Mass Customisation in Manufacturing - the dirty reality

Now the real work begins

What is preventing manufacturing companies from significantly increasing the level of customisation that they provide in their products? In other words to allow them to move closer towards Mass Customisation. This is a pertinent question to ask given the amount of publicity that Mass Customisation has received in the business world. Let me ask this question another way: Is Mass Customisation to be yet another short-lived management fad or is it just difficult to achieve in practice? As we all know the move from the paper of books and presentation to the reality of materials, processes and people is never clear and simple. In this article I've explored the experience of four very different companies which I have worked with in the application of Mass Customisation.

A pragmatic model of customisation

My experience in consulting with manufacturing companies is that when considering mass customisation, companies fall into one of four areas:

Active Mass Customisers
There are indeed a few companies which are strong practitioners of manufacturing Mass Customisation, but such companies are generally few and far between. They are employing highly flexible processes, supported by team-based organisations and up-to-date Information and Production Technology in key areas, to enable the production of highly featured and customised products at a very low or even zero differential cost over their standard competitors.

High Cost Customisers
These companies are providing customisation today. Indeed some may even believe themselves to be 'Mass Customisers'. Certainly they are providing customers with customisation and choice that they value. But they are not mass customisers, for this is the culture of 'specials', of variants at unknown costs, at extended leadtimes, with high parts inventories; the net result being High Cost customisation

Dormant Mass Customisers
These companies have mastered the key underlying internal capabilities required for mass customisation, such as lean production, flexibility, a modular design architecture, supporting organisation and IT. They have probably focused on World Class practices and performance and applied Business Process Re-engineering with vigour. But they have not yet exploited these capabilities with customers by providing significant customisation.

Classic Mass Producers
These are the manufacturers which lack both the capabilities to move to mass customisation and the market stance of offering customisation. There are two reasons for the market position. One is that they operate in a market where customisation would not be valued or that the second is that the company does not have the belief or ability to move in that direction.

Customisation in action

High Cost Customisers

Our first company, let's call them AlphaCo, is one division of a large UK manufacturer of construction and agricultural vehicles which operates globally. They already provide a large number of variants. Indeed they now believe that in some areas, particularly in the number of cab options, that there is more choice than the customers actually want. Currently they have a major challenge to provide today's variants at shorter cycle times, as they are trying to make to order. However, the current 10 week delivery timescale creates a lot of dealer order changes resulting in significant manufacturing scheduling and parts supply problems. Associated

with this goal is that of cost saving through inventory reduction. They are thus looking to significantly reduce the order fulfilment time. Their customisation capabilities are also inhibited by limitations in the modularity of their products at both a high level (i.e. their ability to effectively provide niche products using a set of common parts 'modules' such as chassis, air conditioning, hydraulics etc.) and a low level (e.g. the use of common screws and fixing elements). This is due to two reasons: Firstly the company has a strong business unit focus, which provides vertical integration of design, manufacturing, marketing and sales and thus inhibits design modularity within the total company, and secondly limitations in the company's IT systems which are not providing strong support to the design process.

Effective, integrated IT can provide the 'doors' for communication of key information across a company, through any organisational 'walls' that exist. This company would benefit from the use of a Product Data Management (PDM) system for disciplining and speeding up the design process. Additionally, the use of Parts Classification Libraries would ensure the re-use, rather than re-invention, of components, enabling cost-effective modular designs. Similarly, to support a fast order to shipment process, IT becomes vital, for ensuring that orders are configured correctly and that thay can pass directly to manufacturing. Dealer visibility of order status through on-line systems is also becoming increasingly important.

Our second company, BetaCo is a leading European pump producer. They are already active in producing some of their products for OEM customers who incorporate them in boilers and other products. They customise their products for colour, as well as mechanical features and provide different packaging and shipping options for each customer. They are indeed customising today, but not yet Mass Customisers due to a number of process problems. Their process for new variant introduction is too slow and still primarily paper-based; again a PDM system is required to improve the speed of this process and the reliability of coping with a very large number of variants. There is also the need for a 'modularity strategy' to minimise the proliferation of parts and variants and to enforce a core of standard parts. Again, this would need the support of IT-enabled Parts Libraries. Perhaps more importantly, it's not clear to this company whether they make money on all their variants as their current costing models cannot provide this information.

Dormant Mass Customiser

GammaCo is a medium-sized UK manufacturer of electronic control systems which is the UK market leader. In seeking to expand its market share in a static market, it considered the application of Mass Customisation. Through our benchmarking relationship with this company we already knew the company to be world class in its manufacturing and fulfilment operations and thus capable of providing product-based mass customisation. Their current route to market was through a Value-Added Reseller (VAR) channel, where these system integration companies already provided customisation by tailoring the company's products through coding, wiring and installation to exactly meet the end customers needs. If the company were to mass customise their products at source, this would have brought them into conflict with their VARs. The biggest customisation opportunities proved to be in the services provided to end customer and to their own VARs, through use of the Internet and IT. This case is a good example that Mass Customisation demands cross-functional integration. Looking at manufacturing alone is not sufficient.

Active Mass Customiser

DeltaCo is an interesting example of an Active Mass Customiser in one operating unit of a large global manufacturing company. This business unit was responsible for making industrial abrasives (e.g. sandpaper). An increasing element of its business was in high variety applications such as for powered hand-sanders with different base shapes and sizes and hole locations for dust extraction. Additionally, large industrial customers, such as automotive companies, were demanding customised packs (e.g. with instructions, different paper grades). Traditionally this unit had manufactured abrasive paper using press cutting suitable for large volumes, with long changeover times. In their own words, they'd 'made it by the mile and sold it by the inch'; an approach appropriate for stable demand with low variety. But with the increasing demand for variety and customisation, it was a method whose time had come. They implemented the new production technology of laser cutting, capable of 10 second changeovers, enabling them to compete effectively in this market. They also restructured their business into two focused factories: 1 - High volume build to plan for stable commodity sandpaper, 2 - Mass Customisation cell with orders taken direct into cell and distribution direct to the customer using an outside

company, by-passing their own (and too inflexible) company distribution system.

So what have we learnt?

These are four very different companies, competing in quite different industrial sectors but some common issues emerge:

> Neither of the companies operating as High Cost Customisers had explicitly created a customisation strategy, they'd effectively stumbled into customisation, to meet customer demand and now find themselves with a challenge. Successfully competing on the basis of Mass Customisation demands the application of an integration strategy.
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> Mass Customisation is not 'right' for all companies, the key question to ask is 'Would my customers value increased customisation and choice?' It may be the right approach for some market sectors, with other sectors requiring standard offerings, as in the case of the abrasives supplier.
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> Providing Mass Customisation requires involvement and integration beyond just the factory, with Manufacturing, Design, Marketing needing to link with key suppliers and those companies providing the route to the market. And indeed, customisation of services and delivery may prove to be more important than product customisation for many companies.

All companies need to look at Mass Customisation and question how could this approach be used in their business. Would their customers value increased customisation or would they attract new customers? How could they upset their competitors by creating increased turbulence in the market ? These are key questions to be asked.

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