From Electromobility to Autonomous Mobility in Europe: What Have We Learned? What Is Ahead?

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THE INNOVATION MANAGEMENT RESEARCH PROGRAM AT CRG
STRONG ANCHORING IN AUTOMOTIVE FIELD, ON GOING RESEARCH PROGRAM ON EV AND AUTONOMOUS MOBILITY (R. MANIAK & C. MIDLER)

6 doctoral researches
- The engineering of the deployment of a disruptive platform, the EV case F. Von Pechmann (C. Midler supervisor) [2014]
- Strategies and Management of Disruptive Innovation in Emerging Countries - The case of Electric Vehicles in China B. Chen (C. Miller supervisor) [2018]
- Systemic innovation management and strategies in the digital age : the case of the mobility industry S. Marzocchi (R Maniak supervisor) [ongoing]
- The Development of Electric Mobility System in Indian cities in the next 10 years H. Sawamura (J. Ruet supervisor) [ongoing]
- Managing ambidextrous programs: the case of autonomous mobility T. de Campigneulles (C. Miller and R. Maniak supervisors) [ongoing]
- Technological breakthroughs and industrial dynamics, the EV case M. Alochet (C. Midler supervisor) [ongoing]

AGENDA

1. The rise of Battery Electric Vehicle in Europe: the deployment of a systemic disruptive innovation
   - A quick historical perspective
   - The dynamics of bottlenecks in EV deployment
   - Managing systemic disruptive innovation learning from EV case
2. The Autonomous Mobility Challenge: a triple transition and uncertainties for car industry
   - A technology transition from internal combustion engine to electric motorization, connectivity, artificial intelligence.
   - A business model transition from a B to C product centric to a B to B to C autonomous mobility service business model.
   - An ecosystem transition from an established ICE value chain.
3. Managing the Autonomous Mobility challenges
   - From stage-gate project portfolio management to ambidextrous program management
   - From innovating among the stabilised value chains to exploring in an emerging eco-system
   - From home centric R&D to worldwide exploration & experiment field
A BRIEF HISTORY OF EV DEPLOYMENT IN EUROPE

- The early days of automobile: a promising start, victim of the dominant design of internal combustion vehicles

- The 1970’s and 1980’s: time for renewal of R&D efforts from OEM, with the help of public programs
  80 electrified Renault 4 and Renault 5 in the first EDF test feet
  Few Electrified 205 by Peugeot

- The 1990’s turn: the market emergence at last?

- 2002-2008: Consumer market failure but public supported fleet

- from 2011: a real diversified offer emerges on European market
BEV AND PHEV sold in France 2015-2017

The on-going explosion (TOP 5 Europe)

Analyzing the dynamics in EV deployment 1/5:
In the 1990s and early 2000s: Battery and Product value bottleneck.
- A battery technology bottleneck: range and cost
- A deceptive product offer: electrified ICE cars cannot compete with ICE

80% of daily journeys in Europe are less than 60 km

Analyzing the dynamics in EV deployment 2/5:
From 2011: a market raise much slower than expected.
- A real diversified and valuable product offer
  - The battery range: no more a bottleneck... theoretically
  - But still far from initial market dynamic expectations:

Economic Value vs TCO bottleneck
Charging bottleneck
Public does not know about the real value of EV

The key role of field experiments and early niche markets

And deeply transform the usual marketing and sales practices to adapt the customer experience to the specificity of EV innovation

The key role of public authorities: national and local incentives
Analyzing the dynamics in EV deployment 1/5:
The total cost of ownership (TCO) bottleneck.

- The key role of public authorities: national and local incentives
- Changing the economic model of BEV: the Renault Zoe case

Analysing the dynamics in EV deployment 4/5:
The electric mobility system bottleneck.

Impact of a specific levers on global EV customer sales in French Market:

- Electric mobility system infrastructure lever
- Electric mobility system cost reduction lever
- EV TCO reduction lever
- EV Technology improvement lever

Felix von Pechmann (2014)
Reorienting public incentives from R&D and final customer to EV infrastructure deployment

Analysing the dynamics in EV deployment 4/5:
The electric mobility system bottleneck.

