

Business model innovation in an emerging ecosystem: Electric vehicle diffusion

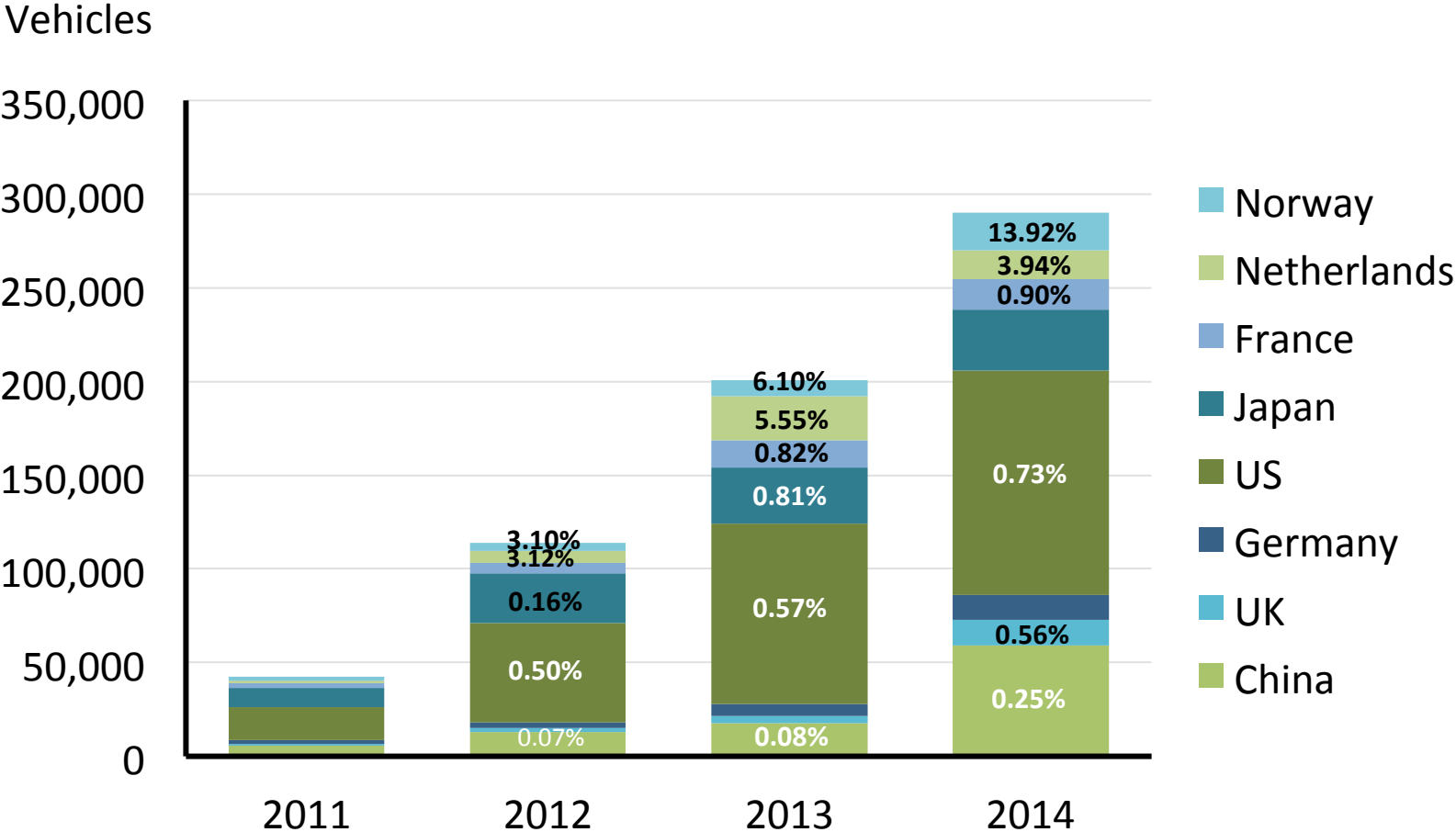
A summary of cases and findings from international
experience

Dr. Claire Weiller
Cambridge Service Alliance presentation
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Outline

