

Enabling environment for technology adoption

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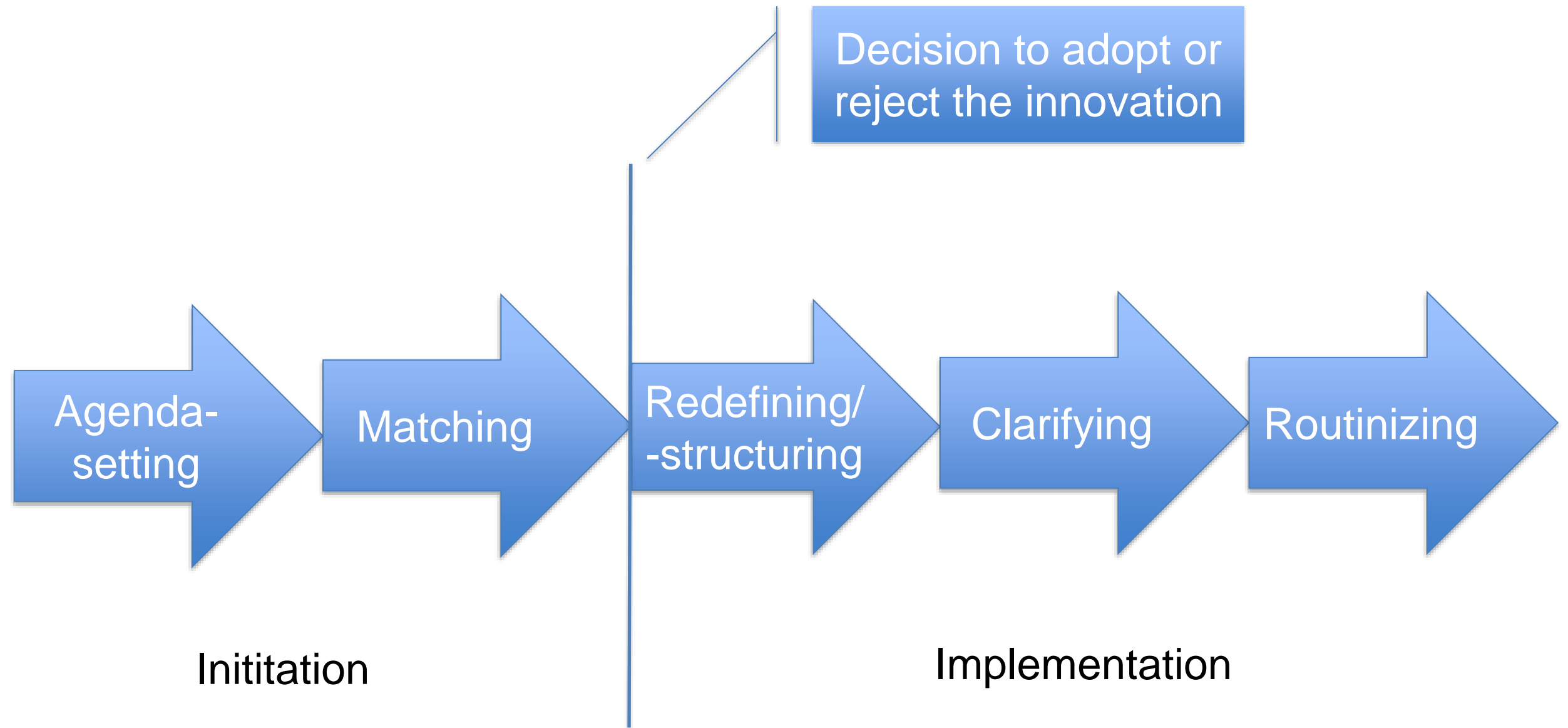
Outline

- Impact of consumer choices on mitigation options
- Impact of assets and commodity space on adoption behavior
- Development of value networks and educational systems
- Methodology

Under the same regulatory conditions customers differ in the adoption of new products (or technologies)