- Reorienting public incentives from final customer to EV infrastructure deployment

- Reorienting the OEM sales and marketing practices from B to C to Mobility Prescribers to C

What have we learn from EV dynamics?

**EV is a systemic disruptive innovation transition**

1. The Radicality of the transition (from featuring capability within to dominant design disruptive changes)
2. The perimeter of the change (from product centric to mobility system transition)
3. The massive scale of the projects (from POC, prototypes and experiments to massive industrial development)
4. The speed of the transitions (from sequential cautious stage-gate processes to ambitious market deadlines)
5. The need to carry out these transitions while maintaining the existing activity (ambidextrous strategies and organisations)
What have we learned from EV dynamics?

Managing such transition needs different innovation processes than usual new innovative product development

1. The radicality of the transition
   - Electrified ICE = not enough value
   - Need a global redesign of product
   - Need a new business model to compete dominant

2. The perimeter of the change
   - To engineer the radical electric mobility system
   - To manage all the components of new electric mobility ecosystem

3. The massive scale of deployment
   - Strategic commitment to the « real size » move
   - Unleashed the technological, market and regulation dynamics

4. The speed of the transitions
   - Anticipation of various lever (product AND customer learning AND infrastructure with field experiments).
   - The first movers are far ahead now RCT.
   - We are now in the « Tornado » period where new generation offers emerge rapidly, based on the confidence of real massive market. Leapfrogging is possible.

5. The ambidexterity strategy
   - Autonomous empowered units, high sponsoring and « ambidextrous program management » to coordinate the diverse concurrent learnings
   - The first massive step generally preserve the existing industrial footprint

Autonomous Mobility: an even more challenging transition !!

1. The radicality of the transition
   - Techno: Electrified + connected + intelligent
   - Business model:
     - Value for customer?
     - Product => service
     - Product+infrastructure+mobility system operating
     - New ecosystem: tech+service providers+public authorities….
     - Billion size investments in many global OEM
     - World wide transition

2. The perimeter of the change
   - Product+infrastructure+mobility system operating
   - New ecosystem: tech+service providers+public authorities
   - New competitors from outside auto

3. The massive scale of deployment
   - Billion size investments in many global OEM
   - World wide transition

4. The speed of the transitions
   - Impressive strategic commitments on AM
     - BMW: highly and fully automated by 2021
     - Hyundai: fully AM for highway in 2020 and urban in 2030
     - Renault: fully AM in 2020
     - Nissan: fully AM by 2022
     - Toyota: 2020 Highway, 2022 City

5. The ambidexterity strategies
   - Strategic ambiguity:
     - Impressive AM commitments
     - US to install the mobility service

Call for a new innovation management process!!

Traditional auto R&D process

- Product centric
- Ambidextrous program management

- Mobility system centric
Call for a new innovation management process!!

Traditional auto R&D process
- Product centric
- Sequential Stage Gate between homogeneous projects portfolios
- Co-innovation with auto suppliers

Ambidextrous program management
- Mobility system centric
- Program coordination between heterogeneous projects
- Management of complex ecosystem

R. Maniak, C. Midler, New Mobility Conference october 2018

Shifting to a disruptive robotized mobility service vision?
- Design and produce Robotaxi vehicles
- Operate robotaxi fleets
- Run mobility platforms

Level 0
- Driver Only
Level 1
- Assisted
Level 2
- Partially Automated
Level 3
- Conditionally Automated
Level 4
- Highly Automated
Level 5
- Fully Automated

Driver not required during defined use case

NO MORE DRIVER
CONCLUSIVE REMARKS

• On going transition is a new game for automobile industry
  • Systemic disruptive innovation
  • Incumbents are well placed but need to adapt ambidextrous strategies

• This transition calls for deeply renewing the innovation management processes
  • Installed sequential stage gate process cannot meet the new game
  • Hierarchical supply chain management is not fitted to manage heterogeneous and unstable eco-système
  • Ambidextrous program management is a potential candidate

• Next step
  • Carry out a global survey to map the various forms of learning tracks and ambidexterity choices

Thanks,

Questions?