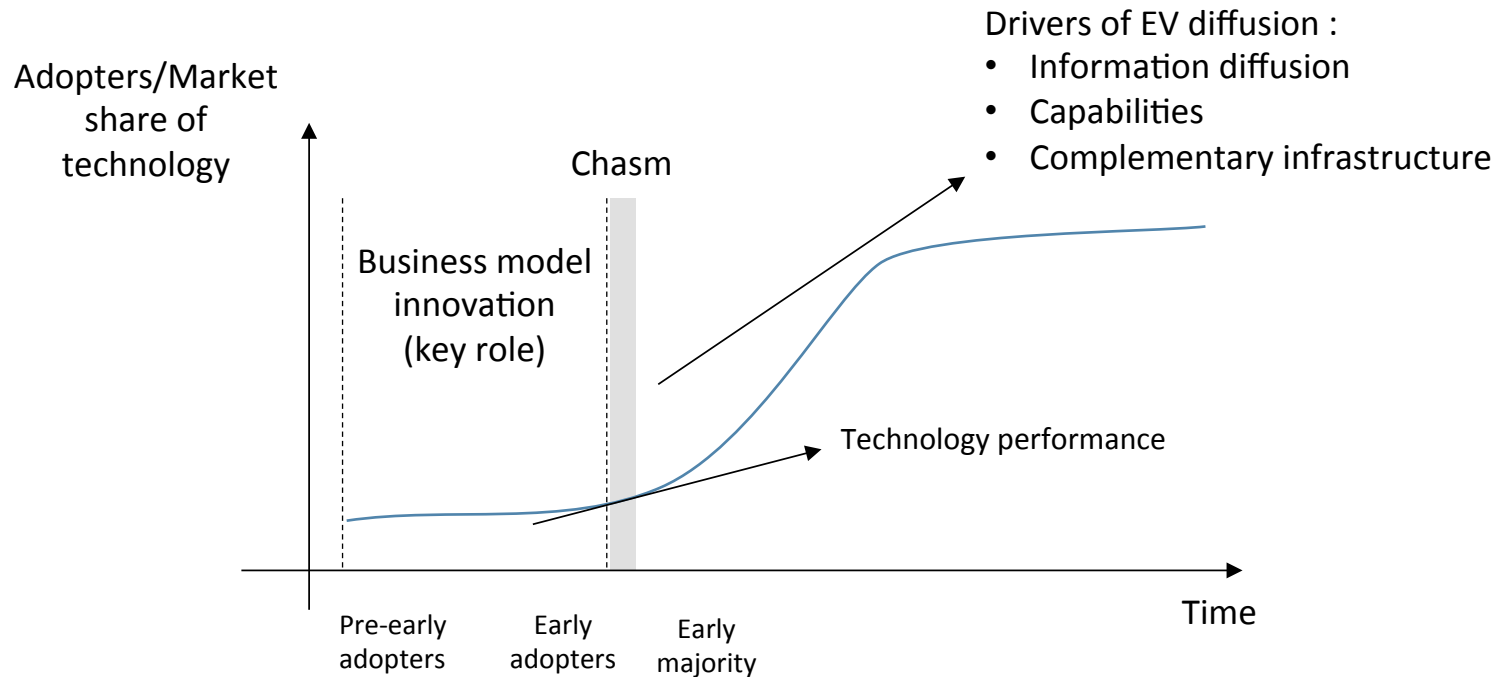
- Electric vehicle market
- Main arguments
- International cases
- Comparison of business model outcomes
- Significance
- Future work

Plug-In Electric Vehicle sales and market share



Data as of 15.02.2015 (Update to Fig. 10 p. 46)

Business model innovation and diffusion



Main thesis argument (2)

- Linking business model innovation and ecosystems
 - Business models influence the emergence of innovation ecosystems
 - Business model innovation as a process should capture the broader ecosystem, through a “reflexive” process

