INDUSTRY PROFILES COLLECTION
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A Profile of the Global Auto Industry

Innovation and Dynamics

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BEP BUSINESS EXPERT PRESS

Major Themes

- Technology Lens on Auto Industry
- Automotive Economic Geography
- New Materials & Auto Supply Chain
- Is it Disruptive Change ?

This time it's Different !

- Technology
- Supply Chain
- China

Technology Lens on the Auto Industry

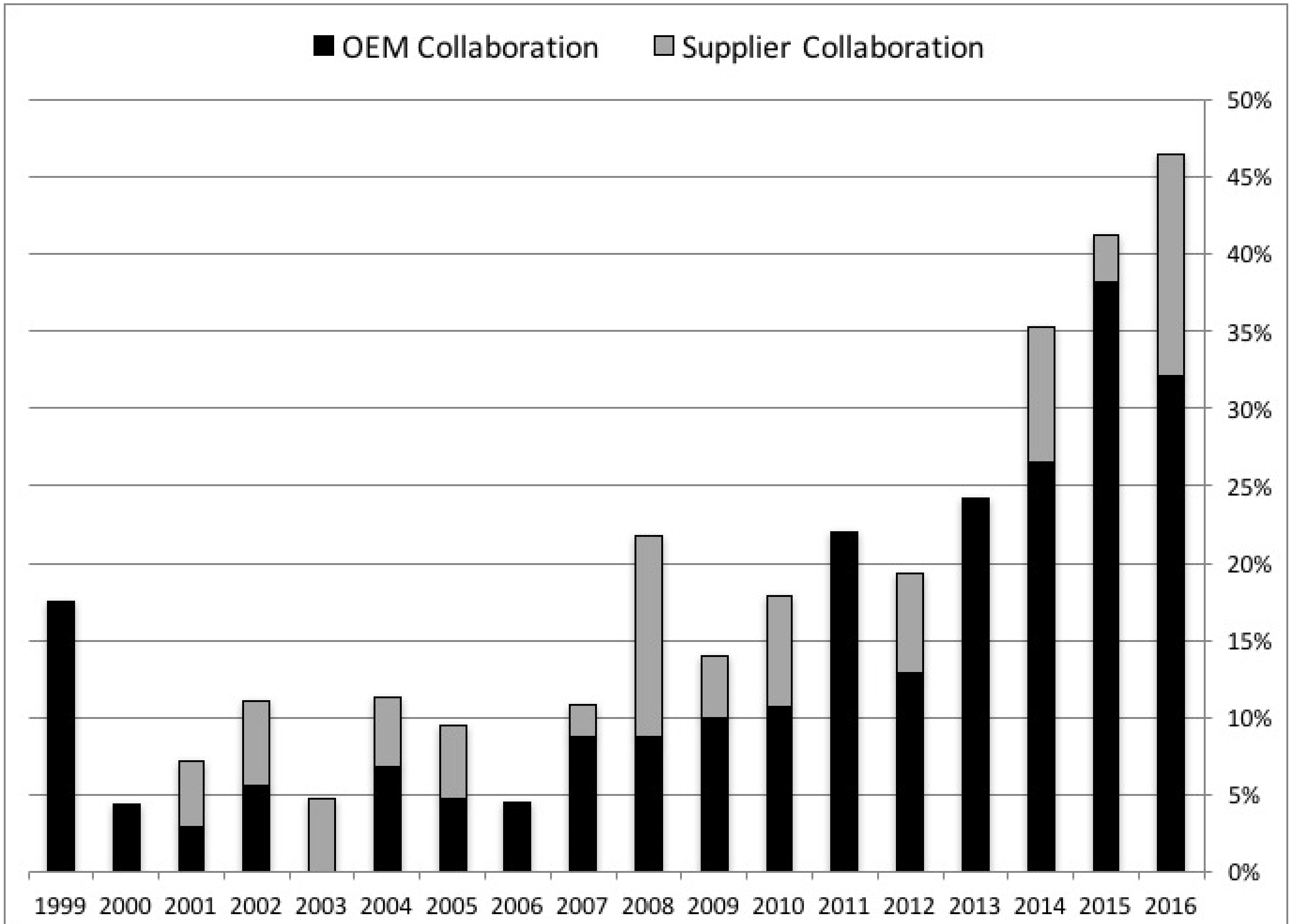
Periodization of Auto Innovation

- 1905-28 Hi Tech 1.0 Innovation. 3000 firms
  - Emergence of Dominant Design: ICE & All-Steel Auto Body
- 1928-88 Incrementalism
  - Proprietary Product Architectures
- 1988- Present Hi Tech 2.0
  - Catalytic Converter & Organic Chemistry
  - Environmental Policy as Prime Driver of Technological Change. “Lightweighting”

