OFFSHORING ENGINEERING

"A Glocalization Conundrum ?"

National Academy of Engineering
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Chief Engineer and VP
Engineering and Operations

What Does It All Really Mean????????

- Globalization
- Localization
- Out Sourcing
- In Sourcing
- Smart Sourcing
- On Shoring
- Off Shoring

A Glocalization Conundrum???

- **Globalization>>>>>>>>>>>>>>>Effectiveness**
- **Localization>>>>>>>>>>>>>>>>Efficiency**
- **Glocalization>>>>>>>>>>>>>>>>Competitive Advantage**

- **Challenges: Core Value Compliance**
  IP Protection
  Staff Retention
  Risk Assessments
  Investment Costs

DuPont Today

- **$28 Billion Revenue**
- **58,000 Employees**
- **19,000 Engineers**
- **Operations in 70 countries, 6 Continents**
- **200+ Facilities**
- **1600 Trademarks and Brands**

Tyvek®
flexible sheet products

Corian®
surfaces

Pioneer
hi-bred seed

Delrin®
acetal resins

Supro®
isolated soy proteins

SilverStone®
non-stick coatings

Kevlar®
brand fiber

Surlyn®
resins

Teflon®
fabric protector

Nomex®
brand fiber and paper

Suva®
refrigerants

Ti-Pure®
titanium dioxide

Mylar®
Packaging

Zodiaq®
surfaces

Mylar®
polyester film

Inkjet Inks

Accent®
herbicide

Biomax®

Soy Protein

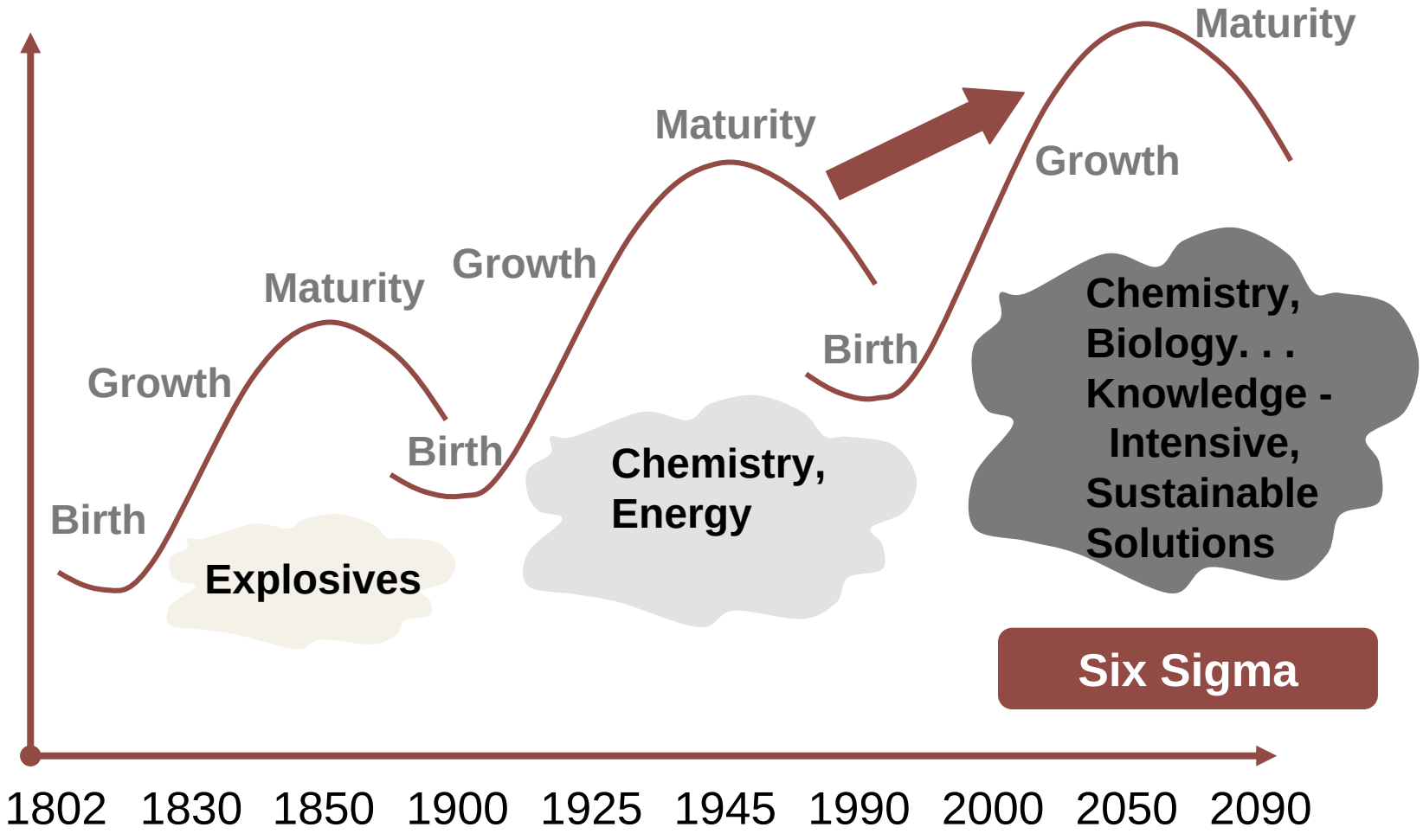
Centari®
automotive and refinish

SmartPaint®

Sontara®
spunlaced fabric

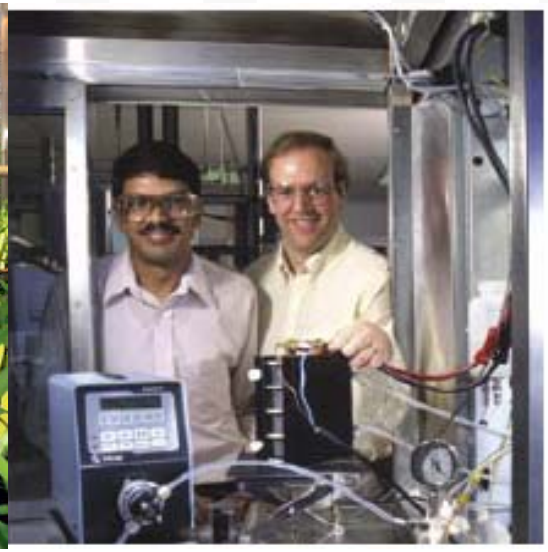
Hytrel®

Transforming For Our Third Century

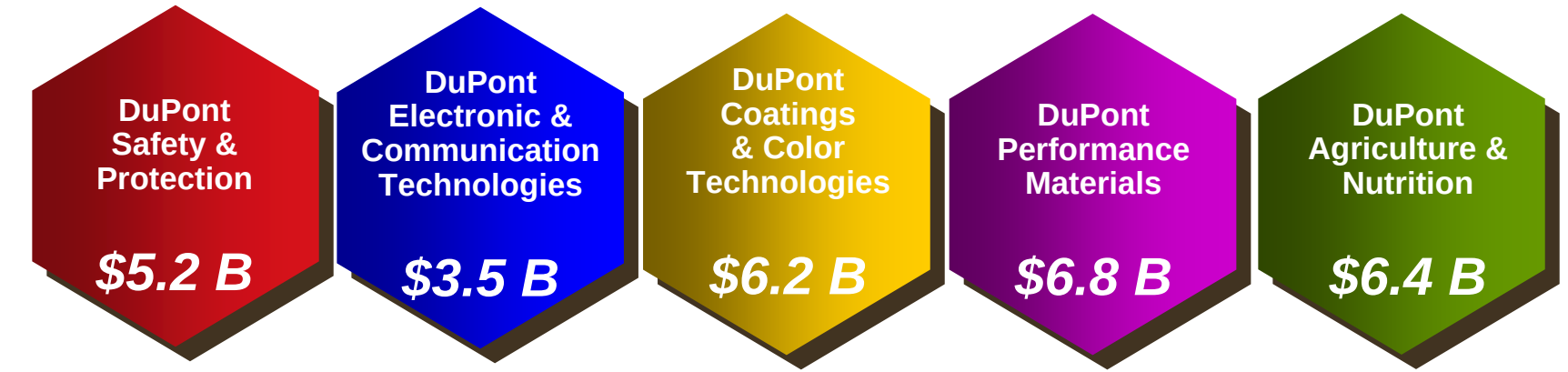


The Vision of DuPont

To be the world's most dynamic science company, creating *sustainable solutions* essential to a better, safer, healthier life for people everywhere.

