

THE ROLE OF MASS CUSTOMIZATION IN AUTOMOTIVE & TRANSPORTATION

Q&A with Fred Thomas, DELMIA Global Industry Director

Q. First, it would be great to get our terms right: should we be talking about 'mass customization' or 'mass personalization'? Which is your preferred term for the automotive & transportation industry and why?

FT. I prefer 'mass customization' as it is more recognizable, accurate and better understood in the context of manufacturing products to exacting specifications in volume. 'Mass personalization' is real for sure, but I believe that it is cosmetic in nature rather than having a design or functional impact.

For instance, Ford offers the ability for Mustang prospects and customers to 'personalize' the Mustang logo in an array of colors and designs. As well as having the car badge manufactured to your personal design specification, the customer can extend that personalization and have the logo printed on everything from coffee mugs to T-shirts. Ultimately, this deepens the relationship with the customer. Essentially, personalization allows unique elements to be added to the product but without changing its fundamental attributes.

Q. Can you define mass customization by giving an example of how it should work in automotive & transportation?

FT. Mass customization is not a new concept. Designing, engineering and manufacturing multiple variants of a product to meet the specific requirements of a customer has been around for quite a while. I see current mass customization as simply a higher level of performance responsiveness for what some automotive manufacturers have already been doing.

For example, Ford currently offers their F-150 truck with the choice of five different engines across six trim levels, available in three cab sizes and two drive trains. When you add in a choice of three bed lengths, the number of ways to personalize an F-150 truck is almost incalculable.

What's also new are the customer's expectations; the company should be able to provide this level of customization across all its products, not just a select few.

There's the added expectation that automakers will be agile and flexible enough to incorporate the latest technologies into existing highly proliferated product line-ups, as well as new product offerings, at a pace that mirrors the best pure-play technology companies.

In general, mass customization requires digital continuity at an enterprise level across engineering and manufacturing to deliver best-in-class operational performance that meets today's customer expectations. Pockets of success exist in automotive but I don't think any company has yet achieved an enterprise-wide capability of mass customization at higher volume levels across multiple product lines on a global scale.

Q. Specifically, what technology is making this possible today? How does the technology work?

FT. 3D modeling and simulation of both product and process is critical. Most manufacturers are using some level of 3D modeling and simulation for product design and engineering. But comparatively few are using 3D modeling and simulation to define, test and improve their manufacturing processes across robots, cells and lines in virtual replications of their actual factories.

I would argue that one without the other only has a marginally positive impact on the goal of profitable, flexible and responsive mass customization.

On the other hand, a centralized innovation platform founded on 3D technologies for both product and process—applying model-based definition and single source data unification right across engineering and manufacturing—is the marque of an agile organization that’s prepared to be a leader in the mass customization movement.

Q. How do you see the technology evolving? What will it make possible in automotive & transportation tomorrow that it currently can’t achieve today?

FT. 3D modeling and simulation technology that incorporates a comprehensive approach to manufacturing processes has evolved rapidly over the last few years. Over the next few years these technologies will fully integrate with manufacturing operations and execution management solutions to create true digital continuity in manufacturing.

It won’t be long before the industry will achieve closed-loop manufacturing where the manufacturing shop floor is fully simulated in virtual space before any capital investment is made, and where the manufacturing model is continuously updated through real-time performance feedback from the execution environment. Once that is achieved, cost-effective mass customization on an enterprise level will be a reality.

Q. In what major ways should a process-based manufacturer or company have to change to properly embrace mass customization?

FT. The first thing that must change is the idea that enterprise-wide mass customization capabilities driven by digital continuity can be achieved through tactical, low-budget technology purchases at a department or plant level.

Instead, true transformation of a manufacturer’s business is required. This entails executive leadership with a clear strategic vision of who they are today and what they need to be in the future. As an example, we’ve recently seen major automotive OEMs adjust their messaging to become “mobility providers” rather than just “car manufacturers”.

Equally important is how that vision gets executed at an operating level in terms of technology. Chasing the latest ‘shiny-ball’ technology concepts is neither strategic nor visionary. Understanding what an innovation platform is and how far it can be extended and utilized across the organization in concert with back-office business systems is where the vision and the strategy should start.

Q. You’ve explained the long-term upsides of mass customization, but what are the short term corporate downsides and what’s the best way to cope with them?

FT. Implementation of any large scale transformative change to a business contains risk. There will be failures, some more visible than others. For example, deployment failures on the shop floor have no place to hide. Everyone sees them and everyone feels the pain when the line is down.

However, nothing worthwhile is ever achieved without risk. The goal is to mitigate the risk to the greatest extent possible. This requires the right technology, the right technology provider and the use of cross-departmental teams who represent the deepest experience and best problem-solving capabilities available from the IT, engineering and manufacturing operations within the company.

Q. Is there still a place for process-based manufacturing in this brave new world?

FT. There is not only a place but a critical role for process-based manufacturing. Without it you should consider going into retail as you will fail as an automotive manufacturer in a mass-customization-driven world! Technologies come and go but at the end of the day, business processes enabled by technology that uniformly deliver digital continuity—from ideation to delivery and field service—are the keys to mass customization success.

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