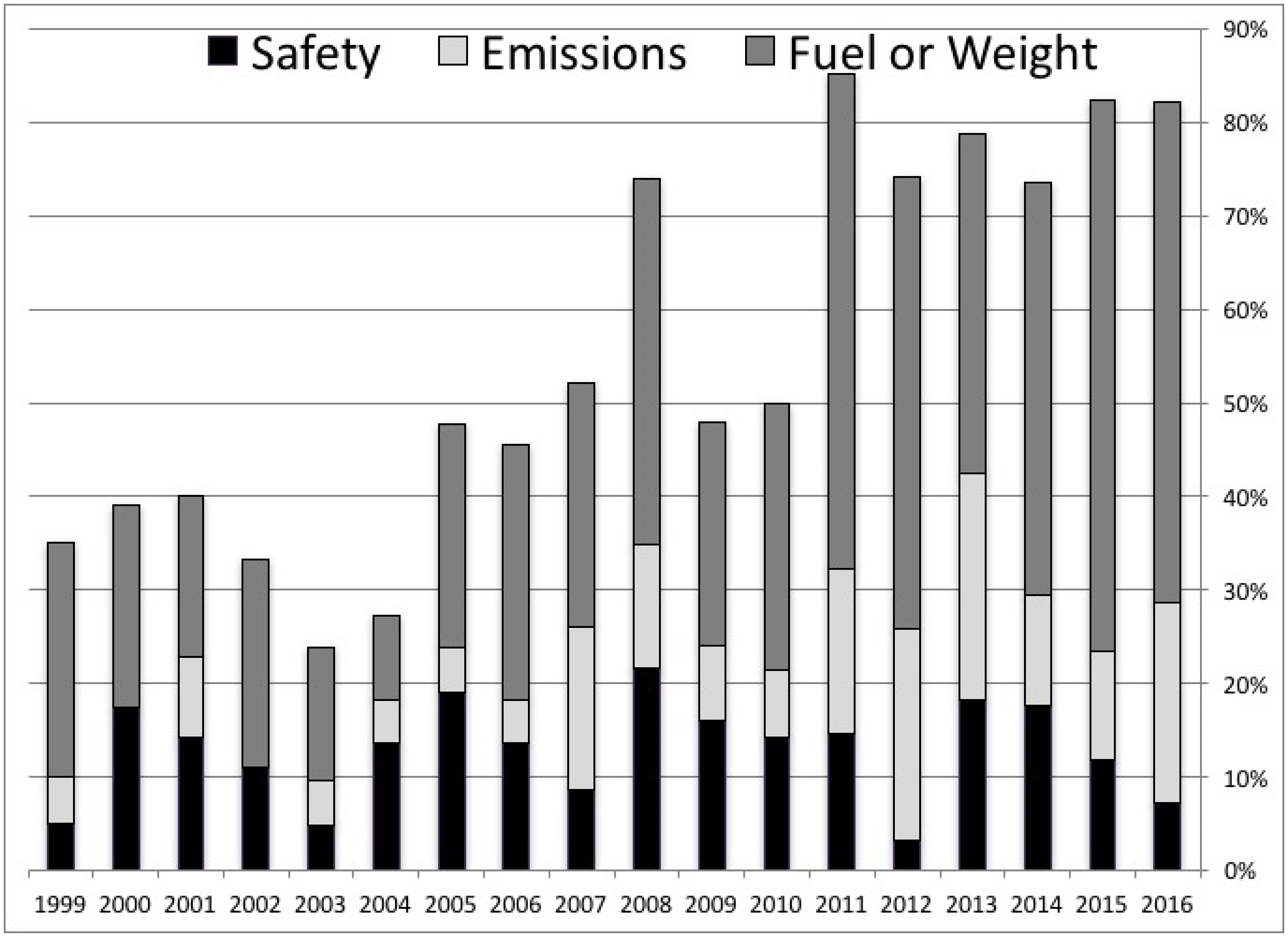
Changing Dynamics of the Auto Value Chain

- OEMs:
  - Can they make money producing new cars?
  - Value added in an Assemble Plant $3500 per vehicle. Most manufacturing and value added is in the Supply Chain.
  - Policy & Geography: Not where the **Assembly Plants** are but **Where the Engineering** takes place

PACE Awards: Collaboration



PACE Awards: Lightweighting



Automotive Economic Geography

Auto Manufacturing Technology Leading Edge in the Mega Clusters

North America, 2013

73% of region's assembly

Europe, 2013

78% of region's assembly

Dilemma of Chinese Automotive

- No Chinese Auto Alley
  - No Consolidation: 60 producers, every Province
  - Huge market does not translate into Strengths
- Policy Failure:
  - No new National Champions Emerge from Joint Ventures
  - International Brands & Platforms Dominate: GM & Volkswagen
  - Exports of single Models: Volvo. GM Buick Envision

New Materials Revolution

Lightweighting Materials

- Key Variable is not just lightweight and high strength.
  - New geometries: merging design & manufacturing
  - Arcelor S-in-Motion: Product Architectures

Perspective

- Manufacturing & Design shift to Supply Chain
  - 80% of production & innovation in SC
- Automotive Innovation
  - Prime Driver: Environmental Regulations
  - New Manufacturing Technologies: Hot Stamping, Roll Forming, Hydro Forming
  - Advanced Materials & Digital Manufacturing
  - Merging Design & Manufacturing

New Materials

- New steels are new materials. Not just adding alloys to the mix.
- Composites may repeat the steel story.
- No “New” Aluminium or Manganese

Disruptive Change ?

Innovation in Automotive

Innovation	Incremental	Transformative
AVs	✖	
EVs	✖	
Supply Chain		✖
Business Model		✖

Changing Dynamics of the Auto Value Chain

- Supply Chain Companies:
  - Parts makers can make money: 85% of value creation
  - New Materials & Software: Innovation Challenge
- Dealers
  - New car sales only cover wages & overheads
  - Financial Services: F&I, financing, warranty insurance, maintenance contracts
  - Vehicle Servicing

What’s Next ?

- China’s Automotive Geography
- Enhancement of NAFTA ‘s Automotive Alley
- Auto Industry as Value Destroyer