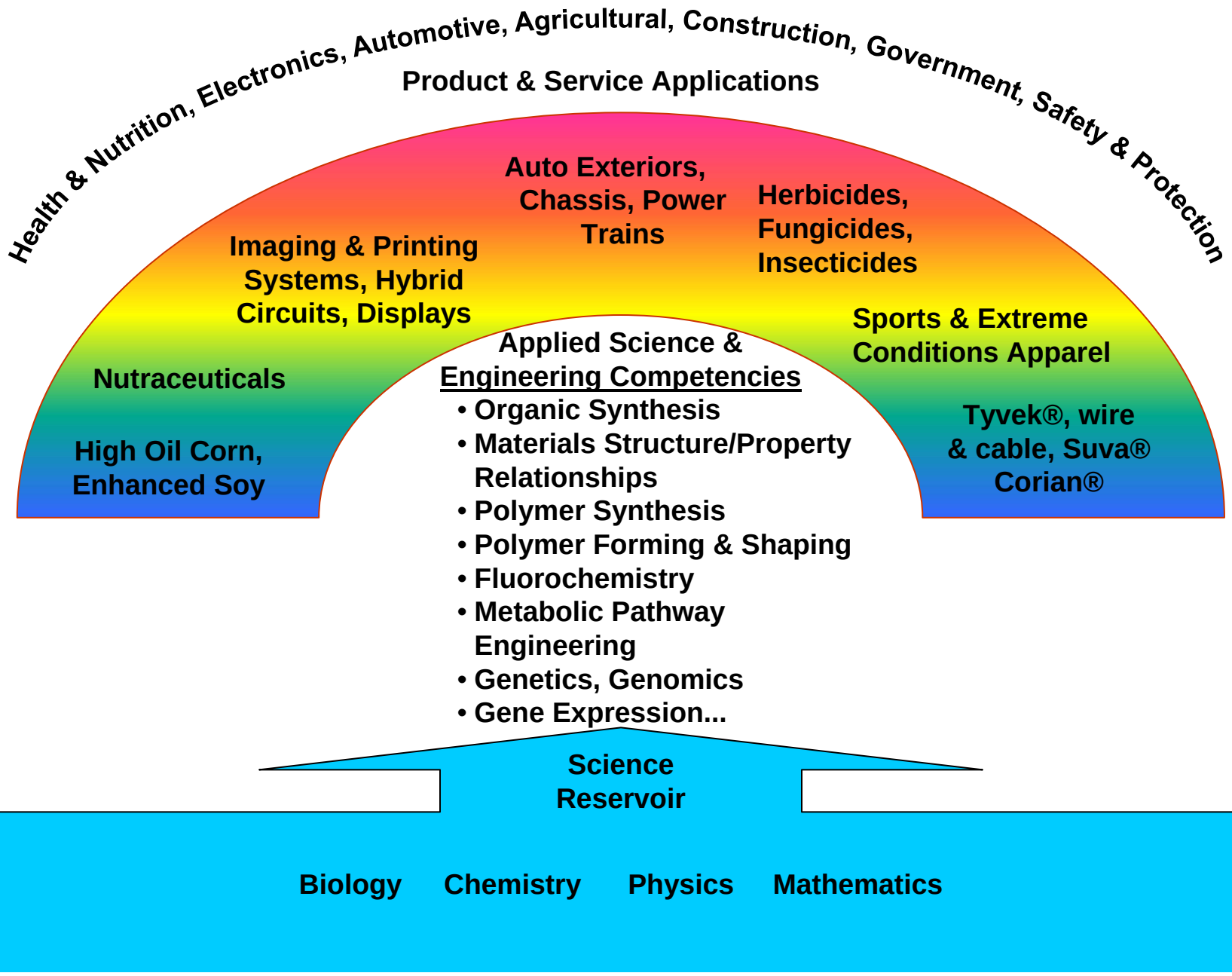
Five Growth Platforms



Three Growth Strategies

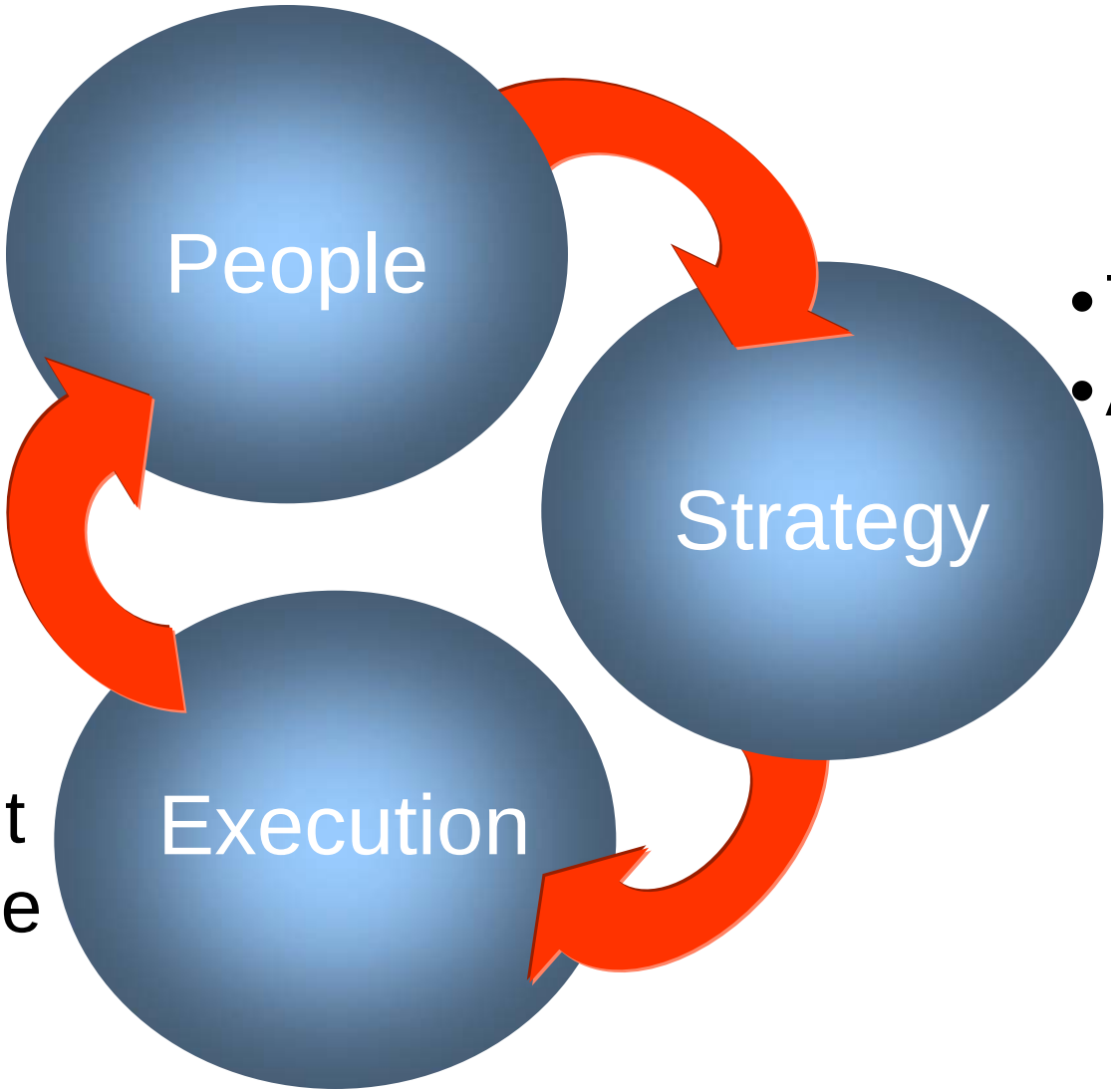
Source: 2005 Segment Sales

Markets


Health & Nutrition, Electronics, Automotive, Agricultural, Construction, Government, Safety & Protection
Product & Service Applications
Auto Exteriors, Chassis, Power Trains
Herbicides, Fungicides, Insecticides
Imaging & Printing Systems, Hybrid Circuits, Displays
Sports & Extreme Conditions Apparel
Nutraceuticals
Tyvek®, wire & cable, Suva® Corian®
High Oil Corn, Enhanced Soy
Applied Science & Engineering Competencies
• Organic Synthesis
• Materials Structure/Property Relationships
• Polymer Synthesis
• Polymer Forming & Shaping
• Fluorochemistry
• Metabolic Pathway Engineering
• Genetics, Genomics
• Gene Expression...
Science Reservoir
Biology Chemistry Physics Mathematics

Delivering Maximum Business and Societal Value….