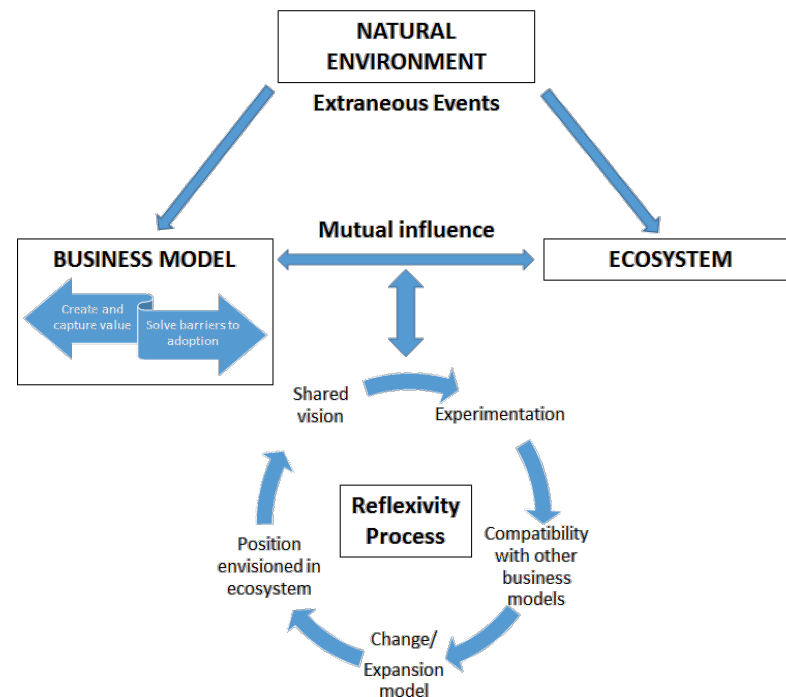


Figure 31. Final framework: Business model innovation in ecosystem

Case studies

Charging systems

1. Battery-swapping by Better Place (California)

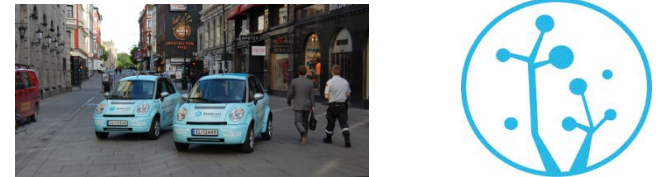


2. DC Fast-charging by TEPCO/CHAdeMO (Japan)



Mobility-as-a-service

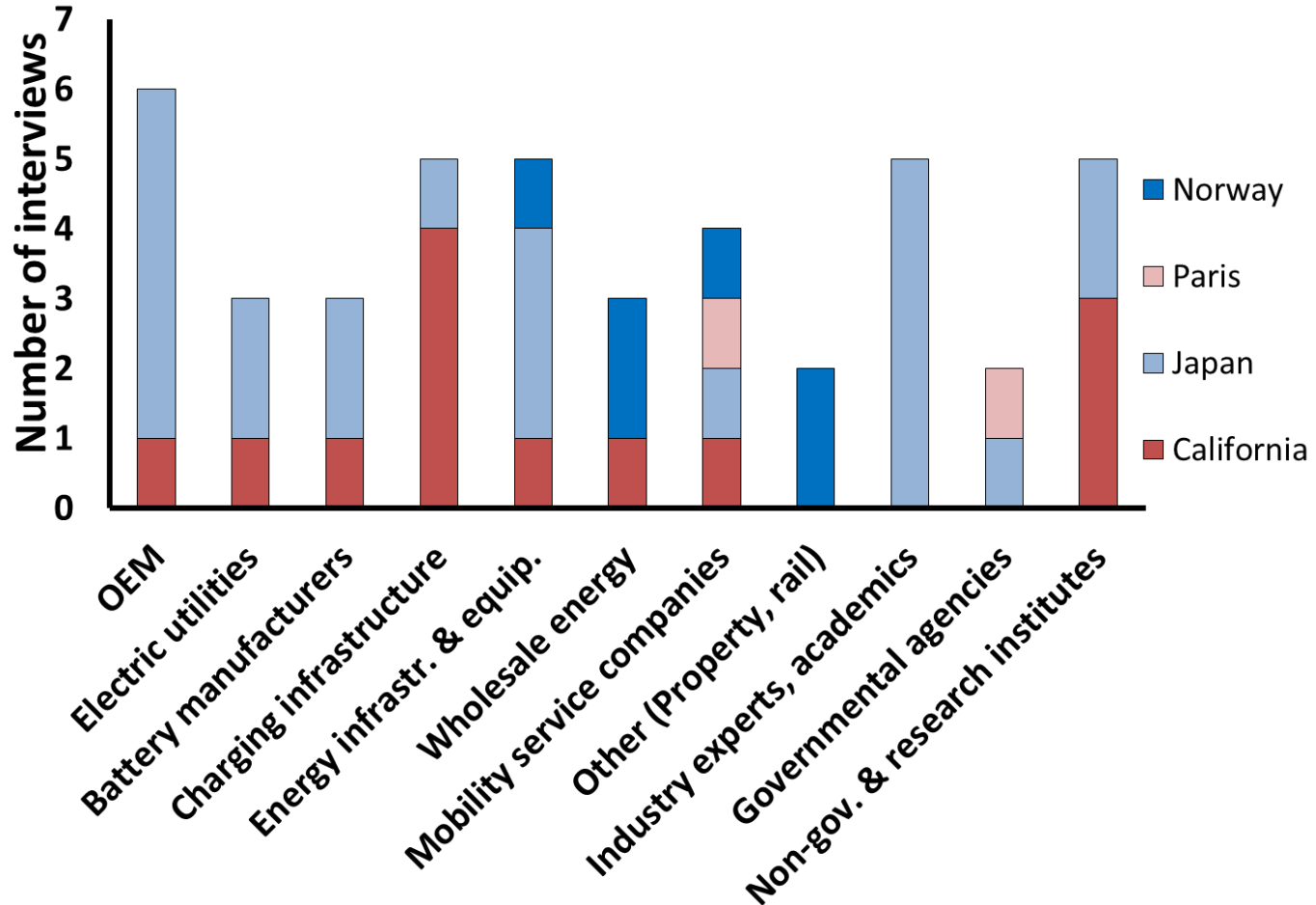
3. Corporate car-sharing by MoveAbout (Norway)



