

Understanding the *'web-of-constraints'* to resource efficiency

Insights into the business, legislative and behavioural barriers to resource efficiency

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Key Polfree question

- Why are resources not used more efficiently?
 - *This is a complex question: because so many actors, factors and structures play a role.*
 - *We should be weary for simple answers*



Key message

- ✧ There are not just single 'barriers' to Resource Efficiency
- ✧ In practice there are usually compound causes for why resources are not used more efficiently
- ✧ We propose a metaphor of '*web of constraints*'
- ✧ Policy instruments that do not address systemic interactions tend to be ineffective
- ✧ We explore how policy (mixes) can address a web-of-constraints



The traditional concept: 'barrier to RE'

- Most RE studies are on energy efficiency
- Efficiency gap
 - actual level vs. cost-beneficial level
- Barrier models to explain the gap



An example of a 'barrier' to resource efficient passenger mobility



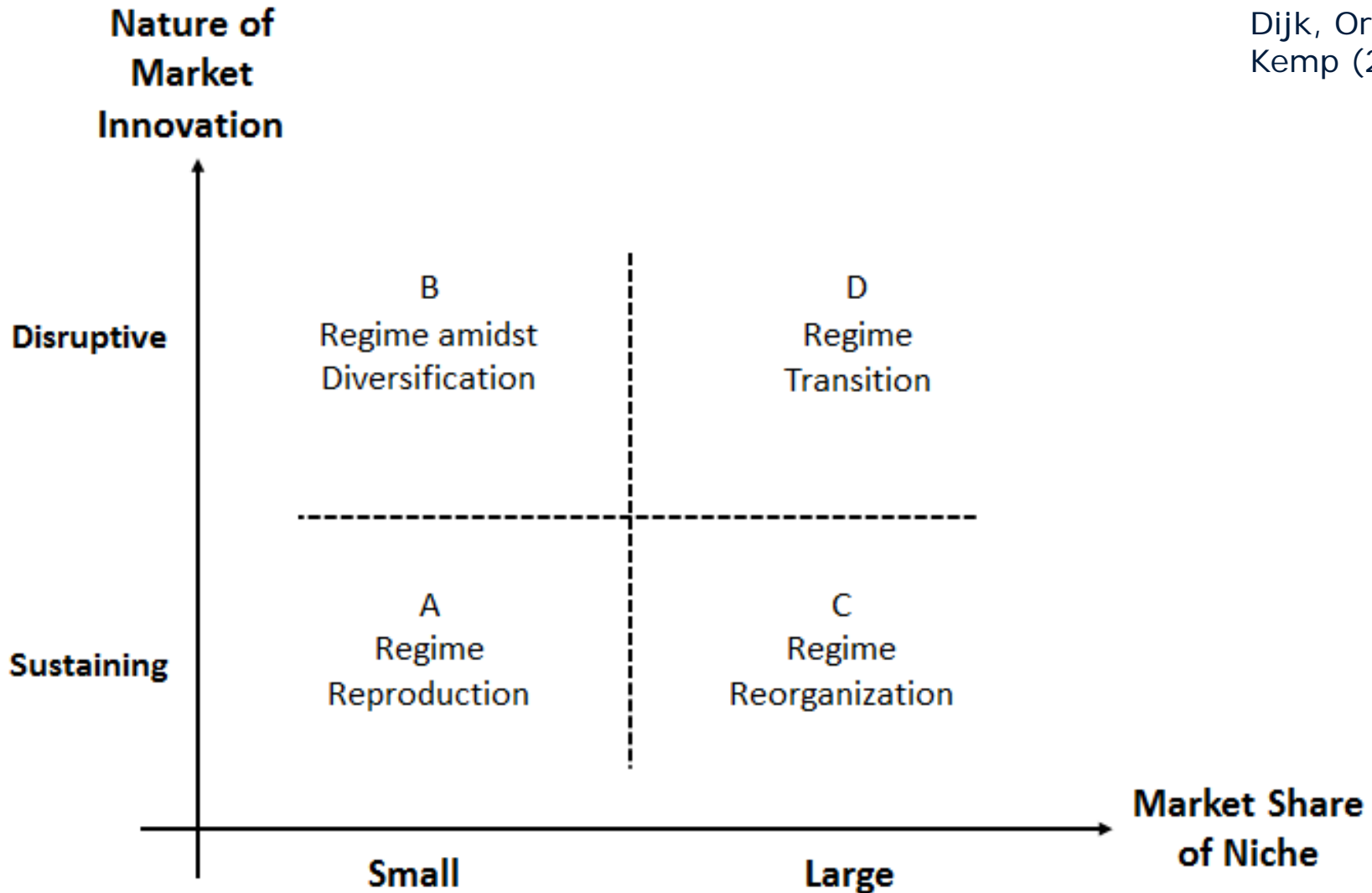
An example of a 'barrier' to resource efficient passenger mobility

- Electric cars
- Why do people not drive more electric vehicles? They are more fuel efficient (relatively cheaper in the longer term, cleaner).