- Capable
- Committed

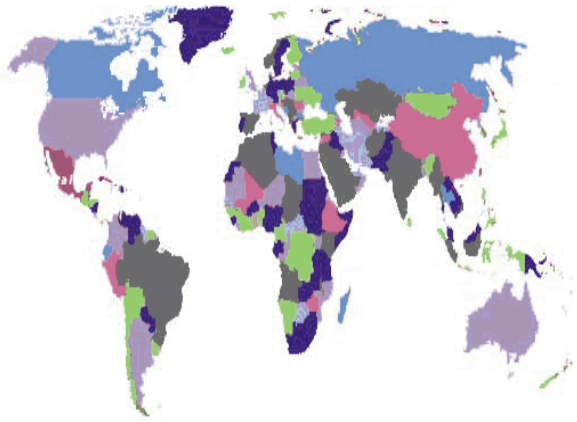


- Targeted
- Actionable

- Consistent
- Defect-free

Key Questions - Management

1. **How must management develop, deploy, and direct the engineering competencies needed to deliver *sustainable solutions* essential to a better, safer, healthier life for people everywhere.**



2. **How will this be influenced by offshoring?**

Core Competencies

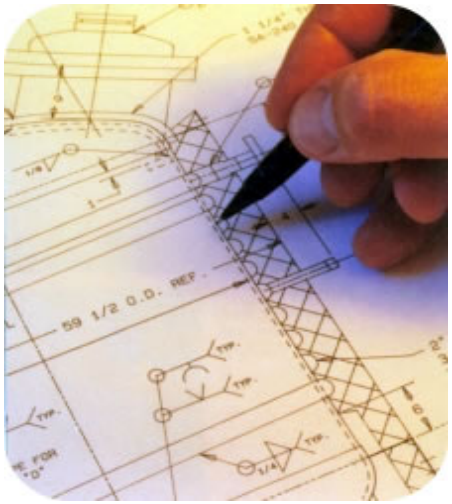
➢ Today

- SHE&E
- Technical/Analytical Skills
- Communications
- Problem Solving
- Information Management
- Project Management
- Teaming
- Organizational Design
- Unit Operations

➢ Tomorrow

- SHE&E
- Technical/Analytical Skills
- Collaborations
- Integrated Solutions
- Knowledge Management
- Business/Risk Management
- Networking
- Work Process Design
- Integrated Supply Chain

Creating Sustainable Business Value



- Information….f (Data)
- Knowledge……f (Information)
- Sustainable Business Value…f (Knowledge)

“Knowledge Management”

