



MASS CUSTOMISATION

In the early 1900's, the introduction of the assembly line and the development of automation changed the manufacturing environment around the world. Companies were able to produce large quantities of goods at a reasonable cost, dramatically changing the economics behind manufacturing. Today, the consumer is driving an even more dramatic change, one that is affecting almost every manufacturing plant around the globe.

Consumers used to be satisfied with the status quo, and manufacturers concentrated on driving profits through economies of scale. Henry Ford's directive, "You can have any colour you want, as long as it's black", represented the typical attitude manufacturers held toward consumers. Over the past century, as competition intensified, technology advanced, and the global market became a reality, consumers were presented with an array of choices once deemed unimaginable. Large manufacturers were caught flat-footed, unable to respond to the fragmenting consumer market. They began to realise that mass production practices promoted companies to adopt highly automated, inflexible structures that value efficiency and low cost over flexibility. In response, manufacturers started to develop new policies, techniques, and practices to address the rapidly changing market. This customer driven paradigm shift has been called *mass customisation*.

Mass customisation is defined as the mass production of individually customised products and services. In its simplest terms, it is giving customers what they want, when they want it, but at a price comparable to the goods produced under the mass production paradigm. The inherent advantage of the paradigm shift lies in the ability to reach fragmented markets.

Over the past two decades, manufacturers have started to take the first steps towards reaching the goal of mass customisation. Concepts and tools like Just-In-Time, Kanban, Enterprise Resource Planning (ERP) systems, Quality Functional Deployment and Design for Manufacturability, have moved manufacturers closer to giving customers what they want, when they want it, yet manufacturers are still far away from implementing the flexibility required to achieve true mass customisation. This newsletter covers the evolution of mass customisation, the factors driving the movement, and one of the major impacts it will have on manufacturers: improving data management.

Evolution

Analysing the progression of manufacturing paradigms over time indicates the full circle the manufacturing landscape has taken over the past 100 years.



Until the early 1900's, the manufacturing community was comprised of craftsmen, producing custom products on a very small scale. This allowed for a limited number of satisfied customers, but craftsmen were unable to satisfy consumer demand at a reasonable cost. The system was plagued by long-lead times and inconsistent product quality.

The next paradigm to evolve was mass production, the dominant system for large volume manufacturers during most of the 20th century. Mass production was an effective strategy to meet growing consumer demand. It focused on producing and selling standardise items by exploiting economies of scale to achieve market-acceptable prices. The strategy worked because the market was able to handle any additional capacity, demand outpaced supply, and products were simpler to manufacturer. The paradigm held true under one major assumption: markets were homogeneous and everyone had the same basic wants and needs that could be satisfied by a few standard products. However, as competition started to increase, especially from overseas, consumers were presented with a wider variety of choices. Supply began to outpace demand, and manufacturers soon realised consumers were increasingly fragmented. Mass producers began to lose market share and recognised they could not drive profits through economies of scale. Faced with this breakdown in the fundamental assumption that enabled the success of mass production, companies began to realise that a critical change in the way they conduct business was required to stay competitive. The technologies, organisational structures, and operational practices that were appropriate to mass production had become a competitive liability.

The ideas behind mass customisation were manufacturing's response to overcome the competitive liabilities of the mass production paradigm. Manufacturers needed to respond to customer's needs quickly and have the flexibility to change operations, technologies, and organisational structures. Mass customisation must balance providing the flexibility the customer will value and keeping costs low enough that the customised products are profitable, even in low volumes. The key is not just to be flexible, but flexible in a way that adds value to the customer. The customer does not care if a manufacturer can produce twenty thousand different style pagers, as long as the manufacturer can produce the one the customer wants. The goal is to combine the best of both previous paradigms—the custom aspect of the craftsman and the cost advantages of mass production. While the two seem in direct conflict, satisfying the consumer while producing at a profitable scale are being used as means to improve customer satisfaction, expand market share, and generate higher earnings.

