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The 27th INTERNATIONAL ELECTRIC VEHICLE SYMPOSIUM & EXHIBITION
BARCELONA
17th-20th November 2013

Competing and Co-existing Business Models for Electric Vehicles:

International Case Studies

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Organized by Fira Barcelona avele
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In collaboration with EVAAP EDTA
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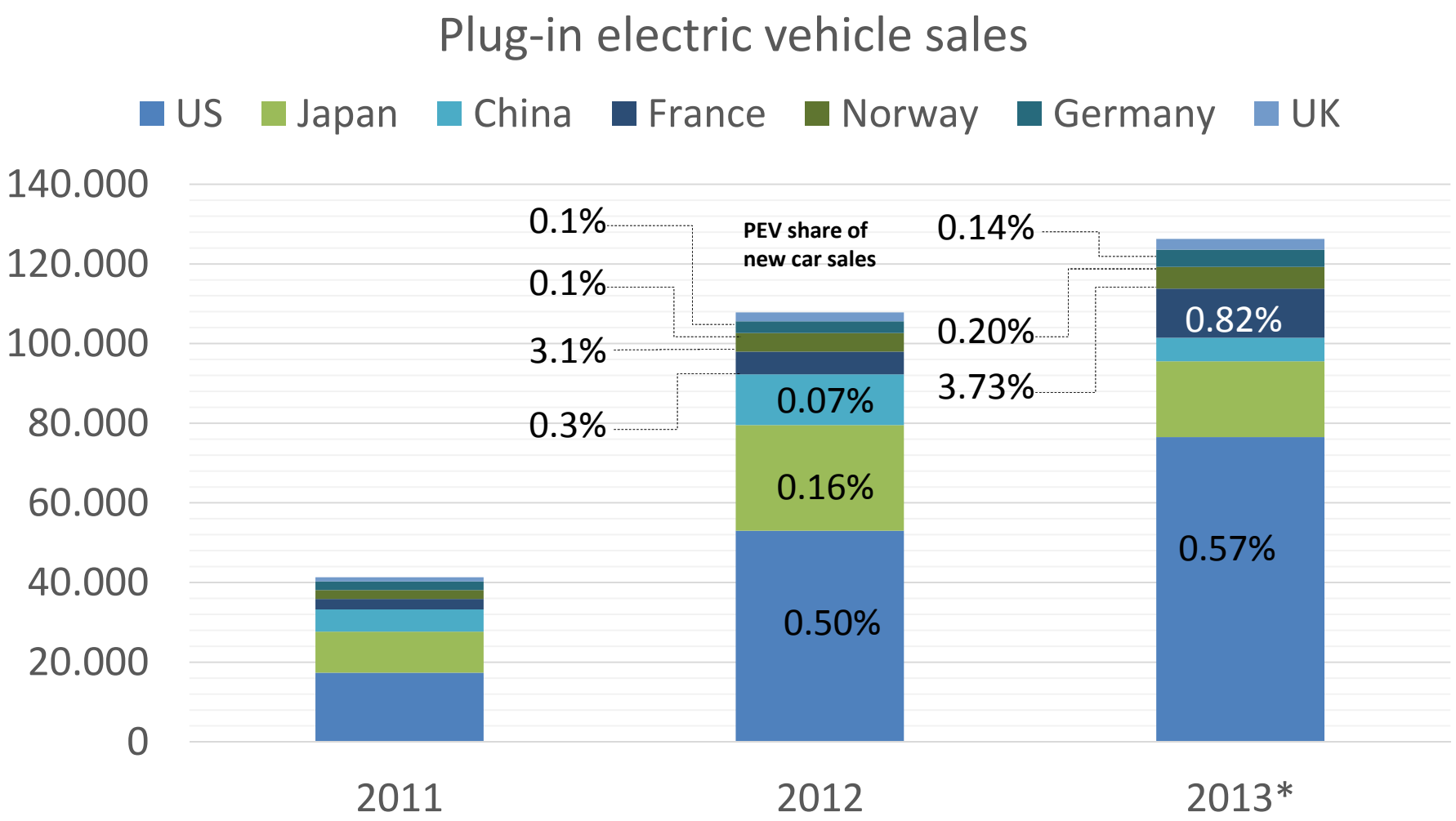
Agenda

