

CIM (21-548)

*Advanced Manufacturing Laboratory
Department of Industrial Engineering
Sharif University of Technology*

Session # 3



Course Description

- *Instructor*
 - *Omid Fatahi Valilai, Ph.D. Industrial Engineering Department, Sharif University of Technology*
 - *Email: FValilai@sharif.edu, Tel: 6616-5706*
 - *Website: Sharif.edu/~fvalilai*
- *Class time*
 - *Sunday-Tuesday* *09:00-10:30*
- *Course evaluation*
 - *Mid-term* *(30%)*
 - *Final exam* *(50%)*
 - *Quiz* *(5%)*
 - *Exercise* *(15%)*

Course Description (Continued ...)

- **Mid-term session:**
 - Sunday: 16th Azar 1393, 09:00 ~ 10:30
- **Final Exam:**
 - Tuesday: 30th Dey 1393, 15:00 ~ 17:30
- **Reference:**
 - Schaefer, D., *Cloud-based Design and Manufacturing (CBDM): A Service-Oriented Product Development Paradigm for the 21st Century*, . London: Springer, 2014
 - Koren, Y., *"The Global Manufacturing Revolution"*, Wiley, 2010
 - Nasr, A., *"Computer-Based Design and Manufacturing An Information-Based Approach"*, Springer, 2007
 - Mitchell, F.H., *"CIM Systems: An Introduction to Computer-Integrated Manufacturing"*, Prentice Hall College Div; 1St Edition edition (January 1991), ISBN: 978-0131332997

Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of
CIM (21548), Session # 3



Course Description (Continued..)

- **Contents:**
 - Globalization and Manufacturing Paradigms (8 sessions)
 - System Concepts (3 sessions)
 - Evolution of Manufacturing systems (2 sessions)
 - Manufacturing System Design (4 sessions)
 - Manufacturing Equipment Design (3 sessions)
 - Information flow in Manufacturing Systems (4 sessions)
 - Product design and Manufacturing System (3 sessions)
 - Manufacturing System Implementation (5 sessions)

Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
CIM (21548), Session # 3

Course Description (Continued..)

▪ Contents:

- *Globalization and Manufacturing Paradigms*
 - *The Importance of Manufacturing to Society*
 - *The Basics of Manufacturing in Large Quantities*
 - *The 1990s: A Decade of Intensified Globalization*
 - *The Global Manufacturing Revolution*
 - *The Manufacturing Paradigm Model*
 - *Four Major Manufacturing Paradigms*

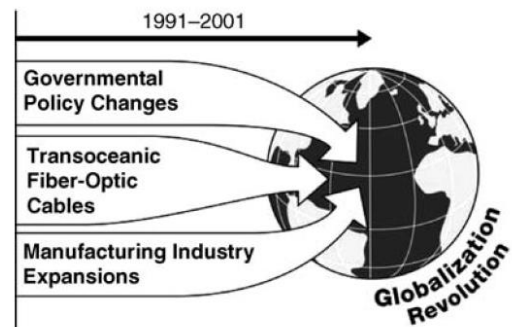
(8 sessions)

Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
CIM (21548), Session # 3

6

Globalization and Manufacturing Paradigms

- *The Global manufacturing revolution*
 - *The global manufacturing revolution started in the last decade of the twentieth century with evolutionary, and largely independent, developments in three important areas:*
 - *Governmental policy changed*
 - *Global expansions of the manufacturing industry*
 - *The laying of a huge network of transoceanic fiber-optics cables increased the volume of inexpensive information flow around the world.*



Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
CIM (21548), Session # 3

7

Globalization and Manufacturing Paradigms

- *The Global manufacturing revolution*
 - *Globalization has created many new opportunities and becoming a global manufacturing enterprise has several benefits:*
 - *Globalization reduces manufacturing costs by utilizing low labor-cost countries.*
 - *Globalization reduces business risk and filters currency exchange fluctuations.*
 - *Globalization is a source for enterprise growth, achieved by accessing new markets.*

Globalization and Manufacturing Paradigms

- *The Way We Are Heading*
 - *Increased responsiveness*
 - *To changing market conditions is crucial for manufacturing enterprises to flourish in a global market and sustain continuous growth.*
 - *Product Development*
 - *Regionalized products*
 - *Personalized products*
 - *Manufacturing Systems*
 - *Business Models*
 - *The business model should be of a pull-type, encouraging customers to send their product preferences to the manufacturer via the Internet and receive their products in a timely manner.*

