Open Innovation: A New Paradigm for Managing Technology

Presentation to OECD Conference on

New Business Strategies for R&D

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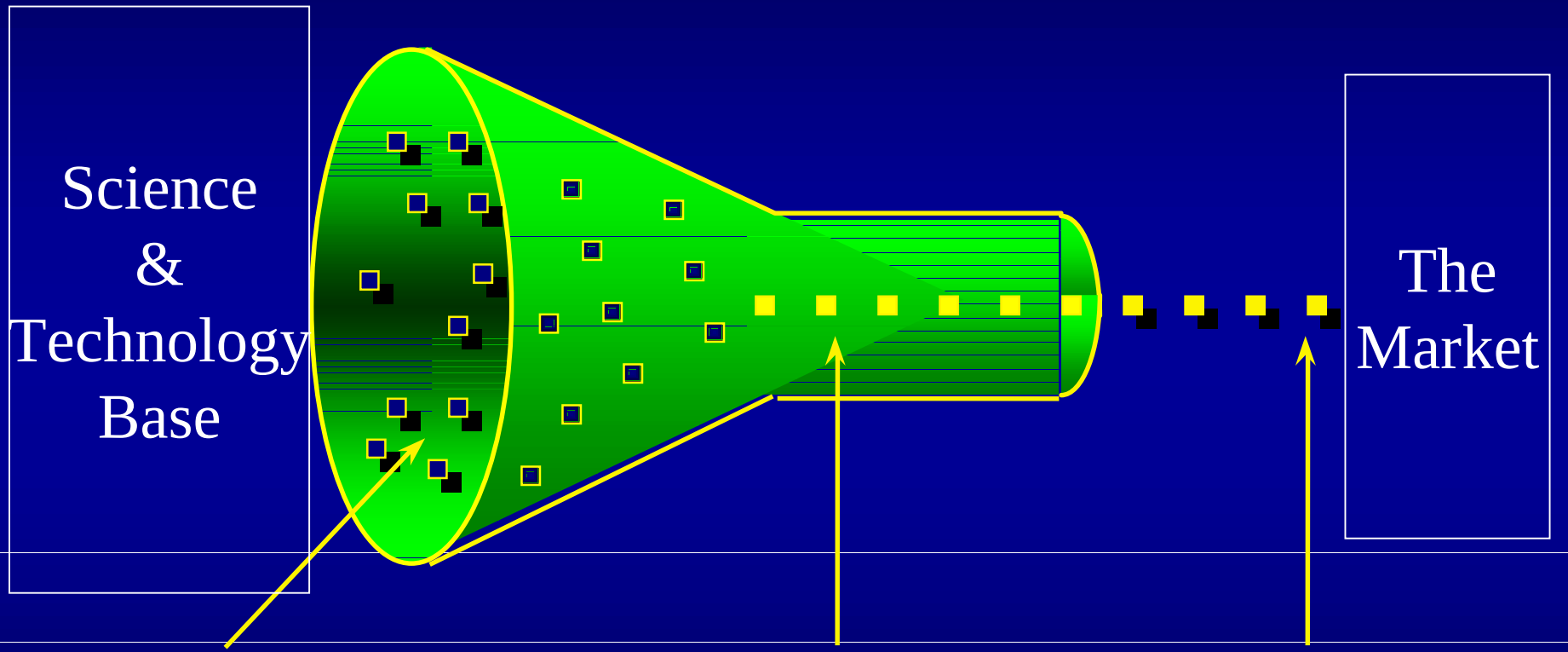
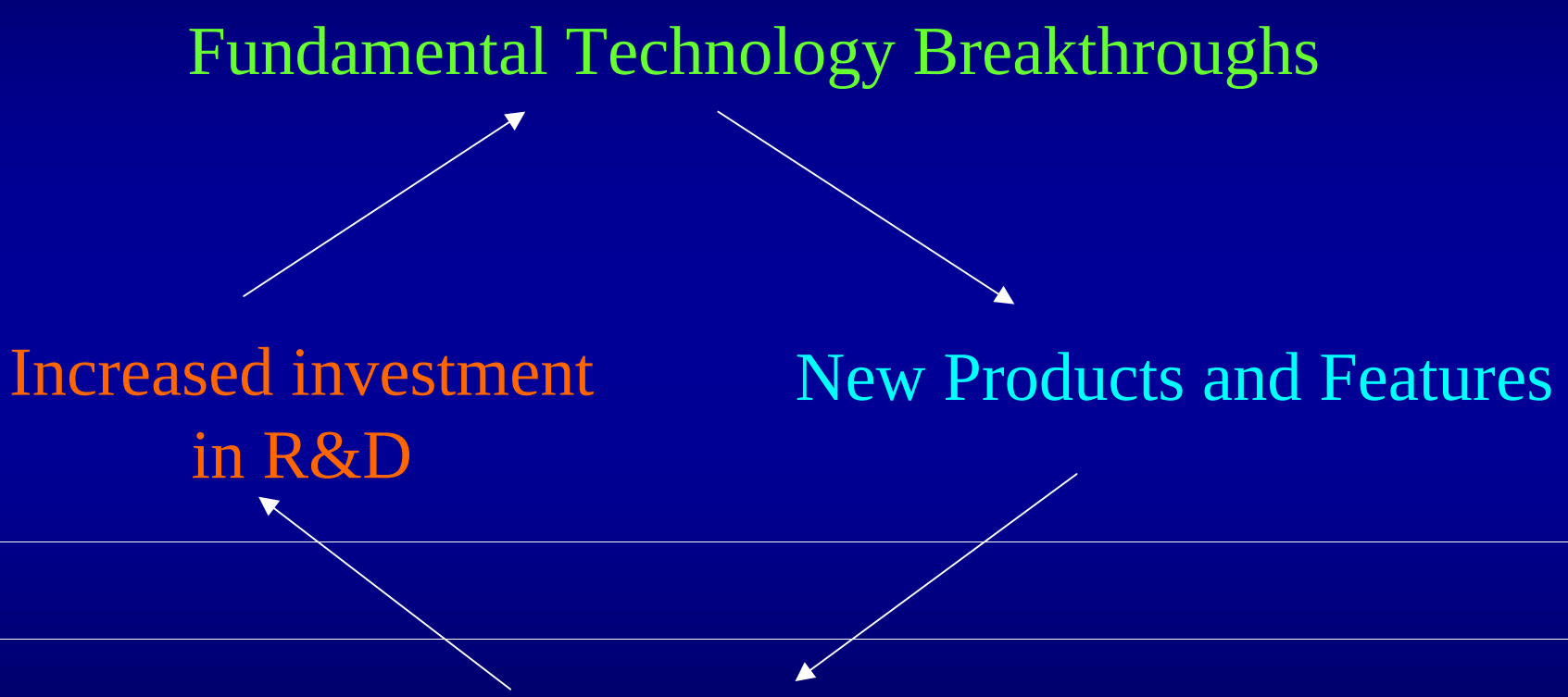
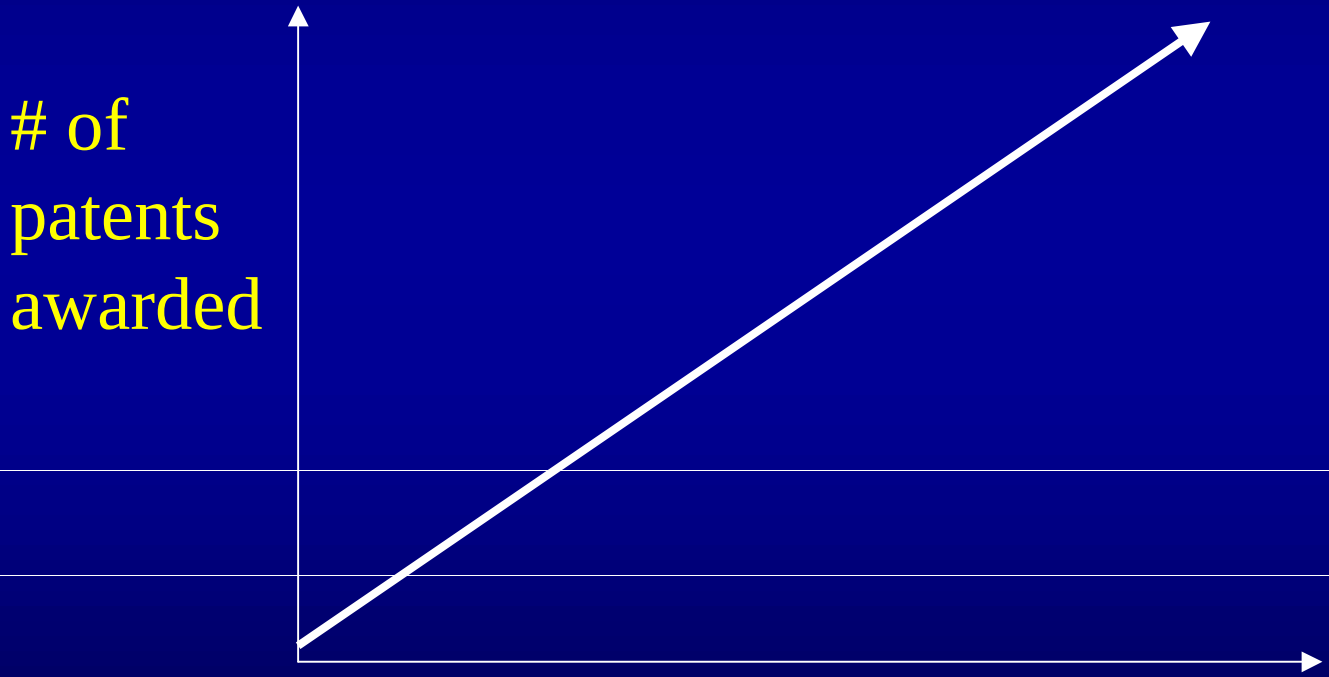
A Closed Innovation System



