



Achieving superior product development in process manufacturing

Even the best innovators have notorious flops: New Coke®, Apple® Newton, Microsoft® Zune, Life Savers® Soda, and Harley-Davidson® Perfume are a few notable examples. Some companies can overcome blunders because their sheer size makes them unstoppable market forces—but for others, even a single mishandled launch can threaten company-wide failure.

The risks are even greater for process manufacturers, who must continually innovate with new and iterative products to excite customers and generate new revenue. But the path to profitable innovation is paved with challenges: tighter launch windows, fickle B2C and B2B customers, volatile market swings, and increasing demand for unique, customized products.

An uphill battle

Product development is fundamentally more difficult in process industries. In many instances, decisions are based on molecular-level evaluations well before any customer has a chance to incorporate a new material into their products. For too many firms in this sector, years of internal research and testing lead to product launches that meet with lukewarm success—and negligible profits.

Equally damaging are the great ideas that aren't pursued, leaving incalculable profits unrealized. Process manufacturing executives are rethinking how they develop and launch new products, to minimize risks and maximize profits.

They want new products to:

- Excite the market with a game-changing innovation, which usually requires the longest time to market, greatest costs, and greatest risks—but also the largest potential profits.
- Expand the market with new products in an existing category. Since these innovations are often requested by customers, there's a better chance of market acceptance—but the approach still entails considerable risk (and opportunity).
- Shift the market via iterations, renovations, and maintenance of existing goods. This approach offers lower risk, but also lower potential profits.
- Catch up to the market by copying what competitors have already launched, competing for a smaller piece of an existing market's share. Savvy leaders avoid this position, if at all possible, because of limited profit potential and increased risk.

According to analyst John Blanchard of the ARC Advisory Group, batch manufacturing operations in chemical processing plants, for instance, have become more complex, while the need for flexibility and speed to market grows.¹

Once a market approach has been identified, process manufacturers must evaluate new products across a range of factors and metrics, including:

- **Costs:** Ingredients, research and development, production, marketing, and distribution/logistics costs
- **Specifications:** Customer, industry, government, and local requirements, specifications, and compliance
- **Capacity:** Facilities, equipment, and corporate knowledge
- **Performance:** Quality, safety, and time to develop and produce
- **Profitability:** Pricing that covers costs, while remaining competitive

Staging your way to success

The overwhelming challenge for process manufacturers is that these factors are not fixed in time. Each factor can change as a product is designed and produced, which then impacts all the other factors. For example, an existing blending operation (capacity) may require an upgrade (costs) to accommodate new ingredients; yet doing so may also impact the speed of production (for better or worse) and characteristics of the product itself (quality and regulatory compliance).

Savvy executives rely on a staged (or phased) approach to development, in which innovations are sequenced with specific “go” or “no go” decision points. A reported 70% to 85% of leading US companies **currently use a staged approach** to product development.

A staged approach to product development isn't new, but new information technologies can make these approaches dramatically smarter and faster. Improved data allows process manufacturers to quantify the costs of innovation, assess product performance and market potential, and project the time required for launch, as well as profitability at each stage of development. Executives can be confident in their decisions to proceed—or not—to give their products the best chance for market success.

A common staged approach involves five stages:

1. **Ideation:** Will there be demand for the product? Does the company need the product to reenergize a tired portfolio? Will new ingredients transform an existing product? Can we leverage raw materials in new ways?
2. **Define the product:** Engineers scope product characteristics, such as formula, usage, appearance, and properties. Marketers re-assess revenue potential based on the product's preliminary design.
3. **Create a product plan:** Engineers now plan production. Do we have the assets to produce (such as plants and equipment)? Can we source materials? How long will it take to go from development and testing to production and market? How do we package and distribute the product?
4. **Prove the product:** This stage is highly quantitative, driven by R&D models, prototypes, and trial batches. Early perceptions based on prototypes are gathered from customers, and engineers run experiments to digitally or physically validate their predevelopment theories. This testing also refines cost estimates: Can we profitably source, make, and distribute? A “go” decision triggers a handoff from development to production, and alerts all support functions (such as procurement, marketing, and finance) to prepare for launch.
5. **Make and deliver:** Production begins with initial batches that are compared to design specifications for quality, regulatory compliance, etc. Is the product that's being produced the same as what we designed? Can we efficiently make full production runs of high-quality product? Ongoing review of market reaction (do customers like it?) and research into product characteristics under market conditions (does it retain quality and safety characteristics?) drive additional development decisions.

The benefits of a staged approach

A staged approach to process industry product development improves the likelihood that a sellable, profitable, and high-quality product hits the market on time. It allows executives to reevaluate product concepts as they become more refined, within a context of real-time business conditions. And by incorporating the latest information technologies with integrated stage-gate functionality—to evaluate product parameters, digitally model product features, assess market trends, and analyze emerging ideas—product development proceeds at a pace that today's markets require. Lastly, a staged approach ensures that product development knowledge is captured throughout the process, whether the product is developed or not. The benefits can be big for a product—and can be dramatic for a company with a portfolio of evolving products.

Despite an inherently uphill battle, product development teams in process manufacturing can thrive with the help of the right approach and technology—and the infrastructure to properly support them. While unexpected changes are inevitable, a proactive approach will help companies be better prepared to address them and overcome any challenge.

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