Engineer-to-Order and Project Manufacturing

Individually Tailored Solutions

Industrial machinery and components customers demand individually engineered solutions to their business challenges. They expect on-time delivery, short lead times, top quality, and affordable prices. Meeting these ever-increasing demands is the key to competitive differentiation and customer loyalty in an engineer-to-order manufacturing environment.

Industrial manufacturers face challenges on many fronts today: increased global competition, technical issues in accommodating changing customer requirements, government and industry regulations, and the need for rapid response to demand fluctuations. Together these challenges require an adaptable manufacturing process.

Manufacturers are focused on providing engineered solutions that meet customer-specific business requirements. Based on situational and requirements analyses of the customer, the manufacturer has to develop a tailored offering that solves the customer's business problem.

Once the customer has accepted the offer, the manufacturer must focus on a streamlined process that integrates sales, engineering, project planning, manufacturing, supply chain, procurement, and service to be certain that the solution can be delivered to the customer on time, with minimal lead time, high quality, and low cost.

To offer custom-engineered solutions with short lead times at low cost, manufacturers must focus on optimized, automated, and integrated engineer-to-order and project manufacturing processes.

39%

Lower manufacturing time where quality system has data sharing and integration of inspection planning with other applications

Source: SAP Performance Benchmarking

Engineer-to-Order Projects

Offer custom engineered solutions with short lead times at low cost, by applying efficient engineer-to-order and project manufacturing processes.

Get the intuitive solution needed to build complex, highly regulated products. Manage configuration information and processes, including changes. Integrate graphic design into the build to simplify comprehension. Manufacture deliverables and components, enforcing regulatory and customer-driven requirements.

When customers demand individually engineered solutions, industrial manufacturers must respond with integrated engineer-to-order, project manufacturing, and project fulfillment processes.

Efficient engineer-to-order and project manufacturing solutions from SAP help industrial manufacturers achieve short lead times with high levels of customer service and high asset utilization.

After winning engineer-to-order contracts, manufacturers need to detail their project planning and perform efficient custom engineering while reusing applicable earlier projects. Efficiently managing project planning and engineering will result in shorter project lead times and reduced engineering costs.

Once engineering has been completed, an optimized production schedule helps manufacturers achieve on-time delivery while making optimum use of capacity. Project fulfillment software helps efficiently manage the material flow to make sure the solution can be shipped, assembled, and installed at the customer site on time.

Best-Run Industrial Machinery and Components

Deliver Custom-Engineered Solutions

Efficiently managing your engineer-to-order and project manufacturing processes helps improve profitability and competitive differentiation.

Through tight coordination and automation of engineering, project planning, manufacturing, and project fulfillment, all stakeholders help realize the broader business objectives – reducing costs, consistently meeting customer needs, and complying with safety and quality standards. SAP solutions can help.

- Reduce engineering design lead times for custom-engineered products, projects, and solutions
- Decrease cycle times for engineering change management and decrease the administrative costs associated with customer changes
- Compress the design-to-delivery cycle time in an engineer-to-order manufacturing environment
- Improve on-time delivery through better transparency and coordination of the supply chain network
- Reduce stock levels and increase capacity utilization through advanced planning and scheduling
- Improve manufacturing profitability, reduce cost of quality, and decrease compliance costs
- Increase revenue and customer loyalty by continually meeting or exceeding customer expectations

10%

Higher capacity utilization with ability to track and manage strategic manufacturing objectives and operational activities

Source: SAP Performance Benchmarking

SAP Innovations

The investments SAP has made in technology provide huge benefits for manufacturers, helping them compress sales cycle times for products and services, minimize time to profit for new projects, and reduce manufacturing and supply chain costs. New technologies and new devices must readily assimilate into existing business processes. SAP innovations meet the needs of existing software systems and respond quickly to business challenges and technology trends.

Big Data – With the SAP HANA platform, manufacturers can analyze business operations based on large volumes of detailed information as it develops, in real time.

Mobile – SAP mobile apps enable all aspects of company operations to run faster and smoother by providing employees with access to critical information anytime, anywhere.

Analytics – Analytics applications from SAP work with both SAP and heterogeneous enterprise applications and data sources to leverage industry-proven best practices.

Cloud – The cloud provides a new way to deliver extraordinary potential for businesses to run better, faster.

SAP software accelerates complex assembly manufacturing by coupling product visualization with mobile and cloud technology to boost productivity throughout the product lifecycle. Visualization using 3-D graphical navigation and search helps a company's diverse departments to center on the product. The resulting quality, operational productivity, and time-to-market improvements increase the organization's competitive advantage.

Efficient Engineer-to-Order and Project Business

Opportunity, Quote, and Contract Management

SAP solutions support the transition from unstructured account management–related information into a structured quote and contract.

Project Management and Engineering

SAP solutions support detail design and construction as well as project planning activities.

