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BEST PRACTICE GUIDE

How to effectively design, sell, and deliver configured products

Industrial Machinery and Equipment

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A critical shift

In the current competitive market for industrial machinery and equipment, “off the shelf” doesn’t cut it. Delivering highly complex, capital intensive, engineer-to-order products has always been challenging, but the demand for a unique product is increasingly extending into many products that have long been considered standard. If your business is unable to efficiently design, sell, and deliver customized products at an attractive, profitable price, it will fall behind the competition in the current environment.

There are three key areas that your business must transform in order to deliver configured products:

- Sales and marketing
- Engineering
- Supply chain and manufacturing

When it comes to sales, you must enable your team—direct and channel—to deliver accurate, timely quotes to customers, or risk missing out on deals to your competition. In the past, delivering a quote or estimate was a manual process where the sales engineer would reference outdated price sheets or go back and forth with product engineering and finance departments to devise a customer quote. This manual process is slow and inefficient, often resulting in missed opportunities that the customer would be interested in. Or, the customer moves on completely because it took too long to deliver a quote. Configuration automation and connectivity across design and manufacturing could be the difference in winning a deal.

Truly, Henry Ford’s famous quote, “You can have any color, as long as it’s black,” has never been less appropriate. In order to compete, your organization must be able to deliver a unique product that meets a customer’s individual needs.

On the product side, complex workflows and lack of product standards and documentation create inflexibility in the ability to provide options as well as communicate where design changes could be made to meet customer needs. Additionally, inconsistent bill of materials (BOM) in design and manufacturing could lead to a situation where materials are not available, or a product is built incorrectly. An integrated business could provide impact analysis of changes to a design across the rest of the organization.

Lastly, supply chain and manufacturing are where the rubber meets the road when delivering configured products. Manual quotations lead to manual entry of production and supply chain requirements, leading to an increased potential for errors. Integration is required from the automated quotation to the creation of the production bill of materials to then drive the operation. Your supply chain must be flexible, predictive, and adaptive to ensure that all options are supported at an adequate level and that margins can be maintained.

Clearly, this is an issue that most industrial machinery and equipment manufacturers must address. Not offering your customers options or continuing to configure on spreadsheets puts your business at a significant disadvantage. This guide will provide you with an overview of how you can increase sales and reduce costs through:

- Facilitated configuration, quoting, order management, and customer communication utilizing CPQ automation
- Integrated design and enhanced innovation through standardized design workflows, enforced quality standards, and links between design, sales, and delivery
- Optimized supply chain, manufacturing, and project management supported by increased visibility and analytics for decision-making

When you’re finished reading the guide, you’ll have an understanding of next steps to take towards providing a superior experience for your customers that meets all of their unique requirements.



Why product customization matters

In [the New York Times article](#) “Customers Want Customization, and Companies Are Giving It to Them,” Aviva Freudmann observes that an increasing number of industries are joining the mass customization bandwagon, a new phase in the broader trend to offer customers personalized products. “The new phase involves customization that is not only aesthetic in nature — choosing the blue item instead of the red one, for example—but also based on features unique to the customer,” Freudmann writes.

In fact, [the Configurator Database Project](#) shows how widespread mass-customization has become. The website provides links to companies that allow consumers to build individualized products, and it lists about 1,360 companies in 17 industries.

When it comes to industrial manufacturing, “the demand for mass-customized manufacturing is changing the nature of the mechanical engineering industry,” [writes Freudmann in the same New York Times article](#).

The article also quotes Christian Bauer, lead developer of 5G at Trumpf, a large machine-tool maker, who says: “our customer is no longer just buying a machine to make its products, but rather the flexibility to make individualized product variations.”

Truly, Henry Ford’s famous quote, “You can have any color, as long as it’s black,” has never been less appropriate. In order to compete, your organization must be able to deliver a unique product that meets a customer’s individual needs. These customizations could be simple, requiring small changes to a product using inexpensive, easy to procure, or already on-hand materials. Or, the customizations could be drastic, requiring significant engineering changes, altered supply chains, and new cost structures. Either way, customized products must be delivered at the same level of quality, and at a profitable margin, as a standard product in order to make them a successful part of your product portfolio.

Ultimately, an inability to personalize products will keep your business firmly behind the competition. Further, attempting to deliver customized products without integrated workflows and technology will keep your business from reaping the benefits due to ineffective customer communication, increased costs, and lower quality. This presents challenges across the three key components of product personalization:

- Sales and marketing
- Engineering
- Supply chain and manufacturing

Sales and marketing are the first line of defense in customer interactions. Today's consumer has high expectations when it comes to their interactions with you. In the case of industrial machinery and equipment, customers expect the experience to reflect how they purchase products in their day-to-day lives, even if purchasing machinery and equipment is far more complex. Consumers want to know what they're getting, when they're going to get it, and how they will pay for it—and they want this information within minutes. Without the right technology in place, delivering this positive customer experience is difficult when products are lightly customized, and near impossible when they are highly engineered.

