Value Creation Through Integration Workshop

A Framework for Integration from the Manufacturing Perspective

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Contents

- Industrial product maturity impact on manufacturing
- What is manufacturing system design
- The manufacturing system design framework
Post Dominant Design Industrial Role

- Product differentiation harder to achieve
- Product performance enhancements best satisfied by incremental improvements
- Acquisition and life cycle costs predominate
- Insertion of process technologies has highest leverage

Use Manufacturing for Competitive Advantage
How can Manufacturing be Used for Competitive Advantage?

- Product design alone is less of a discriminating factor for competitive success therefore ...
  - Design efforts should ensure producibility
  - Manufacturing inputs should carry more weight

- Process technology development yields most benefits
  - Continual introduction of new processing capabilities
  - Organizational elements to champion process developments
Elements for a Manufacturing System Design Framework

- A holistic view of manufacturing system design environment
- Visual depiction of “design beyond factory floor” ideas
- Manufacturing as part of the product strategy
- Manufacturing system design is strategy driven, not product design driven
- Combines multiple useful tools
- Provides insights into order and interactions
- Not prescriptive
- Can lead to innovative & new manufacturing system designs
- Shows the unending design cycle -- Continuous Improvement
1. Manufacturing system “infrastructure” design
   - Manufacturing strategy
   - Operating policy
   - Partnerships (suppliers)
   - Organization structure details

2. Manufacturing system “structure” design
   - Buildings, location, capacity
   - Machine selection
   - Layout
   - WIP
Manufacturing System Design

Stakeholders

Corporate Level
[Seek approval]

Business Unit

Product Strategy

Suppliers

Product Design

Manufacturing System Design/Selection

Manufacturing

Marketing

Requirements/Considerations/Constraints

DFMA, IPT
3-DCE
Concurrent Engineering

Customer Needs
Technical Feasibility
Feasible performance guarantees

- Miltenburg, - 3P, - 2D plots,
- MSDD, - AMSDD - design Kaizen

Implement (pilot)

Fine Tune

Evaluate/Validate

Rate Production

Finalized Product Design

Make/Buy
Risk-sharing Partnerships

- Analytical Tools,
- Simulation Tools

VSM
Kaizen
Trial & Error
Kaikaku

• VSM
• Kaizen
• Trial & Error
• Kaikaku

Modifications

Miltenburg, 3P, 2D plots,
MSDD, AMSDD - design Kaizen
- Focused Factory
  - Wickham Skinner
- Product-Process Matrix
  - Hayes and Wheelwright
- 3-DCE
  - Charlie Fine
- Nine Components of Manufacturing Strategy
  - Fine and Hax
- Manufacturing Strategy Worksheet
  - Miltenburg
Axiomatic design/MSDD

Cochran

Production Preparation Process (3P)

2-D manufacturing world maps

Toyota production system frameworks

Ohno, Shingo, and Monden

Various analytical tools/computer simulation tools
Conclusions

- Manufacturing system design is more than the factory floor
- Manufacturing system design is strategy driven
- There is no one size fits all general manufacturing system design methodology
- Best results realized by interacting with design, suppliers and marketing
- Manufacturing is a competitive weapon in a maturing product industry