CPET 575 Management Of Technology

Organizing the High-Technology Enterprise¹

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Topics of Discussion¹

- GM Advanced Vehicle Development – Reducing Time to Market with Streamlined Organizational Processes
- Today's Business Processes Require Flexibility, Speed, and Efficiency
- Organization Designs for Technology-Based Enterprises
- Organizational Layers and Subsystems
- Organizational Choices
- Real-World Hybrids
- Understanding Networking Environment

GM's Advanced Vehicle Development¹

- GM’s efforts to reduce the time to launch new products and to react to market changes
  - Major competitors: Toyota, Honda
  - Rick Spina, Executive Director, Program Management, GM North America
    - “Most of GM’s new product programs are on a 24-month schedule”
    - “We are continue to cut it down, but 24 months is pretty much our norm now”
GM’s Advanced Vehicle Development¹

Most Critics agree
- Government safety & emissions standards turned the company bureaucracy into an organizational albatross
- Take 18 months or more to bring a new car model to market

Shrinking Product Development Cycles
- Advances in design technology and processes
- From CAD/CAM, simultaneous engineering, project management, etc
- Time-to-market
  - 18 months for most cars
  - 16 or 14 months: Hammer H2 and Ford GT


GM’s Advanced Vehicle Development (cont.)

Time-to-market performance - metrics
- Technology
- Project management process
- Improved productivity
- Elimination of bureaucracy
- Focused decision making

Mark Hogan, GM group vice president, Advanced Vehicle Development:
- “The new approach is possible because the overall product development organization has continue to increase productivity and more focused under the Vehicle Line Executive (VLE) System”


GM’s Advanced Vehicle Development (cont.)

Up-front work to determine if the program is viable and profitable is very complex and includes many different variables
- Portfolio planning – the work and resources associated with a new product idea
- Involving all stakeholders
- Product execution – sound business case
GM's Advanced Vehicle Development (cont.)

- Ron Pnjewski, GM North America vice president of planning
  - "The previous sequential approach, using a lot of hands-off, is time consuming and invites communication breakdown."
- The current Advanced Vehicle Development process
  - Organized a new product team
  - Includes all line functions: engineering, design, planning, purchasing, manufacturing, quality, and marketing
  - Managing virtual organizations
  - Integration: various product development stages

Today's Business Processes

- Require Flexibility, Speed, and Efficiency
- Effective organizational structure – fundamental to business success
- Tools offer
  - Better capabilities for executing operations more integrated with business process
  - Greater emphasis on supply chain integration
  - Horizontal decision making
  - Work/technology transfer
- Tools include
  - Administrative tools, Product development techniques, Project management, etc

Today's Business Processes

- Performance Evaluation of Functional Units (trend)
  - Measured by contribution to specific enterprise objectives
  - Rather than its ability to provide superior functional services in its specialty: R&D, marketing, engineering, or manufacturing
Today's Business Processes

The drive for broader business accountability combined with the pressures for faster, more effective market response have led to many new and innovative organizational designs

- Simultaneous (concurrent) engineering
- Concurrent project management
- Design-build
- Stage-gate processes

Overlays to the traditional functional organization

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Today's Business Processes

Presents challenges

- The drive toward greater cross-functional efficiency and agility
- Requires large degree of resource and power sharing
- Diluting central decision making and control toward unified enterprise objectives
- Diminish the autonomy of functional resource groups to develop and maintain the best functional capabilities needed by the enterprise

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Today's Business Processes

Mark Hogan, GM’s group vice president for advanced vehicle development under the Vehicle Line Executive (VLE) System pointed as the importance of

- Resource alignment
- Supply chain integration
- Central organizational focus
- Senior leadership
Organizational Designs for Technology-Based Enterprises

How can a company be organized to conduct its business most effectively and yields the greatest value to its stakeholder?
- Different times in history produced different answers
- Missions, Organizational Models
- 1600-1874: the British East India Company, owned nations, and mainly traded in
  - Headquarters - London
  - Cotton, silk indigo dye, saltpetre, tea, opium
  - Exercising military power and assuming administrative functions

Organizational Designs for Technology-Based Enterprises

How can a company be organized to conduct its business most effectively and yields the greatest value to its stakeholder?
- In 1900 – Henry Ford (1863 – 1947) invented assembly line for automobile manufacturing
  - Organization model - Horizontally and vertically integrated
  - Owning virtually all stages in the supply chain and having strong central control
- Compare to today’s
  - Internet startup?
  - Intel?
  - GM?
Organizational Designs for Technology-Based Enterprises

Today's Business Environment and Issues?

• Issues:
  • Complexity, Agility, Resource efficiency, Interdependence
• Need:
  • Both centralized control and decentralized decision making
  • Functional autonomy and cross-functional integration
• Tricky balance, great challenge

High-Tech Company Challenges?

• Time-to-market pressures
• Accelerating technologies
• Innovation
• Resource limitations
• Technical complexities
• Social and ethical issues
• Operational dynamics
• Risk
• Uncertainty

Table 3.1 High-Tech Business Environment: Today's Characteristics and Challenges

• Changing business models and structures
• Complex business performance measurements
• Complex joint venture, alliances, and partnerships
• Complex projects
• Complex success criteria
• Different organizational cultures and values
• Global markets
• High risks and uncertainties
• Integrating across functions
Organizational Designs for Technology-Based Enterprises

Table 3.1 High-Tech Business Environment: Today’s Characteristics and Challenges (cont.)

