

The 'iPhone effect': The Impact of Dual Technological Disruptions on Electrification

Dr. Rolando Fuentes

8th Conference on the Regulation of Infrastructures

June, 2019

Florence, Italy

Context

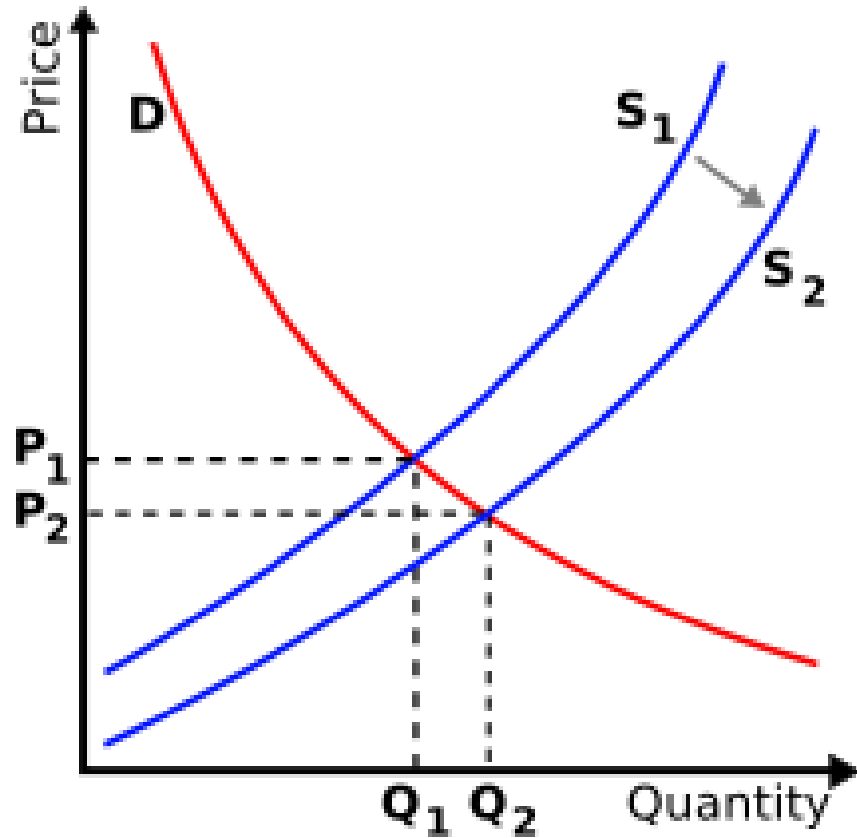
- Meeting climate change goals requires both the decarbonization of the electricity sector and the electrification of much of the rest of the economy.
- But the electricity sector itself is navigating through major disruptions that are changing the regulatory and business landscape. Whether these changes would help or hinder electrification is the focus of this paper.
- We take transportation as an example of a sector that currently uses other fuels.

Question and answer

- To what extent, changes in the electric power and transportation sector are compatible? Would they reinforce or delay each other's transition?
- We suggest that business models in both sectors will necessarily be moving towards offering aggregated services, repackaged as subscriptions, traded in digital platforms. This can create synergies between them that could eventually lead to a rebound effect, where more mobility and more electricity consumed than in lack of thereof