Project-Driven Manufacturing, Procurement, and Logistics

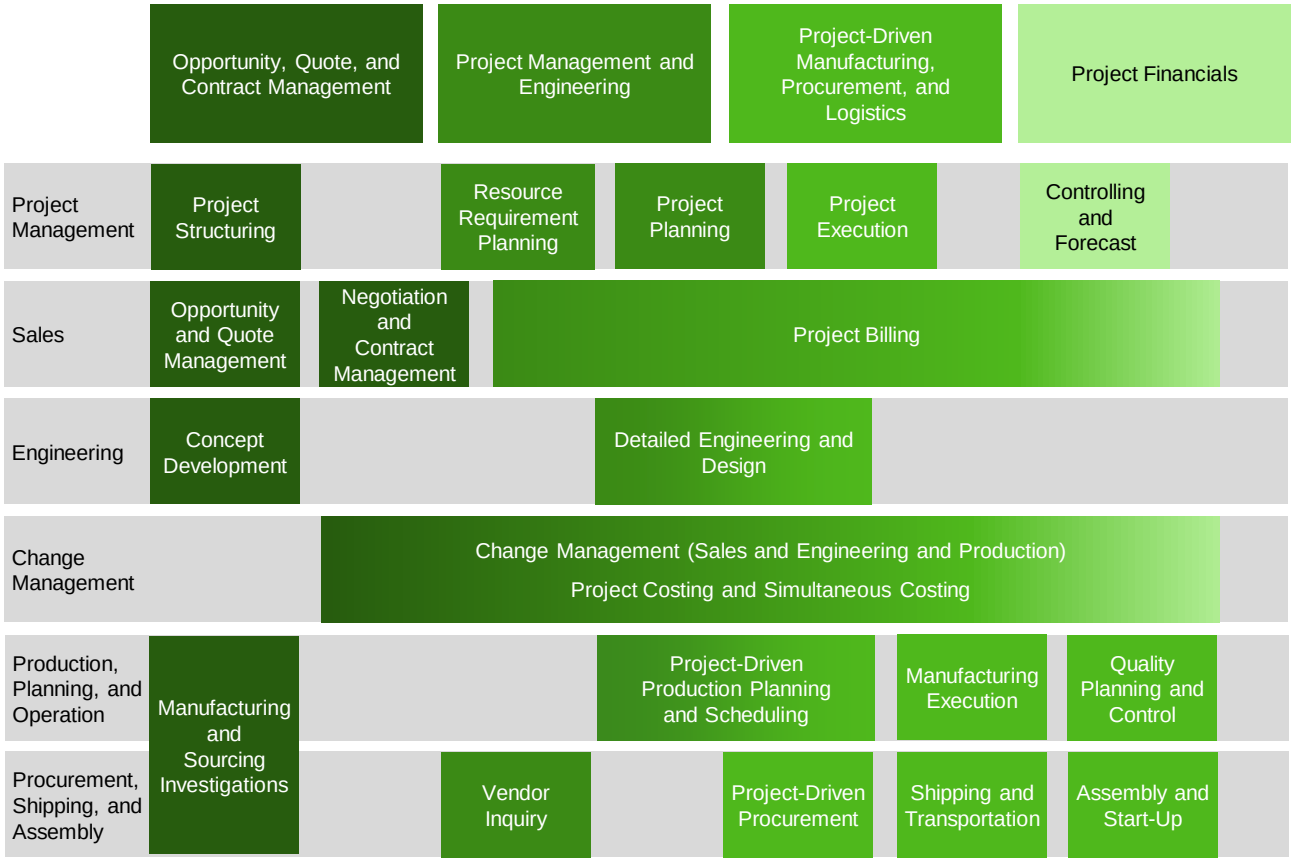
Strong, integrated SAP solutions help to build the products and assets controlled by the project.

Project Financials

SAP solutions focus on cost and revenue management as well the complete invoicing process.

Engineer-to-Order and Project Manufacturing

Engineer-to-order software integrates sales, engineering, and manufacturing processes for complex tailored products and solutions.



Opportunity, Quote, and Contract Management

Manufacturers operating in engineer-to-order and project manufacturing environments use account management activities to increase long-term opportunities. The main challenge for sales teams is to make the transition from unstructured account management information into a structured quote and contract process.

11%

Higher sales achievement as a percentage of quota for top quartile organizations compared to average organizations

Source: SAP Performance Benchmarking

Intensive project quoting, with versioning and change management, requires significant time, resource, and financial investment by the manufacturer, often before a customer contract is even signed.

Each project provides opportunities as well as risks. The goal of the initial sales phase in an engineer-to-order and project-manufacturing environment is to collect and understand structured and unstructured customer requirements.

Ultimately, these are transferred into a well-structured, signed contract with the lowest risk and the highest potential for profitability.

