Not everything has to be produced in-house.

ex: HP

Ink → Core competency

Production

In-house

Scheduling

Translates into MCTs and jobs

Purchase

Inventory control
1. How many do we purchase?
2. Order frequency?

Supply chain mgmt (SCM)

Suppliers
- Raw, basic parts/components
- Subcontractor of specialized parts/subassemblies

Manufacturer

Customers
How do we make the entire system more effective/efficient?

- Quality of the solution
- Time required to identify the solution

Ex: Method A
- Cost = $1500
- Comp time = 10 min

Method B
- Comp time = 5.5 min

⇒ More lean.
⇒ To realize a win/win situation for everyone involved.

Product design

- Quality
  - Design of the product affects quality
  - Product's conformity to design also affects quality

Customer satisfaction (Is the product competitive in the market?)

The product must be easily manufacturable to make it conform to design requirements.
Product development

Three entities that interact the most are:
- Marketing
- Design
- Manufacturing

Time to market

The organization that gets the product out in the market first would have a greater market share and thus a greater profit. As a result, the organization could eventually end up being the market leader.

Reverse engineering

Take a competitor's product, dismantle and investigate it thoroughly to identify its strengths, and use them to develop an improved design than the competition.

⇒ "leap frog"

Design ↔ Manufacturing

We need a strong hand shake between the other engineering disciplines and us (IE/mfr. eng. et al.)
Optimal design may not mean optimal manufacturability.

- Ease of fabrication and/or assembly
- Ease of conformity to specifications
- High quality
- High productivity

Design and mfg. should work together to develop a design that lends itself for ease of mfg.

⇒ concurrent/simultaneous mfg.

It is a mfg. concept, primarily aimed at bringing design and mfg. functions together.

Over-the-wall approach to manufacture a new product created a lot of challenges for mfg. That resulted in a much longer time to perfect the processes, needed to produce a product that conformed to specifications and ramp-up to full production.
Conv. mfr.: 
\[ \text{Units} \rightarrow \text{Time} \]

Concurrent eng.: 
\[ \text{Units} \rightarrow \text{Time} \]

\[ x \gg \gg y \]

Product \rightarrow \text{Revolutionary product}

\[ 777 - \text{Boeing} \rightarrow \text{The entire air craft was designed in the computer.} \]

Phil Condit \rightarrow \text{CEO}
Ordinary craft → subsonic speeds
- 550 - 600 mph.

Speed of sound ≈ 767 mph.

1976 - Concorde
1354 mph. → supersonic

London - NY → 7 hrs. (Ordinary)
3½ hrs (Supersonic)