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Where We Are Now

Chapter	Relationships	Sustainability	Globalization	Organizational Culture/Ethics	Change Management	Measurement
Part 1 Supply Chain: A perspective for Operations Management						
1. Introduction to Managing Operations Across the Supply Chain	X	X	X			
2. Operations and Supply Chain Strategy	X	X	X	X	X	X
Part 2 Foundations of Operations Management						
3. Managing Processes and Capabilities	X					X
4. Product/Process Innovation	X	X	X		X	
5. Manufacturing and Service Process Structures	X		X	X		X
6. Managing Quality	X	X	X	X	X	X
7. Understanding Inventory Fundamentals	X		X			X
8. Lean Systems	X		X	X	X	X
Part 3 Integrating Relationships Across the Supply Chain						
9. Customer Management	X					X
10. Supplier Management	X	X	X	X		X
11. Logistics Management	X	X	X			
Part 4 Planning of integrated Operations Across the Supply chain						
12. Demand Planning: Forecasting and Demand Management	X		X			X
13. Sales and Operations Planning	X		X			X
14. Independent Demand Inventory Planning	X					X
15. Materials and Resource Requirements Planning	X		X			X
Part 5 Managing Change in Supply Chain Operations						
16. Project Management	X	X	X	X	X	X
17. Evolving Business Models and Change Drivers in the Supply Chain	X	X	X	X	X	X



4-2

Learning Objectives

1. Explain importance of innovation to firm performance
2. Contrast innovation strategies and projects
3. Describe new product/process design and development objectives and project phases
4. Explain importance of cross-functional integration
5. Describe and use tools for integrating customer and SC considerations into projects

4-3

Design and Development Definitions

- ***New Product Design and Development:***
transform market opportunities or new technologies into product design specifications
- ***New Process Design and Development:***
transform product specifications or technology into a new or revised production strategy

4-4

Product Life Cycle Definitions

- **Launch:** introduction into the market and may require SC process innovation
- **Growth:** increasing demand, flexible SC, more data from customers, increasing standardization
- **Maturity:** demand and product stabilization, increasing importance of cost, process innovation to increase SC efficiency
- **Decline:** changing technology or customer needs, declining demand, potential phase in of a replacement product

4-5

Product Life Cycle

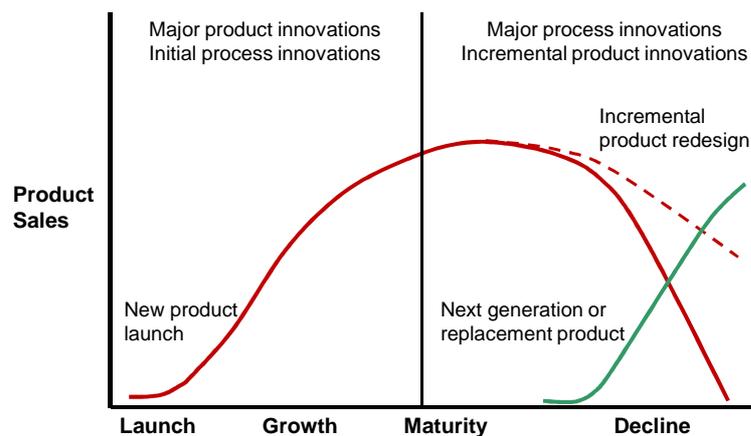


Figure 4-1

4-6

Innovation Across the Product Life Cycle

Launch

- Intense design and development
- May need SC process innovation

Growth

- Customer data aids in the refinement of product
- Product changes, but moving toward standardization
- Process innovation postponed
- SC flexibility due to high mix/low volume, increasing capacity

Maturity

- Demand stabilizes
- Product stabilizes
- Emphasis on cost
- Process innovation needed to increase SC efficiency

Decline

- Market/technology changes
- Pressure to reduce cost and capacity
- Incremental projects needed to extend life
- Introduction of next generation products

4-7

Innovation Affects Performance

- Many functional groups are involved:
 - **Customers** share needs and desires
 - **Finance** evaluates potential opportunities
 - **Marketing** communicates customer needs and desires, and information on competitive priorities into the organization
 - **Engineering** turns customer needs and desires into product and process specifications
 - **Operations** across the SC determine how to best source, produce and deliver based on operational capabilities

4-8

Types of Innovators

- **Fast Innovators**
 - Get to market quickly
 - React quickly to competitor's actions
 - More continuous stream of product introductions
- **High-Quality Innovators**
 - Fewer issues launching products, and fewer failures
 - Effectively satisfy customers for higher brand loyalty
- **Efficient Innovators**
 - Fund more new design and development projects
 - Sell at lower prices, or have lower break even quantities