Many industrial machinery and equipment manufacturers can't support a facilitated sales process because they rely on highly complex pricing sheets that are often outdated and inaccurate. By solely relying on a process with outdated and clunky spreadsheets, it's difficult for sales engineers to know which changes are possible, whether or not changes are even possible, and other complementary products that should be sold. This often results in promises the manufacturer cannot keep, or they have to spend time calling into engineering, finance, and manufacturing to create a quote. This manual process could take days or even weeks, by which time the customer could have moved on to a competitor.

When it comes to product design, customization must be built in from the ground up. It's not always simple to add options to a product that has already been tested and standardized, especially as that product becomes more complex. Existing design workflows and supporting documents may not be flexible enough to support customization.

In the age of mass customization, supply chain and manufacturing need to be predictive, flexible, and in constant communication with sales and R&D. Integrated communication between the three is crucial for delivering configured products.

Building new products with an eye towards modularity is key to enabling the delivery of customized products, and further towards creating an ability to deliver new products by tying those sub-assemblies together. Truly, R&D sits at the center of customization.

Today, design changes and options are not always communicated to sales. Conversely, R&D must be able to work with supply chain and project delivery to communicate when purchasing or production plans need to be changed and if these new products can even be produced. At the center of it all, data is not always consistently passed between the three, with conflicting BOMs.

It's a lot easier to manage a supply chain and run production when you can easily predict demand and don't have to make many changes to products. In the age of mass customization, supply chain and manufacturing need to be predictive, flexible, and in constant communication with sales and R&D. Integrated communication between the three is crucial for delivering configured products.

Clearly, product customization is a difficult challenge that impacts industrial manufacturers today, but this presents an opportunity for manufacturers that are able to do it effectively. To be successful, you must assess your processes and links across sales and marketing, engineering, and manufacturing and distribution. **McKinsey states that** "the technology platforms that come together to enable mass customization could rejuvenate stagnant markets and help companies pioneer new opportunities that deliver attractive growth and margins." By addressing these challenges with the tactics listed in the next section, your business can win more deals, increase margins, and improve customer satisfaction.



Necessary transformations to support customization

Now that we understand why customization is an important part of your product strategy and why delivering personalized products is difficult, let's examine each of the three key areas that must be changed in support of customization. To prepare for transformation, we can identify the impact of failure across each, define the expected outcomes of taking action, and help you to understand what an optimized process looks like.

1. Sales and marketing

As mentioned above, many industrial machinery and equipment manufacturers struggle during the sales and marketing of configured products because sales executives and channels are often referencing highly complex, outdated, and inaccurate pricing sheets that make it difficult to access available options and cost structures. This causes a negative ripple effect across the business and often results in low customer satisfaction because these manufacturers do not have the ability to facilitate communication on the customer's terms.

The failure to optimize these processes impacts your organization in many ways. As the head of the snake, the inability to configure, price, and quote products immediately limits your ability to extend your product set. You'll be limited in what you can offer, and consumers will move to your competitors to find what they're looking for.

If your configure, price, and quote (CPQ) processes are not optimized, you most likely face significant challenges. Paper-based and manual quoting processes lead to inefficiency, inaccuracy, and a lack of visibility. Calling multiple key stakeholders to generate a quote is time consuming. By the time the process is completed, a customer may have moved on, resulting in fewer won deals. Plus, the quote that is calculated may lead to a delivered product that loses the company money due to costly materials or altered timelines. A manual quoting process is prone to human error, which could cause a sales executive to quote an option that is not available or not of sound design, either requiring extensive rework to an existing design, poor quality, or an incredibly long lead time due to a lack of available materials or new production requirements. In this case, you can incur increased costs or shipment delays.

Seamless communication with customers is often a challenge for manufacturers who lack an efficient configure, price, and quoting process, which leads to damaged customer relationships. Customers expect to interact with you in the ways they interact with the companies they purchase consumer products from in their day-to-day lives. The ways in which you communicated with your customers in the past no longer suffices. Not taking the action to modernize this process can result in an inability to cross-sell and upsell—and decrease customer satisfaction.

So, what does good look like in relation to selling and marketing configured products? There are two sides to this equation: the direct customer interaction and generating the quote itself.



Leading industrial machinery and equipment manufacturers rely on automation for configuration and quoting, which results in efficient processes, improved productivity, and increased sales. Their sales executives have access to dashboards or portals that display accurate information about available items and options, as well as configurations that are no longer supported and should not be selected. They use a robust configurator tool that is linked with engineering and supply chain data to maintain accuracy. Sales engineers can efficiently select the desired product and automatically receive a generated quote that they can communicate to the customer. Advanced configuration tools allow the customer to go through this guided selling process on their own. If the customer has questions, they can easily connect with product engineering. Even better, the sales engineer can view the information they need to approach the customer with upsell options.

