

Energy Transitions, Electrification and the Power Sector Unbundling 2.0

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Decarbonisation**

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Motivation

- Disruptive technologies make it evident that electricity has multiple attributes, each potentially valued differently by consumers.
- This presentation will evaluate the extent to which the creation of markets for these attributes can foster the electrification of additional sectors in the economy, taking transportation as an example.

Context

- Electricity and transportation are traditional sectors that are under deep transformation. Moreover, both technological disruptions have similar characteristics.
- The future of these sectors is intertwined. Electricity provide the basic input of future transportation and transportation is most promising area of demand growth for electricity.

Overarching questions

- Would the unbundling of electricity services lead to a greater use of electricity in other sectors, like transportation?
- To what extent, changes in the electric power and transportation sector are compatible? Would they reinforce or delay each other's transition?

Electricity: Understanding the technological disruptions

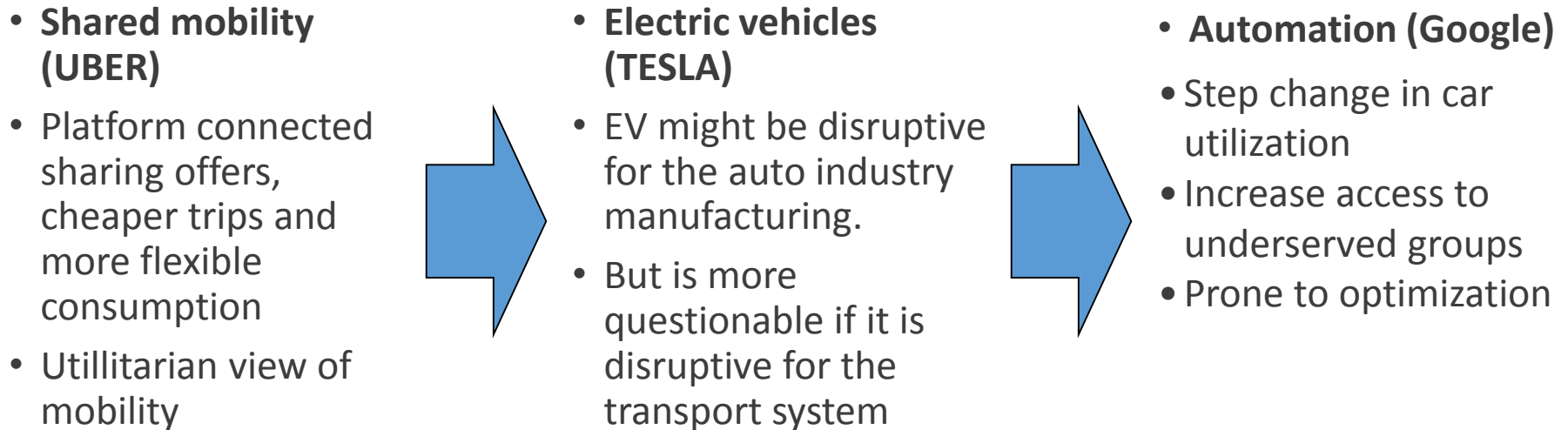
Consumer centered

- “Behind the meter”/Amateur (home made)
- Decommodification/ Services
 - Technology driven new markets
 - What is not measured doesn't count
 - Business models around electricity attributes
- Local aspects of energy policy would be more prominent.

Decarbonization / 0 Marginal cost

- How do to keep a sustainable business model in a zero marginal cost world? Market vs regulation
- Traditionally fixed costs have been covered by variable costs, which are higher than true variable costs. This has the perverse effect of reducing consumption, self generation, and in one extreme, autarky.
- Memberships an subscriptions where customers self select themselves.

Transport: Understanding technological disruptions



Together

- Electric propulsion, ride hailing and self-driving technology create mobility as a service.
- Disruptive when together? Are they independent? What if one or two together? Are they additive?

