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Advanced Information Technology Solutions:
An Engine of Innovation

CAR Breakfast Briefing
The Inn at St. John's, Plymouth, Michigan
March 25, 2014

Thank you to our sponsors:

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Acknowledgments

- Dassault Systemes, PTC, and SAP
- To the many interviewees that contributed to the study
- CAR Staff
  - Brian Esterberg
  - Brett Smith
  - Lisa Hart
  - Jocelyn Paslowski
  - Mike Forster
  - Matt Schmidt

Study Objectives

- Identify the key market drivers that influence the use of automotive IT solutions
- Investigate new tools and approaches to IT that address these market drivers
- Evaluate information technology's potential impact on the automotive industry

Overarching Market Drivers

Manufacturing Flexibility

Sustainability

Vehicle Electronics and Software

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Manufacturing Flexibility

- Increased need for manufacturing tools and facilities that can deliver a wide range of parts
- Trend toward common architectures
- Globalization and Localization

"Any customer can have a car painted any colour that he wants so long as it is black."

- Henry Ford

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Sustainability

- Greater industry focus on fuel efficient products as well as sustainable products and manufacturing systems

- Driven by policy changes, consumer acceptance, and profitability

"Ten years ago nobody was communicating on carbon impact; today it is part of our day-to-day communications. "

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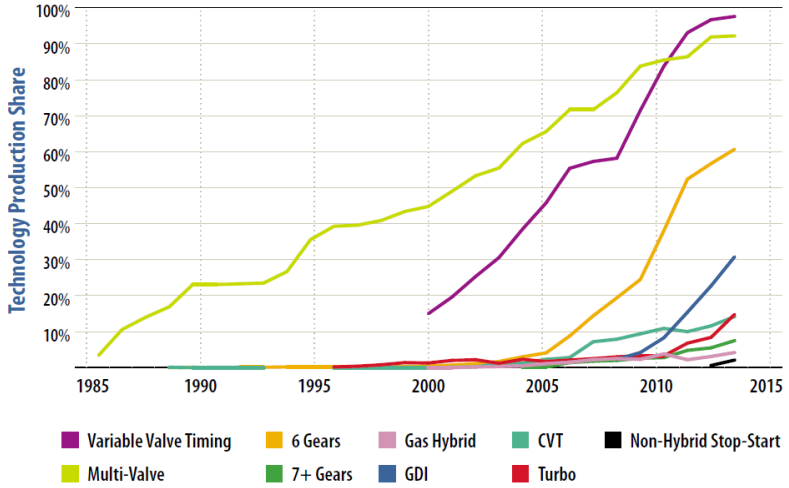
Sustainability

- Challenges:
  - Diverse set of fuel efficient technologies
  - Supplier metrics based on key fuel saving goals
  - Monitoring of entire value chain
  - Internal carbon tax
  - Requires a systems approach to engineering



Source: Environmental Protection Agency

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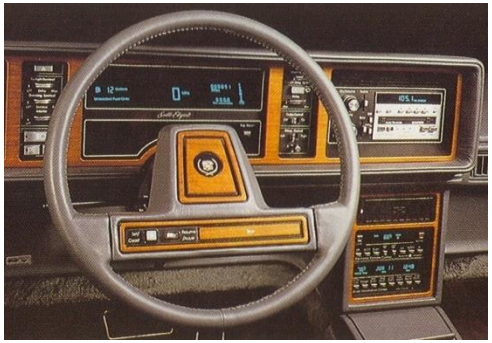
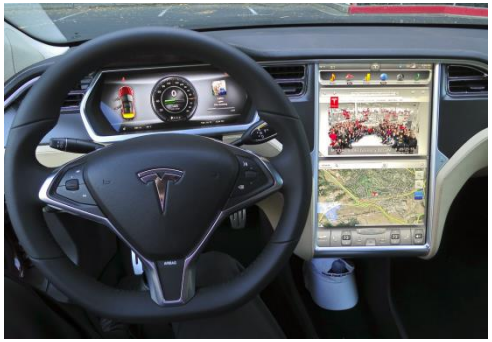
Vehicle Electronics and Software