The Right Information

at the Right Place

at the Right Time

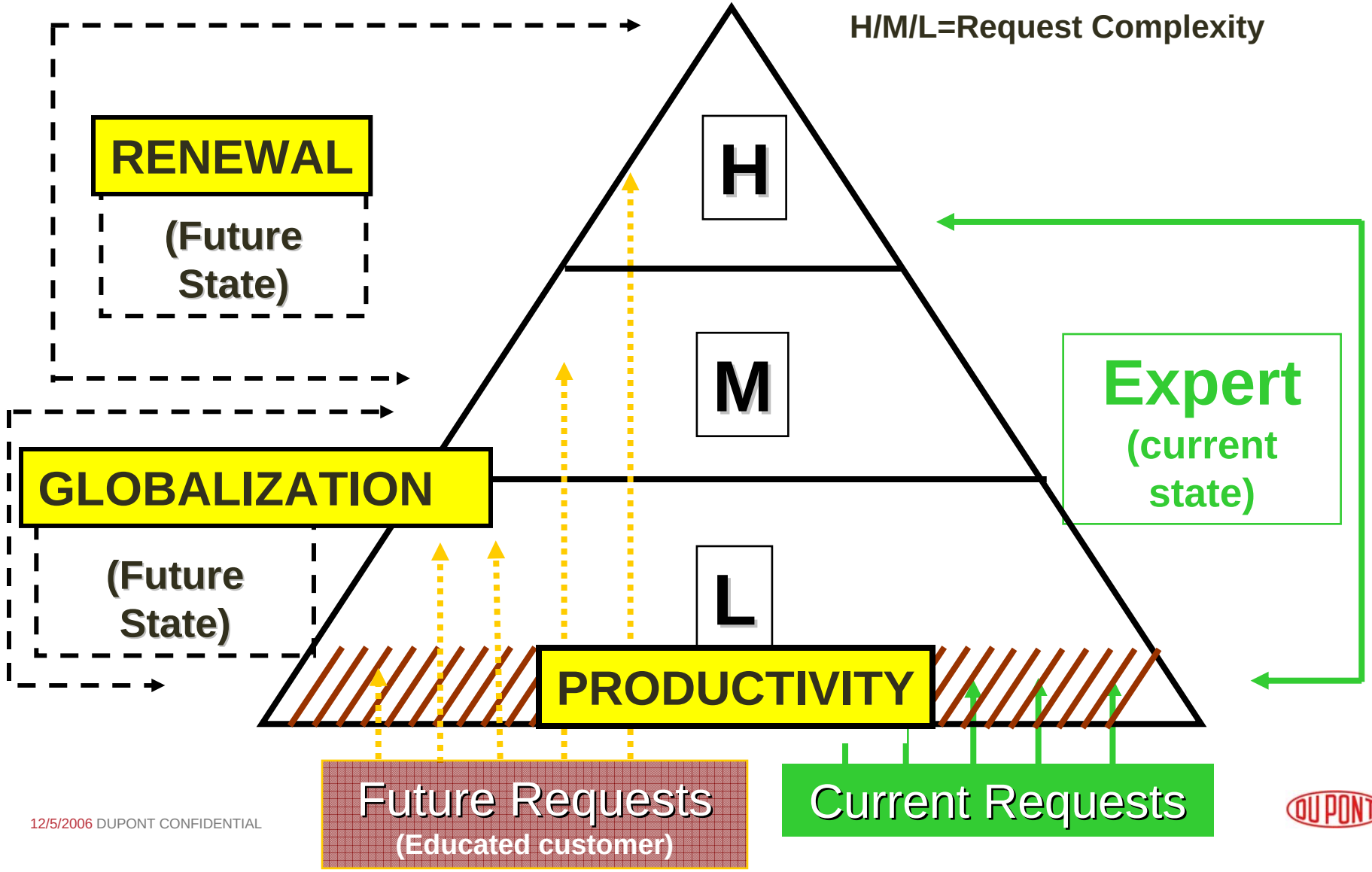
at the Right Price

enables rapid, effective Decision Making

and Problem Solving delivering

Sustainable Business Results

Knowledge Management as a Business Driver

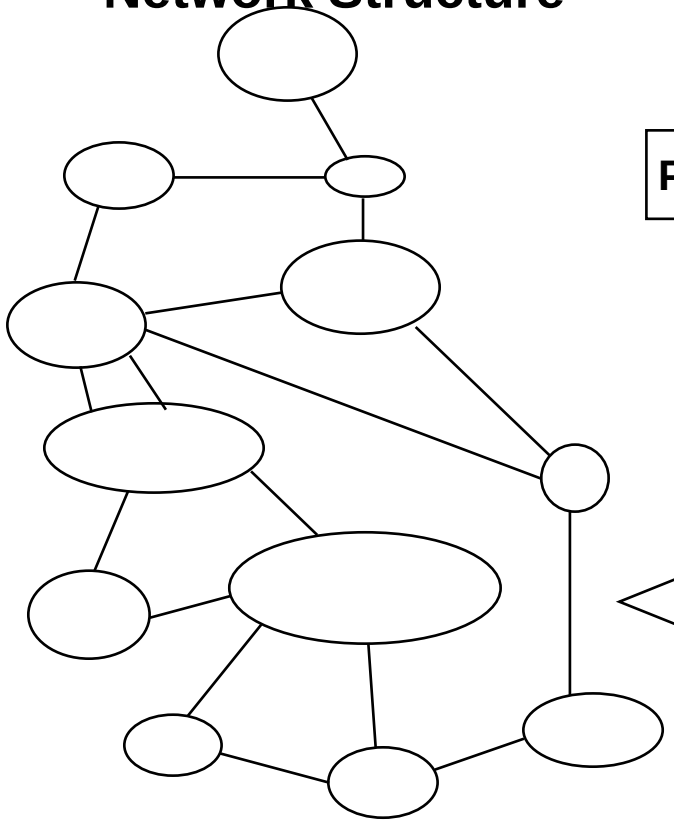


Knowledge Management Vision

Create a strategy and managing process for accelerating knowledge management that will introduce a culture change as well as effective tools and processes to further enable employees as "knowledge workers," improve productivity, and use knowledge intensity to achieve sustainable growth.

Networking Works……

Network Structure

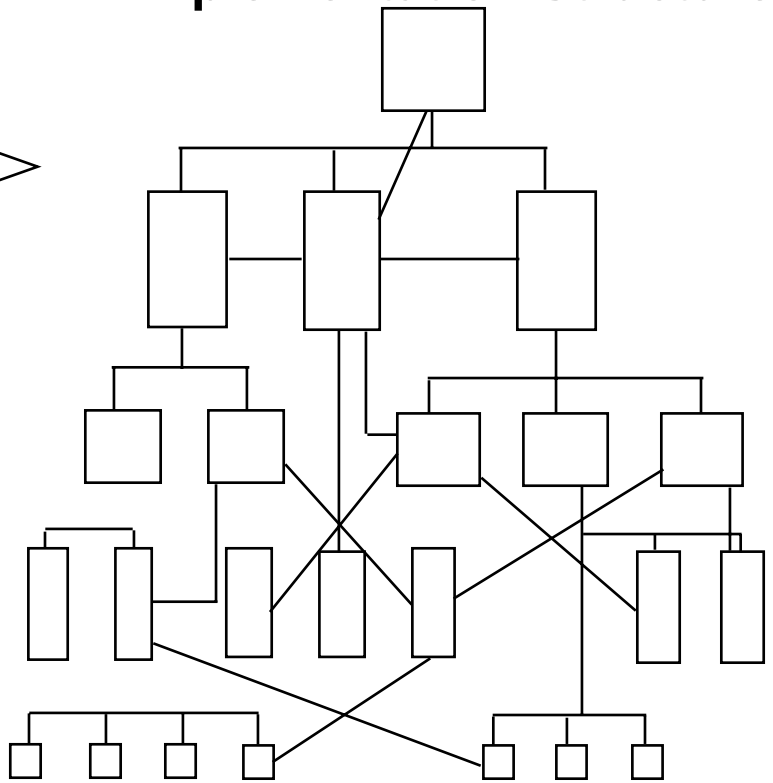


- Unpredictable relationships
- Innovates
- “How to get the job done better”
- Heterogeneous
- Do the right things

