

# Technological Platforms Competition and Innovation

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## What are industry platforms?

- An industry platform is a building block (product, technology, or service) upon which an ecosystem of firms can develop complementary products and services
- Examples:
  - The Internet
  - The Win-Tel platform for computing
  - Video games
  - Mobile phone operating system

## Platforms: a precise definition

- **An industry platform is:**
  - An essential component of a larger technological system
  - Functionally linked to several components of this system
  - Allowing third parties to develop complementary products or services (and a multiplicity of possible end-uses)

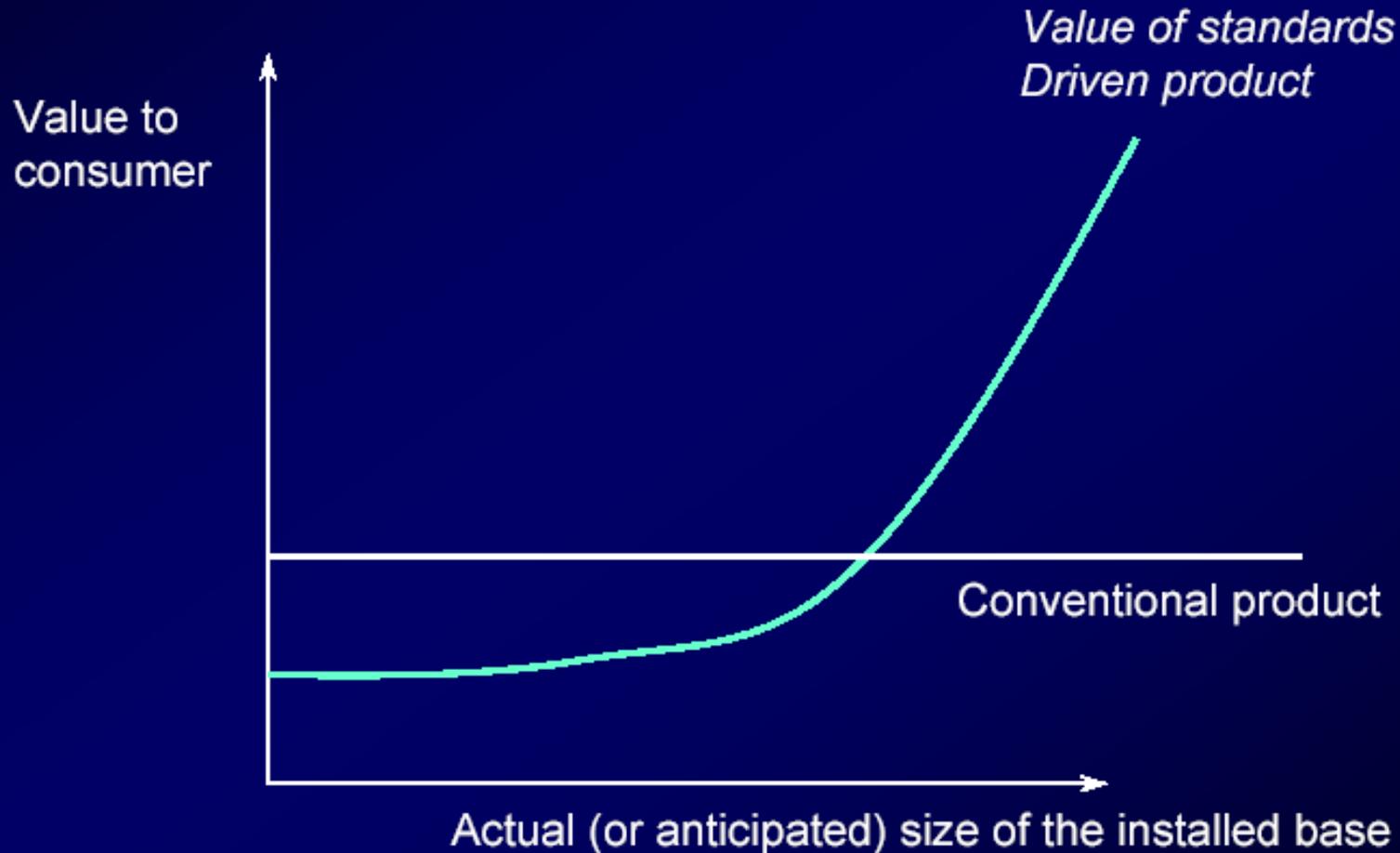
## Platforms: not only digital ones ...