Common aspects of technological disruptions

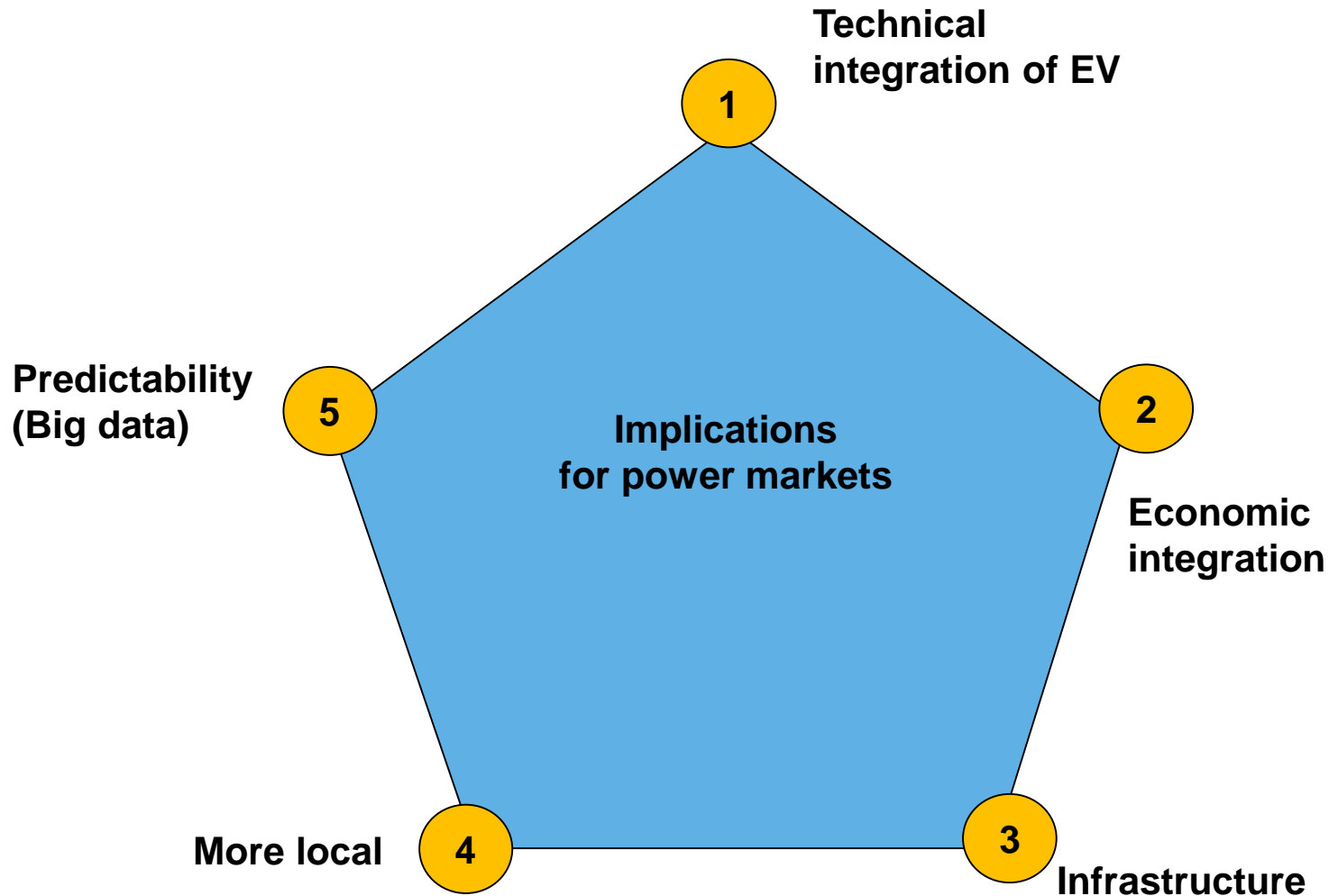
Implications

Technology development

Similarities/ Differences

1. The total is more than the sum of the parts (iPhone).
2. Electrification through batteries (DERs/ EVS).
3. Platform, pools (aggregation, subscriptions).
4. How to reduce Idle capacity? How to monetize it?
5. BUT-->Transport moves from distributed to centralized, while electricity is moving from centralized to distributed
 - Is this the end of the car ownership? (distributed to centralized/autonomous)
 - Is this the end of the utility? (centralized/optimization to distributed/de-optimization)

Transport disruptions ripple effects into electricity sector



Conclusions

- To what extent mobility as a service trends are compatible with unbundling of electricity services? Would they reinforce or delay their transition?

- Converged technologies (iPhone)
- Batteries, platforms, subscriptions,
- Local

- Would the unbundling of electricity services lead to a greater use of electricity in other sectors, like transportation?

- More consumption, more demand, shrinking markets (?)
- Big integrated transport companies as big prosumers.

- What would be the “Amazon” future for electricity/transport?
- Is regulation keeping pace with technological developments? Why regulate, what and how? Not clear