Possibilities

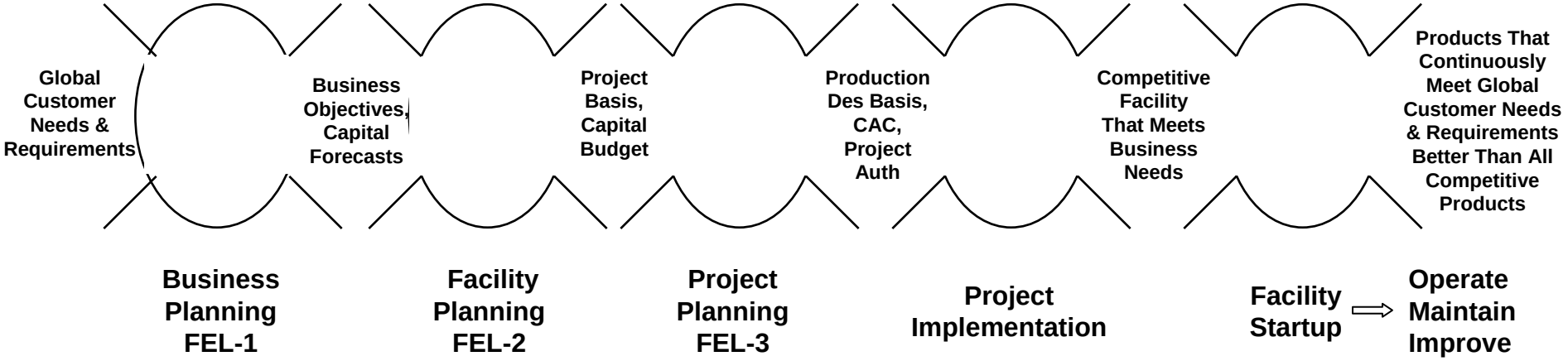
Needs

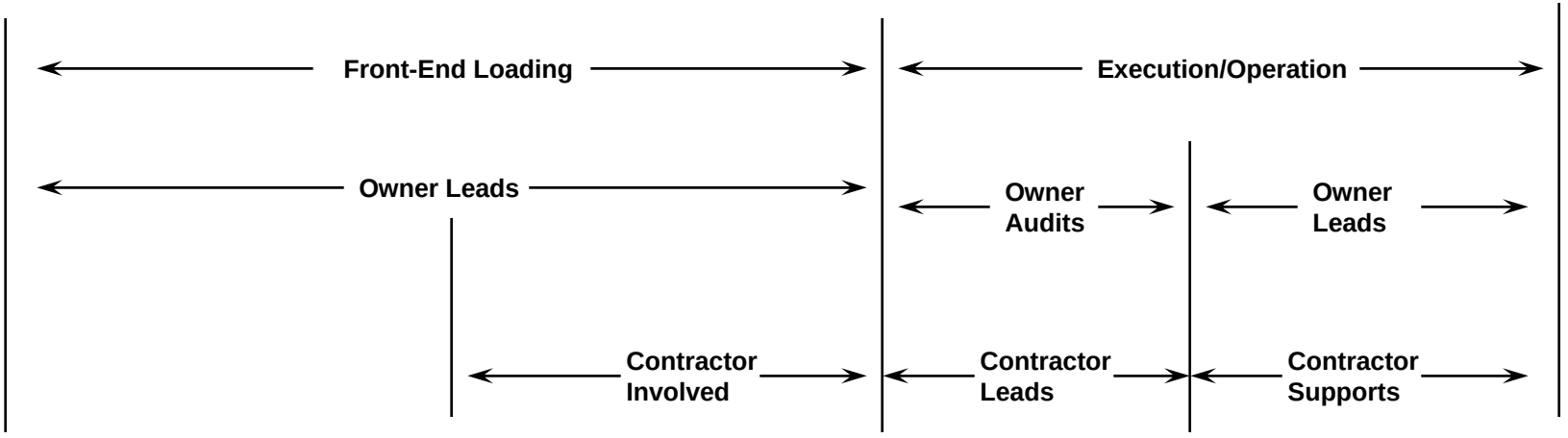
Implementation Structure



- Drives form vs. function
- Implements
- “Get the job done”
- Homogenous
- Do it right