- Industrial Challenges & Questions
- Cases from US, France & China
- BM Framework Analysis
- Implications & Recommendations

Industry overview



Source: EV-Sales BlogSpot & SMMT (UK)
** Year to date available figures*

Research Questions

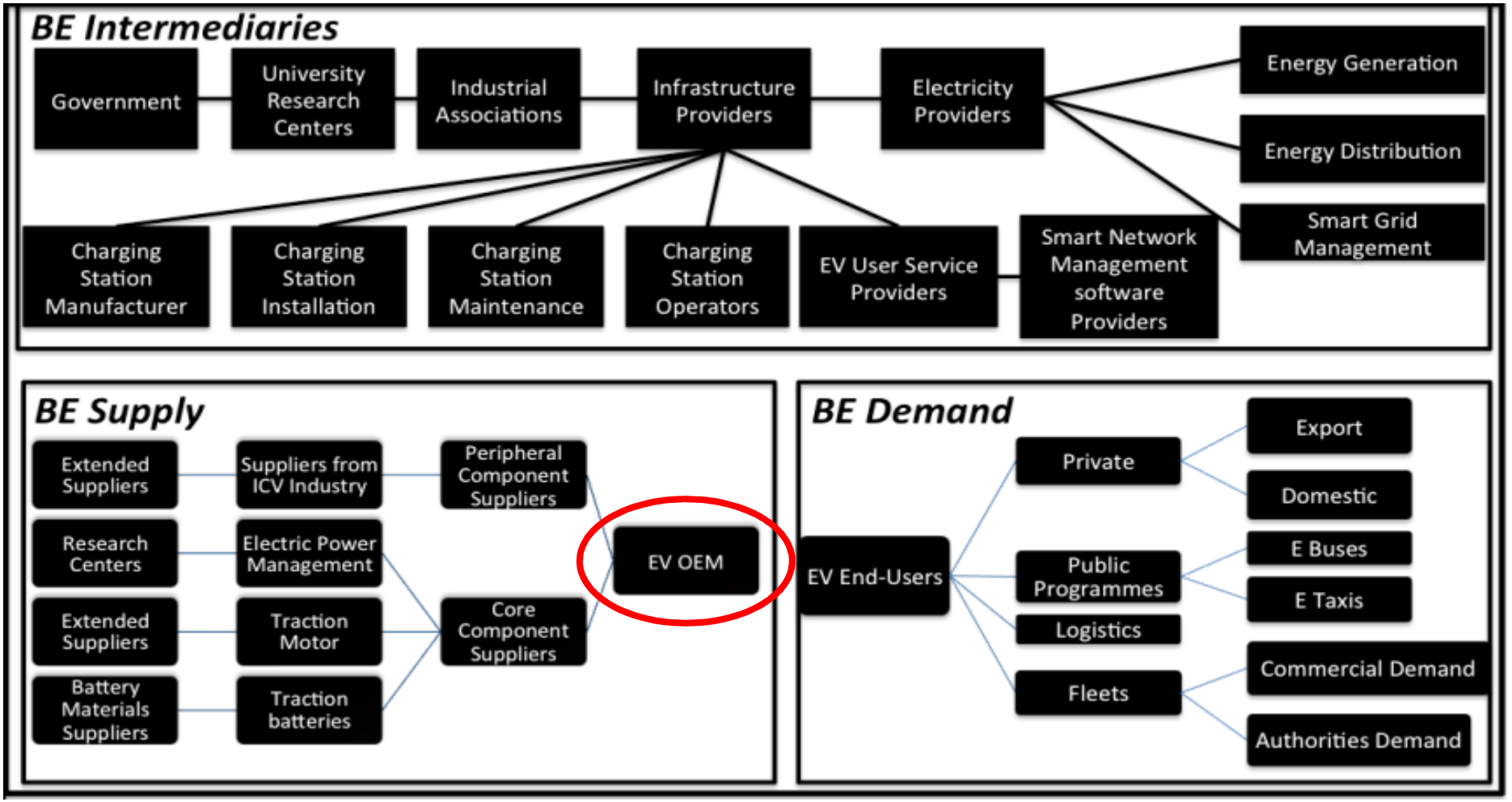
Business Model Innovation

- Alternative Models?
- Co-existence?
- How to Improve?