4. Public car-sharing by Bolloré/Autolib' (Paris)



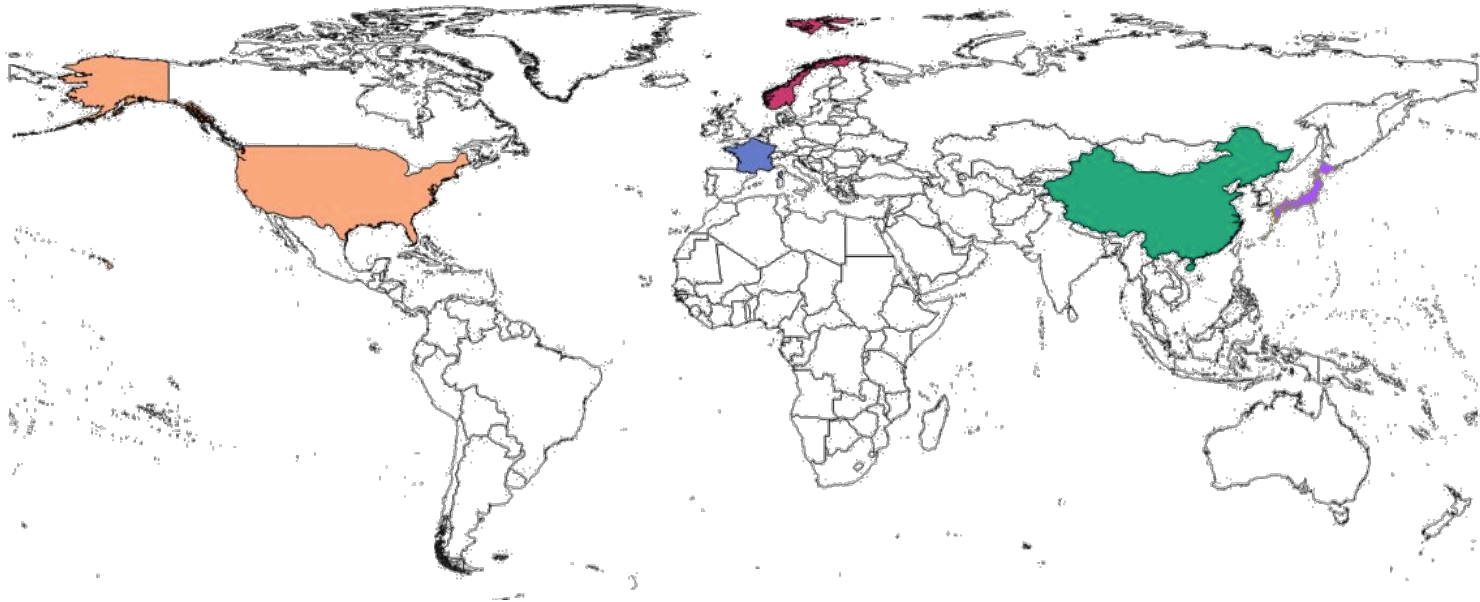
Methods: Summary of interviews by firm type



Case studies

Four electric vehicle ecosystems chosen to represent:

- Differing and extreme approaches to business model innovation
- Business model strategies at different critical positions in the EV ecosystem: charging infrastructure, end-user service, and battery technology.
- Diverse international contexts



Cases 1 and 2: Charging infrastructure business models

1. Better Place: The battery-swapping business model

better place



- Founded in 2007 in Palo Alto by Shai Agassi
- Developing in Israel, Denmark, China, Japan, Australia, Hawaii
- Replace depleted battery in 4 minutes without getting out of the car
- ~\$800 million invested; bankrupt in 2013



2. Fast-charging: Developed in Japan (TEPCO/ChadeMO)



CHAdEMO

- R&D consortium developed around Tokyo Electric Power Company
- DC charging at 50 to 62.5 kW (compare with AC level 2, 240V, of ~3.4 kW)
- 15-30 min to charge a 100-mile range vehicle
- In use in America, Japan, Europe, on complying stations & vehicles



Case 3: Autolib'



Key facts & figures

- Public-private partnership between Bolloré group and Mairie de Paris/municipalities
- Bolloré Group and its CEO Vincent Bolloré invested €1.5 billion in the project
- 103,080 subscriptions, of which 19,134 annual and 147 “recharge-only”