Drivers of Mass Customisation: Technology and Globalisation

The increased pace of technological change and the globalisation of the market have allowed companies to move toward the mass customisation paradigm. The introduction of technology has improved quality, increased communication between suppliers, and



reduced the overall cost of operations. Now, the evolution of advanced information systems allows the co-ordination required to implement mass customisation on a large scale. Also, the globalisation of the economy exposed emerging markets, which increased the competitive landscape. Global imbalances between supply and demand allow small companies to compete by finding and filling niche markets, encouraging innovation and investment in new technologies. These macro changes have made it impossible for most manufacturing companies to keep strict mass production principles as their competitors embrace the concepts behind mass customisation.

One Impact of the Mass Customisation Paradigm Shift: Improved Data Management

The ability to reach fragmented markets (i.e. become agile) takes an incredible amount of planning and research and disrupts the day-to-day operations of a manufacturing plant. As the plant moves from producing one to 200 different style products, operations become extremely complex. The cost of gathering and compiling the information required to run such an operation overwhelms the advantages of economics of scale. The following are some key processes where data management is essential to minimise the cost of implementing mass customisation:

- N **Order/Operations:** Communicating the exact specifications of each model, style, or variant generates huge volumes of data coming in and out of materials and resource planning, order entry, and the shop floor. With so many different styles, lot or batch sizes going through production, the number of set-ups and changeovers increase. This adds to complexity of the operation and places more emphasis on managing constraints.
- N **Inventory:** The increase in variations adds to inventory required on-hand to meet demand since each model, style, or variant may require different raw materials. Companies are minimising the affects on inventory by using concepts such as DFM, which is concerned with understanding how product design interacts with other components of manufacturing systems. Companies are designing products that can be customised late in the production cycle in order to minimise the affects of holding more inventory to meet unpredictable demand.
- N **Scheduling:** More end items are competing for the same production resources (machines, tools, people and materials). Thus, scheduling and sequencing become much more complex in order to optimise order fulfilment times while maximising profitability.

Also, non-value-added activities tend to increase as the company adopts mass customisation principles. As the number of product variations and lot sizes increase, it takes more research and development time to create different product variations. It also



takes more time to develop new operating procedures and implement changeovers. Companies try to minimise the impact of the increase in non-value activities by minimising their occurrence and offsetting them with productivity and operational improvements. The movement toward mass customisation does not come without a cost, and the recent wave of technology, especially ERP systems, helps companies minimise some of the cost associated with data management and the increase in non-value activities.

Examples of Mass Customisation at Work

Anderson Windows has focused on involving customers in the mass customisation process. They began allowing individual customers design their own windows using graphical PCs in hardware stores and other retail outlets. The specifications go directly to Andersen's manufacturing plant in Beauport, Minnesota. The "Window of Knowledge" system has been implemented at 387 Andersen dealers. The system has increased the company's business in custom-designed windows, and competitors have started to imitate the system.

John Deere's Harvester Works manufacturing plant in Moline, Ill., produces a wide variety of crop planters. Until a couple of years ago, the plant was a typical mass-production operation, with long manufacturing cycles. The company was unable to respond quickly to individual orders. The old system forced the plant to project demand and keep a finished-goods inventory of about 300 planters. The plant recently revamped its manufacturing processes to respond to individual orders, and it reduced its finished machines in inventory to only 20.

Motorola's Pager Division has implemented a system that manufacturers hand-held pagers to individual customer specifications. Using a computer, retailers help customers design their pager with the features they want. The computer communicates directly with the plant, and within 20 minutes, an individual customer's order is started on Motorola's highly automated production line. Within an hour, the unit is completed and ready for shipment.

Conclusion

The shift toward mass customisation is beginning to move out of its early cycle and the pace of change will only quicken companies face even more intense competition. As organisations take strides toward reaching the ultimate goal of mass customisation, they raise the competitive bar one more level. This endless competitive cycle is driving the trend toward implementation of new technology and the redesigning of business process, all with the hope of minimising the costs associated with operating in this new environment.



BIBLIOGRAPHY

1. Teresko, John, "Mass Customisation or Mass Confusion", *Industry Week*, June 20, 1994, pg. 45-46, 48.
2. Fraser, Julie., "Customer Drive Desires Home: How to Synchronise When Mass Customisation Comes to Roost", *Intelligent Manufacturing*, June 1995.
3. Anonymous, "Tailoring for a Niche of One", *Nation's Business*, November 1993, pg. 45.
4. Pine, Joseph. *Mass Customisation*. HBS Press, October 1992.



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