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From the customer's perspective, the configuration process is simple. Leading manufactures who have modernized their configuration and quoting process allow the customer to get a quote the way they want to—whether they are calling a salesperson or using a dedicated customer portal. If they choose to call the manufacturer directly, the salesperson can walk them through available options and generate a quote immediately. Or, they can use the customer portal to see available options, what they look like, make changes, and automatically be presented with a quote. No matter what option the customer chooses, the process is seamless, allowing them to see what they're going to get, when they're going to get it, and how much it's going to cost. And ideally, they could pay right there.

In an ideal world, the sales process would be supported by customer self-service, increased interactivity, and automatically generated quotes—but that's just the tip of the spear. Delivering customized products stems from R&D's ability to create the options that customers expect.

2. Engineering

You can't deliver customized products if your engineers aren't building modifications into their designs from the beginning. Plus, delivering customized products is increasingly difficult if your product engineering team is not effectively linked with sales, supply chain, and delivery. Failure to take customizations into account leads to several adverse outcomes:

- Products don't meet quality standards and utilize materials that are not readily available.
- Designs may limit options that could've been supported with minor alterations to the original design.
- The size of components prevent new options from being added.
- One-off products create delays in the regular delivery of standardized products.

Many additional outcomes are impacted by a lack of visibility and communication in design. Without accurate visibility into product designs, standards cannot be enforced and new mods cannot be easily made to existing designs. If these restrictions are not enforced and linked to sales and supply chain, sales may promise customers product designs that are not sound and procurement may be sourcing insufficient or noncompliant materials. This lack of quality and visibility will harm your business and in the case of heavy machinery could physically harm the users of your products.

If your business optimizes the design aspect of delivering customized products, you'll reduce lead times, reduce costs, and improve quality. Here's how:

In the design phase, modularity is key to delivering configured products. Design products in segments and consider how they can fit together, while working with sales and marketing to determine options that customers want. Creating a configurable BOM and linking that to all phases from sales through delivery is essential for enabling customization. There is a line in the sand that demarcates the difference between a new product with product codes, and simply an option. You must have an up-to-date and accessible repository of product designs and options. You must also have the ability to identify the impact of changes to a design on cost structures, quality, sourcing, and resource scheduling.

This can be accomplished by linking product lifecycle management (PLM) systems with your customer-facing product configurator, but also with enterprise resource planning (ERP) systems for enhanced analysis. Artificial intelligence (AI) and analytics applied to product changes will lead to more accurate pricing and will ensure margins are met. Think about how much more profitable you could become if your engineers could predict demand for a product, and how efficiently it can be delivered to the end user.





3. Supply chain and manufacturing

The supply chain is the last function that must be optimized in the delivery of configured products. Customization adds variability, while ineffective planning can increase costs, lower quality, and lead to an inability to deliver products on time.

In order to optimize the supply chain for configuration, there must be a link between sales, engineering, and planning systems for complete visibility into what is coming. Engineering BOMs and manufacturing BOMs must be consistent, drilling through to planning, and they must be automatically generated based on the quote or estimate from the sales cycle. Forecasts must be built intelligently based on probability factors devised for the various options, features, and materials that need to be supported. To lessen the burden on manufacturing, go all the way back to design and ask yourself: At what level can something be partially built in a make-to-stock fashion and simply added to when a new configured order comes in?

In a perfect world, supply chain planning would have full visibility into demand factors and AI-assisted probability analysis of the need for materials. The optimal amount of sub-assemblies can be built ahead of time enabling a smaller impact on the line as new deals are won.

Purchasing schedules can be automatically informed to ensure the availability of materials when they are needed. This will ensure that customer needs are met, costs are kept in check, and quality is maintained.

So, what does this look like in real life? Consider this example from a manufacturer who successfully delivers configured products. International Equipment Solutions (IES) serves the construction, agriculture, landscaping, infrastructure, recycling, demolition, mining, and energy markets under various trade names worldwide. IES operates through two primary business lines: engineered attachment tools for operator-driven equipment and cab enclosures for operator-driven equipment.

Seeking to improve the positioning of its brands, IES implemented Infor® Configure Price Quote (CPQ) in its Pengo and EMCOR divisions. IES chose Infor CPQ to increase sales, quote volume, and accuracy, and reduce the costs associated with generating quotes. Since implementing the solution, IES has increased sales and sales-to-order conversion, while also freeing up capital that was previously stuck in generating quotes for custom orders. Infor CPQ has also helped IES improve its quote volume and accuracy. For its Pengo division, Infor CPQ has helped differentiate its brand by offering the industry's first online quoting and ordering experience. With this unique offering, Pengo has swiftly become a market leader.