Achieved (2013)	Targets (plan)
2,000 EVs	3,000 EVs
729 stations	1,100 stations
20,000+ annual “premium” subscriptions	80,000 annual subscriptions



Case 3: Autolib'

Drivers

- Costs
- Convenience
- Environment
- French EV/automotive industry support

Strategic opportunities for Bolloré

- Entry in energy storage market
- Battery field test
- Subsidiary markets:
 - Consulting services
 - Battery sale, IP/ Licencing value (OEMs)
 - EV commercialisation
 - Charging-only contracts (for private EVs)

Case 4: Move About, Norway



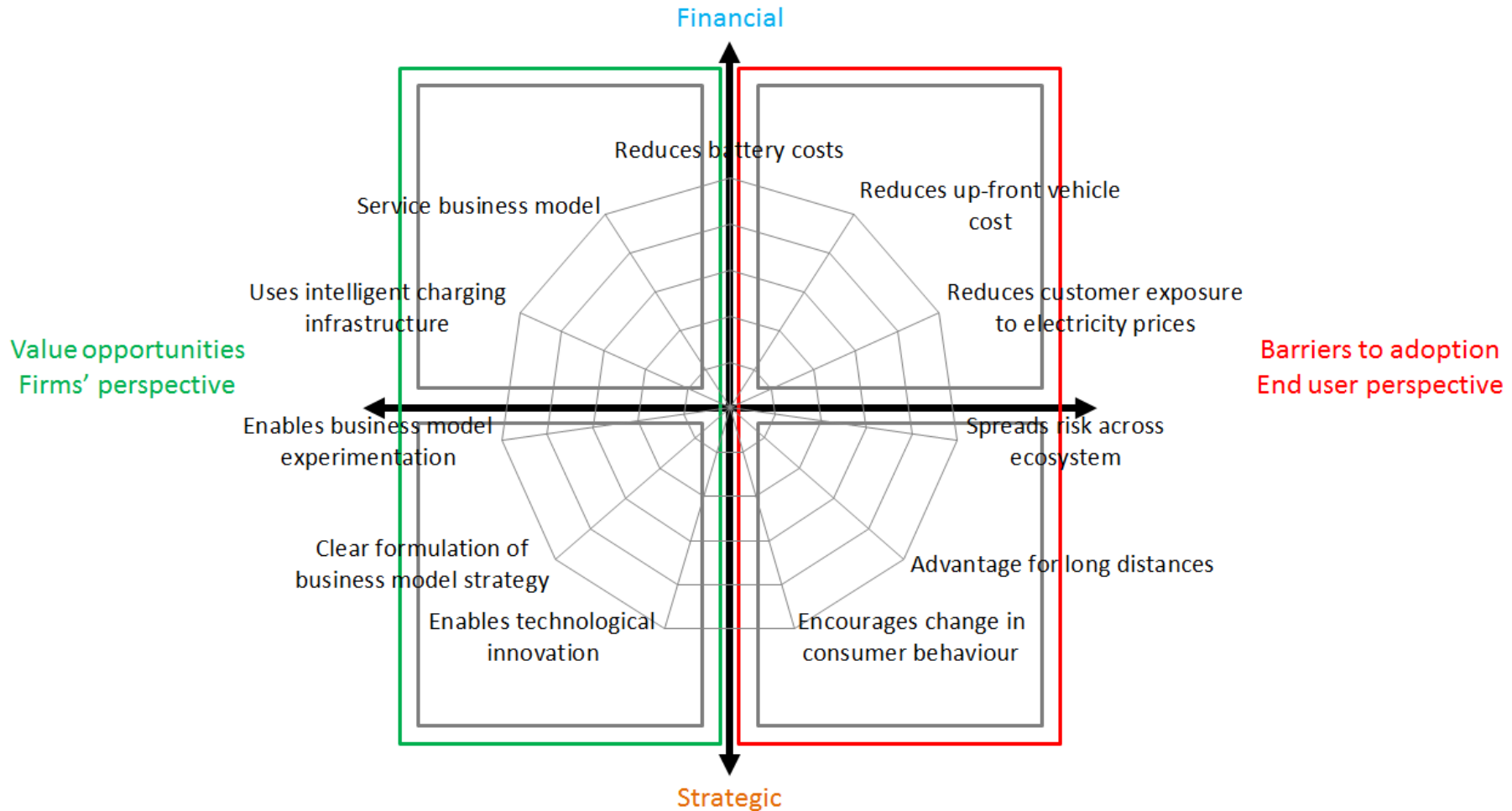
Key facts & figures

- Founded in 2007 in Norway as a spin-out from Think
- Presence in Oslo, Gothenburg, Copenhagen and soon Paris, Germany
- 65–70% corporate customers and 30–35% private customers
- Full service package... minus charging