Research Context & Method

- Focused on OEMs within the business ecosystem
- Alternative business models:
  - For charging: Fast-charging vs. battery-swapping
  - For vehicles: Product sales vs. mobility services
- Comparative framework
- Primary (interview) and secondary data

Business Ecosystem Perspective



EV Business Ecosystem Mapping (Shang & Shi 2012)

Case Overview

Case No.	Company or Joint Venture	Country	Ecosystem Function	Business Model Strategy	Market Presence
1	Fast-Charging (BYD)	China	OEM	• Partnership with electricity supply company • Technology leadership for fast-charging	Metropolitan area (Shenzhen)
2	Battery-swapping (WanXiang)	China	OEM	• Joint venture with electricity supply company • Technology leadership for battery-swapping	Metropolitan area (Hangzhou)
3	EV manufacturer (Tesla)	United States	OEM	• Niche market • Entry in energy supply with fast-charging	Regional (California)
4	EV Sharing (Autolib')	France	Mobility-as-a-service	• Public car sharing • Vertical integration	Metropolitan area (Paris)

Case Studies

WanXiang

- Headquartered in Hangzhou
- EV Project since 1999
- Collaborating with the State Grid

BYD

- Headquartered in SHENZHEN
- Established BYD auto in 2003
- Collaborating with China Southern Grid

