The Introduction of Radical Product Innovations through Legacy Retail Channels in the Automotive Sector: Plug-in Vehicles, New Car Dealers, and Policy

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Background

- Degrees in Engineering, Management, & Policy (MIT)
- Technology Management
  - U.S. Navy, Boeing, Quantum, X PRIZE
- Founder & President, Adaptiv Consulting
  - NPC Future Transportation Fuels Study
  - Emerging vehicle markets
- Technology strategy and innovation policy
- LEAF owner
PEV Dealer Study Overview

- Problem Statement
- Research Objectives
- Initial Exploration
- Research Questions
- Theoretical Framework
- System Boundaries
- Data Collection
- Progress
- Acknowledgments
Problem Statement

- Sector-unique condition: State franchise laws

Auto Manufacturer → New Car Dealership → Customer → Policy → ?

New car dealers will continue to intermediate PEV transactions for the foreseeable future...
Dealers as gatekeeper

ZEV Action Plan: “Encourage and support auto dealers to increase sales and leases of ZEVs.”

Source: ARB Staff Report (2012)
Problem Statement

Degree of change at...
- Micro-level
- Macro-level
- Technology
- Market
- Customer preference shifts (Tripsas 2007)

PEVs introduce significant changes that legacy retail players may be ill-equipped to accommodate.

Source: Garcia & Calantone (2002)
Research Objectives

1. Illuminate retail level dynamics affecting PEV sales

2. Identify retail-level drivers that support or inhibit PEV sales

3. Advise policy accordingly
Initial Exploration

- January 2013: Informal dealer workshop
- July 2013: Exploratory focus group

Many factors beyond simple price differences affect PEV sales.
Industry Background & Trends

• Traditional revenue streams
  • New cars
  • Used Cars
  • Service & Parts

• Compensation
  • Front-end commission (flat fee or %)
  • Bonuses (volume, spiffs, spins, trade-ins, options)
  • Satisfaction → I can’t get no...
Industry Background & Trends

• The march of technology...
  • Internet
  • Vehicle quality
  • In-vehicle devices
  • Powertrain
Systems Perspective

• What is a technology system?

A dynamic network of agents interacting in a specific technology area and institutional setting to develop, diffuse, and use innovations.

... are defined in terms of knowledge and competence flows rather than flows of ordinary goods and services.

• Socio-technical systems

• National, Regional, Sectoral systems

Frame of Analysis

• Technological Innovation System (TIS)

The network of actors, institutions and technologies in which an emerging technology is embedded but has not yet been built up.

TIS Framework

- **Common processes underlying innovations**
  - Knowledge development and diffusion
  - Entrepreneurial experimentation
  - Resource mobilization
  - Influence on the direction of search
  - Legitimation
  - Market formation
  - Positive externalities

- **Structures differ; processes do not**

- **Gaps: Which actors? To what degree? When?**
  - Methods/tools needed to analyze/measure/compare (Carlsson et al. 2002b, Edquist 2005)
  - Actor-oriented (Markard & Truffer 2008)
Why the TIS framework?

• Supplies context
• Relates dynamics at the firm and system levels
• Processes common to all new innovations
• State of process development
• Processes are directly comparable
• Allows for descriptive and normative assessment of the system
• ‘System Failure’ as basis for policy action
• Inductive; more open to alternatives
Research Questions

1. What processes are key for growth of the PEV market at the retail level?

2. To what extent are new car dealers participating in these processes?

3. What dynamics drive or impede sales of PEVs?
System Boundary

Source: UC Davis PH&EV Center (2013)
Structural Components

Government/political subsystem

CAFE
ATVM
CA ZEV
ARRA
HOV
CVRP

Automakers

Charging

Utilities

Consumers

Knowledge Infrastructure

EV Project

UCDAVIS
SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS
Structural Components

Government/political subsystem

CAFE
ATVM
CA ZEV
ARRA
HOV
CVRP

Automakers

Charging

Utilities

Knowledge Infrastructure

Dealers

Consumers
Actors

- Dealers
  - Business Managers
  - Sales Representatives

- Consumers
  - Buyers
  - Considerers

- Others
  - OEMs
  - Electric Utilities
  - EV Associations
  - Others (e.g. CCSE, CEC, PEVC)
Data Collection

- Four largest PEV markets
- Dealer Site visits
- Semi-structured interviews
  - Dealers (business manager/owners & sales personnel)
  - Also OEMs, utilities, CCSE, regional governments
- CVRP survey
- JDPA data
- Dealer workshop
### Dealer Selection Matrix

**Geographic Availability of PEVs**

<table>
<thead>
<tr>
<th>Sales Volume</th>
<th>Nationwide</th>
<th>CA or ZEV ‘Section 177’ States Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Nissan, Chevrolet (GM), Ford</td>
<td>Toyota</td>
</tr>
<tr>
<td>Low</td>
<td>Nissan, Chevrolet (GM), Ford, Mitsubishi</td>
<td>Honda, Fiat (Chrysler), Toyota, Smart (Daimler)</td>
</tr>
</tbody>
</table>
CVRP Questionnaire

- 50 min; 20-40% response rate
- 200-300 responses per week

Explanatory Variables
- SES, PEV make/model, purchase date, dealer
- Initial interest
- Source knowledge (breadth and depth)
- Source influence
- Innovation supply/demand asymmetry
- Search

Response Variables
- Customer Satisfaction
- Sales
Select Hypotheses

1. Customer sales satisfaction scores for PEVs are lower than equivalent non-PEVs.

1. Customer sales satisfaction scores for PEVs are higher for ‘innovative’ dealers than for traditional dealers.

1. Poor satisfaction scores result in fewer PEV sales.
Intended Contributions

• Illuminates retail level dynamics
• Advance differentiated policy
• Uses an inductive process
• Offers some initial hypotheses and models of dealer influence on TIS growth
Progress

- Develop initial protocol + OK from IRB ✓
- Obtain funding ✓
- Conduct exploratory focus group ✓
- Launch CVRP survey questions ✓
- Conduct site visits / interviews
  - San Diego ✓
  - Los Angeles ✓
  - Bay Area
  - Sacramento ✓
- Conduct final dealer workshop
- Submit report to CEC

In Progress
Dec 2013
Mar 2014
Apr 2014
Acknowledgments

- Research funding from California Energy Commission
- Collaboration with California Center for Sustainable Energy
- Jonathan Morrison, California New Car Dealers Association
Thank you!

QUESTIONS?
Select Literature


Back-up Slides

PH&EV Dealership Study
# Methodology by Market

BM = Business Managers  
Sales = Sales Personnel  

<table>
<thead>
<tr>
<th>PEV Market</th>
<th>BMs+Sales BMs</th>
<th>Method</th>
<th>Consumers</th>
<th></th>
<th></th>
<th>Focus Group</th>
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<tbody>
<tr>
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<td>X</td>
<td>Final Dealer Workshop</td>
<td>CVRP Web Survey</td>
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<td>Greater Sacramento</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Statewide</td>
<td></td>
<td>X</td>
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