Globalization and Manufacturing Paradigms

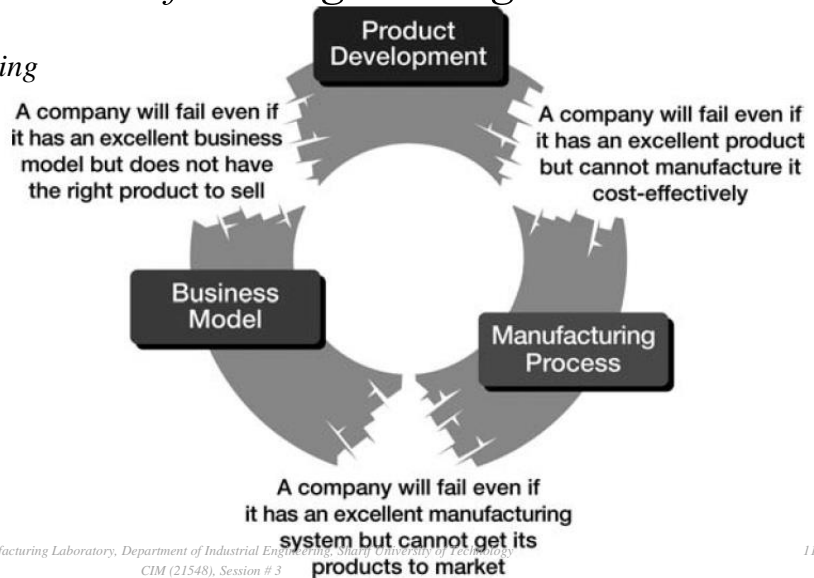
- *The Way We Are Heading*
 - *The global manufacturing revolution should stand on four fundamentals:*
 - *Innovative products for global markets and for personalization in domestic markets*
 - *Reconfigurable manufacturing systems*
 - *Global business strategies with rapid responsiveness to customers and markets*
 - *A solid integration between product, process (i.e., manufacturing system), and business*

Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
CIM (21548), Session # 3

10

Globalization and Manufacturing Paradigms

- *The Way We Are Heading*

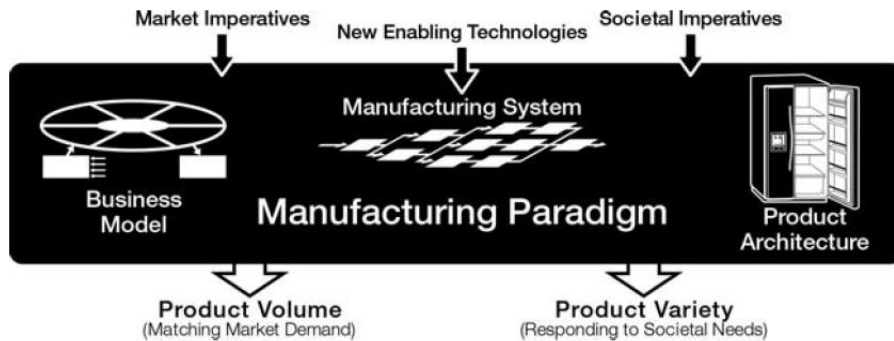


Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
CIM (21548), Session # 3

11

Globalization and Manufacturing Paradigms

- **A Manufacturing Paradigm**
 - *A revolutionary integrated production model that arises in response to changing societal and market imperatives, and is enabled by the creation of a new type of manufacturing system*



Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
 CIM (21548), Session # 3

12

Globalization and Manufacturing Paradigms

- **Paradigm transitions over time**
 - *Craft Production (Job Shop), in which each product is designed and made for a particular customer, effectively a “Market-of-One.”*
 - *Mass Production, in which only a few models are made, assuming there will always be enough buyers.*
 - *Mass Customization (or FMS), in which customers select a product from a list of available options before production.*
 - *Personalized Production—a segment of Global Manufacturing—in which product options are designed by the customers, sold, and then produced on advanced manufacturing systems.*

Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
 CIM (21548), Session # 3

13

Globalization and Manufacturing Paradigms

▪ Paradigm transitions over time

Paradigm	Craft Production	Mass Production	Mass Customization	Personalized Production
Focus	The individual	The product	Market segments	The individual
Societal new needs	Tailored-made products	Low-cost products	Large product variety	Personal-fit products
Business model principle	Pull	Push	Push–Pull	Pull
	Sell–Design–Make	Design–Make–Sell	Design–Sell–Make	Design (A)–Sell–Design (P)–Make

*Advanced Manufacturing Laboratory, Department of Industrial Engineering, Sharif University of Technology
CIM (21548), Session # 3*

14