Facilities Engineering Process

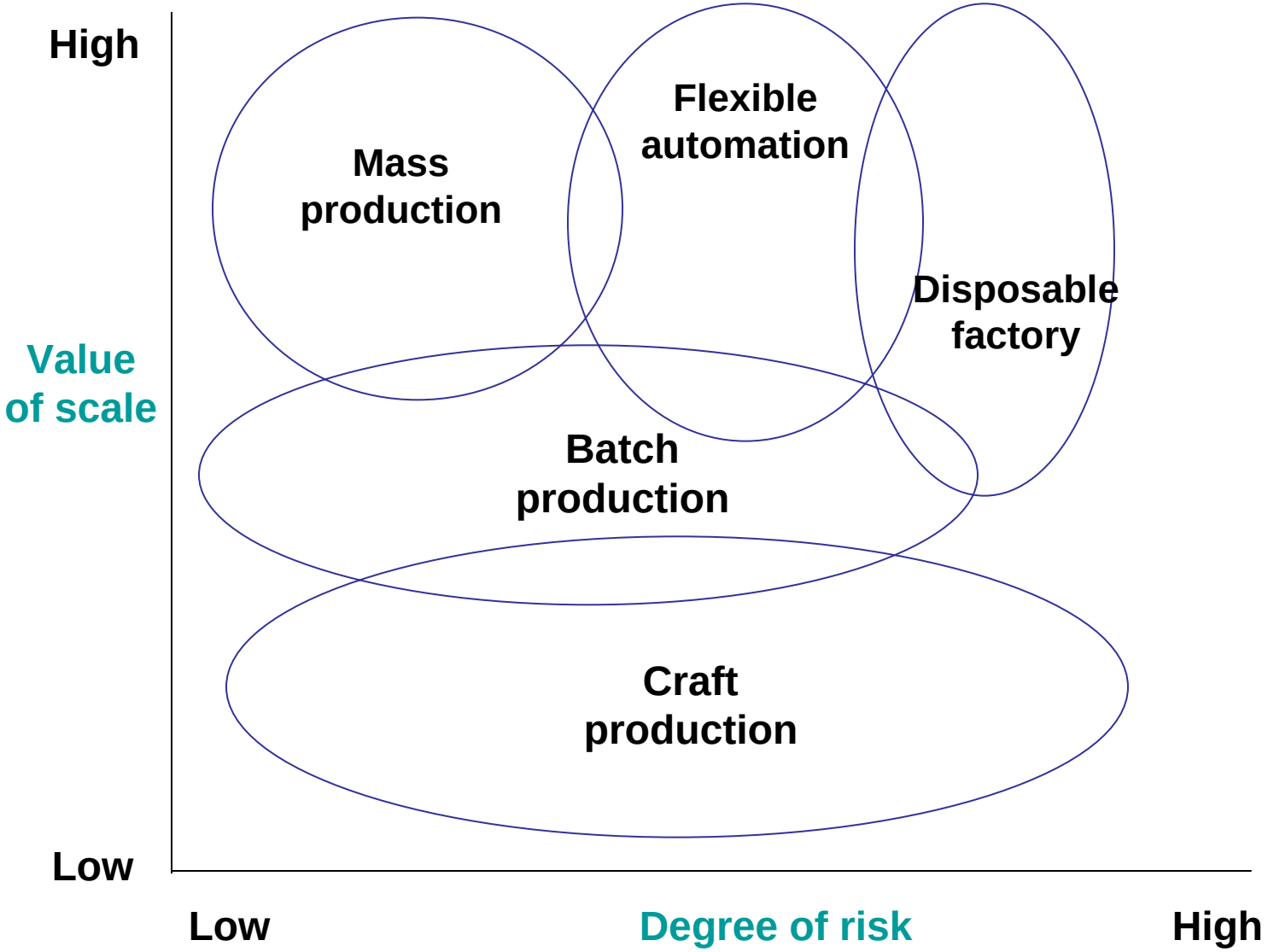




Key Questions - Education

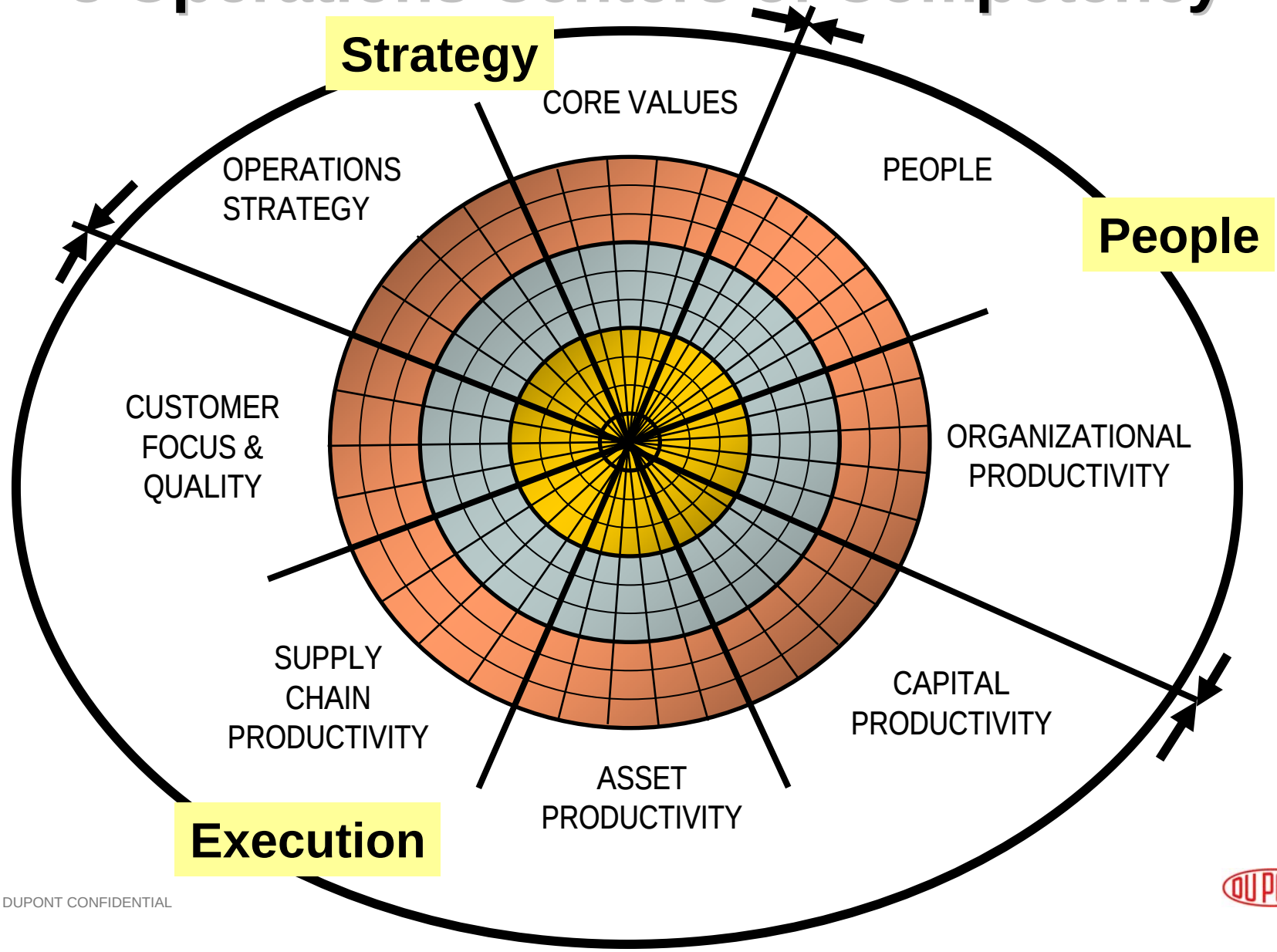
1. **What capabilities will engineers need in the future to best meet business and societal needs?**
2. **How is this going to be affected by offshoring?**

Production Model Selection



Source: BCG analysis.