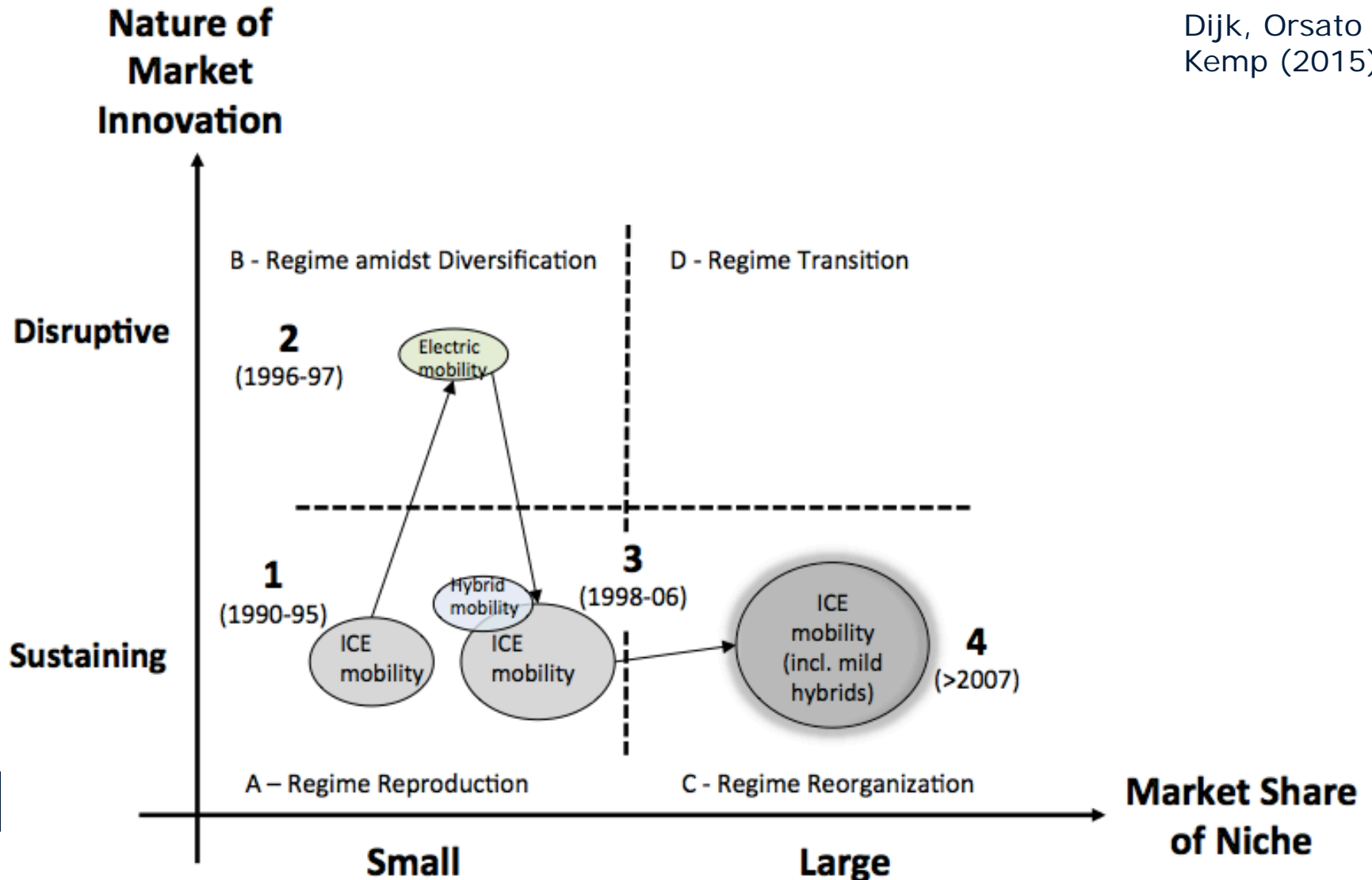
Disruptive innovation framework

Dijk, Orsato & Kemp (2015)

