

Free to Choose: Mass Customization for Modern Manufacturers

by Jordan Reynolds

"The customer can have it painted any color he wants, so long as it's black."

This famous remark from Henry Ford circa 1909, in reference to his line of Model-T automobiles, captures the nature of product development in the late industrial revolution. In an age when automobiles were perceived as a futuristic luxury for the affluent, Ford recognized that the average consumer was likely to be enthused with low prices offered by economies of scale, rather than a more expensive product that fit their unique needs. Ford set out to "build a car for the great multitude," and reached this goal with great success through a production model that minimized variation while maximizing efficiency. Ford's method of producing "for the great multitude" is appropriately acknowledged today as mass production.

The mass production strategies put forth by the titans of the 20th century still resonate today on manufacturing floors, in business processes, and the systems that support them, like Product Lifecycle Management (PLM). Personalization and production efficiency have long been believed to be on the opposite ends of a continuum; mutually exclusive benefits that manufacturers and consumers are forced to choose between. In the last decade, however, innovative companies in a broad range of industries have shattered this dichotomy.

To get started, manufacturers should consider current challenges, historical approaches and the potential benefits of a modern mass customization model.

The Challenge for Modern Manufacturers

Demand for configurability and personalization is growing in the marketplace and presents a threat to traditional mass production techniques. The Smart Customization Group at MIT estimates that by the year 2020, 15 percent of the clothing Americans buy will be customized for fit, color and style. Clayton Christensen, Professor of Business Administration at Harvard Business School and author of the *Innovators Dilemma*, predicts wholesale bankruptcy among standard universities in the next decade, as highly customized online learning programs rapidly build market share. Food manufacturers like MyMuesli and YouBar offer customers the opportunity to design products that fit their own personal dietary restrictions.

Discrete manufacturing is no exception: automotive customers can mock up their dream ride using a simple design application on the company's website or a smart phone app. Desktop and notebook computers are highly customizable for features and appearance. One has only to look as far as their kitchen cabinets and countertops to see custom design in action.

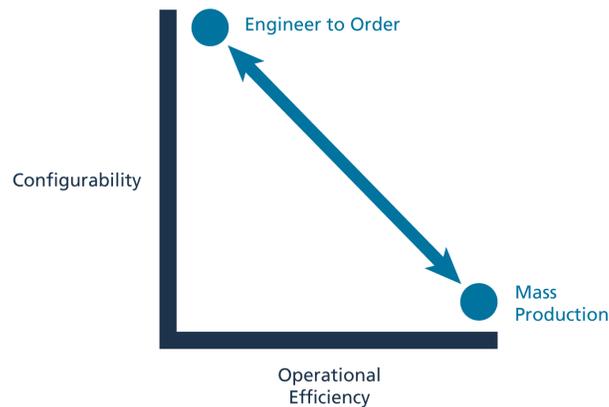
It's easy to see that customer collaboration in the design process is quickly becoming the norm, but manufacturers today still face a difficult question: *"How can I improve my customer focus by offering highly configurable products, while maintaining the operating efficiency of a mass-production model?"*

Historical Approaches to Customization

Companies have taken a number of different approaches to solving this problem. Some negotiate contracts, estimate cost and effort, and assign engineering resources to develop products directly for customers. This model is known as Engineer-to-Order (ETO) and is prevalent today in construction, aerospace and defense. While appropriate for many companies, ETO falls short for a number of reasons. Since products derived from an ETO model are unique to each order, the engineering processes and work plans used to develop these products are unique as well. This lack of predictability is heavy on operating costs, and usually requires extensive engineering attention on a per-order basis, limiting time spent on innovation and new product development. Aside from a few outliers, manufacturers that operate with a pure ETO model are accustomed to thin margins and creative stagnation.

Other companies attempt to tweak the mass production model by pre-configuring a set of product variants, and mass-producing each variant. This model is not without its shortcomings. To produce predictably and efficiently, the number of variations must be strictly limited. A company whose customers' needs are unpredictable, or require a substantial number of product variations, may find that pre-defining a massive number of bills of material (BOM) combinations can be difficult or impossible.

Most companies that strive to offer product configurability are stuck somewhere on a spectrum of tradeoff between customer centricity and operational efficiency:



A third idea, foreshadowed by Stan Davis' in his 1987 book *Future Perfect*, is growing today in innovative products ranging from automobiles and semiconductors to designer handbags and nutrition bars. Mass customization, as Davis branded it, describes the process of "producing goods and services to meet individual customer's needs with near mass-production efficiency."

Here's a modern, practical twist on Davis' definition: *mass customization means developing a product architecture, within which an indeterminate number of products variants can be configured dynamically by the customer at the point of sale, and with minimal engineering intervention.*

Benefits of a Modern Mass Customization Model

As the product of a marriage between mass-production and ETO, mass customization allows businesses to inherit the dominant traits of each: high efficiency paired with a high degree of customer focus.

The business opportunities inherent in this solution quickly stand out:

Customer satisfaction

Delivery times are shortened, extraneous features are reduced, and the utility offered to each individual customer is maximized. A mass customization strategy can help to ensure accurate quotes, lead times, and interpretation of customer requirements.

Shareholder value

Products that are configured to meet unique customer needs have the potential to reach a broader audience, and have a greater range of application than those that are mass-produced. This offers manufacturers the chance to increase the footprint of their products and expand sales. Additionally, an enterprise optimized for mass customization ensures that the costs of order fulfillment are minimized.

Innovation

By removing your engineering resources from solving order fulfillment problems, they are available for new product development, innovative R&D projects, and designing new configuration options for the products in your existing portfolio. The cost of capital is reduced through effective product development. Mass customization also creates an interface between the manufacturer and the customer, enabling collaboration and open innovation.

Mass customization presents an enticing promise, but as a manufacturing trend it is still in its infancy, and companies may find that the availability of industry testimonials and academic research is under-developed.

Many companies ambitiously venture into mass customization implementations only to find that their enterprise technology is configured precisely to a mass production model. For manufacturers who choose to champion the virtue of consumer choice, please stay tuned for a series of blog posts on five rules to live by.

5 Rules to Live By

[Modern Mass Customization – Rule 1: Modularize your People, Processes and Products](#)

[Modern Mass Customization – Rule 2: Follow the Rules](#)

[Modern Mass Customization – Rule 3: Honor the Order, Abandon the BOM](#)

[Modern Mass Customization – Rule 4: Look Your Customer in the Eyes](#)

[Modern Mass Customization – Rule 5: Brace for Change](#)

Originally published on March 3rd, 2014

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