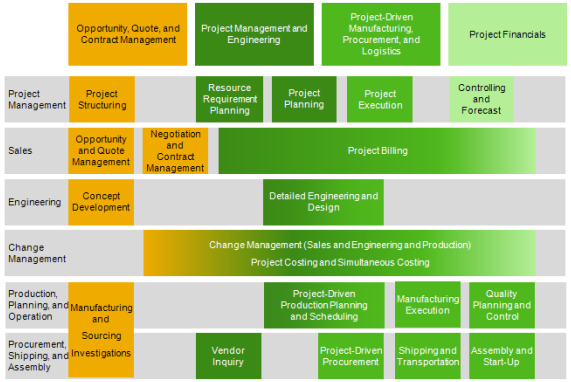
Depending on the customer-specific engineering effort and the number of stakeholders involved, some project activities may commence before the contract is actually signed. Initial design concepts and sourcing activities for long lead-time items and outsourced components may also be started at this time.

Transition from an Unstructured Opportunity to a Structured, Signed Contract

During the information collection phase, the account manager assesses the potential opportunity on a high-level basis in the SAP Portfolio and Project Management application. Project timelines, pricing, costs, feasibility, risk analysis, as well as sourcing options are also considered at this time.

Projects and opportunities rarely start from scratch, as there are always former projects that can be used as templates or as information sources. Therefore, while still in the sales phase, the project structure is initiated in SAP software for project management, which will eventually support the collection of time and material for all involved parties.

For some products, the engineering and development departments have to begin the conceptual design phase, which will be done in the CAD system and stored via the direct integration into SAP software for document management.



Engineering change orders requested by customers, partners, or internal stakeholders are often triggered by specification, condition, and timeline modifications, which can be intuitively managed via document versioning.

High-level manufacturing planning and strategic resource scheduling must be executed as early as possible to mitigate risk.

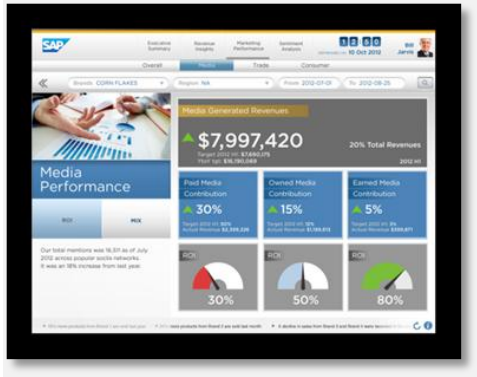
27%

Fewer complaints as a percent of orders processed when invoicing and billing functionality are expanded for customer needs

Source: SAP Performance Benchmarking

Smoothly Transition from an Opportunity to a Well-Structured Contract

Engineer-to-order and project manufacturing software is characterized by tight integration between the sales team and other departments within the organization. SAP solutions support this level of deep, well-documented, and visible integration across all stakeholders.



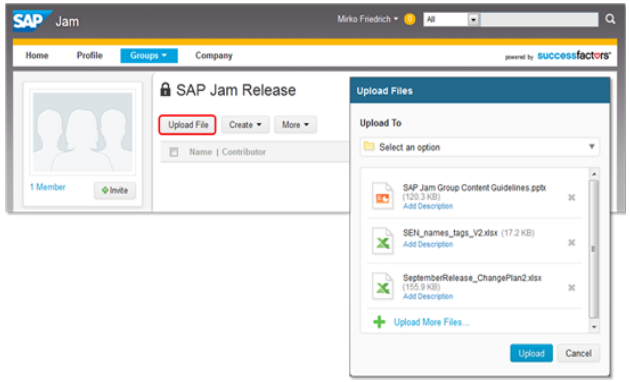
Guided and well-structured risk mitigation in the sales phase helps industrial manufacturers quote and sell low-risk, high-margin projects. Collaboration among the parties involved – customers, suppliers, contractors, as well as manufacturing or assembly units – is key to creating the foundation for a profitable, custom-tailored solution. Collaboration processes help transform large amounts of structured and unstructured data into a homogeneous, self-contained knowledge solution.

Comprehensive documentation builds a knowledge management pool for other projects as well.

Engineer-to-order and project manufacturers continually face numerous project changes when they transition from the quote phase to a signed contract. SAP provides a sophisticated, guided change management process that connects all stakeholders.

Innovations for Opportunity, Quote, and Contract Management

Manufacturers gain real-time insight into the order management process, accelerate order management, and improve customer engagement by utilizing the SAP Jam social software platform, an integrated, flexible, and scalable business communication platform for internal and external collaboration.



54%

Fewer errors in sales quotes when organizations leverage analytics to gain actionable insights from sales outcomes

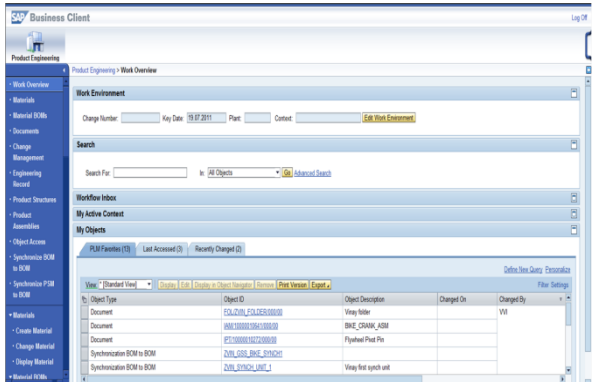
Source: SAP Performance Benchmarking

The SAP Jam social software platform not only supports the communication and traceability of information and chats among the internal and external stakeholders during the project sales phase, but also across the entire project lifecycle. The solution helps bring different groups together in one virtual space where everyone can see what is happening on a project at anytime, anywhere.