- Platform dynamics have appeared in many industries:
  - Computers; Internet; Telecommunications; Electronic payment; Media; Consumer electronics
  - Transportation (airlines, package delivery, fuel cell-powered cars)
  - Retailing (shopping malls, barcodes)
  - Energy: electric power grid
  - Biology: genomics, biotech
- These industries share common features:
  - Complex technological systems
  - Fast evolution of technology
  - Require collaboration among several firms
  - Importance of interoperability, and integration

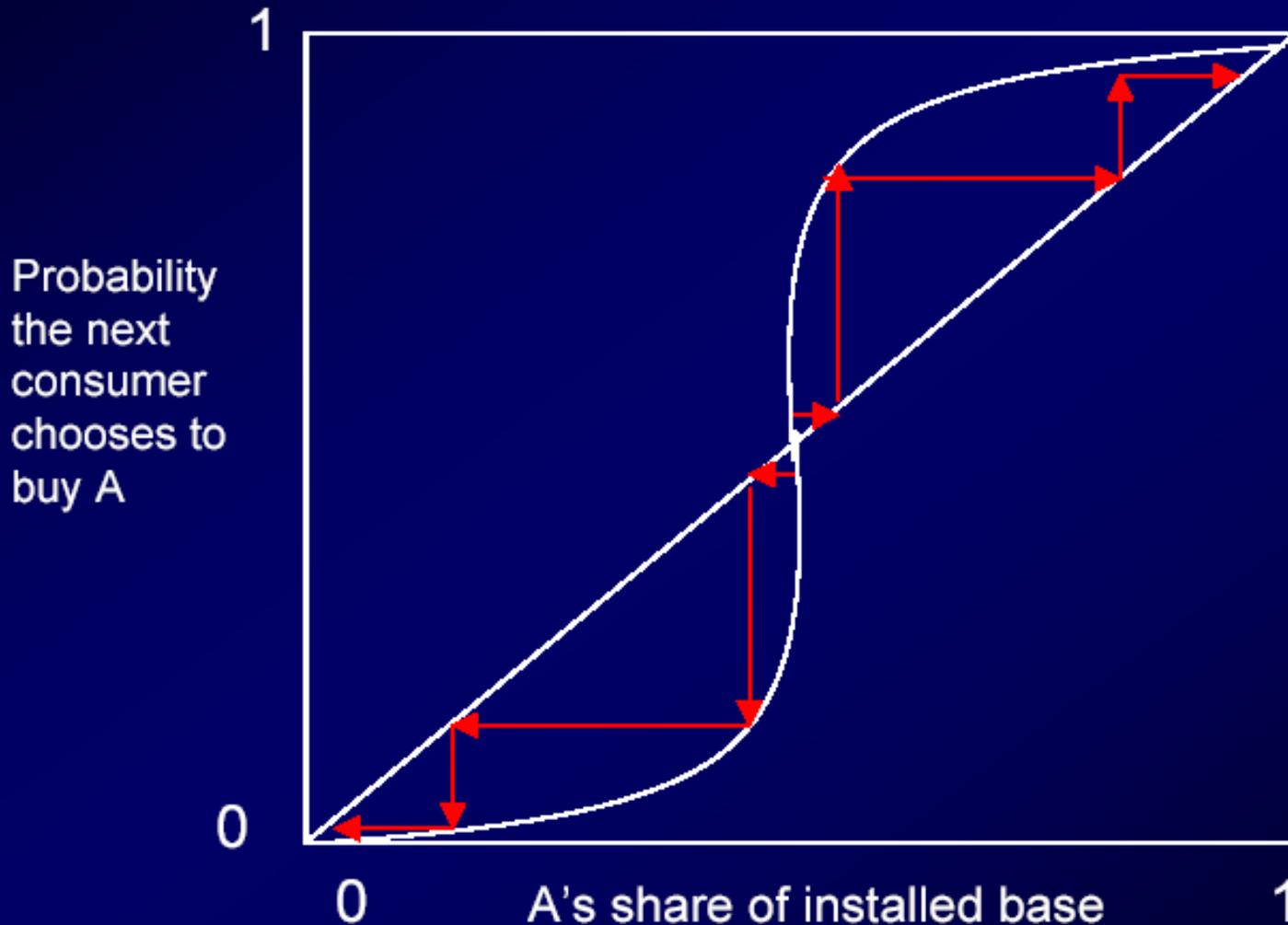
## Platforms: pervasive, yet not well-understood

