R&D Dynamic Capabilities and New Power Train Technologies

John Ettlie, RIT
Francisco Veloso, CMU
Bruce Belzowski, UM

July 15, 2009
### Background and Motivation for the Study

- **R&D spending levels shifting to suppliers in the auto industry**
- **Auto Parts (SIC 3714) vs. Auto Assemblers (SIC 3711)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Auto Parts (SIC 3714)</th>
<th>Auto Assemblers (SIC 3711)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>2.2%</td>
<td>4.3%</td>
</tr>
<tr>
<td>1997</td>
<td>3.8%</td>
<td>4.2%</td>
</tr>
<tr>
<td>2002</td>
<td>3.9%</td>
<td>3.8%</td>
</tr>
<tr>
<td>2004</td>
<td>3.7%</td>
<td>3.9%</td>
</tr>
<tr>
<td>2005</td>
<td>3.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>2008</td>
<td>4.4%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

(Source: Schonfeld & Associates, Riverwoods, IL 60015)

- **Opportunity to study an entire industry in transition: new technologies in constrained resource context**
- **Currently there is an uneven mix of case histories and a few empirical studies indicating trends**
  - Novartis, Procter & Gamble, Fiat, Barclays Capital, Toys-R-Us, Bank of America, Zara, Audi, and Kia all taking aggressive posture in the downturn
  - Tellis, et al (2009) study shows culture is the key to innovating firms
Central Thesis of Dynamic Capabilities

- **Learning, coordinating and integrating** are the key processes that constitute dynamic capabilities by enabling the reconfiguration of existing resources into functional competences.

- **Research questions:** Under what circumstances do R&D performing firms survive and thrive under very challenging conditions? What are the strategies that account for the variance of innovation performance? How are technological capabilities dynamically reconfigured to support new challenges?
Preliminary Findings

- Six in-depth case histories across several projects in three OEMs and three power train, first-tier suppliers (before economic downturn)
- Most of these firms were in the process of restructuring their technical organizations based on these lessons learned before the down turn (e.g., the emergence of centers as the dominant organizational form requires confirmation the full sample).
- Trends concerning strategic technological integration
  - Within R&D
  - Between Functions
  - Redefinition of the competitive landscape
Dynamic Capabilities approach in a resource-constrained context

- Recent trends suggest the following questions:
  - e.g., do some firms retrench to “core” technology strengths, while others aggressively pursue growth areas to anticipate the coming “up turn?”
  - Do some firms stick with the existing R&D portfolio while others aggressively reconfigure their strategy and portfolio?
  - How do these changes affect customer and supplier alliances?
Potential Outcomes of the Study

• We anticipate findings will inform on the following issues:
  • To what extend do R&D investment levels, types (i.e., portfolios—breadth and scope) impact configurations of capabilities (e.g., mix of centralized & decentralized focus)?
  • How does one structure the link between changing business strategy in a downturn and R&D capabilities? What is the impact on performance?
  • Are effects in predictive models still dominated by firm effects? Or are other external effects (e.g., regulatory) effects are also equally important?