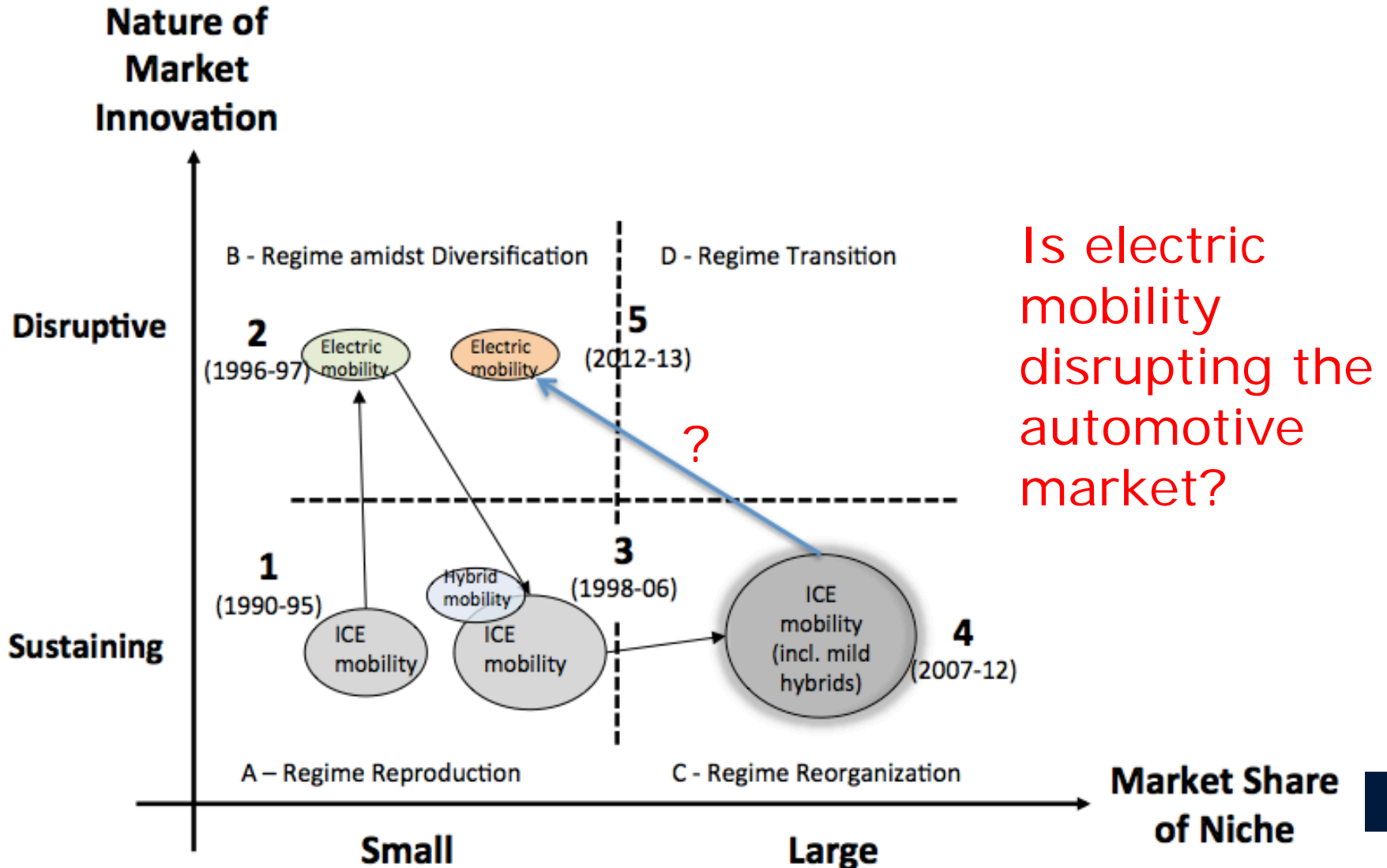


Example automobility

Dijk, Orsato & Kemp (2015)