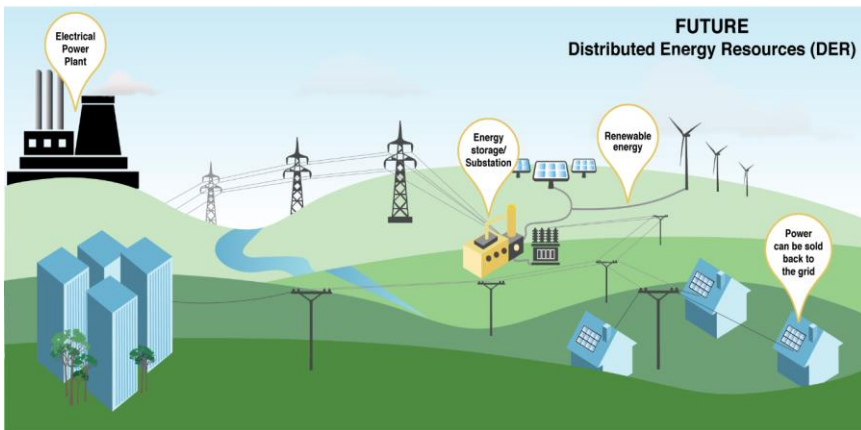
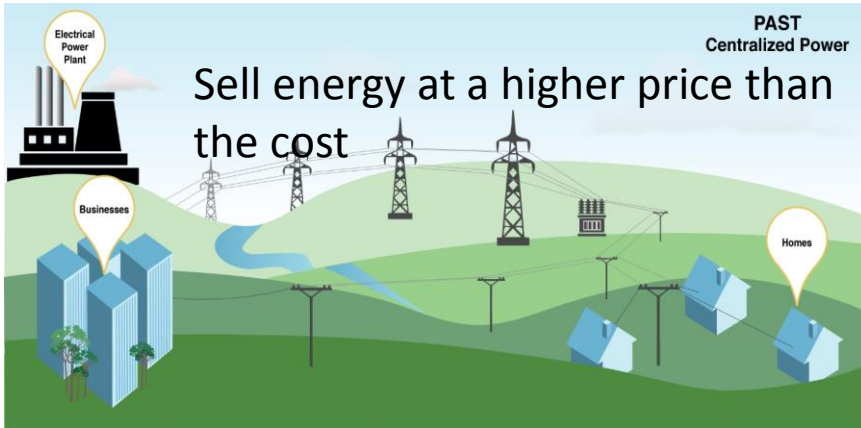
Theoretical construct

- Most technological progress can be characterized as supply shocks.
- Direct transition and then a rebound effect.
- Indirect effect through a positive supply shock in complementary goods.
- What would happen if one technological is a supply shock but not the other?
- Can synergies in the disruptions in the power and transport sector reproduce a “rebound effect”?



Positive supply shock

Electricity: Utility death spiral, electricity services but not supply shock



Reconfiguration of business models

De-commoditization

- Instead of buying electricity as a commodity, customers could purchase a product, differentiated by its intangible attributes, like clean or reliable.

Servitization:

- Instead of buying KWh, customers could buy the service electricity provides like cooling/heating.

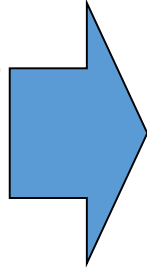
• KAPSARC (2016). “New Business and Regulatory Models for the Utilities of the Future”, KAPSARC workshop brief, August, 2016

• Fuentes, R. (2016). “Future business models for power markets: what can we learn from the ‘sharing economy’?”. Oxford Energy Forum, Issue 107, February 2016.

Transport: Capacity utilization, mobility as a service, car ownership

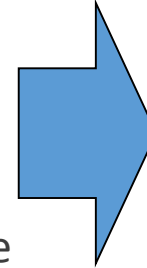
- **Shared mobility (UBER)**

- Platform connected sharing offers cheaper trips and more flexible consumption
- Utilitarian view of mobility



- **Electric vehicles (TESLA)**

- EV might be disruptive for the auto industry manufacturing.
- But is more questionable if they are disruptive for the transport system



- **Automation (Google)**

- Step change in car utilization
- Increase access to underserved groups
- Prone to optimization



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?

Are there any synergies?