- Platforms have appeared in many industries ...
- ... and when they emerge, they alter industry competitive and innovation dynamics:
  - Topple giants (Microsoft and Intel vs. IBM)
  - Increase intensity and diversity of industrial innovation in business ecosystems
  - Network effects: momentum that accrues market power to platform leaders as their market share grow

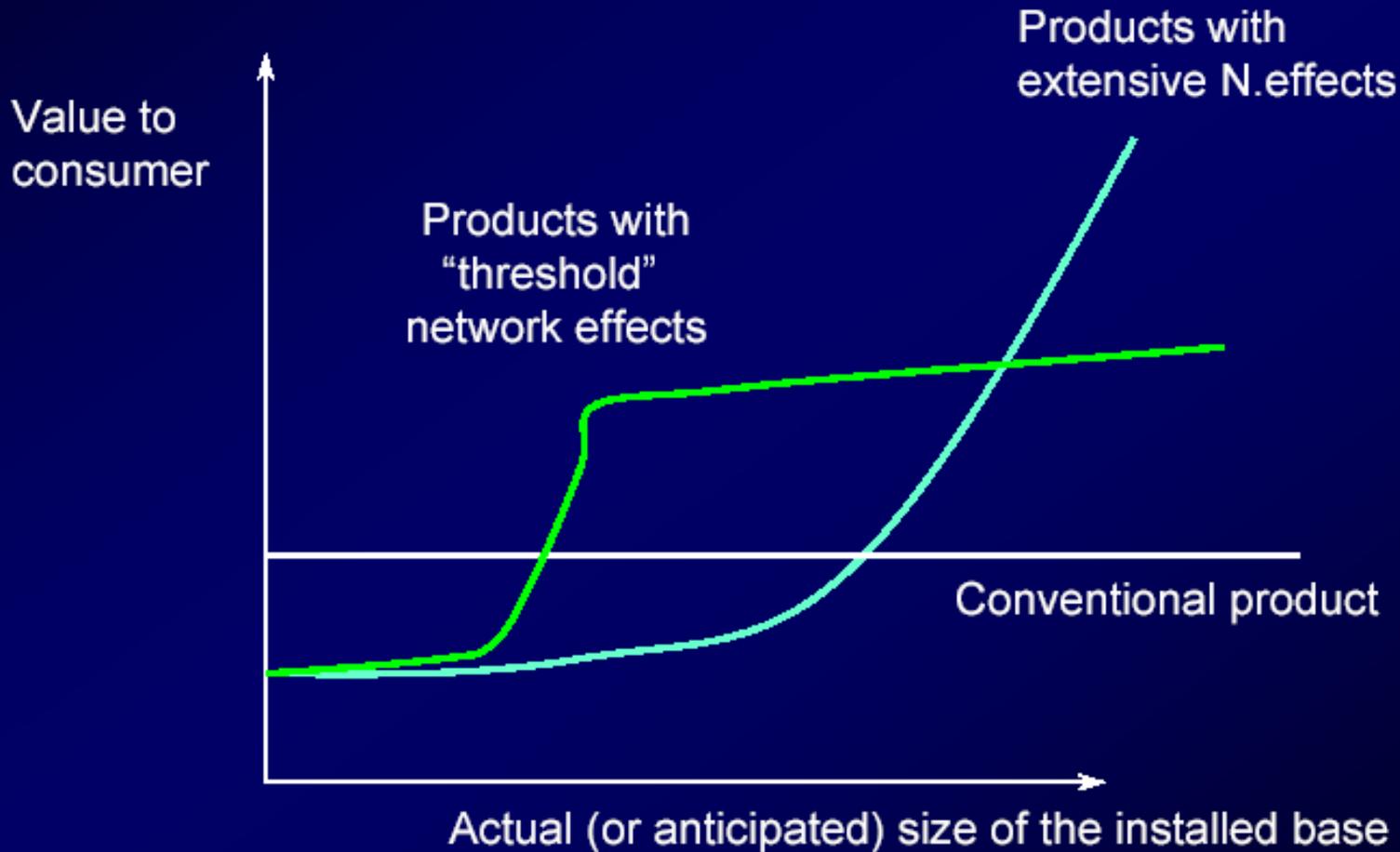
# With Strong Network Effects *Market Share Itself Creates Value*