- Exponential growth of vehicle electronics and software to control almost every aspect of the vehicle
- Significant growth in vehicle computing power
- Consumer demand for in-vehicle connectivity
- Advances in vehicle safety and automation





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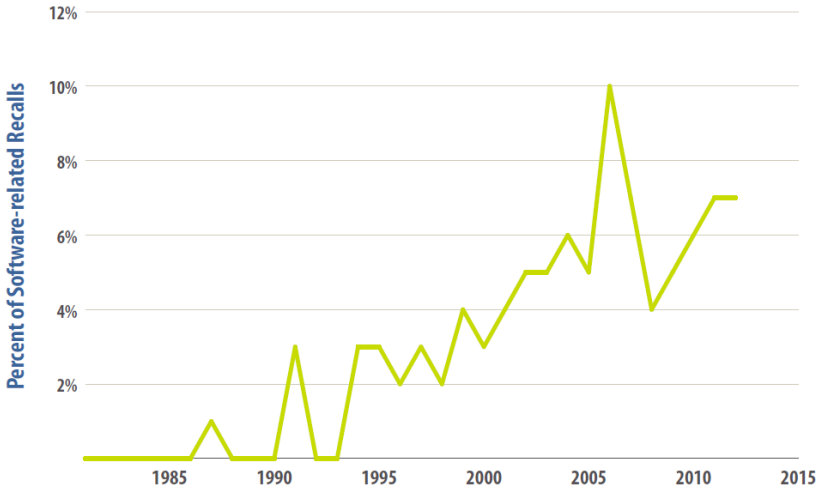
Vehicle Electronics and Software

- Challenges:
  - Significant increase in vehicle complexity
  - Verification and validation of millions of lines of code
  - Cyber security and data privacy
  - Driver distraction and HMI



Source: National Highway Traffic Safety Administaration

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EMERGING OPPORTUNITIES

Cloud Computing

- Global operation and standards
- Real-time collaborative engineering
- Centralized data
- Advanced analytics of data

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Enterprise Social Networks

- Improve internal communication – particularly for tribal knowledge
- Easy and intuitive to use
- Potential to provide quick feedback

"Most of the knowledge is tacit. It is walking around in the heads of our employees. The question is how do you get that knowledge?"

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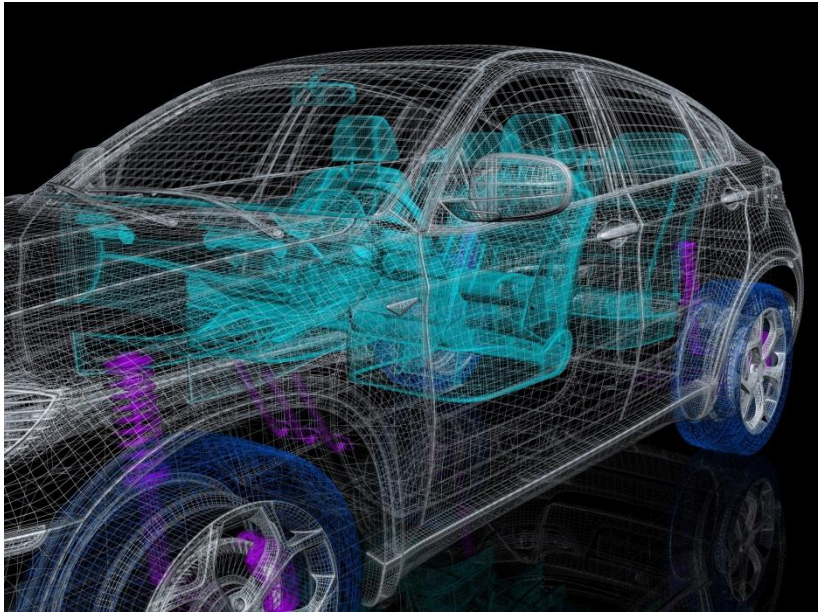
Big Data

- Vast amount of data in automotive industry – market studies, social networking, testing, change orders, plant quality, logistics, warranty, repair history, vehicle telematics, etc.