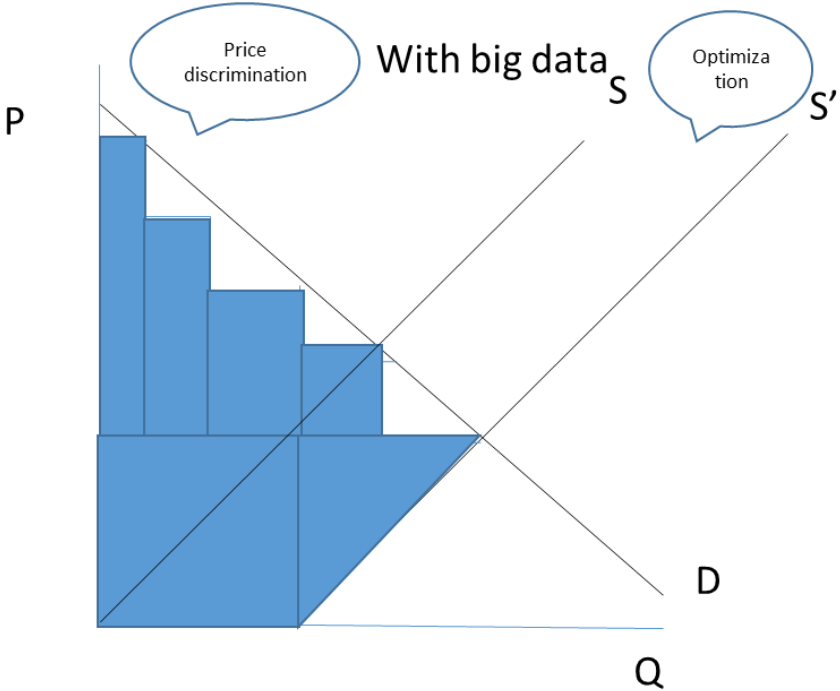
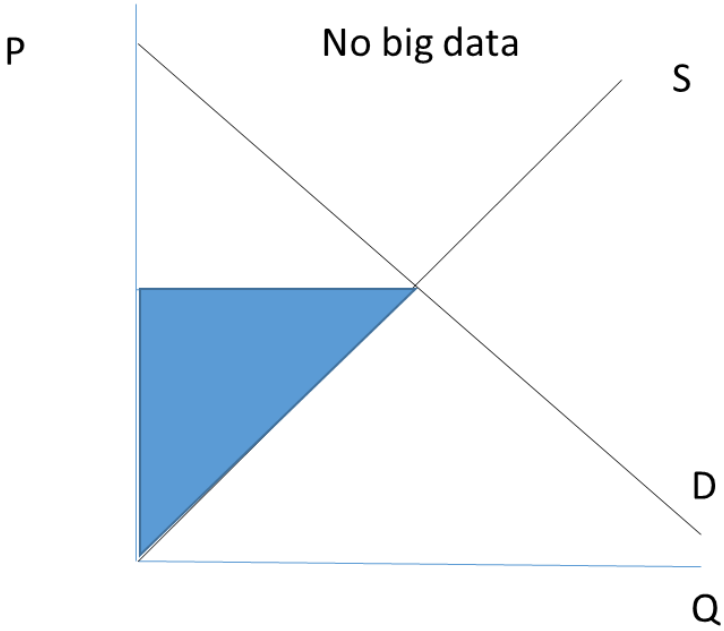
Disruption