4-9

Innovation Strategy

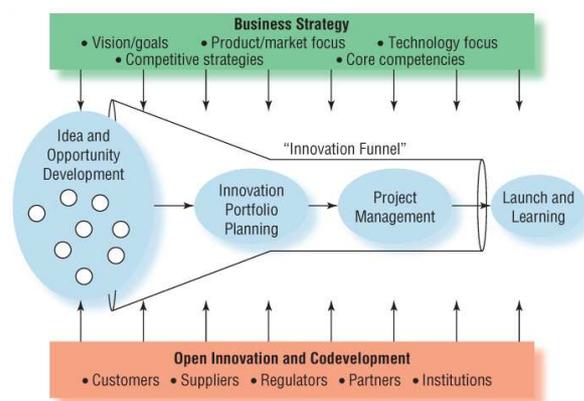


FIGURE 4-2
Competency Areas for
Product/Process Inno-
vation Management

Figure 4-2

4-10

Critical Innovation Operational Skills

- Idea and Opportunity Development
- Innovation Portfolio Planning
- Innovation Project Management
- New Product/Process Launch and Learning
- Co-development

4-11

Idea and Opportunity Development

- Organizational culture affects innovation success
 - Hiring the 'best and brightest'
 - Having an effective reward system
 - Allocating adequate resources

4-12

Innovation Portfolio Planning

Research and advanced development

		Extent of product change			
		New core product	Next Generation of core product	Addition to product family	Derivative or enhancement
Extent of Process change	New core process	Radical breakthroughs			
	Next generation of core process		Next generation or platform		
	Single-department upgrade		Enhancements, hybrids, and derivatives		
	Tuning and incremental changes				

Figure 4-3

4-13

New Product/Process Launch and Learning

- Management of a progression of projects
- Capture lessons learned post launch
- Learning applied to next project
- Continuous chain of projects adds to capabilities

4-14

Codevelopment

- Firms often partner with other firms to codevelop major products or processes

Benefits:

- Increased sources of, and access to, ideas and opportunities, leading to higher quality
- Leveraging the expertise of others increases the number of successful launches, and reduces lead time
- Financial and legal risks are shared

Risks:

- Less control over intellectual property
- Partner dependency may lead to less control over goals and timing

4-15

Product/Process Design and Development

- Multiple ways to manage multiple stages to introduce new products using a firm's capabilities and SC processes
 - **The Stage-Gate process:** resources allocated on stage-by-stage completion
 - **Concurrent engineering:** simultaneous (not sequential)
 - **Design for the customer:** use of multiple customer focused tools
 - **Design for supply chain operations:** use of multiple supply chain or product techniques

4-16

Stages of Product/Process Innovation

FIGURE 4-4
Overlapped Product Development Activities:
Concurrent Engineering

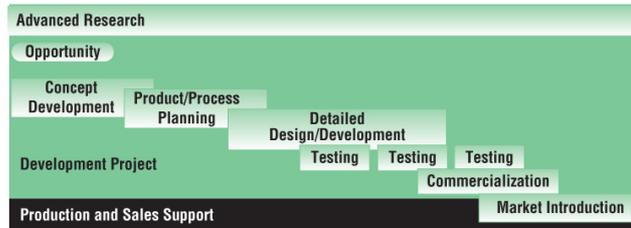


Figure 4-4

4-17

Concurrent Engineering

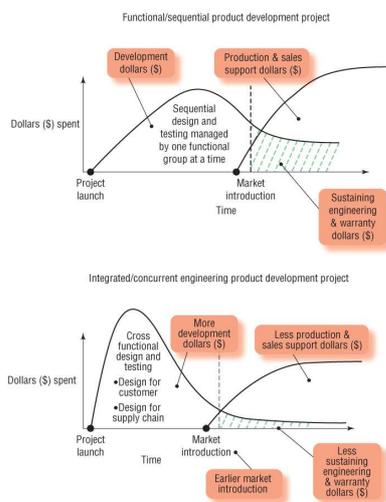


FIGURE 4-5
Comparing Resource Expenditures in Functional and Integrated Product Development Projects

Figure 4-5

4-18

Design for the Customer

- **Voice of the Customer (VOC):** gather input on customer's needs and wants
- **Quality Function Deployment (QFD):** convert customer's needs and wants into specifications
- **Failure Modes and Effects Analysis (FMEA):** identification and correction of potential problems
- **Value Engineering/Value Analysis:** improvement of benefits and costs through examination of functionality