Case Studies

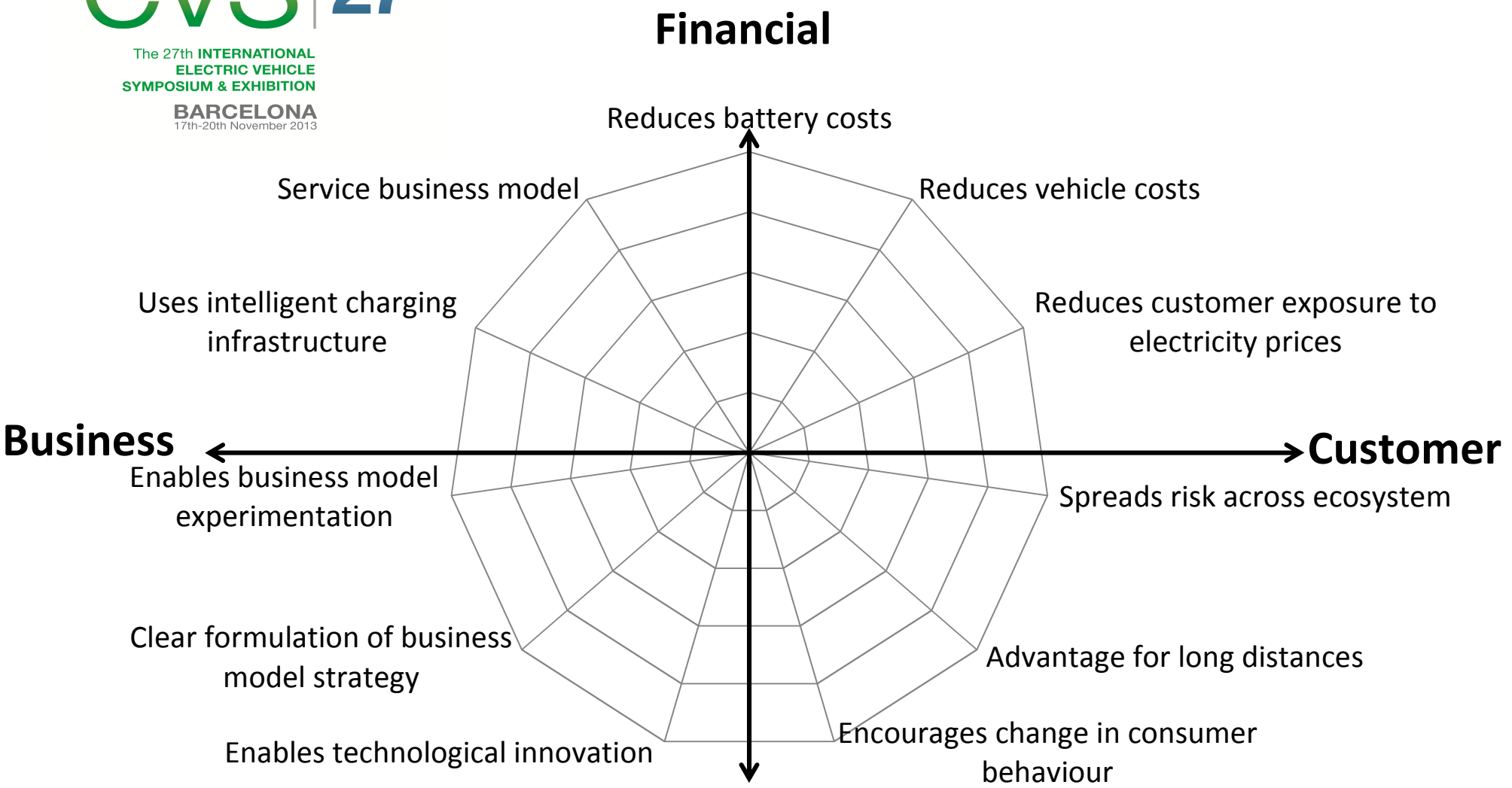
TESLA

- Luxury sports EV OEM
- Headquartered in Palo Alto in 2003
- From niche to mainstream
- From OEM to energy services

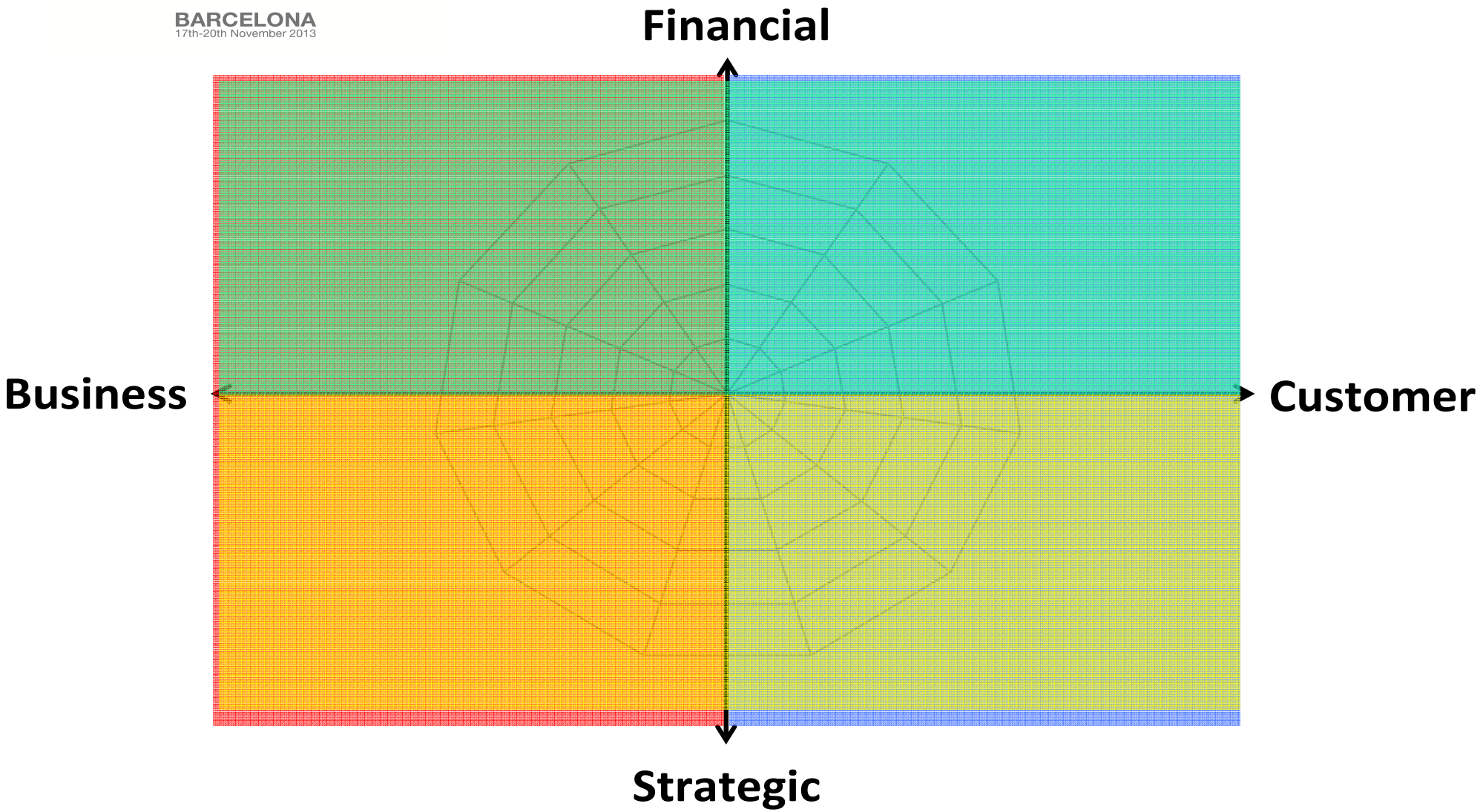
- Public EV sharing service
- Started in Paris in 2011
- Managed and operated by Bollore