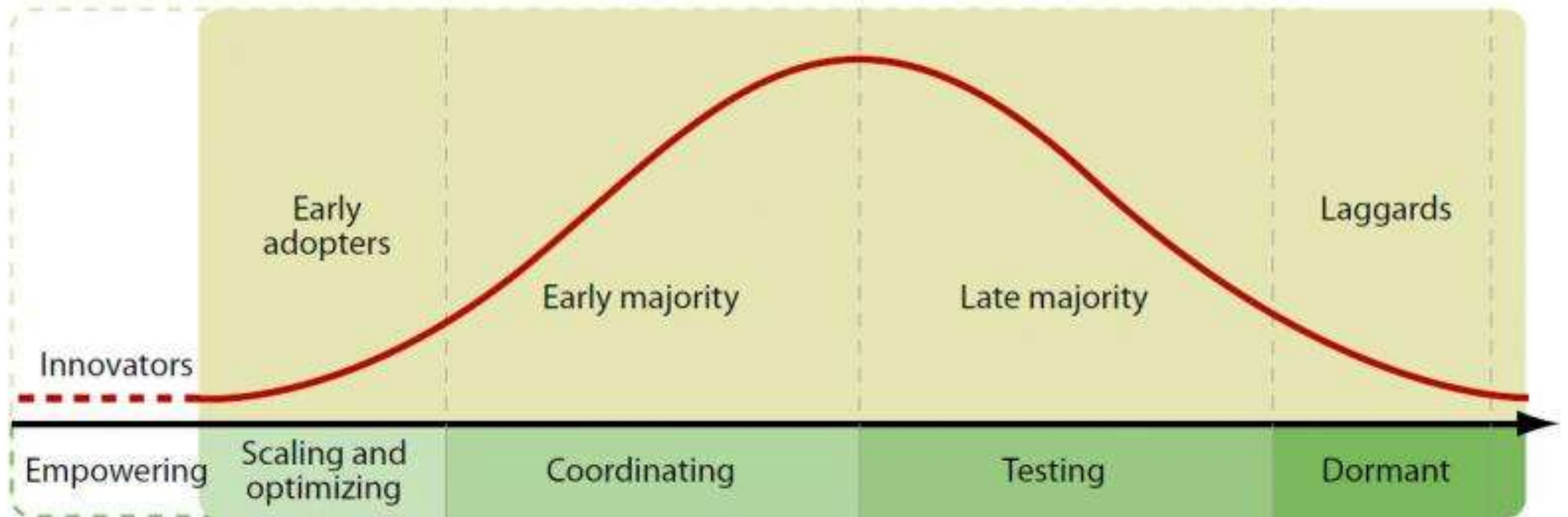


Adoption is more than the decision only of a customer



Rogers 2003

Customers differ in when (and whether) they adopt a new product independent of what different suppliers offer



(Rogers, 1995)

Customers differ in what and why they adopt a new product

- Consumers (or end-customers) buy a new product based on their perception of its relative advantage, compatibility and complexity (Arts et al. 2011).
- For new sustainable products, consumer adopter characteristics seem to matter such as environmental awareness, consciousness and willingness to pay
- Under what conditions (e.g. type of products) are consumers in favor of government regulations enforcing firms to meet sustainability criteria?
- Industrial customers likely differ in behavior from consumers
- Research question: To what extent and how can consumer choices impact development and adoption of mitigation options (material and efficiency choice etc.)?

Industrial customers within supply chains likely differ

- Firms differ due to their added-value position in the supply chain
- Higher added value (and thus gross margin) at the higher and lower end in the electronics industry (Shin et al. 2012)
- Influenced by market structures and the firm assets and capabilities
- High chance of breakthrough innovation if firms have high expected future returns and sufficient competing firms join in (Kok & Van Deemen, 2005)
- Research question: How does lumpiness and longevity of assets and the cyclical nature of commodity space impact adoption and how does it need to be considered in policy design?

Adoption depends on what customers demand *and* their suppliers or supply chains offer

- Customers empowered by concentration in industry are in the position to develop value networks
- The power to develop new value networks may also come from suppliers within and across supply chains
- Such powers likely are determined not only by the creativity to reformulate business models and value propositions
- Such powers are likely also determined by the systemic nature of innovations and standard setting for technology and practices
- Research question: What is the role of supply chain reconfigurations, business model and value proposition reformulations, system innovation, and normative practices in developing value networks?

Adoption by customers also differs due to what governments enable or neglect

- Isomorphic pressures from governments may enable those transitions needed towards the development of value networks
- For example: governments may allow to develop codes of conduct
- Such isomorphic pressures may represent institutional voids that prevent customers or suppliers to act at all or act in a consistent way (Pinkse and Kolk, 2011)
- Research subquestion: What isomorphic pressures and institutional voids play a role during the transition towards value networks of firms?

Adoption and development also depend on the development technology education systems

- The development of the knowledge and skills requires industry-specific educational systems at all (vocational) levels
- How to arrive at consistency across the development of knowledge and skills across the educational levels?
- How to involve firms in consistent learning and application of knowledge and skills?
- Example: Chemical Innovation Labs and Centres of Chemical Innovations are designed complementary to Centres of expertise and to Schools at different levels of education
- Research subquestion: What governance and organizational change systems stimulate the development of technological knowledge oriented educational systems in each of the energy intensive industries?

Methodology

- Consumer adoption behavior: Quantitative large scale surveys/experiments
- Industrial customer adoption/development of technologies: Qualitative in-depth case study approach
- Developing value networks and educational systems: Qualitative in-depth case study approach

Thank you & Questions