4-19

House of Quality using QFD

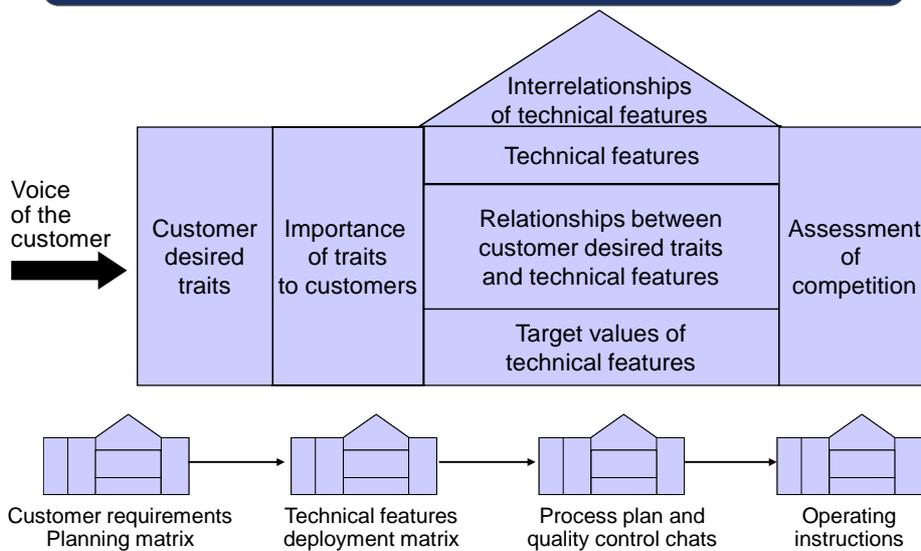


Figure 4-6

4-20

House of Quality

FIGURE 4-7 House of Quality for Housekeeping Services

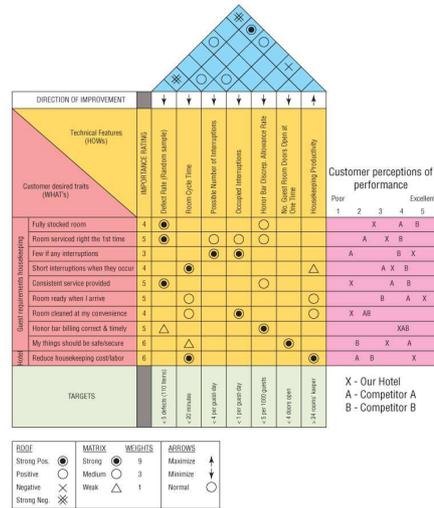


Figure 4-7

4-21

FMEA

1. Determine unit of analysis
2. Identify potential failures and sources
3. Prioritize failure modes
 - Risk Priority Number (RPN) =**
Occurrence rating x Severity Rating x Undetectability Rating
4. Create plans
5. Implement plans, measure impact, adjust analysis

Name	Function	Failure Mode	Effect	Cause	Severity (S)	Occurrence (O)	Undetectability (U)	RPN SxOxU	Recommendation

4-22

Activity

- Develop a FMEA for pizza delivery



Name	Function	Failure Mode	Effect	Cause	Severity (S)	Occurrence (O)	Undetectability (U)	RPN = SxOxU	Recommendation

4-23

Design for Supply Chain Operations

- **Design for Manufacture:** improvement of product *producibility*
- **Design of Assembly:** minimizing number of components and easing assembly processes
- **Design for Product Serviceability:** easing disassembly and component reuse
- **Design for Six Sigma:** improving process consistency

4-24

Design for Supply Chain Operations cont'd

- **Standardization:** reuse parts for existing designs
- **Modularity:** using combinations of standardized parts
- **Design for Logistics:** minimizing packaging, handling and shipping costs
- **Design for Environment:** minimize detrimental environmental impacts, across product life cycle

4-25

Enabling Technologies

- **Computer-aided Design (CAD):** automating systems for drawings and specifications
- **Computer-aided Engineering (CAE):** systems that create 3-D models, reducing prototype need
- **Product Life Cycle Management (PLM):** capturing and sharing product definition data across the life cycle



4-26

Product/Process Innovation Summary

1. Innovative firms gain competitive advantage.
2. Innovation in the SC involves customers, suppliers and other partners, resulting in faster and more efficient development.
3. Innovation projects have multiple stages.
4. Innovation project stages can proceed sequentially or concurrently.
5. Innovation projects require the integration of many interrelated product/process design issues

4-27