autolib'

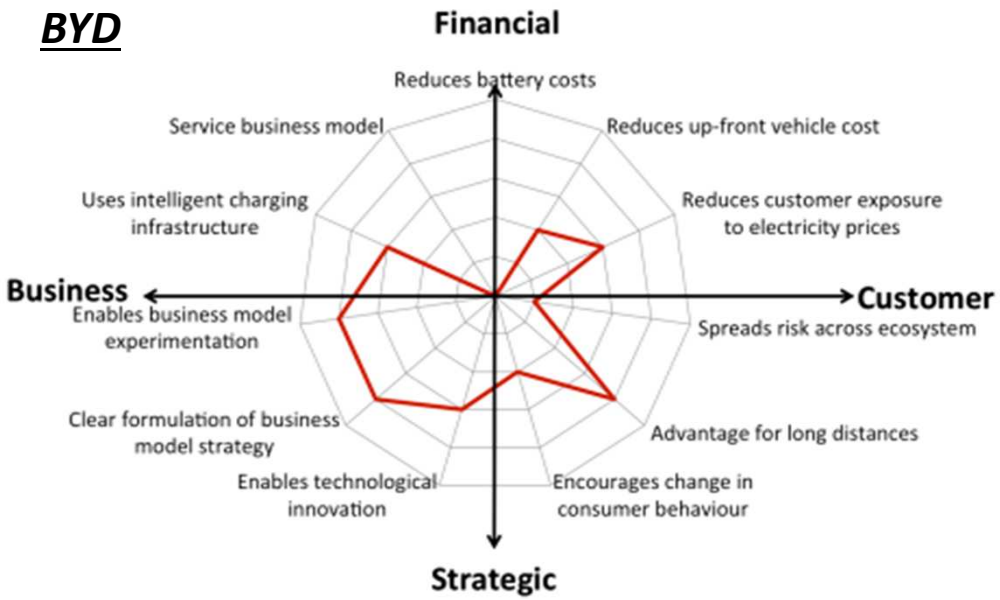
Framework


Financial
Reduces battery costs
Service business model
Reduces vehicle costs
Uses intelligent charging infrastructure
Reduces customer exposure to electricity prices
Business
Customer
Enables business model experimentation
Spreads risk across ecosystem
Clear formulation of business model strategy
Advantage for long distances
Enables technological innovation
Encourages change in consumer behaviour
Strategic