SAP Jam helps connect unstructured pools of project information in the social realm to structured business objects in the enterprise system. This type of connection is key for efficient and effective project performance, regardless of where the data originated.

Project Management and Engineering

Design and construction activities begin in engineering, while project managers plan for material and resource requirements. Project management software from SAP supports complete, end-to-end integration from CAD, product lifecycle management (PLM), project systems, and manufacturing execution all the way through supply chain management.



73%

Of organizations do not collaborate well with suppliers and customers to track project risks from identification to resolution

Source: SAP Performance Benchmarking

One of the more challenging issues during the project planning phase is the abundance of change requests. Changes can have significant impact on design, production, and costing, as well as pricing and scheduling. Engineering changes ripple across the entire project manufacturing value chain and must be well documented and visible to all concerned parties.

The process of material requirements planning (MRP) requires establishing the materials and services needed for the project.

MRP takes into account required deadlines and initiates internal and external procurement.

To help ensure compliance to project milestones, material supply must be scheduled to various value-add stages, even if the design documents are not yet available. Bottleneck resources and long lead-time materials may also need to be kept in a ready state.

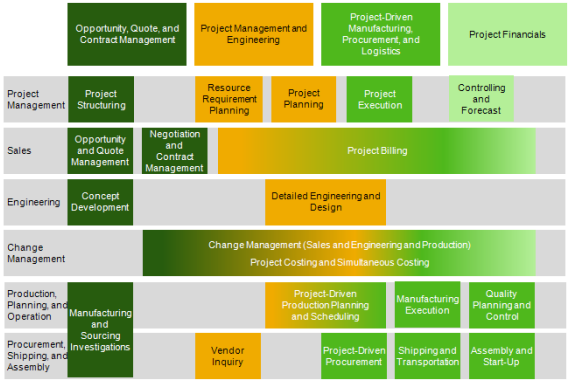
All of these operational activities and complex relationships can be orchestrated effectively by a well-structured project plan.

Build a Custom-Tailored Solution Based on Enhanced Standard Products and Innovations

SAP software for product design enables the alignment of many different design-related processes, including direct CAD integration to document management solutions for master and meta data.

Engineer-to-order and project manufacturing scenarios are characterized by frequent changes. Independent of the design in progress – whether released or still awaiting handover to manufacturing – all change requests can be controlled by tightly integrated engineering change management and order change management processes.

Project management is a key capability for orchestrating and controlling the engineering change process. Tight integration between the different tasks, including design, sourcing, changes, and production is critical to keep projects running on time and on budget.



By using tightly integrated project management software from SAP, companies can readily build and manage complex project structures, while controlling planning for material and resource requirements. Multilevel supplier research and risk analysis activities play an important role in the engineering phase of a project, because individual contractors rarely handle all of their tasks on their own. They also rely on other partners, suppliers, and subcontractors to execute various stages of a project.

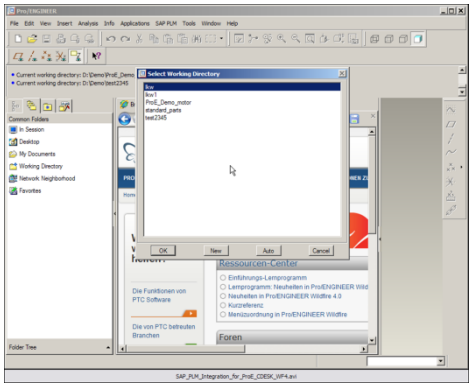
28%

Of organizations have driven the project management process to maturity by using standardized templates

Source: SAP Performance Benchmarking

Develop a Complex, Custom-Tailored Solution in a Rapidly Changing Environment

During the project design phase, industrial machinery and component companies benefit from strong collaboration and tight integration along the entire value chain. Collaboration and integration play a key role in reducing cycle times and mitigating, or even precluding, having product specifications that fail to meet customer expectations.



32%

Of companies have the technology for project managers to reconcile planned and actual project costs and schedules in real time

Source: SAP Performance Benchmarking

Tight integration across CAD, document management, project, and manufacturing systems helps reduce design times and engineering costs.

