System Dynamics and Agent Based Models for Industrial Transition Modeling

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System Dynamics and Agent Based Models

- System Dynamics: Modeling technique for simulating dynamic complex systems. It includes flow and stock variables, causal loops, feedback effect, time delays, etc.
- This method can be of great help to analyze the dynamics of industrial transitions, and the effects of technological changes.
- Very flexible technique that can be applied to different scales, and to a large variety of environments.
- It is a useful approach for identifying problems and weaknesses, improving behaviours of industrial agents, and to study industrial policy implications.

Agent Based Models (ABM)

- A second modeling technique that can be useful for studing industrial transitions is Agent Based Models (ABM).

- Similar idea to System Dynamics: Using of simple rules to describe and simulate complex systems, but based on the behaviour of "agents". The objetive is to simulate a complex system based on the behaviour and interactions of multiple agents

- Agents can be individuals, groups of individual, organizations, productive sectors, regions, countries, etc.

- In modeling industrial transitions, agents can be firms, industries, firms in a geographic area, etc.

- The two modeling techniques are different (simple equations versus simple behavior rules) but complementary for simulating industrial transition.
- Both modeling techniques can be useful in the design and implementation of industrial policies, and they can produce information of great interest for policymakers.
- These tools are relative easy to be applied to case study and are very flexible for modeling any complex environment.