'iPhone effect': the total is bigger than the sum of parts

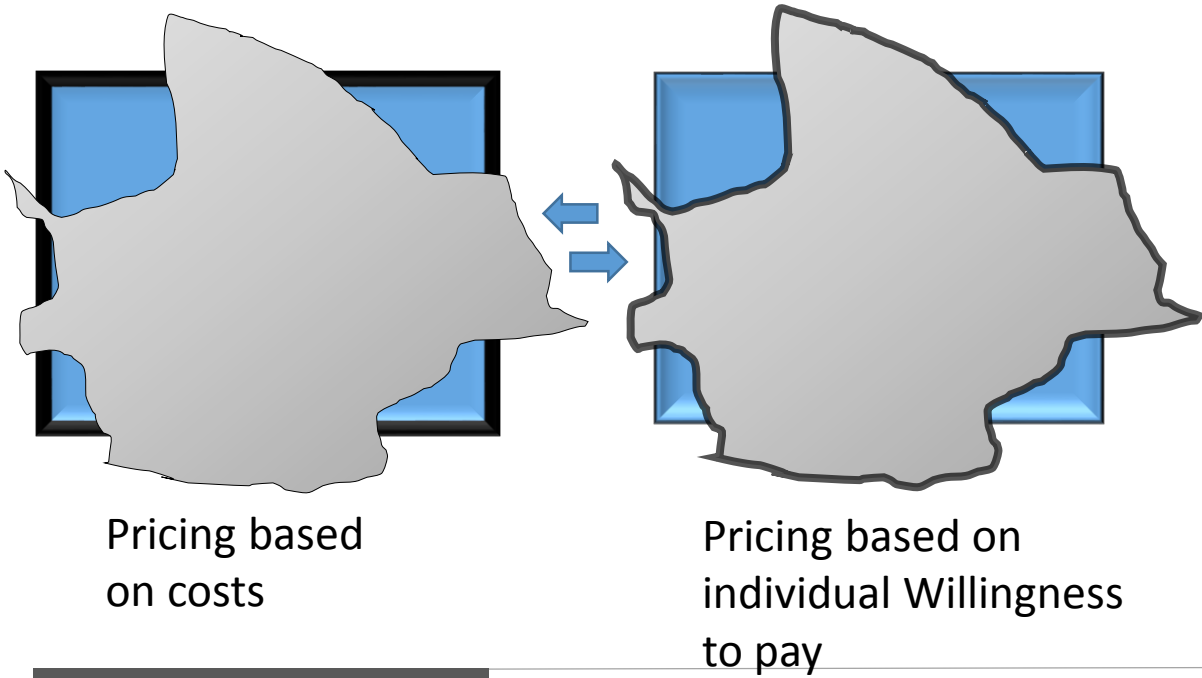
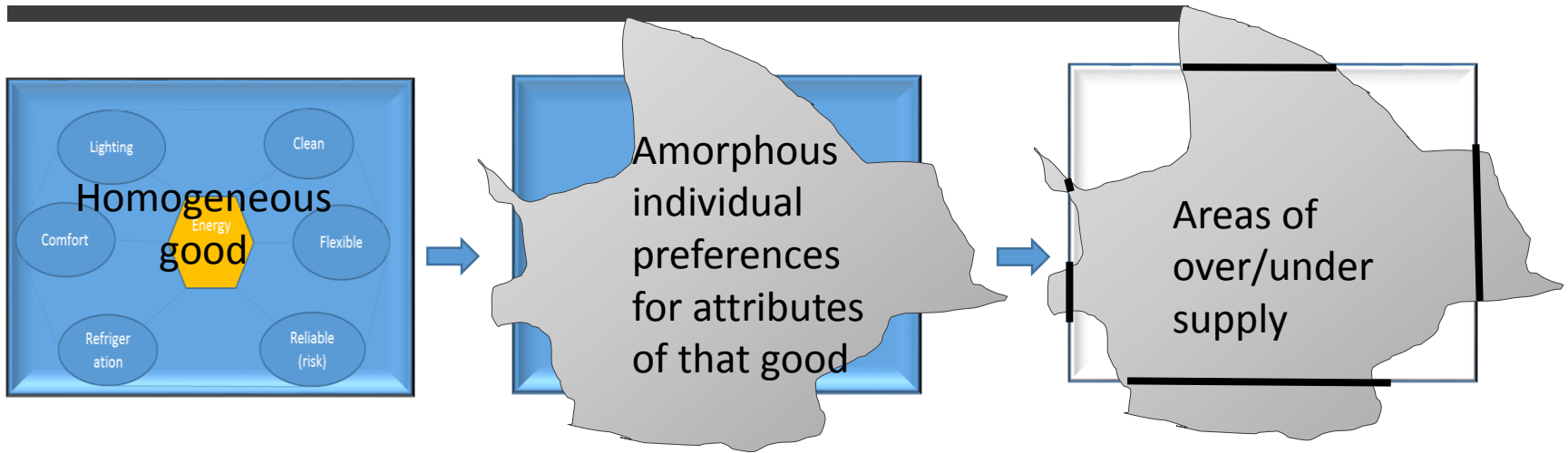
Synergies

1. Killing two birds with one stone: it is battery development! (DERs/ EVS).
2. Platform, subscriptions and horizontal integration
3. Data generation and predictability
4. Local focus
5. BUT-->Transport moves from distributed to centralized, electricity from centralized to distributed

Regulatory Implications




Regulatory implications



Conclusions

- If the technological disruptions described above come into full effect, they would threaten the viability of the dominant paradigms in both the electricity and transportation industries. We have therefore attempted to consider whether the demise of these two paradigms point to the electrification of more sectors in the economy?

- 
- We argued that through the horizontal integration of these two sectors in a single platform, companies would obtain economies of scale, they would lower transaction costs, and obtain complementary data sets, potentially producing a rebound effect that could lead to increased demand for mobility and electrification.
 - If renewable sources generated electricity, this could help address the aforementioned climate change problem.
 - What would be the “Amazon” of energy?