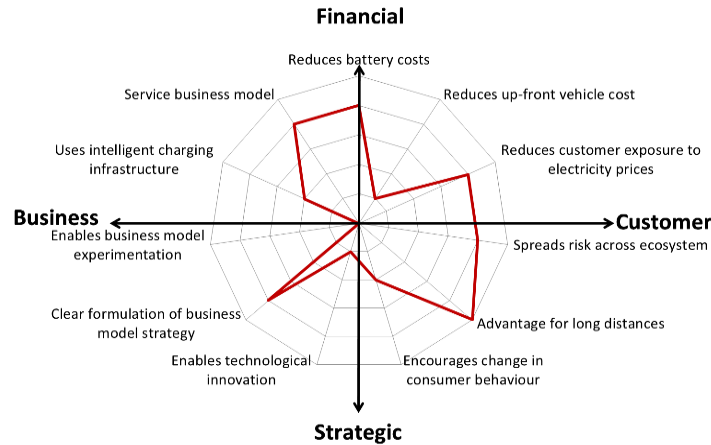
“... we have the cars, the booking site, we wash the cars, we take them to service them, replace tires. They have cars when they need them and we take care of everything else”

Comparative framework

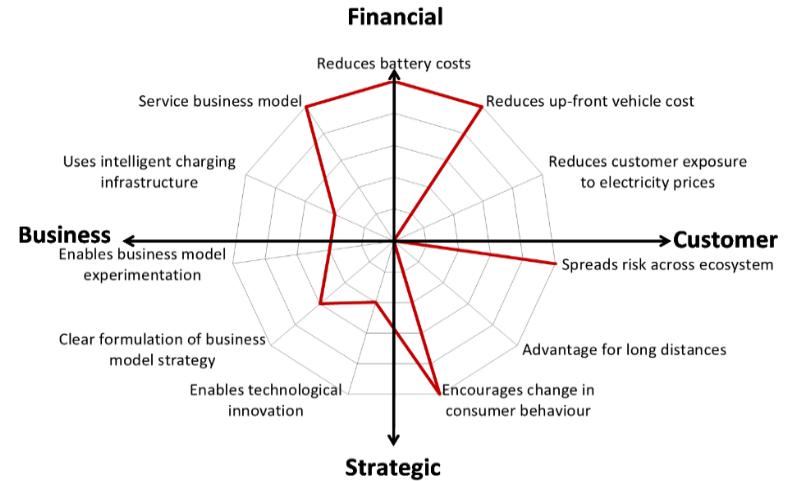


Business model comparison

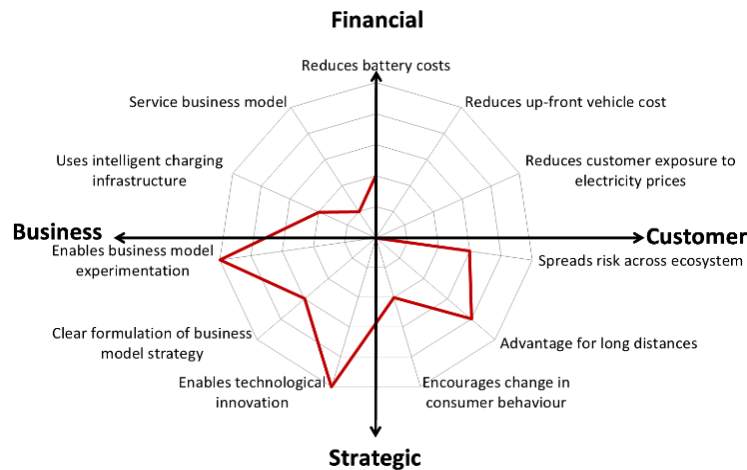
Battery-swapping



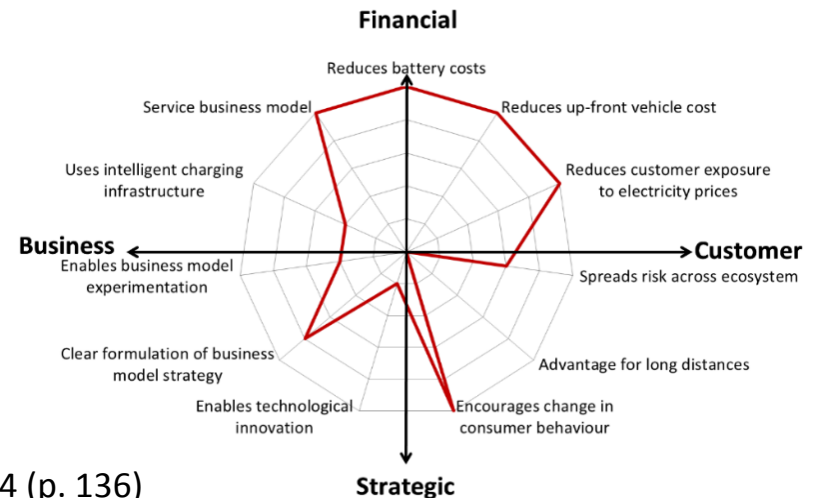
Mobility-as-a-service: Corporate



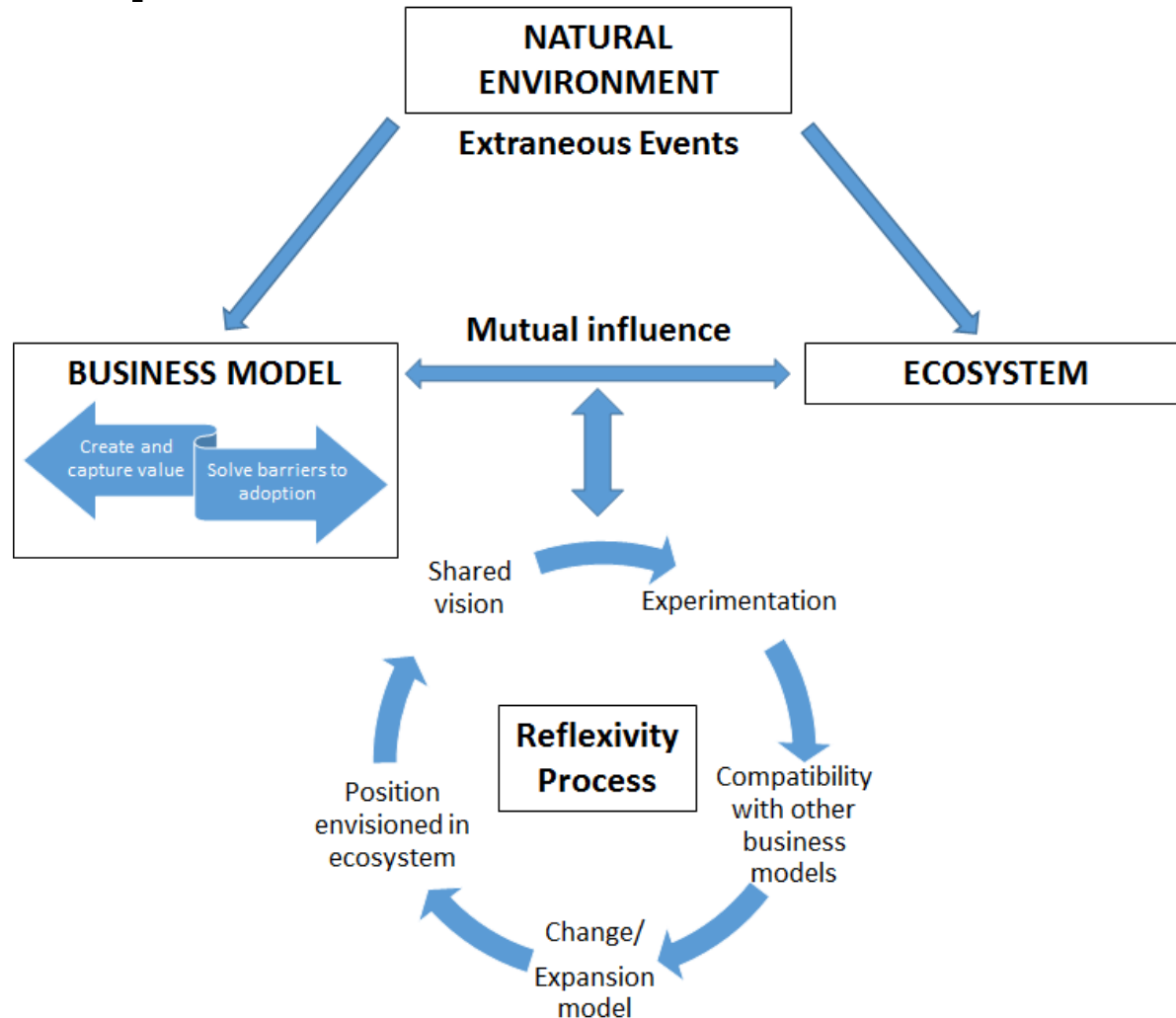
Fast-charging



Mobility-as-a-service: Public



Conceptual framework



Analysis – Firm’s business model

	Solving barriers to adoption	Revenue streams: Services	Relationship to customers and change in customer behaviour:	BM outcome
	Active at solving, if so: through BMI (3) or through technology (2) – not active at solving (1) (or "not a real problem")	Shift towards (3) - Partial shift (2) - No/ shift from (1) + Attitude towards: Positive (3), Indifferent (2), Negative (1)	Leader of change (3), Enabler of change (2), Adaptive/reactive to change (1)?	
Better Place	Active - Through BMI	Shift to services + Positive attitude towards services	Enabler	Defunct
Chademo	Active - Through technology	Shift to services + Positive attitude towards services	Fairly adaptive	Standard in use in chargers worldwide; Continued expansion
Autolib'	Active - Through BMI	Shift to services + Positive attitude towards services	Leader	Active – Stable, pursuing options for growth
Move About	Active - Through BMI	Shift to services + Positive attitude towards services	Leader	Active – Stable