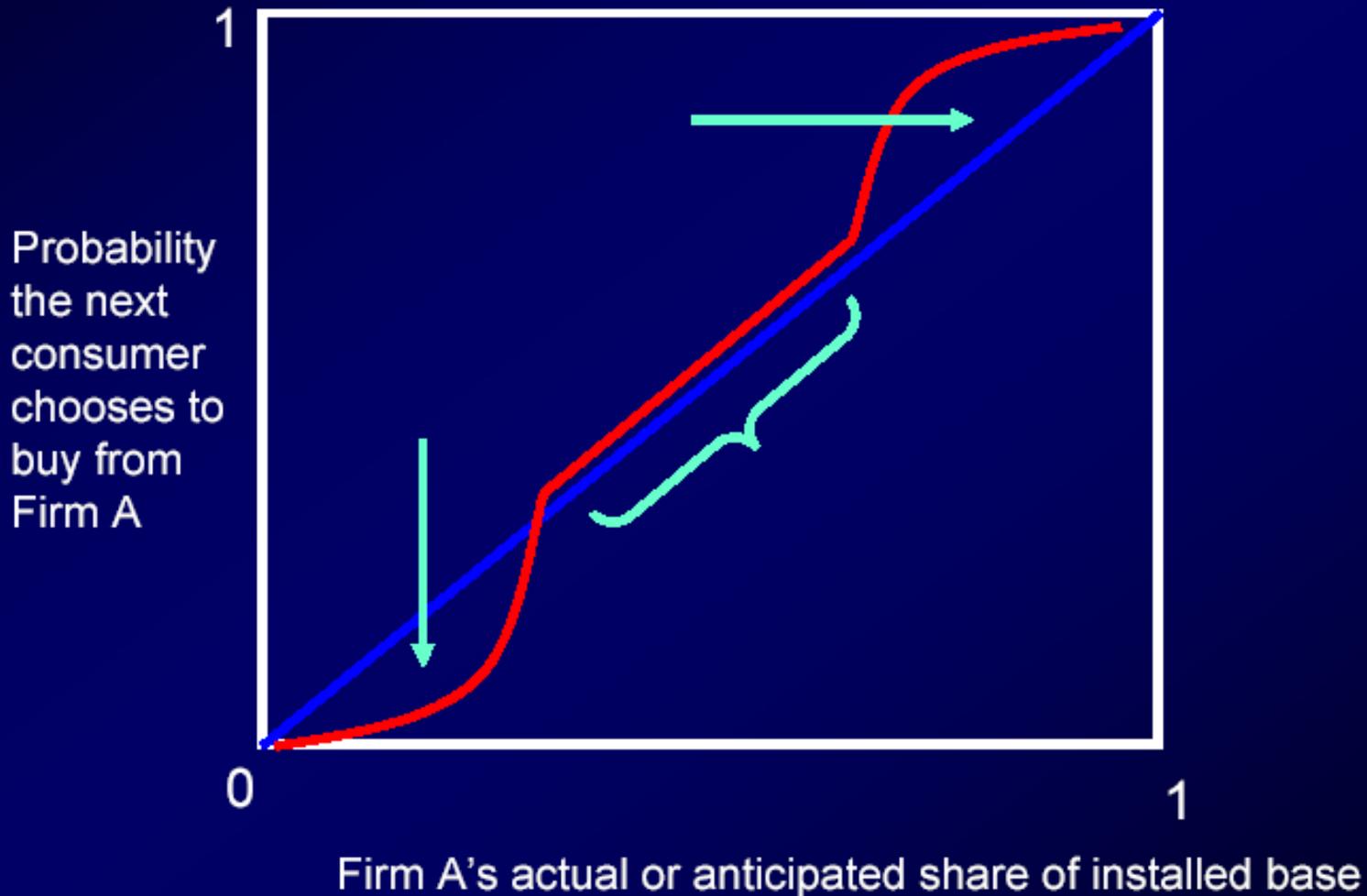
# If network effects are important, markets may “tip”