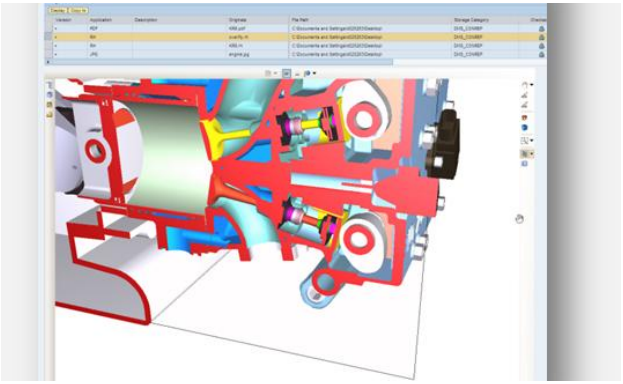
Changes in engineer-to-order and project manufacturer scenarios are daily occurrences. Integrated change management functionality from SAP diminishes the financial impact of change requests and supports smooth, fast, and transparent engineering transactions.

Project-driven products or assets are delivered by many different internal and external parties. Collaboration solutions help bring all these different stakeholders together on one platform to reduce engineering lead times and costs.

Highly collaborative scenarios based on 3-D visualization, as well as automated handovers of information to the next process in line, lead to higher quality, compressed cycle times, and lower costs.

Innovations for Project Management and Engineering

Manufacturers can benefit from SAP software for 3-D visualization by combining 3-D views with enterprise business information. All stakeholders in an engineer-to-order and project manufacturer scenario can use a comprehensive collaboration and visualization platform to communicate with each other better.



20%

Higher availability of real-time insights into business processes for organizations that use analytics to track strategic KPIs

Source: SAP Performance Benchmarking

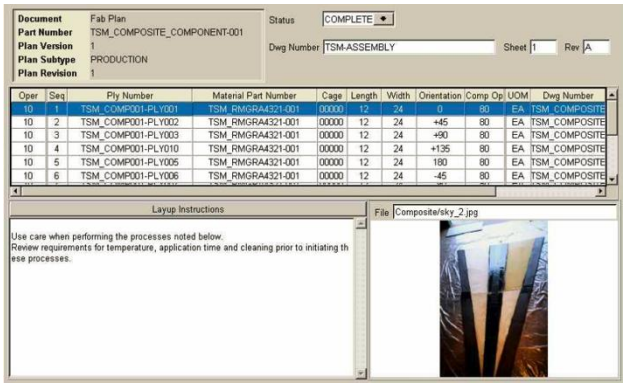
The unique 3-D view of products and assets provided by SAP software, enriched by context-sensitive business data, helps to eliminate the silo approach to product development.

The 3-D model is the collaboration medium for all project participants across the value chain. 3-D visualization propels state-of-the-art communication to an entirely new level.

Companies can accelerate decision making, optimize productivity, and improve quality with SAP software that integrates 3-D product visualization with business data from upstream and downstream processes. Visual enterprise applications from SAP enable effective communication across departments, lines of business, customers, suppliers, contractors, and partners along the entire value chain and elevate collaboration to a new level.

Project-Driven Manufacturing, Procurement, and Logistics

Engineering designs are released to the production department via the project structure system, which plays a key role in orchestrating all engineering and manufacturing activities against a time schedule as well as a cost target. Tight integration across all disciplines is paramount for a successful project.



6%

More orders shipped on time when warehouse operations are integrated with extended supply chain

Source: SAP Performance Benchmarking

Define and organize tasks and resources globally to adapt to changing customer and production needs.

Integrate bills of material with text, tools, and graphics to create and maintain work orders and maintenance instructions for manufacturing, rework, and asset management.

Use leading intuitive 3-D visualization technology to unify and accelerate the design-to-manufacturing process. Use intuitive 3-D visualization to create, maintain, and communicate process plans, bills of material, and work instructions. Graphically query and maintain multilevel product structures.

Structure a project from initial customer quotation through production project scheduling. Manage work breakdown, scheduling strategies, and project capabilities.

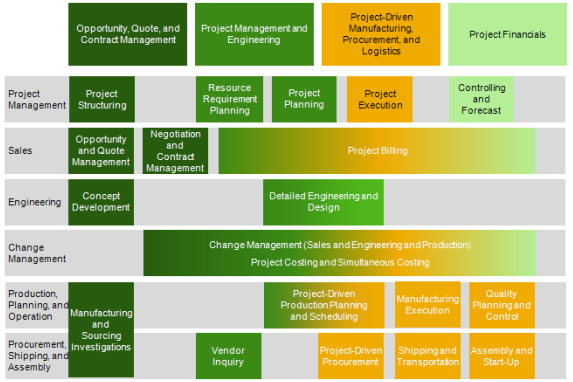
Employ manufacturing execution for complex assembly to manage shop floor product and processes efficiently, along with scheduling priorities, quality management, and as-built records.

Integrate Complex Project Management Across the Entire Manufacturing Process

Process planning and scheduling is integral to documenting and maintaining project manufacturing activities. Integrate bills of material with text, tools, and graphics to create and maintain work orders and maintenance instructions for manufacturing, rework, and asset management.

