—it will be possible to track the time and cost involved and to make adjustments for any delays or issues the subcontractor has with respect to their part of the process. Conversely, if the manufacturing process is



delayed before items are sent to the subcontractor or if quantities or other requirements are changed, these are also flagged in the application as a variance, so that the subcontractor is notified and can make adjustments accordingly. This notification can either come from a project manager or can be automated, and sent by email or even through a Web service to a portal used by the subcontractor.

A project-based application will also automate the processes and paperwork necessary to ship production materials to a subcontractor and provide visibility of where the materials are during the time that outsourced work is being performed.

ADVANCED PROJECT-BASED MANUFACTURING PRACTICES

While the key aspect of project-based manufacturing is control, another key aspect can be intelligence. The detailed and faithful project record that results from integrating functionality by project rather than by company department can be used to more intelligently plan subsequent activities and make more profitable business decisions. Without a project-based application, an executive in charge of profit and loss does not really know what financial and organizational resources are being used to achieve various tasks or what aspect of a project or product offering are making or losing money. With a true project-based application however, that executive can see cost, resources as well as any risk elements, not only in real time to help managers execute the project profitably, but after each project activity is completed to aid in future decision-making. Some projects may be turned down because that executive was able to determine that the company lost money the last time the company undertook similar work, or at the very least that executive may be able to negotiate a higher price.

Even if all of the elements of a project being considered are not identical to a historic project, significant elements of the project that are comparable can still be used as templates for determining the cost and risk profile of subsequent ones. This is precisely how a project-based application can bring predictability to the volatile world of manufacturing. As repetitive processes go by the wayside, repetitive project elements need to emerge to bring predictability and control back to manufacturing estimating and planning.

But what about companies that outsource product design? How can they use technology to maintain control of this less tangible element of the product lifecycle?

Maintaining control of outsourced manufacturing processes presents challenges, but outsourcing product design presents new challenges. When communicating across company boundaries about a complex design project, special challenges include the need to retain visibility of what is happening, securing product and design documentation, and tracking progress. Government entities have instituted systems like Earned Value Management (EVM) in order to monitor the work of their vendors when it comes to complex design and fabrication projects, and a project-based application ought to offer functionality that at the minimum can meet these EVM mandate



requirements. Moreover, a manufacturer engaged in outsourced design work will often want a secure online repository for design information that suppliers and subcontractors can access through the Web—enabling subcontractors to see documentation that they will need to plan their own part of the project and to be able to make and suggest appropriate design changes in real-time. As changes are made to the design, the project-based application should be able to electronically notify members of the project team when design changes are made, when changes are made to the project timeline or when certain project benchmarks are reached. This central online repository can also help the manufacturer monitor the design work in progress and serve as a communications hub with the design and engineering team.

ADVICE ON MOVING TOWARDS PROJECT BASED SOLUTIONS

Once you have determined that your business is moving further towards a greater reliance using projects, it would certainly make sense to consider adopting technology to facilitate this way of doing business. In particular, moving away from using projects that are managed outside of the corporate enterprise business solution, to where projects are an integral part of a single business application. But technology alone will not help any business surmount these challenges. While the right enterprise application will make it possible to do business in a project-based environment and eliminate some technology barriers present in a legacy system, the organization itself must often change in order to truly maximize the benefits of the Project Based Solutions (PBS).

Here are three simple suggestions to getting the most out of implementing an enterprise application such as IFS Applications to accommodate your project-based business model.

STOP THINKING DEPARTMENTALLY

Traditionally, businesses have been organized by functional departments, with members of that department reporting directly or indirectly to a department head. In order to use any of the resources of that department, it was necessary to work through that department head as these people were his or her responsibility.

This model may have worked well for repetitive manufacturers, but in order to function well within a project-based environment, project managers must be able to freely access resources within all departments as required to deliver on contracts or the company's business plan. An enterprise application can allow the project manager to assign tasks and to schedule tasks for various people across multiple departments as needed, placing activities directly on an individuals' "to-do" list. However, if the people in question are caught between a mandate from a project manager and the wishes and authority of the manager they report to, there will obviously be problems. Cultural change and business structure change are just as important as technology in making a project-based business model work.



DO NOT BE AFRAID TO USE SUBCONTRACTORS

Particularly during economically slow times, manufacturers are reticent to “give away” a portion of their business by outsourcing it. Conventional wisdom would suggest that hanging onto more of a company’s gross revenue by self-performing more work would help a manufacturer weather periods of reduced demand. But in good times as well as bad, it is still possible to make more money and operate more profitably by limiting self-performed work to what the manufacturer does best, or to activities that are hardest to outsource. The right enterprise technology can help executives identify what processes make the most sense to outsource.

The right technology can also help those manufacturing executives mitigate their other fear about outsourcing—a loss of control over the work being sent to a contractor.

MOVE INTO HIGHER-MARGIN WORK

Rapidly changing product offerings that might outstrip a manufacturer’s ability to retool can lead some to outsource manufacturing and design work. But there is an often-overlooked upside to outsourcing that many manufacturers at the vanguard of project-based manufacturers are only now beginning to realize.

As margins for manufacturing get tighter, savvy executives are realizing that the real profit center in the 21st Century will come during the later stages of a product lifecycle. Aftermarket parts, service and support can all bring revenue that had probably been left on the table when the company was focused strictly on self-performing the manufacturing process. But as organizational capacity becomes available through outsourcing, an executive may do well to consider how the sale and administration of maintenance contracts, service plans and other aftermarket services could benefit their customers and their shareholders.

CONCLUSION

Project-based manufacturing business models are becoming an economic necessity for many companies, and this change exposes them to a number of risks they were not vulnerable to 10 or 20 years ago. As a result, the information technologies developed for a manufacturer 10 or 20 years ago will be inadequate for companies working in this new paradigm. Not only will the correct PBS technology help manufacturers mitigate the risk; it will allow them to not only survive, but thrive by gravitating towards work that offers the highest margin.

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ABOUT IFS

IFS is a public company (OMX STO: IFS) founded in 1983 that develops, supplies, and implements IFS Applications™, a fully-integrated, component-based extended ERP suite built on SOA technology. The company has more than 2,000 customers in more than 50 countries and focuses on seven main industries: aerospace & defense, utilities & telecom, manufacturing, process industries, automotive, retail & wholesale distribution, and construction contracting & service management. IFS has 2,700 employees and net revenue in 2008 was SKr 2.5 billion.

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