Context and concepts

- Context: You're in a competition to establish a technical standard for a new product. Do you fight for your standard or agree to establish a compatible standard?
- Concepts: standards wars, compatibility.

Compatibility decisions

- A proprietary standard can be very profitable (Windows, Palm OS, CDMA).
- But often two or more standards compete for a market.
- If the network effects are strong enough, people may abandon one standard when the other gets a substantial installed base (a critical mass, one might say).
- Two polar choices:
  - Compete aggressively to establish a proprietary standard (benefit: high profits, cost: competition may be costly, may even destroy the market)
  - Cooperate on an open standard

Compatibility decisions...

- Two alternative designs for a new technology. Should I choose a compatible or an incompatible technology?
- Case A: If I choose incompatibility, then one of the technologies will become a standard at random with 50% probability each.
  - Compatibility $\Rightarrow$ Duopoly Profits $= \pi_D$.
  - Incompatibility $\Rightarrow 50\% \times 0 + 50\% \times \pi_M$.
  - Typically, $\pi_M > \pi_D + \pi_D$.
  - Hence, incompatibility is a better choice.

Compatibility decisions...

- Case B: If I choose incompatibility, then one of the technologies will become a standard depending on who invests the most in the “standardisation war.”
- Each firm invests up to the difference between being a winner ($\pi_M$) and being a loser ($0$).
  - Payoff if I win: $\pi_M - \pi_M = 0$.
  - Payoff if I lose: 0. Hence, $\pi_M > \pi_M + \pi_M$.
  - Hence, compatibility is better.
### Quadraphonic sound

- Better than stereo
- Two versions:
  - Matrix systems (4 into 2): simpler
  - Discrete systems: “real” quad
  - Incompatible
- 1971: Columbia introduces SQ (matrix); JVC launches CD-4
- 1972 (January): RCA announces support for JVC

### Quadraphonic sound...

- Fierce competition in
  - Product improvement
  - Complementary products
  - Influencing expectations
- Expectations
  - “RCA is acting as a spoiler ... Discrete is premature”
  - “Matrix is Mickey Mouse quad”
- Albums sold
  - Matrix (by 1973): 160 albums, 2m copies
  - Discrete (by March 74): 25 albums, 860K copies

### Policy dilemmas

**Dilemma #1: Influencing the choice between alternative technologies: narrow windows.**

- Moving too early implies deciding with little information. Examples:
  - Light-water nuclear reactors
  - Japan’s HDTV standard
- Moving too late implies paying high costs of switching. Examples:
  - Driving on the right in Sweden
  - Dvorak keyboard

### Policy dilemmas...

**Dilemma #2: Market v Government standard setting.**

- The trade-offs:
  - Speed of standardization
  - Technological competition
  - Price competition
- Example: Second and third-generation wireless communications
  - Europe: ETSI → GSM
  - US: G ‒→ TDMA, CDMA, multi-band phones
  - Question: Is wireless like quadraphonic (will confusion hurt development of the market?)?

### Policy dilemmas...

**Dilemma #3: Antitrust policy.**

- Favouring compatibility may lead to market power
- Encouraging competition may lead to incompatibility problems (bad for consumers).
- Examples:
  - Microsoft.
  - ATMs in Portugal.
Takeaways

- Proprietary standards can be very profitable.
- Standards are influenced by quality, competition, and blind luck.
- A firm may decide whether to fight for its standard or opt for a compatible standard depending on the intensity of competition over the standard and the product.
  - Intense competition over the standard points to compatibility
  - Intense competition over the product points to incompatibility (fight for your own standard).
- Policy toward network industries faces a dilemma: a single standard may be efficient but leads to monopoly.

Practice problem

Firm A invested in technology $\alpha$, Firm B in technology $\beta$.

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<thead>
<tr>
<th>Firm B's choice</th>
<th>$\alpha$</th>
<th>$\beta$</th>
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<tr>
<td>$\alpha$</td>
<td>$u+v$</td>
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What's the Nash equilibrium? Would firms do better to agree on a compatible standard?