# Tipping dynamics differ with the strength of network effects



# Markets with moderate network effects only tip once critical thresholds are reached

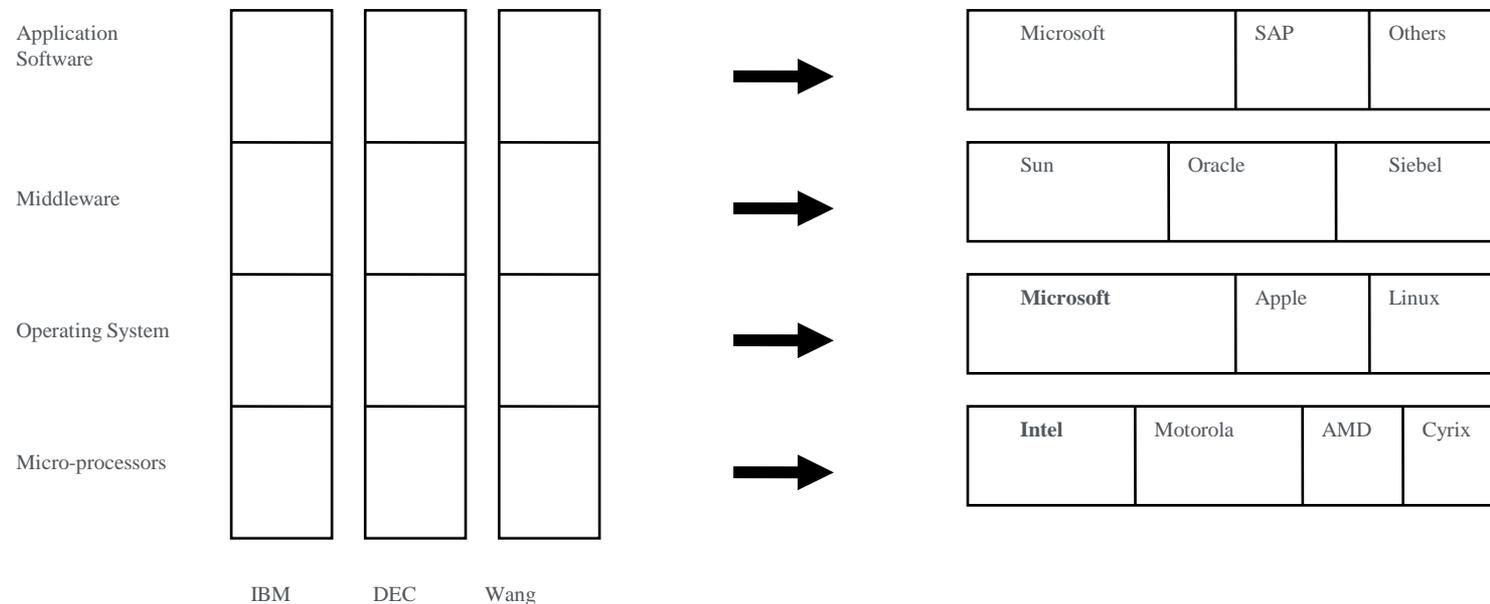


## Lots of unanswered questions

- In a variety of domains:
  - Industrial dynamics
  - Social welfare, policy
  - Business strategy and organization
  - Design and management of platforms
- Which factors contribute to the emergence of platforms?
- Issues around (abuse of) monopoly power
  - Question of market power, as platforms often become “bottlenecks” (“essential facilities”?) and erect barriers to entry as their market share grow
  - Does the momentum/network effect necessarily lead to monopoly power?
  - Should government get involved?
  - Trade-off between innovation and competition?
  - How to evaluate the trade-offs between innovation in systems vs. innovation in components?

