

Solution for Homework #1: Manufacturing Overview

**2.008 Design and Manufacturing II
Spring 2004**

**Out: February 4th
Due: February 11th**

Problem 1:

Do review question 5 of the handout, Chapter 1 of Benhabib's book.

“Compare Ford's passenger car manufacturing and marketing strategies in the early 20th century to those implemented by GM. Elaborate on the continuing use of these competitive practices in today's manufacturing industries.”

Solution:

In the early 20th century, car manufacturing at Ford as well as at GM was a capital-intensive activity, driven by the forces of mass production. A specialized workforce in which the individuals performed small tasks over and over again reduced production costs dramatically. This manufacturing and assembly process was made possible by product standardization.

The Ford Motor Company pushed this manufacturing technique to its extreme by applying Taylor's “scientific management” concept to its assembly lines. This included a lack of customer choices by selling only one or very few products in high volumes. The marketing strategy behind this concept was to sell cars by their low price (competitiveness-via-price strategy).

GM used standardization techniques as well as Ford to cut down manufacturing costs. But with standardized components (platforms), different models were built, covering multiple pricing categories. Using the same parts for different models helped to maintain low prices and to sell high volumes while different models addressed a wide field of customers by offering some choice. In addition minor changes were introduced in frequent intervals, which kept the products up to date.

Current manufacturing is still driven by low-cost mass production as well as by a need for flexibility. As industrial design (color, style) a mainstream issue, the technology gap between different manufacturers becomes small, and companies keep decreasing the product lifecycle to attract more customers. In order to maintain a balance between the cost and flexibility, new techniques have been developed, such as MRP, JIT as well as the flexible manufacturing systems. Extensive use of IT-systems and computer-based tools throughout the complete manufacturing process is a necessity in order to stay competitive.

Problem 2:

Do discussion question 9 of the same handout.

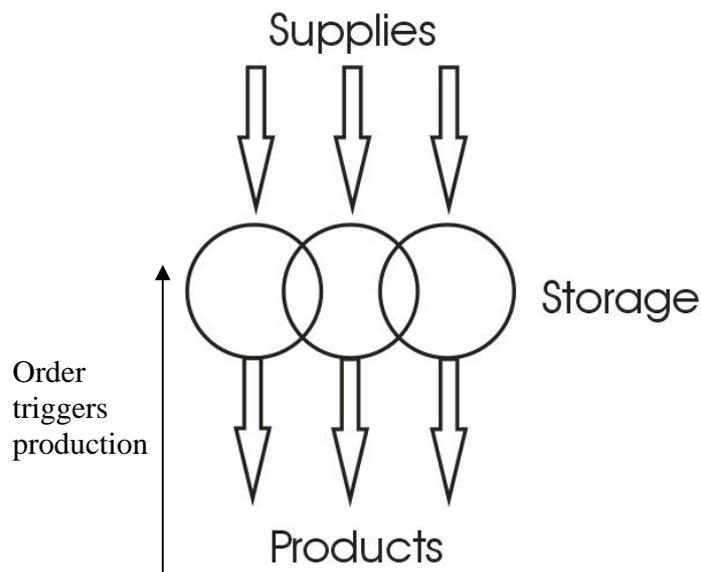
“Fast food outlets have been managed via familiar manufacturing strategies that have been evolved over the past century, moving from a mass-production environment to mass customization. Discuss and compare the manufacturing strategies of McDonalds and Subway (or Chinese food truck at Mass Ave. and LaVerde). Sketch the process flow of each case.

Name engineering products which are produced by a similar manufacturing strategy for each case.”

Solution:

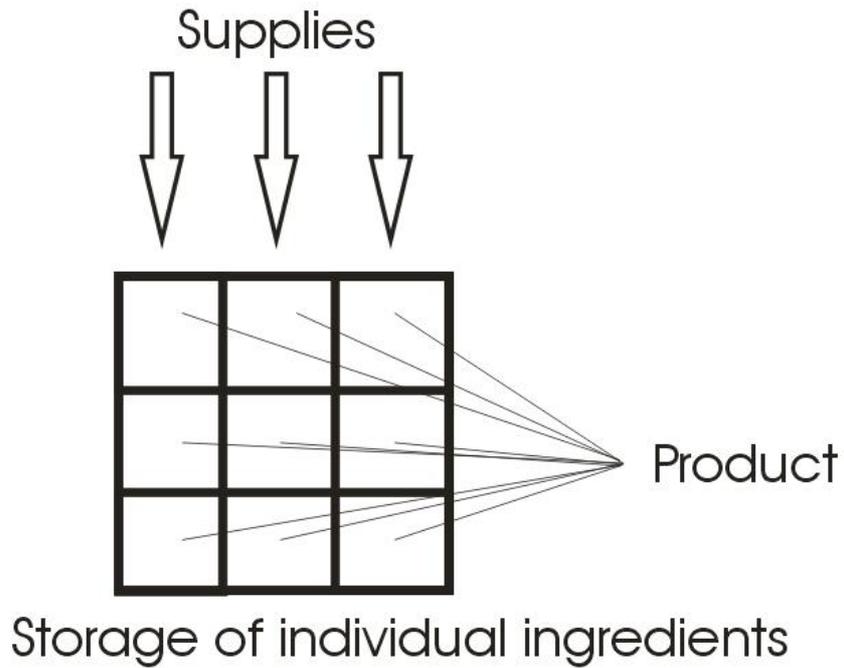
McDonalds/food truck offer standardized products with an apparent pull production system (when an order comes in or when the storage level of specific product falls below some number, the production (assembly) starts). Products with a high demand might even be pre-made and ready to go. High throughput and low cost are the main target. Every product is “assembled” in a standardized sequence, using always the same set of ingredients. Some ingredients are a part of more than one product, though (the circles in the process flow overlap each other).

Most of the mass production systems and batch production systems have similar natures as seen in McDonalds/food truck. They include automobiles and computers (DELL: order one, produce one with a near complete product.).



One possible process flow for McDonalds/Food Truck

Subway/La Verde offer a variety of choices, which can be customized as the product is made upon demand. Target is high quality and high customer satisfaction. For this higher value, the customer has to pay a higher price and/or their patience. This type of production is the same as many job shops, which produce fully custom ordered products, such as airplanes, lithography machines, and custom-designed houses.



One possible process flow for Subway/La Verde