Example automobility

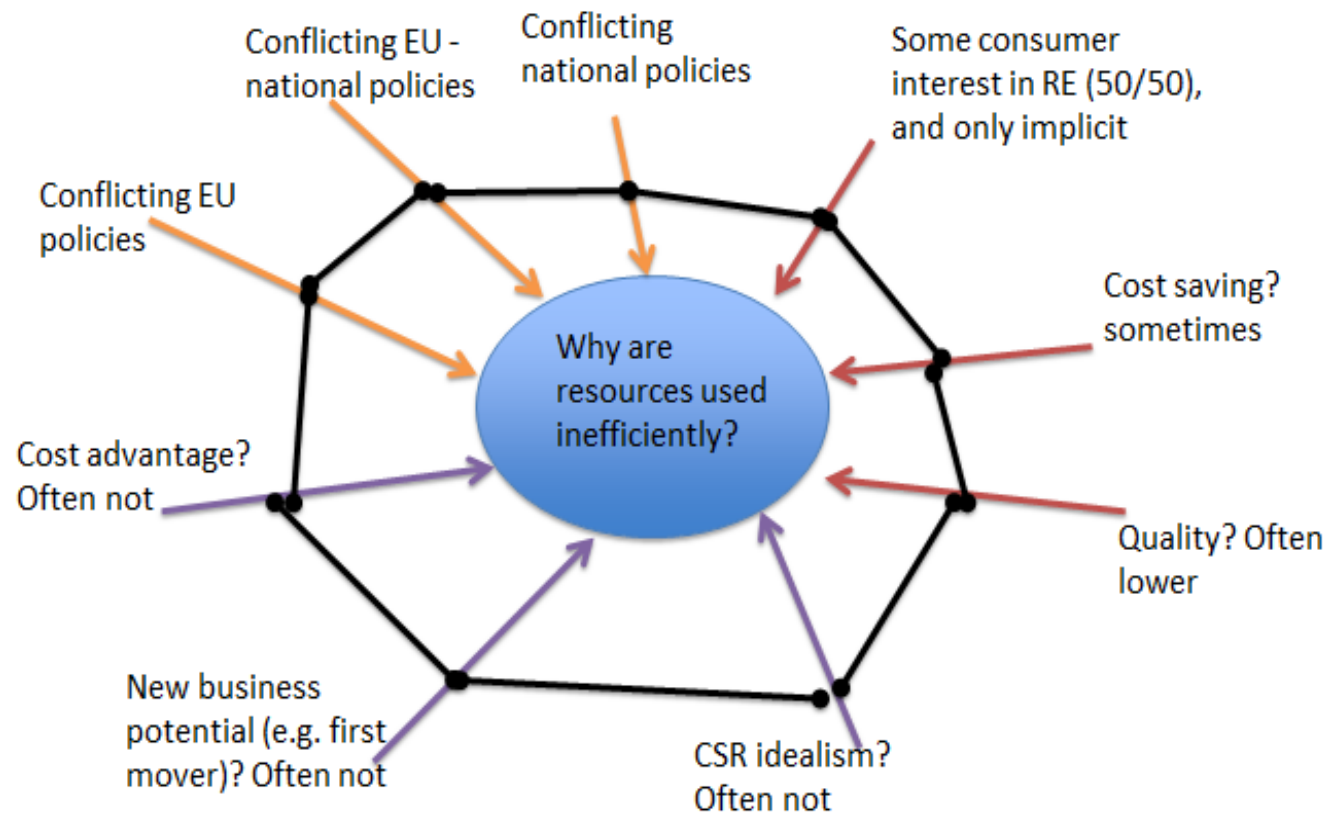


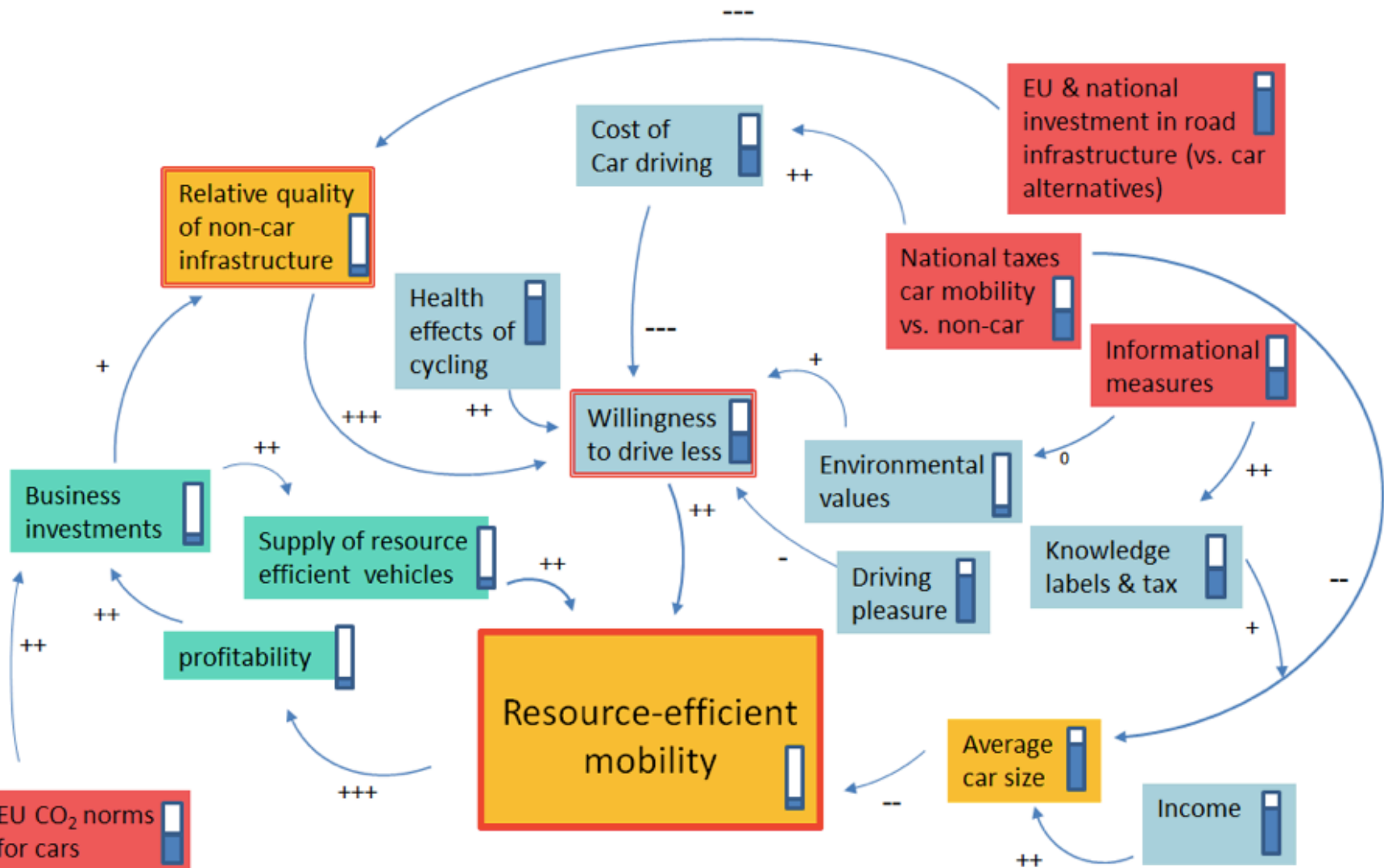
Why 'barrier' – thinking is problematic

- Infrastructural barrier? Example of Estonia..
- Individual barrier? Example of Denmark..
- Market barrier? Example of NL..

- Even if 90% of the trips are shorter than 50 miles, people tend to buy a vehicle based on the longest trip
- Resource use is not a significant attribute for consumers

Web of constraints





Policy implications

- Instruments or measure need to anticipate systemic effects (i.e. primary effect of measure and collateral effect)
- Design of policy mixes needs to be based on understanding policy interaction

Example E-mobility Policy

- In the Netherlands substantial financial support schemes for E-mobility were ineffective because clean gasoline was stimulated at the same time
- In Denmark substantial financial support schemes for E-mobility were ineffective because of uncertainty regarding infrastructure standard.

