

Green Chemistry: A Study of Innovation for Sustainable Development

Citation:

Matus, Kira. 2009. *Green Chemistry: A Study of Innovation for Sustainable Development*. PhD Dissertation, Public Policy Program, Harvard University, Cambridge, MA.

Abstract:

The goal of this thesis is to understand how policy can better encourage technological innovation that promotes sustainable development. I used a theory informed, historical and dynamic investigation of innovations required to achieve sustainable development. The study is comparative but also grounded in a global, connected context. In particular, I examined green chemistry innovations, which are chemical processes and products designed to lessen negative environmental and health impacts, while still improving performance and profitability. I constructed a qualitative model for the green chemistry innovation system, to identify the major factors that help or impede innovation in that system, and to evaluate the impact on the system of a variety of potential policy interventions. I developed system-specific and general insights about the role of policy in encouraging innovation for sustainability in today's complex and globalizing world.

All together, this research led to six key findings in three main categories. These findings are:

A) Globalization

1. Innovations that promote sustainable development can face additional barriers (compared to other public goods innovations) because their costs and benefits are particularly "leaky" across spatial and temporal boundaries.
2. Like the problems that many innovations for sustainable development seek to address, the system of innovation for sustainable development itself is highly transnational.
3. Regardless of local contexts, technical barriers present a common challenge to the development and implementation of innovations for sustainable development.

B) Context

4. The different human resources and human capabilities found in any particular country context, as well as economic organization (how firms are structured, what is being produced) impacts whether, how, and in what ways innovations occur.

C) Intervention Strategies

5. Efforts to foster innovation for sustainable development need to include analysis of the where in the innovation system interventions are effective.

6. Innovation for sustainable development requires smart, strategic engagement between different combinations of stakeholders.

These findings are a foundation for further work to understand the particular intricacies of sustainable innovations. This and future work can be used not just to expand and refine existing theory, but also to improve the ability of policy-makers to craft appropriate and effective policies and programs.