The Auto Future: Fast, Fun and Scary

David E. Cole
Chairman
Center for Automotive Research (CAR)

Geography of Auto Production—Will Detroit Continue to be Industry’s Hub?
Federal Reserve Bank of Chicago
Detroit Branch
November 3, 2003
Auto Industry—Like Pro Football

Everyone is Fast and Hits Hard
Industry, Highly Unstable — Not in Final Form
Competition

Relentless

Unforgiving
Is the Business Model Broken?
U.S. Automotive Capacity Utilization and Profits
1978 - 2002

Source: Federal Reserve, U.SDOC/BEA.
The Old Business Model is Broken
Old Business Model

- Vertical Integration
- Bureaucracy
- Paper
- Linear
- Talk
- Slow
- Lean
- Control
- Legalistic
- Sequential
- Individual
- Physical Prototypes
- Job for Life
- Regional
- Kings
- Competition
- Acquisitions
- Structured
New Business Model

- Virtual Integration
- Paperless
- Fast
- Listen
- Anti-bureaucracy
- Real-Time Collaboration
- Lean Agile
- Virtual Prototypes
- People Flow
- Coopetition
- Empowerment e-enabled
- Team
- Parallel
- Global
- Trust Coaches
- Alliances
- Flexible
Lean / Agile

▲ Investment
▲ Engineering
▲ Manufacturing
▲ Everything
Old Economy

Value Economy

New Economy
Cost of Risk is Decreasing
Auto Industry 2006

- Successful manufacturers and suppliers
- Strong market
- Great products
- But—not everyone made it
Capacity, People, Companies — 25% Reduction
But Still Important

- Production
- Knowledge Center
Economic Contribution of the U.S. Automotive Industry

▲ Manufacturing
▲ Retail
Auto Manufacturing

Manufacturers . . . . 620,000 + jobs
Suppliers . . . . . . . 1,800,000 + jobs
R & D Spending . . . $18+ billion
### Economic Contribution Per Job

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Mfr.</td>
<td>$292,000</td>
</tr>
<tr>
<td>Average Job</td>
<td>$73,000</td>
</tr>
<tr>
<td>Average Mfg.</td>
<td>$120,000</td>
</tr>
</tbody>
</table>
Economic Multiplier

Auto Manufacturers – 7.6

New Vehicle Dealers – 2.7
Foundation for Excellence

- Smarter Industry
- Platform / Component Set Rationalization
- Faster, Better Product Development
- Manufacturing Flexibility
- Stronger Processes
- Discipline
- Supplier Competence
- Lean Everything
Future Profits

- Price Increase
- Market Share
- Cost Reduction
Cost Reduction — Survival Issue

- Low Investment
- Modular Design / Construction
- Global Sourcing
- Flexible, Lean Manufacturing
- Fast Product Development
- High Volume Platforms and Component Sets
Knowledge

The Competitive Edge
Customer Pull

Cars and Trucks

Technology Push

Product and Process
Product Technology

At the edge of a revolution?
Technological Progress—When to Commercialize

![Graph showing the relationship between time and technological progress.](image-url)

- **Current Technology**
- **A**
- **B**
- **Too early**

---

**Time**

**$**
Future Power Technology

- Advanced Gasoline
- Clean Diesel
- Hybrids
- Fuel Cell
### Engine Redesign — 2009

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four Cylinder</td>
<td>52.5%</td>
</tr>
<tr>
<td>V-6</td>
<td>50</td>
</tr>
<tr>
<td>V-8</td>
<td>40</td>
</tr>
</tbody>
</table>
## Electrical / Electronic Content

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Combined E/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>31.5</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>
Future Trends

It’s Economics Stupid
Auto Future

- A Few Big Dogs
- Consolidation Continues
- Modular Explosion
- Super Suppliers – Tier 1 & 2
- Lean — Agile
- Fast, Smart, Rich, Global
- Technology Revolution
- Survival of the Fittest