Analysis – Reflexivity

	Position envisioned in ecosystem	Shared vision	Experimentation	Compatibility	Change/Expansion model	BM outcome
Better Place	Active	Yes - Electric clean cars with a charging service network (cell phone analogy)	Low	Low priority (“others should be compatible with us”)	Traditional	Defunct
Chademo	Active	Yes - Complementarity of charging options, standardise and provide support infrastructure for EV sales and electricity sales	High	High priority	Partly lateral, partly progressive-adaptive	Standard in use in (5735) chargers worldwide; Continued expansion
Autolib’	Active	No (Did not come up)	Core BM: Low; Aux BM: High	Medium priority (chargers compatible with other vehicles)	Lateral	Active – Stable, pursuing options for growth
Move About	Passive	Yes - Growth of car-sharing and EVs	Low to medium	Low priority	Lateral	Active – Stable

Business model outcomes

- Better Place: Battery-swapping growing in niche markets (e.g. in China, for scooters in Germany)
- TEPCO: Nearly 6,000 Chademo equipped chargers worldwide; Reversal of EU Parliament decision; Fast charging in use worldwide:

“Apart from the CHAdeMO-saturated Japanese market, we shall strive to collaborate with the Combo group in the form of multi-standard chargers, rather than fight the standards war, in order to accelerate the overall EV adoption and for the best interest of today's and tomorrow's EV drivers.”

- Autolib’: BlueCar sales top 5 best selling EVs in France; New cities: London, Indianapolis; Charging-only subscriptions; Corporate and multi-user memberships; Blue Solutions storage company
- MoveAbout: Recent management change; Plans to expand in European cities and in the corporate segment

Future research

- Establish the relationship between business model innovation and firm success
- Explore the two paradoxical needs of business models in early stage ecosystems: to ensure sufficient compatibility with other players' business models, and to innovate/disrupt current paradigms
- EV as context for study of platforms and for co-evolution of emerging society “trends” (co-evolution of autonomous driving, shared ownership, with electrification)

Acknowledgements

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Questions and comments welcome:
cw451@cam.ac.uk

Extra slides

Main thesis argument (1)

- The role of business models in technology diffusion
 - Business model innovation played a prominent role in supporting the early-stage diffusion of electric vehicles
 - Business model innovation can provide solutions to the barriers to adoption of disruptive technologies
- How:
 - Meeting user needs with new configurations of activities, e.g. services, ownership models
 - By breaking chicken-and-egg type barriers:
 - Familiarity (try mobility as a service with EV before purchasing an EV)
 - Infrastructure / product (developing new business models for charging infrastructure)
 - Technological learning and capabilities (launching EV through tests and trials)
 - By creating value from additional services:
 - ICT (e.g. navigation to find charging stations),
 - Energy (charging optimisation, grid services, battery secondary use as storage)

Impact and significance of findings

- Business model innovation
 - Two units of analysis of BMs: the focal firm and the ecosystem
 - Reconfiguration of services can overcome technological barriers in early-stage market
 - Ecosystem perspective to factor in the interests of essential complements and components providers
- Electric vehicle market
 - Four cases illustrate experience in the early days
 - Identified reflexivity as a possible success factor

Extra case Japan : Okinawa EV Rent-a-car

Key facts & figures

- Service designed in 2009
- 200 Nissan Leaf EVs (160km range)
- 5.5m tourists/year visit Okinawa
- 27 fast charging stations in operation

Contextual drivers

- “Okinawa Green New Deal”: Wider project
- Island geography: 130 km x 30 km



Nissan Leaf charging at an AEC fast-charging station on Okinawa Island

Sub-case Japan: Okinawa

Challenges

- Low adoption rates
- Customer range anxiety
- Over-frequent recharging
- Risk for travel agents to promote EVs

Achieved (2013)	Target (plan)
10.6% utilization	20% utilization*
Used EV WTP: 1.5 MYen (\$15,000)	2.5 – 3 Myen (\$20,000)

*A 100% utilization is defined as 100 rentals per EV per year