Framework

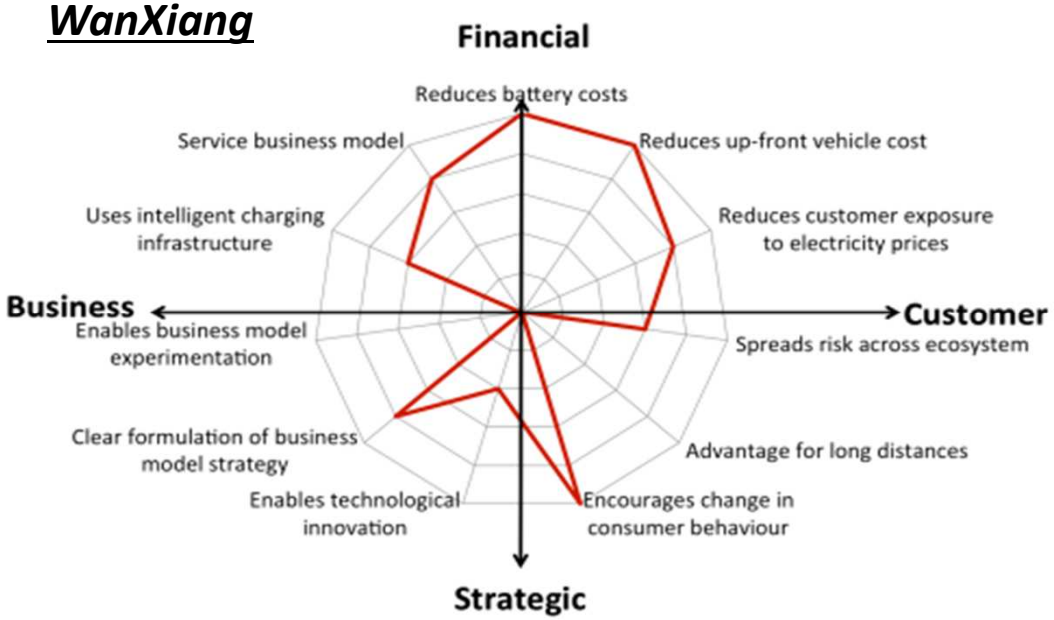


BYD

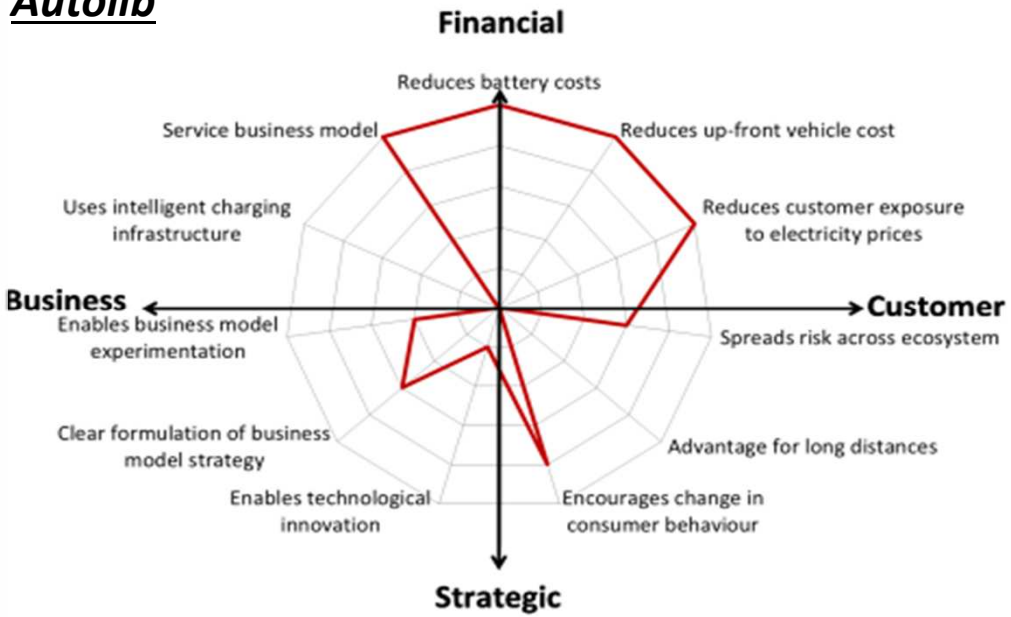


Tesla

WanXiang



Autolib



Recommendations

- Leverage ecosystem resources
- Be prepared for ecosystem reconfiguration
- Excel in specific competencies, then expand your value proposition

Conclusions and Future Work

- Business models co-existence
- Ecosystem vision
- Expand/Develop new competencies

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Thank you for your attention!

