

Impediments and Facilitators for Adoption of Wireless Innovations: Discussion Comments

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What is innovation?

■ Invention

- Webster's: "...act of discovery."
- Generation of new ideas.
- Commonly thought of as hard science or basic research.

■ Innovation

- Webster's: "... introduction of something 'new.'"
- Development of new ideas into marketable products.
- Commonly thought of as technology, applied research or R&D.

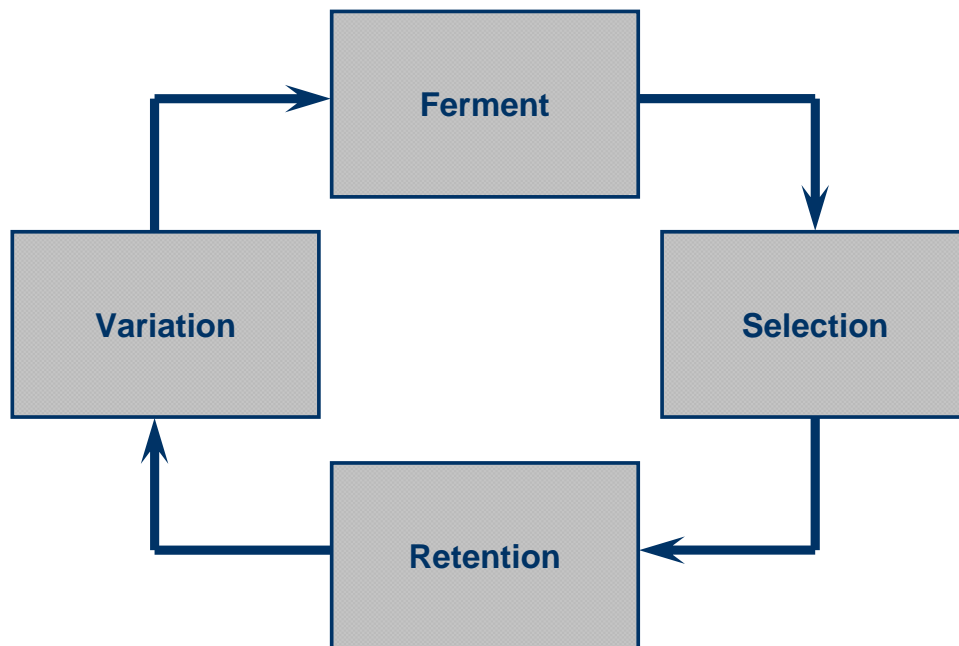
■ Diffusion/Adoption

- New products spread across the market.

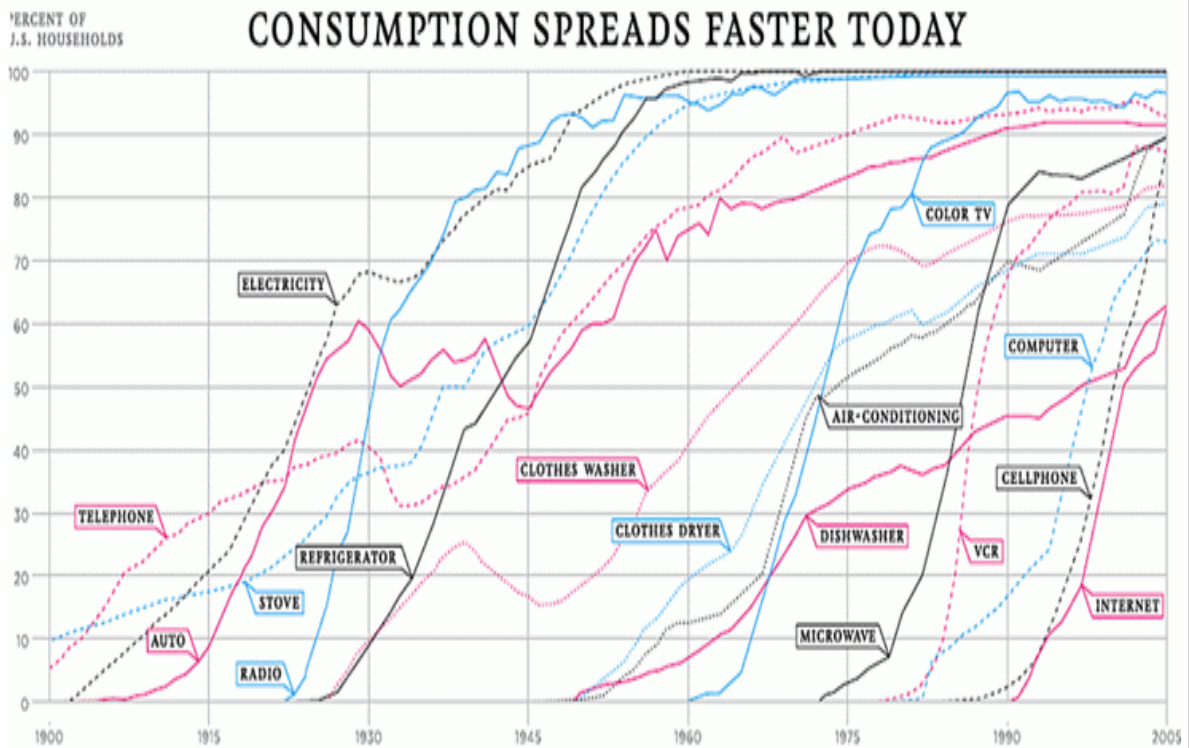
What is innovation?