## The emergence of platforms transforms industries

- Example: Evolution of the computer industry



Graph adapted from Grove, A. (1996), *Only the Paranoid Survive*

## Platform emergence can affect industry dynamics

1. Positions of industry leadership get challenged
2. The structure of the industry changes
  - From tightly controlled supply chains to loose coalitions of complementors (business ecosystems)
3. The nature of competition itself may change
  - Away from system-based competition towards component-based competition
  - Competition between coalitions of firms
4. The nature of industry innovation changes also
  - Focuses innovation trajectories on complements
5. New strategic opportunities arise
  - Platform leadership, to exploit the benefits of open innovation (tapping into innovative capabilities of external firms/individuals)
- 6.

## Platform dynamics: Virtuous cycle, Good for innovation

1. Platforms tend to **encourage innovation** on complementary products, technologies, and services
  - Examples      iPhone apps, Windows-compatible applications, Linux-open source software, Facebook      user content, YouTube video content, etc.
  - Why?              Because complementary innovation increases demand for the platform, platform owners tend to invest to specifically encourage complementary innovation by third-parties
  - How?
    - Division of labour in innovation: By offering ways to connect (connectors, APIs, SDKs, etc.), technological platforms help structure industry innovation, they act as “inducement mechanisms and focusing devices” : they reduce uncertainty (which delays innovation), and they focus the attention of innovators and structure / guide the problem-solving process and indicate where to invest and what problem to solve, they reveal demand, they divide the innovative labour, and therefore...
    - They lower the costs of complementary innovation
2. Platforms tend to encourage **market creation** on complements:
  - Platforms create incentives for platform owners to facilitate complementary market creation: “Here is a connector, now they all have to compete”
  - Platforms owners make technological design and business design decisions towards this goal
3. **Positive effect on social welfare:**
  - Platforms can therefore create situations where it is in the private interest of a firm to elicit and encourage innovation by others

## Platform dynamics: Bad for competition? Bad for innovation?

- Market share itself creates value:
  - Early advantage can turn into a self-fulfilling prophecy, with a positive feedback loop
  - Complementary developers will choose to develop for the platform with the largest installed base
  - This could reinforce platform owner incentives to encourage complementary third party innovation
- Problems arise:
  - But, at the same time, by sheer virtue of the increasing supply of platform-compatible complements, market platform dynamics **start erecting barriers to entry** in the market of the platform (see “application barriers to entry in the Microsoft case”).
    - This can happen without the platform owner specifically trying to monopolize the market and exclude rivals
    - Obviously, platform owner still can choose to act in an anti-competitive way

## Product boundaries become blurred

- Framing the issues as tying / bundling may not be the way to get the best insights
  - Products evolve fast, and features (often software-based) move easily between product scopes
  - Un-tying did not prove to be solving the problem
  - Structural remedies (separating “platform” from “applications”) may not be it either (see Andy Grove quote), as the platform-application boundary constantly evolves
- Framing the issues as platform’s foreclosing of complements way prove a more fruitful avenue
  - But then we need a robust test, to determine from which threshold a (platform) firm should be expected to allow other firms to connect
  - Let’s understand that by forcing firms to connect ...:
    - By forcing a firm to connect, one forces it to open up its technology
    - Platform firm may be allowing to connect firms that are complementors today, but could become rivals tomorrow
  - Should government do this? Or wait for competition to play (competition in the shape of a new platform)?

## In Andy Grove's own words

- “We are defining the platform and we want to be a participant to build on the platform. It’s a pretty common situation. *It is almost inconceivable that you can have the expertise, the momentum, and the market credibility to define a platform unless you are participating both above and below that platform.* Microprocessors are below. You can’t come and define buses if you don’t know enough about chip sets and microprocessors. On the other hand, if you are in it, you obviously have a business interest for yourself. *The resolution of these tensions is crucial for repeated success.*”

Interview with Andy Grove, former Intel Chairman and CEO

## Last words

- Platforms are here to stay and will become more pervasive
  - Legal challenges will keep coming up
- Platforms point to the limits of our existing theories
  - They cannot be understood if we abide by existing silos of thought: business (for economists, or management scholars only)/ technology (precinct of engineers)
- Platforms are also a rich setting to understand:
  - Which industry arrangements stimulate most innovation
  - How private incentives and collective good can be reconciled