Understanding Policy interaction

- Relationships between measures/instruments:
 1. precondition relations
 2. synergetic or facilitation linkages
 3. contradictory relations
 4. Neutral Givoni et al (2013)
- Policy learning in sectoral platforms



Conclusions

- Plea for 'webs' instead of 'barriers'
- Needs tailor-made analysis – both on the dynamics of the issues and on the dynamic implications of the policy (mix)
- Economic instruments are key, but alone will not do the job: too many possible strategic reactions.
- A sectoral platform may be the suitable way to address this (need to engage with businesses & consumers etc.)
- Much work to do



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Questions?

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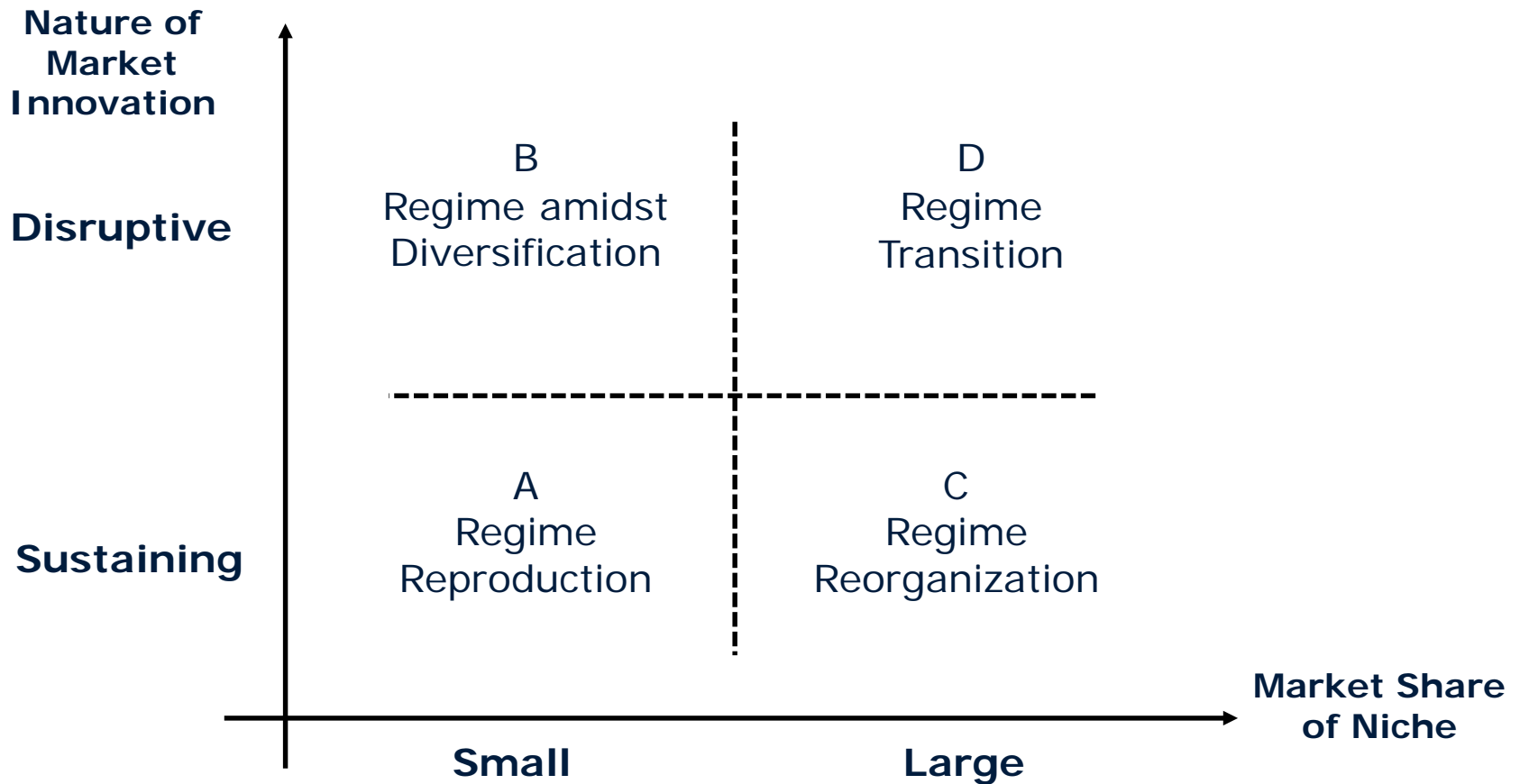
POLICY OPTIONS FOR A
RESOURCE EFFICIENT ECONOMY