- Dominant driver in many industries.
 - E.g., pharmaceuticals, software, semiconductors, **telecom**, etc.
- Many causes.
 - E.g., globalization, competition, etc.
- Difficult industry realities.
 - E.g., Shorter development cycles, rapid price declines, shorter product lives, etc.
- No single, agreed-upon taxonomy.
 - E.g., incremental vs. radical; modular vs. architectural; sustaining vs. disruptive; process vs. product; etc.
- Some “features” have consistently been identified.
 - Technology Cycles – Patterns of recurring innovation streams.
 - Technology S-Curves – Rates of performance or adoption.

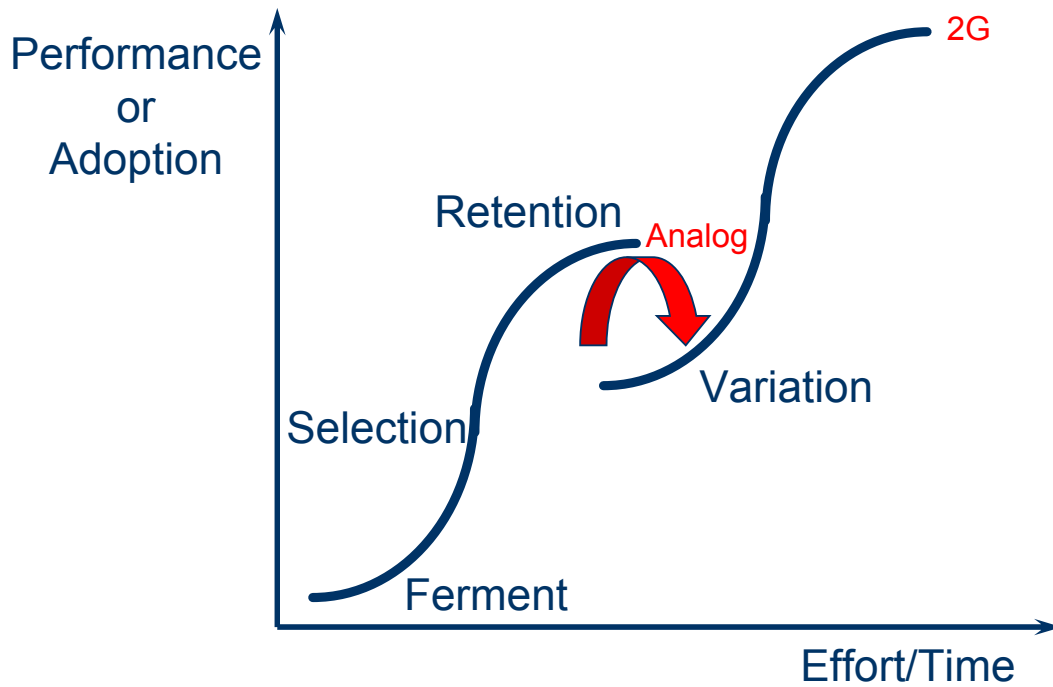
Technology Cycles



Technology S-Curves



Technology S-Curves



What is innovation?