Apply visualized manufacturing to achieve efficient production operations. Integrate visual manufacturing with enterprise resource planning (ERP), product lifecycle management, and manufacturing execution systems to manage extremely large, complex structures with massive designs and data sets.

Employ project manufacturing software to manage complex product build cycles. Use a software solution to track engineering, manufacturing, assembly, installation, shipping, and order-related activities. Apply work break-down structure functionality to help manage the overall project. Task and relationship networks, including material and capacity requirements, trigger logistical planning and execution.



Rely on manufacturing execution to manage and document shop activity. Use work-in-process (WIP) documentation, including production and rework orders, to manage each worker's access rights to actions such as start, stop, complete work, hold/release, split, reschedule, close, reopen, certify, and batch.

15%

Lower FTE cost when production personnel can monitor production and parametric data in real time

Source: SAP Performance Benchmarking

Smoothly Integrate Complex Project Activities Across the Entire Manufacturing Cycle

Engineer-to-order and project manufacturing processes are characterized by complex project and product structures as well as numerous engineering change orders. SAP offers a tightly integrated project manufacturing solution that supports dynamic environments, decreases lead times, and increases quality levels.

30%

Lower rework time when monitoring, notification, and resolution processes are automated in the maintenance process

Source: SAP Performance Benchmarking

The integrated solution helps improve complex change processes by reducing errors and costs through a consolidated, standardized, intuitive, and graphical data storage system.

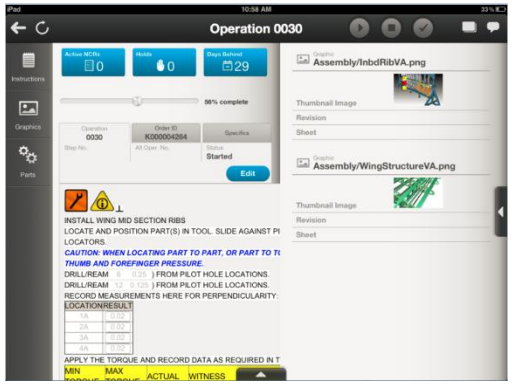
The SAP solution helps simplify production processes, accelerate comprehension, and consolidate product knowledge by providing quick, intuitive access to multilevel product structures. The functionality helps enhance process understanding and eliminates unnecessary duplication of effort.

Manufacturing performance is improved by leveraging advanced planning and scheduling functionality. Supply chain planning solutions help streamline all activities associated with complex custom orders.

The solution helps manage continually changing WIP activities to reduce cycle times and costs through efficient manufacturing execution tools. These tools help minimize rework, repairs, and inventory, while intuitive interfaces help project stakeholders quickly learn and utilize the system.

Innovations for Project-Driven Manufacturing, Procurement, and Logistics

SAP innovations for manufacturing, procurement, and logistics can help improve performance across the entire enterprise. Leveraging visual, mobile, analytical, and optimization technology, these innovations are revolutionizing performance efficiencies in engineer-to-order and project manufacturing environments.



5%

Higher order fill rate when warehouse data and reports are shared with stakeholders

Source: SAP Performance Benchmarking

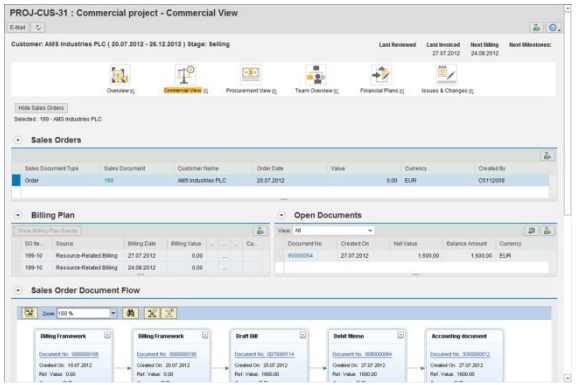
Analytics solutions can revolutionize manufacturing processes through advanced modeling and process optimization throughout the entire production lifecycle.

Manufacturing is simplified through the use of mobile platforms that allow devices to display instructions and provide analytics in the field, anytime and anywhere.

Analytics, graphics, and mobile solutions enable advanced modeling and optimization throughout every aspect of the manufacturing network and give manufacturers always-on access to production status and reporting as well as exception management and alerts.

Project Financials

SAP software provides project financial information at multiple levels. SAP Portfolio and Project Management is for high-level budgeting, planning, and reporting. More sophisticated financial functionality is provided at a much lower level of detail by the SAP Commercial Project Management application and other project management solutions from SAP.



86%

Lower finance costs for expertise subprocesses when organizations focus on accurate planning and forecasting

Source: SAP Performance Benchmarking

Maintaining accurate project information and real-time transparency into financial data, project progress, and operational issues while viewing the impact of potential changes are all essential ingredients for sound business decisions.

Finance functionality in SAP Commercial Project Management enables project controllers to estimate, plan, and forecast quantities, costs, and revenue across the entire project lifecycle.