Why people like cars / automobility

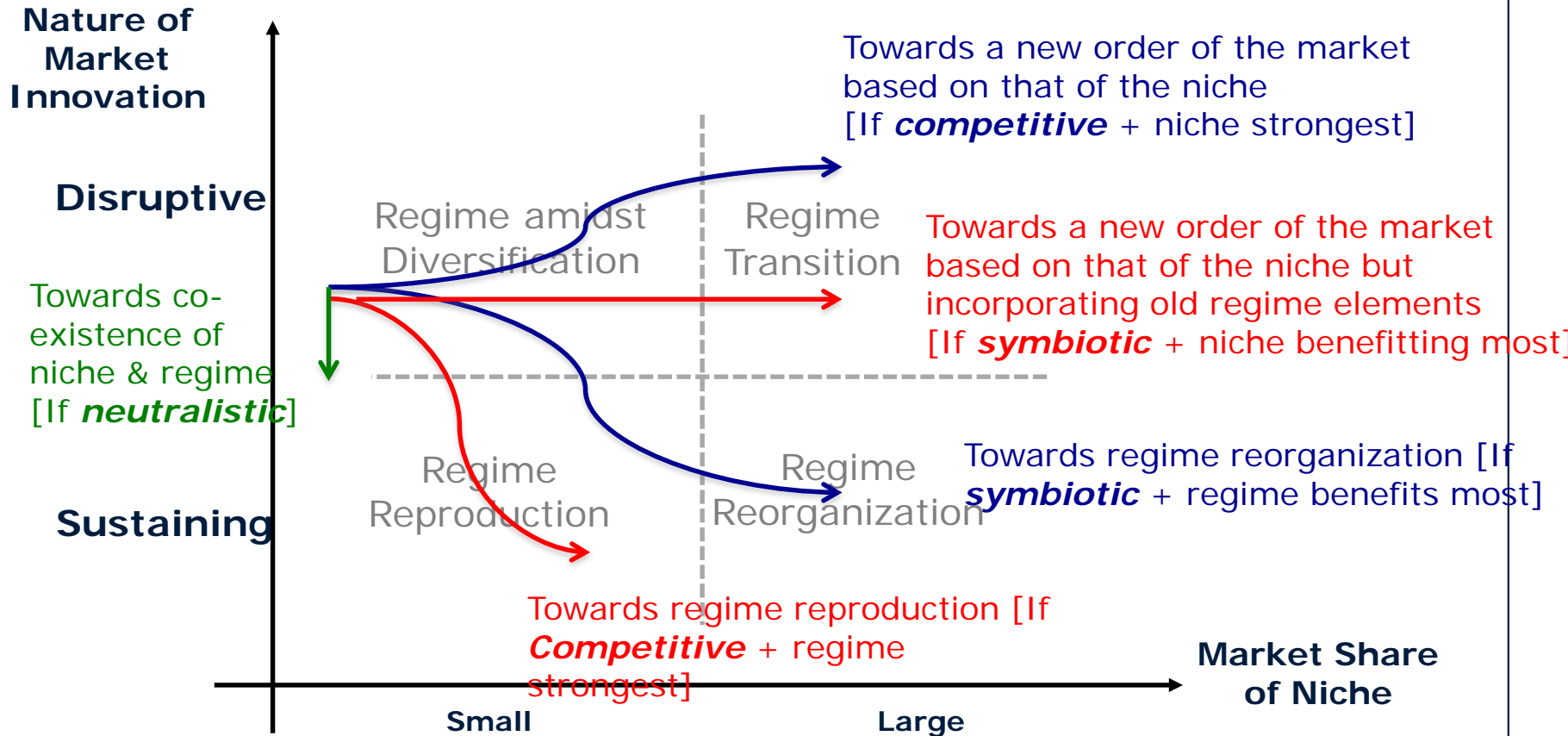
- Travel time
- Door-to-door
- Flexibility
- ..
- *...! Driving in my car to work is one of the scarce moments that I can shout, sing, gesture etc. without any repercussion; neither from my wife at home, nor from my boss at work'*