Bohlin, Gruber and Koutroumpis – The Basics

- Research Question
 - What economic and technological factors affect the diffusion of different mobile telecommunications technology generations?
- Theoretical Lens
 - International / Industrial Organization (IO) Economics.
- Method
 - Empirical – RE, FE, FE Robust, FD IV, and DP.
- Findings
 - Locational factors affect diffusion.
 - **2G** – Urbanization, GDPC and Internet Penetration ↑.
 - **3G** – Urbanization, Regulation, GDPC and Broadband Penetration ↑.
 - Competitive, technological and generational factors affect diffusion.
 - **2G** – Competition ↑; Technology ↑ (early) ↓ (later); Generational – **1G** ↑, **3G** **N/E**.
 - **3G** – Competition ↑; Technology **N/E**; Generational – **2G** **N/E**.

Bohlin, Gruber and Koutroumpis – My Comments

■ Research Question

- Interesting and informative.
- But emphasize the 1G–2G as complements and 2G—3G as substitutes story more.

■ Measures

- Good set of locational variables.
- Good set of competition and diffusion variables.
 - Better explain high correlation between inter-generational (HHI Generation) and inter-technology (HHI Technology) indices.
- Consider other variables (e.g., new handsets introduced)?

■ Econometric Analysis

- Solid empirical robustness (with many models presented).
- But perhaps too many?

Layne-Farrar and Padilla – The Basics

- Questions
 - To what extent does royalty stacking (i.e., the complements problem) in mobile telecommunications exist?
- Theoretical Lens
 - Intellectual Property / Licensing.
- Method
 - Empirical – Summary Statistics.
- Findings
 - Limited evidence of royalty stacking in WCDMA 3G mobile telephony.
 - Policy changes and/or intervention (e.g., setting licensing fees, denying injunctive relief to non-practice patent-holders, etc.) is unwarranted.

Layne-Farrar and Padilla – My Comments

- Research Question
 - Interesting; some potential to make contribution.
- Approach
 - Bring more theoretical/empirical royalty stacking literature into paper.
 - More fully flush out differences among firm types.
 - Be more up-front regarding approach and note limitations.
 - Citations – Patent examiner citations? Self-citations?
 - Data – (1) must hold patent; (2) no pure downstream firms; (3) public.
 - Downstream firms – Results neither confirm nor deny royalty stacking relationship.
- Measures
 - Does citation HHI measure accurately capture IPR fragmentation?
 - Unequal patent values → unequal royalty rates.
 - Consider alternative measures (e.g., HHI measure of forward citations of prior art)?
- Empirical Analysis
 - Why sample statistics and figures? Consider (or at least present) more sophisticated econometric methods.
 - e.g., $MV/TA_i = f(TYPE_i; HHI_i; TYPE_i \times HHI_i; X_{it})$
 - Consider separating analysis for SIC 3663 (eqpt.) and SIC 4812 (operators).

Koski and Kretschmer

– The Basics

- Research Question
 - How does (imitative/innovation) new product introduction for mobile handsets affect firm value?
- Theoretical Lens
 - Industrial Organization (IO) Economics.
- Method
 - Empirical – OLS with FE.
- Findings
 - Manufacturers launching new cellular handset models at or near the leading edge create more value (Tobin's Q).

Koski and Kretschmer – My Comments

- **Research Question**
 - Interesting and important.
 - But innovative vs. imitative argument is somewhat lacking.
 - And shift from vertical to horizontal innovation is largely lost in discussion.
- **Unit of Analysis**
 - Very good data (EMC World Cellular Database).
 - Firm-month? Firm-year? Other?
- **Measures**
 - New Handsets (NEW_HSET) – Why logged?
 - Vertical Innovation (TECH_LEAD) – Firm's handset models innovations (talk, standby & weight) in sample year versus who? What? When?
 - Horizontal Innovation (CV_TALK & CV_STANDBY) – Dispersion can represent many things. Too imprecise!
- **Econometric Analysis**
 - Fixed Effects – Explanatory power of year DVs (Telecom bubble)?
 - Other firm (e.g., scale; scope; age) control variables?
 - New Handsets (NEW_HSET) – Any nonlinear effects?
 - Previous Handsets – Robustness (1-, 2-, 3-month, etc.) around timeframe?
 - Vertical Innovation (TECH_LEAD) – Aggregated vs. disaggregated effects?