Questions?

We are grateful for the support of:

- Prof. Andy Neely, Dr. Yongjiang Shi
- Cambridge University Engineering Department
- St Catharine's College, RADMA, IBM
- Case company interview participants

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Extra slides

Future Implications

- Co-existence vs. competition of alternative business models
  - Sustainable without subsidies?
  - Emergence of a dominant design?
  - Bending the boundaries of traditional value chains

Literature basis of framework

1) Barriers to consumer adoption

Scale	Description	Implications	Low score (0)	High score (5)
Reduces battery ownership costs (Andersen et al., 2009)	Who owns the battery?	- Technological risk associated with battery degradation and improvements - Capital costs	Customer fully owns the battery	Company fully owns the battery
Reduces vehicle ownership costs (Andersen et al., 2009)	Who owns the vehicle in the BM?	- Vehicle cost risk - Market risk associated with industry evolution	Customer fully owns the vehicle (- battery). Business-as-usual	Company fully owns the vehicle
Reduces customer exposure to electricity prices (San Roman et al., 2011)	Does the BM include the price of recharging, or do customers pay a fixed rate, or market prices?	- Fuel price risk - Elasticity of demand for electricity - Incentives for "smart" charging choices - Pay-back time of initial costs	Customers pay for electricity at market prices. Highest elasticity of demand and price risk.	The cost of electric recharge is fully included/covered by the supplier.
Spreads risk across ecosystem (Visnjic & Neely, 2011)	Who bears the risks in this BM – technical, market, financial, infrastructural?	The distribution of risks influences EV adoption and entry strategies	All risks of adoption accrue to consumers. Business-as-usual	Risks are distributed over different agents
Advantage for long distances (Andersen et al., 2009)	Does this BM resolve the issue of range limitation?	- Solution to a major barrier to EV adoption	The BM does not address the problem	The BM explicitly offers a solution for long-distance recharging
Encourages change in consumer behaviour (Turrentine et al., 2007)	Does the BM change the way people drive and attitudes?	- Market research and modelling: cannot treat driving behaviour as exogenous	No changes in consumer behaviour	Full range of changes: driving habits, attitudes towards personal vehicles and mobility

Literature basis of framework

2) Enablers of EV ecosystem development

Scale	Description	Implications	Low score (0)	High score (5)
Enables technological innovation (Adner & Kapoor, 2010)	Does the BM allow for innovations in vehicle design, in battery technology, in charging networks?	Technology-based competition drives industry growth	The BM does not require or facilitate technological change	The BM requires significant technological change
Clear formulation of business model strategy (Chesbrough & Rosenbloom, 2002)	Does the company explicitly define its strategy as BM innovation?	Emphasis of entry strategy on technical vs marketing aspects may be a determinant of success	The BM and its innovative component are not addressed explicitly.	Explicit focus of the company on BMI
Enables business model experimentation (Chesbrough, 2010)	Is the BM flexible? Can it be adapted to new technological and market conditions?	BM flexibility improves firm resilience in a changing market	The BM requires irreversible actions	The BM can be implemented gradually and adapt to market needs
Uses intelligent charging infrastructure (Andersen et al., 2009)	Does the BM require smart charging and grid communication technologies to be implemented?	Arguably, ICT allows the full value creation and capture from innovations in the EV sector	The BM uses a "dumb" charging infrastructure	The BM requires smart controls for charging
Servitized business model (Tukker, 2004)	Is EV transportation viewed as a private good, a private service, or a public service?	Changes the value proposition	Vehicles as a product. Business-as-usual	Mobility as a service with maximum efficiency and optimisation