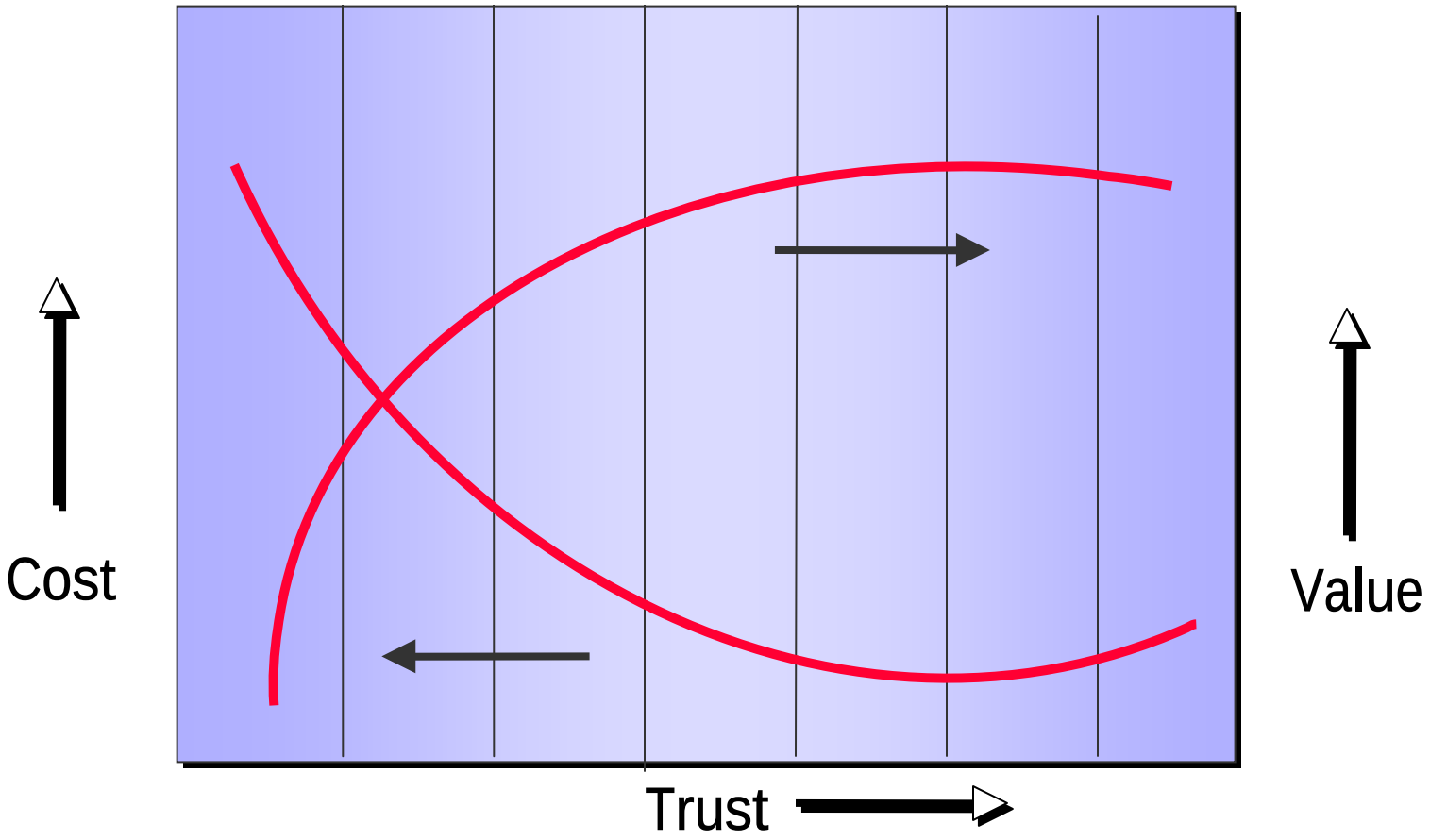
8 Operations Centers of Competency



Behavior Shifts

From	To
• Flexible	•Agile
• Internally Focused	• Externally Focused
• Replication Oriented	• Innovation Driven
• Control	• Influence
• Value Status Quo	• Value Diversity
• Coopetition	• Collaboration

Competitive/Trust Relationships



$$\text{Trust} = f\left(\frac{\text{Intimacy X Competency}}{\text{Risk}}\right)$$

Education Implications……

- **Engineers must understand and appreciate history, philosophy, culture, and the arts along with the creative elements of their technical discipline.**

- **Curriculums must be responsive to disparate learning styles.**

Process Industry Owner
Engineering Operating Principles…….

- **Engineering competencies are critical to business success.**
- **Engineering must have the right mix of engineering competencies available at the right time and place capable of delivering sustainable competitive advantage.**
- **Engineering must help businesses leaders understand and capture the value .... run a "pull" process.**

My Reflections……

- **Must see resourcing processes holistically**
- **Business value defines the pathway**
- **Leadership is learn/teach/learn**
- **It's never over**
- **Positive attitude critical**

"People don't resist change, they resist being changed!"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The miracles of science™