- Integrating broad spectrum of functions and support services
- Integrating many business processes
- Many stakeholders
- Multifunctional buy-in and commitment
- Need for continuous improvement
- Need for sophisticated people skills

- Organizational conflict, power and politics
- Resource constraints
- Self-directed teams
- Tight, end-date-driven schedule
- Tough performance requirements
- Virtual organizations, markets, and support systems

Organizational Layers and Subsystems

The three fundamental organizational sublayers
- Institutional Framework
- Functional System
- Operational Areas
Organizational Layers and Subsystems

- High-Tech Company, but relatively undifferentiated, computer assembly plant:
  - Would have a relatively large part of resources organized along functional lines

- Consulting Firms example
  - Would be organized with two strong axes of functional and project/operational responsibilities

- Boeing, Aerospace company
  - Most likely organize the whole company around product lines
  - Integrating both functional and operational areas with focus on a particular product or project
  - 747, 767, 777 etc

Organizational Layers and Subsystems

- The three fundamental organizational sublayers
  - Institutional Framework
    - Strategic direction, Long-range survival and growth plans, Policies, Procedures
    - Staffs: Senior management, corporate officers, directors
    - Responsibilities: provide broad guidelines and resource allocations
  - Functional System
  - Operational Areas

Organizational Layers and Subsystems

- The three fundamental organizational sublayers
  - Institutional Framework
  - Functional System
    - An area of slow change and the provider of stability
    - Positions the enterprise for competitive advantage, growth and profitability by advancing methods of operation, markets, supply lines, and by integrating new technologies into the operating areas of the organization
  - Operational Areas
Organizational Layers and Subsystems

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    - Positions the enterprise for competitive advantage, growth and profitability by advancing methods of operation, markets, supply lines, and by integrating new technologies into the operating areas of the organization
  - Resource groups: R&D, Engineering, Development, Manufacturing, Marketing, HR, Legal, Quality Control, Purchasing, IT
- Operational Areas
  - Most directly responsible for business results
  - Organized as programs or projects
  - New product development
  - Contracts
  - Off-the-shelf deliverables
  - Internal maintenance
  - Field support operations

Two Organizational Axes: project Operations and Resource Functions

- Functional:
  - PROJECT: Planning, Organizing, Tracking, Reporting, Controlling, Customer & Management Interfaceing
  - Resource Management
    - People
    - Places & Facilities
    - Materials
    - Processes
    - Quality of work

![Diagram](image-url)
Organizational Choices

Choices for Structuring Business Operations

• Functionally Organized
• Project Organized
• Matrix Organized: Function/Project Hybrid

Organizational Choices

Choices for Structuring Business Operations

• The Functional Organization
  • Traditional and most fundamental form of organization and management
  • Functional Responsibilities: R&D, Engineering, Product development, Marketing, Finance, HR, etc
  • Examples: Governments, Military Organizations, Churches, Commercial enterprises
  • Strengths
  • Weaknesses

Organizational Choices

Choices for Structuring Business Operations

• The Functional Organization
• The Projectized Organization
  • The enterprise is partitioned into project units (or programs)
  • Resources allocated to specific projects, managed autonomously and independently
  • A center for each project or program
  • The organization has a limited life
  • Strengths
  • Weaknesses
Organizational Choices

- Choices for Structuring Business Operations
  - The Functional Organization
  - The Projectized Organization
  - The Matrix Organization

  - Strengths and Weaknesses
  - Four Categories
    - Project-Function Matrix
    - Product-Function Matrix
    - Product-Regional Matrix
    - Multidimensional Matrix

Real-World Hybrids


- Five businesses in financial services, Infrastructure, and media market
  - Energy Infrastructure: Energy, Oil & Gas, Water & Process Technologies
  - Technology Infrastructure: Aviation, Enterprise Solutions, Healthcare, Transportation
  - GE Capital: Aviation Financial Services, Commercial Finance, Energy Finance Services, GE Money
  - NBC Universal: Film, Sports & Olympics
  - Consumer & Industrial: Appliances, Consumer Electronics, Electrical Distribution, Lighting

Understanding The Working Environment

- High-Tech Companies
- Businesses info
  - A company Web site
  - Annual reports
  - News release

- How people fit into the enterprise and what their responsibilities are?

- Management processes
  - Command and control structure
  - Responsibilities
  - Reporting relations and Interfaces
Understanding The Working Environment

- Principal Tools
  - Policy Directive – Appendix 1.1, page 357
  - Procedure
  - Charter of Key Positions – Appendix 1.2 and 1.3, page 360
  - Organization Chart
  - Responsibility Matrix
  - Job Description
- Make Interdisciplinary Relations work for you

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Six Selected Business Subsystems (cont.)

- Managerial Tools and Techniques
  - Project Management
  - Product Management
  - Quality Control
  - General Management (legal, HR, accounting, training)
  - Strategic
- Impact Areas
  - Effectiveness of Tools and Techniques
  - Trade-offs Factors
    - Efficiency vs. Speed
    - Control vs. Flexibility
    - Optimization vs. Risk
  - Implementation Challenges
Questions & Summary

- Critical Thinking: Questions for Discussion