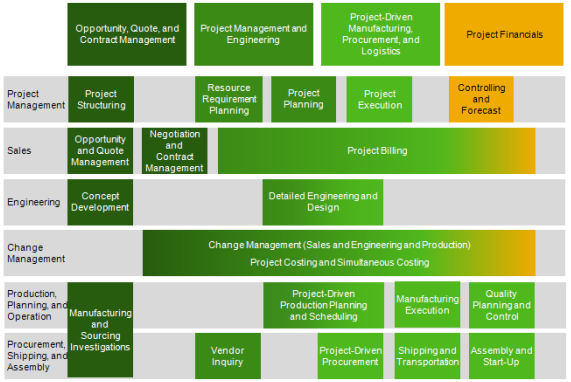
The unified, flexible, and user-friendly interface enables processes from bid stage to baseline planning to execution.

Finance functionality integrated with project planning, execution, issue, and change management, as well as enterprise accounting, helps project manufacturers improve estimating and forecasting accuracy while providing transparency into cost drivers, process deviations, and resource productivity.

Efficiently Handle Financial Data

Inaccurate financial planning and estimating, coupled with nonintegrated planning tools, can result in incorrect project data and cumbersome data synchronization. Industrial machinery and components manufacturers utilize the finance functionality in SAP Commercial Project Management to achieve a unified financial plan for all processes along the project lifecycle, including resource, material, expense, and revenue management.

Powerful bidding functionality allows industrial machinery and component companies to transfer high-level estimates into detailed project costing and baselines. During project execution, planned costs and revenue form the basis for forecasting and monitoring project financials. The flexible, user-friendly interface uses a Microsoft Excel front-end and advanced versioning and analysis functionality. The commercial project management solution integrates with the SAP ERP application for effective and precise financial data management.



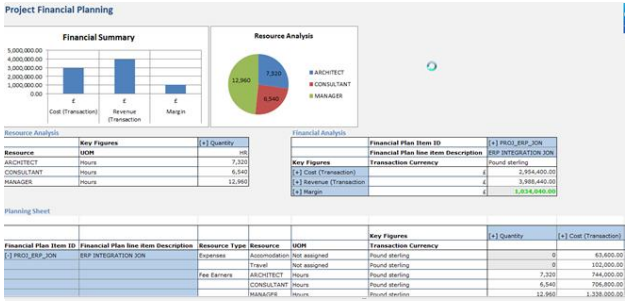
22%

Lower cycle time for forecasts when online forecasting models are globally accessible for analysis

Source: SAP Performance Benchmarking

Increase Financial Data Accuracy

In an engineer-to-order, project-driven environment, efficient and integrated project financial data management dramatically increases the accuracy of project estimates, financial plans, and forecasts, which greatly improves project profitability for industrial machinery and component companies.



76%

Higher operating margin with historical and forecasting views into financial and operational performance

Source: SAP Performance Benchmarking

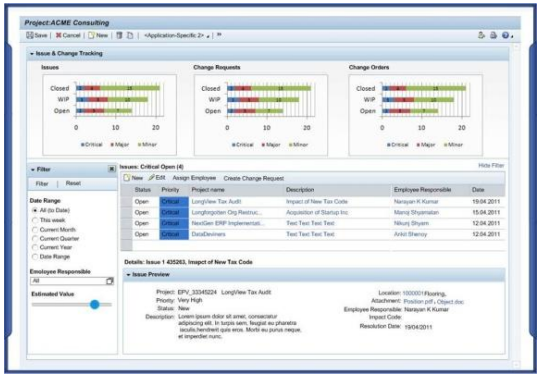
Finance functionality in SAP Commercial Project Management provides flexible, user-friendly tools for consistent handling of project financial data along the entire project lifecycle in an engineer-to-order manufacturing environment.

Integrated project planning, execution, accounting, and resource planning enables efficient project financial data control and a high level of data accuracy, allowing industrial manufacturers to improve visibility into bid estimates, baseline plans, and planned vs. actual comparisons and what-if analyses.

Accurate project financial data improves transparency of project cost, productivity, and profitability information. Early insights into financial deviations enable industrial machinery and component manufacturers to quickly take corrective measures and optimize project profitability.

Innovations for Project Financials

Project estimation, production planning, and manufacturing forecasting functionality, integrated with SAP ERP, differentiate the user experience for companies that operate in an engineer-to-order manufacturing environment where project management processes are mission critical.