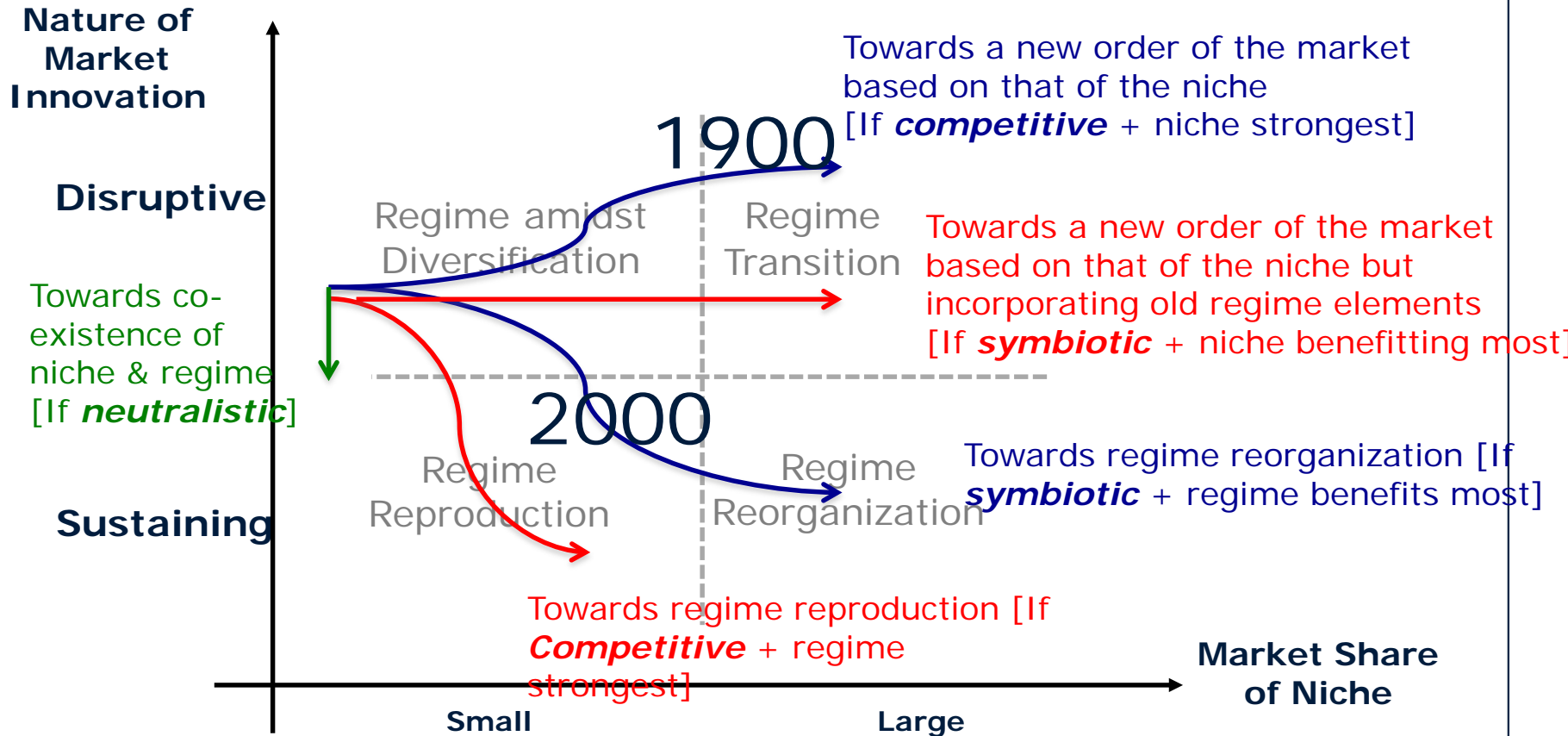
Socio-technical theory on innovation



Five generic patterns



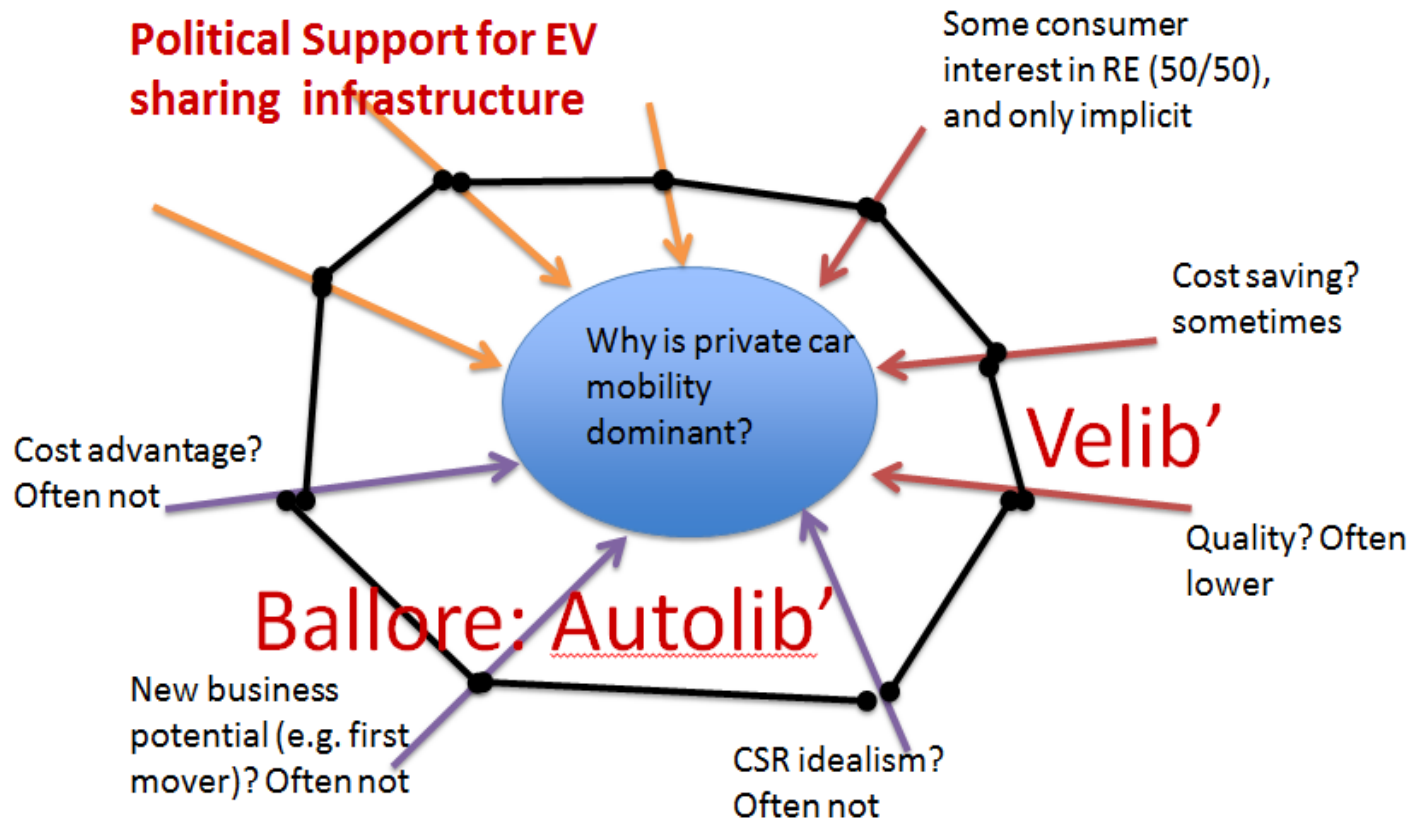
Five generic patterns



Socio-technical theory on innovation

- We take a socio-technical and evolutionary approach that does not privilege either economic, technological or social or institutional factors in proximate explanations of social and technical change.
- We will not end up with simple cause and effect between factors. Nevertheless we do try to identify patterns which are driven by some factors more than others.

Web of constraints – exam. urban mob.



Level of disruption

Consumers		score
	New functional attribute?	1-3
	New social connotation?	1-3
Manufacturers		
	New competences/knowledge?	1-3
	New business models?	1-3
Infrastructure		
	New hardware?	1-3

Sustaining (5) ←-----→ disruptive (15)