With the ability to standardize a manually driven quoting process that previously took days or weeks to only a few minutes, Pengo has been able to increase the efficiency of its business processes. Infor CPQ's versatility has allowed for complete integration with Pengo's CAD system, driving the generation of custom 3D drawings that are sent as part of the quote package for customer sign-off. This has also helped reduce error rates and dramatically increase order accuracy. Quotes are now accurately presented in a highly professional, visual, and consistent proposal package. Pengo has benefitted from a 40% year-over-year increase in the number of quotes processed. More impressively, Pengo has not had to add any additional staff to accommodate the increase in sales.

The solution has helped free up valuable engineering time formerly assigned to quoting, allowing the team to focus on product enhancements and new product development. The engineering team gained back over 600 hours of design time by having the Infor configurator generate custom product sign-off drawings. Internal and external sales teams are now able to use the same system to generate customer quotes for configurable items. Moreover, the external sales team has access to the Infor CPQ tool whenever there's an internet connection available, giving them actionable capabilities in the field.



How to deliver personalized, customized products

If your organization is struggling to meet customer needs, it's time to examine how you can deliver more personalized, customized products to your customers. Or, maybe your organization already offers customizations to customers, but you are experiencing challenges in your ability to quote, sell, design, and deliver customizations optimally. In either of these scenarios, there's a series of actions you can take to optimize your workflows. For the most bang for your buck, it makes sense to effectively integrate the key systems used across the entire configuration lifecycle. This will enable a consistent BOM across sales, engineering, and manufacturing. It will also enable a cascading impact analysis on changes to designs on the other key areas. Your entire organization can move in lock step.

CPQ, PLM, ERP, and other supply chain applications can be the technology backbone that enables you to move forward in additional projects that will have benefits beyond your configuration project. In sales and marketing, start by gathering all essential information in one central repository. Pricing, product standards, and upsell paths should be gathered holistically in one place.

Keep product engineering, manufacturing, and supply chain teams actively involved so this information stays current. Automatic updates based on changes in other systems are ideal, but in the meantime these functions must stay vigilant. After this information is gathered, this function could embark on a digital transformation initiative to automate quotes and even create a portal for an online buying experience that can be used directly by customers or your sales channel.

In product development, your team can assess design standards or build new designs to factor in modularity and customization. You can create new BOM structures that take this into account and work with sales and customers to determine which types of customizations and products will be in demand. Digitizing this information in a PLM system and linking it with other operational systems will enable you to identify the impact of changes to designs so that your business can ensure product profitability.

In manufacturing and supply chain, your project should focus on integration, flexibility, and predictability. Applying analytics to demand data and creating formulas that predict the probability of choices can inform purchasing plans and schedule resources that will not exceed your plants capacity. The transformation you make towards a modern, connected supply chain will impact your business' ability to succeed even beyond the ability to deliver personalization.

Digital transformation projects can be daunting, but the ability to design, sell, and deliver configurable machinery to your customers is crucial for your business' ability to differentiate itself in a competitive market. It's a journey, maybe you do this in phases, starting, for instance, with creating CPQ models and rulesets, before moving on to other phases such as integration. Some roadblocks may occur—lack of executive buy-in, disconnected business systems, a lack of a unified data strategy, and an ill-defined roadmap—but by creating a cross-functional team of IT and the line of business, your organization can devise a strategy for taking the steps it needs to be able to deliver customized products to customers. From there, you can work with key business consultants and software vendors with industry expertise to create a roadmap for transformation.

They will help you to understand industry-best practices and provide recommendations on how to best proceed. While your goal is to deliver customized products, your goal should also be to avoid customization of the business systems and workflows you implement. Of course, transformation is never complete. Continuously monitor key performance metrics and continue to tweak your workflows as you innovate.

Leading industrial machinery and equipment manufacturers rely on automation for configuration and quoting, which results in efficient processes, improved productivity, and increased sales.

The path toward leadership

For industrial machinery and equipment manufacturers, delivering personalized, unique products is the key to doing business in an increasingly competitive environment. Doing this effectively requires synchronization across engineering, sales, finance, supply chain, and manufacturing.

To reduce costs and improve responsiveness and sales, successful manufacturers embark on digital transformation journeys, automating calculations and decisions, while differentiating customer and employee experiences through connectivity.

In sales and marketing, manufacturers must be able to deliver timely and accurate quotes to customers, preferably in a self-service capacity. In engineering, users must create easily customized designs, be able to predict the impact of changes to designs on operations and share a consistent BOM across functions. Lastly, supply chain and manufacturing must be able to optimize demand planning and manage production schedules effectively.

Taking these steps will put your business on a path towards leadership in the industrial machinery and equipment industry.



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