22%

Lower audit cost with automated controls, rather than manual controls, to improve assurance and minimize cost

Source: SAP Performance Benchmarking

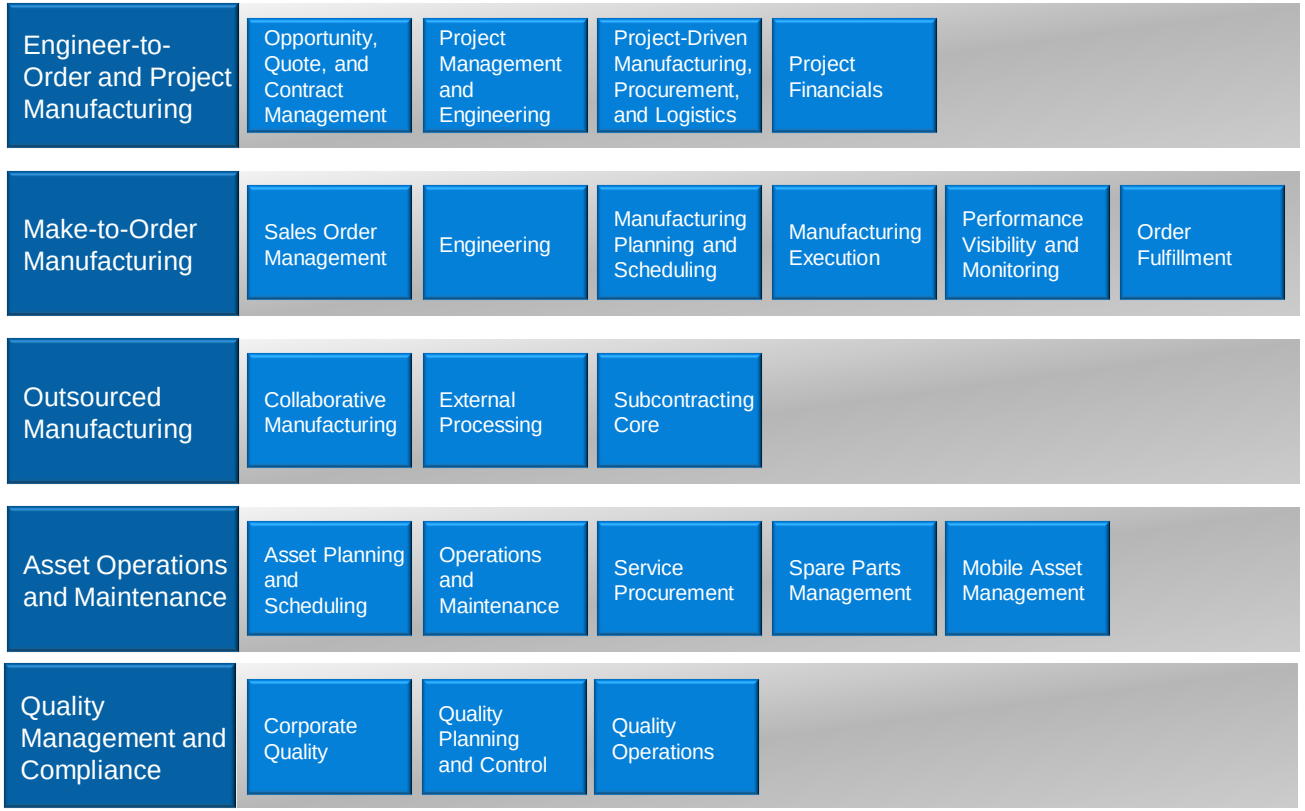
SAP Commercial Project Management includes an option for cost and revenue planning that provides flexible planning and analysis functionality. The solution improves the end-user experience through tight integration with SAP ERP.

Throughout the project lifecycle, manufacturers can employ a single tool to estimate, plan, and forecast quantities, costs, and revenue on a monthly, weekly, or daily basis.

The definition of bid structures and resources, additional characteristics for planning and valuation, as well as data-transfer strategies provide a new level of planning customization and the ability to run highly granular plan-versus-actual comparisons and version comparisons.

Manufacturing Value Map

SAP software streamlines delivery of engineered solutions.



Why SAP?

Engineer-to-order manufacturing solutions in the SAP Business Suite applications help companies closely align operations with corporate objectives, synchronize manufacturing processes with business processes, achieve continuous improvement, and optimize IT investments.

Deploy Opportunity, Quote, and Contract Management

SAP software offers functionality for opportunity, quote, and contract management and supports project management and engineering change management.

Optimize Manufacturing, Procurement, and Logistics

With integrated SAP software, manufacturers can optimize project-driven manufacturing, procurement, and logistics to improve overall project financials.

Leverage Industry Best Practices

A comprehensive portfolio of closed-loop processes across sales, planning, execution, and delivery helps manufacturers leverage industry best practices, enabling improved visibility and more efficient manufacturing processes across the complete value chain.

Leverage SAP Technology Innovations

SAP has led IT innovation for business for 40 years. Today's new technologies will enable companies to plan better and provide companies with access to the insight needed to improve every aspect of their enterprise operations.

Find Out More About How Your Organization Can Become Best-Run

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Position your organization for dominance in this new economy with the business performance benchmarking program from SAP – available free to SAP customers and select prospects. The SAP benchmarking program has helped more than 3,000 organizations assess their strengths, uncover areas for improvement, and identify best practices and IT strategies that generate clear, tangible value – not someday, but today.

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