- Connected vehicle technology estimated to generate 11.1 petabytes of data by 2020

Simulation Tools

- Increasingly reliant on simulation tools
- Frontloading of programs
- Shows dependencies between systems



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Mobile Devices

- 69% of college educated employees own a smartphone
- Tablet ownership increased from 2% to 42% between 2011 and 2013 (adults 18+ years of age)
- Automotive industry looking to leverage this through BYOD
- Some examples in automotive exist today (Google docs, internal social networking)
- Would like to use more, but may not make sense in some instances

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IMPLICATIONS OF NEXT GENERATION IT

Manufacturing

- Transition from green screens and clipboards to completely visual and digital environment
- Central collection of data enabling the ability to analyze all data at any time
- Automated report locally and globally
- Improve work force work instructions through visualization and real-time updating

image: copyright Dmitry Kalinovsky/Shutterstock

Product Development

- Advancements in simultaneous and collaborative engineering
- Systems engineering tools to drive requirements management and traceability
- Simulation tools have moved from an added bonus to essential
- Accessibility of data is greater than ever and with almost any device
- Real-world data driving continuous improvement

Supply Chain

- Analytics to assess risk of supply chain
- Greater visibility of sub-tier suppliers
- Shipping efficiency
- Logistics forecasting


Image: Infracor

Service Centers

- Improved logistics
- Integration with connected vehicle technology
- Service technician tools

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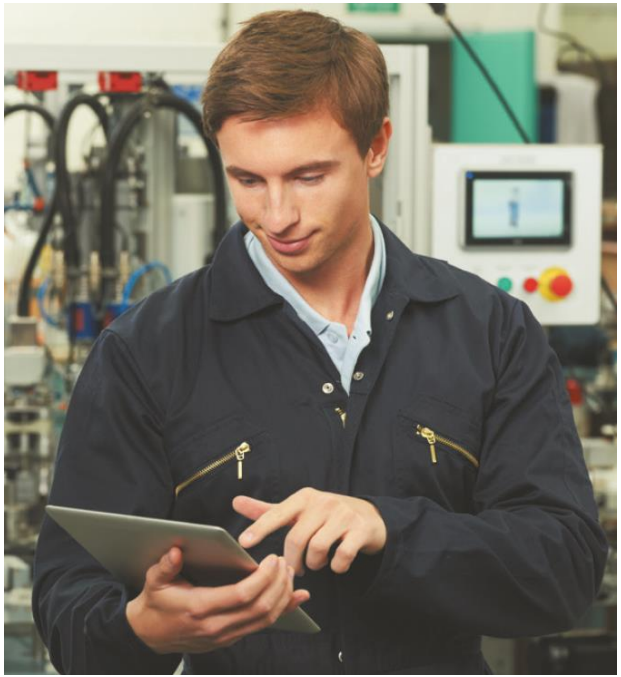
Marketing

- Use of CRM and Big Data analytics
- Identify key life events of consumers (e.g., Target's ability to identify expecting mothers)
- Challenges with Dealer Management Systems

Workforce

- Greater focus on software engineering
- New tools may require specialized workforce and training
- Some tools may make it easier for average worker



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Consumers

- Potential to improve relationship with dealers
- Vehicles are getting more complex and demand more of the drivers attention
- Collection of vehicle data raises consumer privacy issues

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Conclusions

- Enterprise IT systems impact virtually all elements of the automotive industry
- Transitioning from mechanical to software driven industry
- Global platforms, manufacturing flexibility, and increase vehicle complexity is pushing the industry to increased use of IT systems
  - Manufacturing visibility and historical data
  - Systems level approach to engineering
  - Supply chain risk analysis
- New opportunities with Big Data analytics and vehicle connectivity

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THANK YOU

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