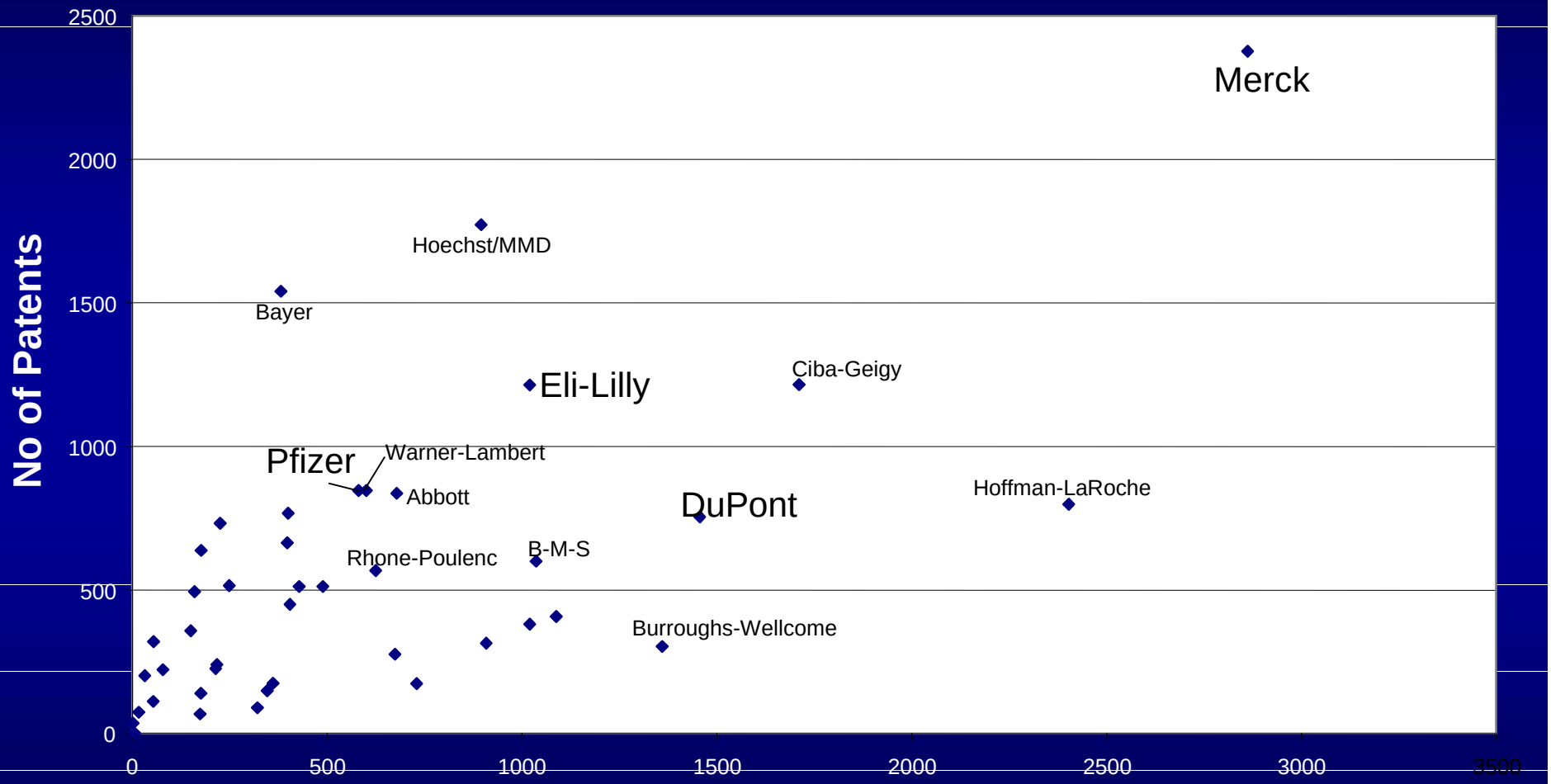
The Virtuous Circle for R&D



The Payoff to Doing Research



The Payoff to Research - Pharma



Source: K. Lim, National University of Singapore

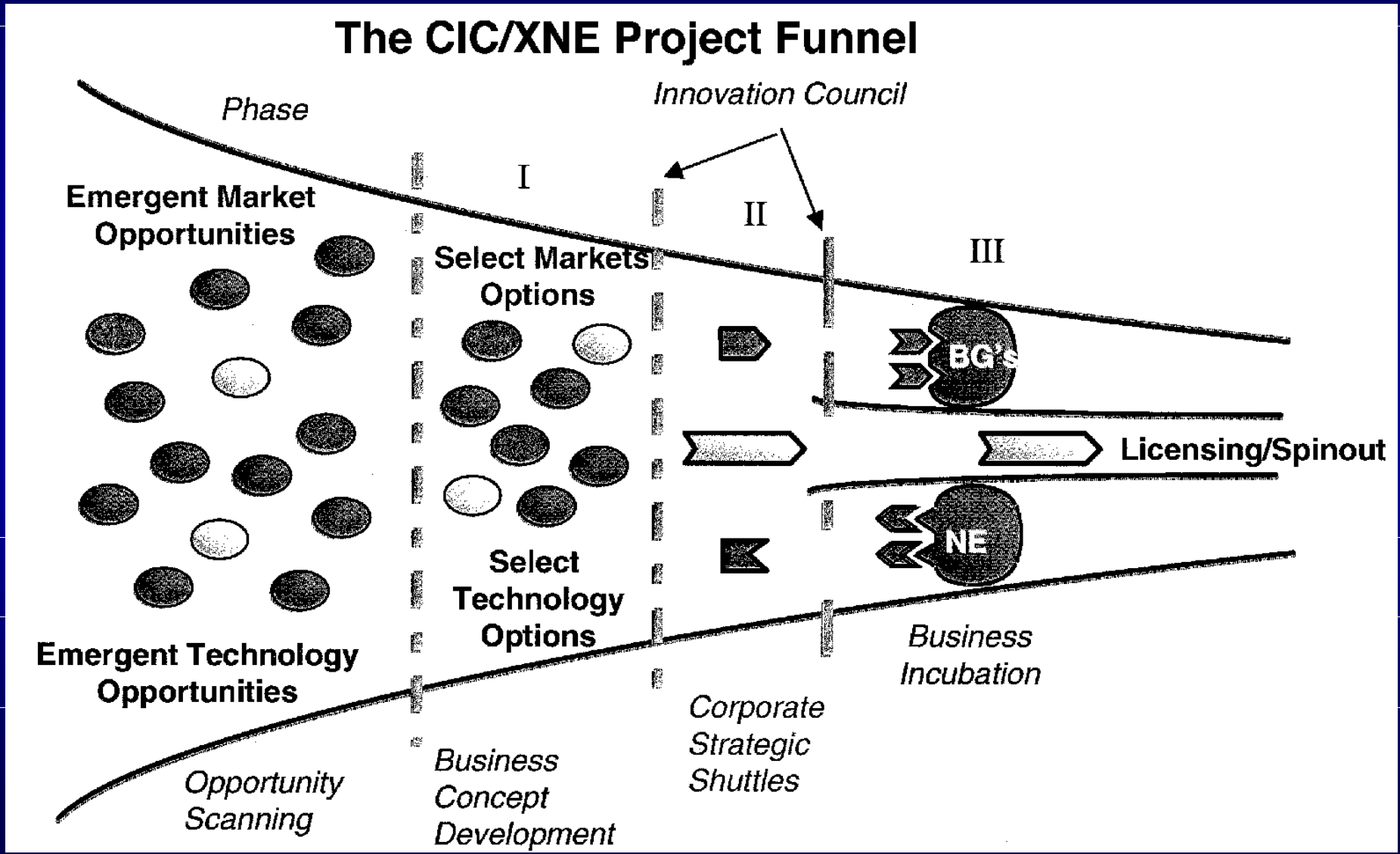
Hidden Assumptions in the Internally-focused Innovation System

- If I discover it, I will find a market for it
- If I discover it first, I will get it to market first
- If I discover it first, I will own it
- The important technologies I will need can be anticipated in advance
- The best people in this field work for us

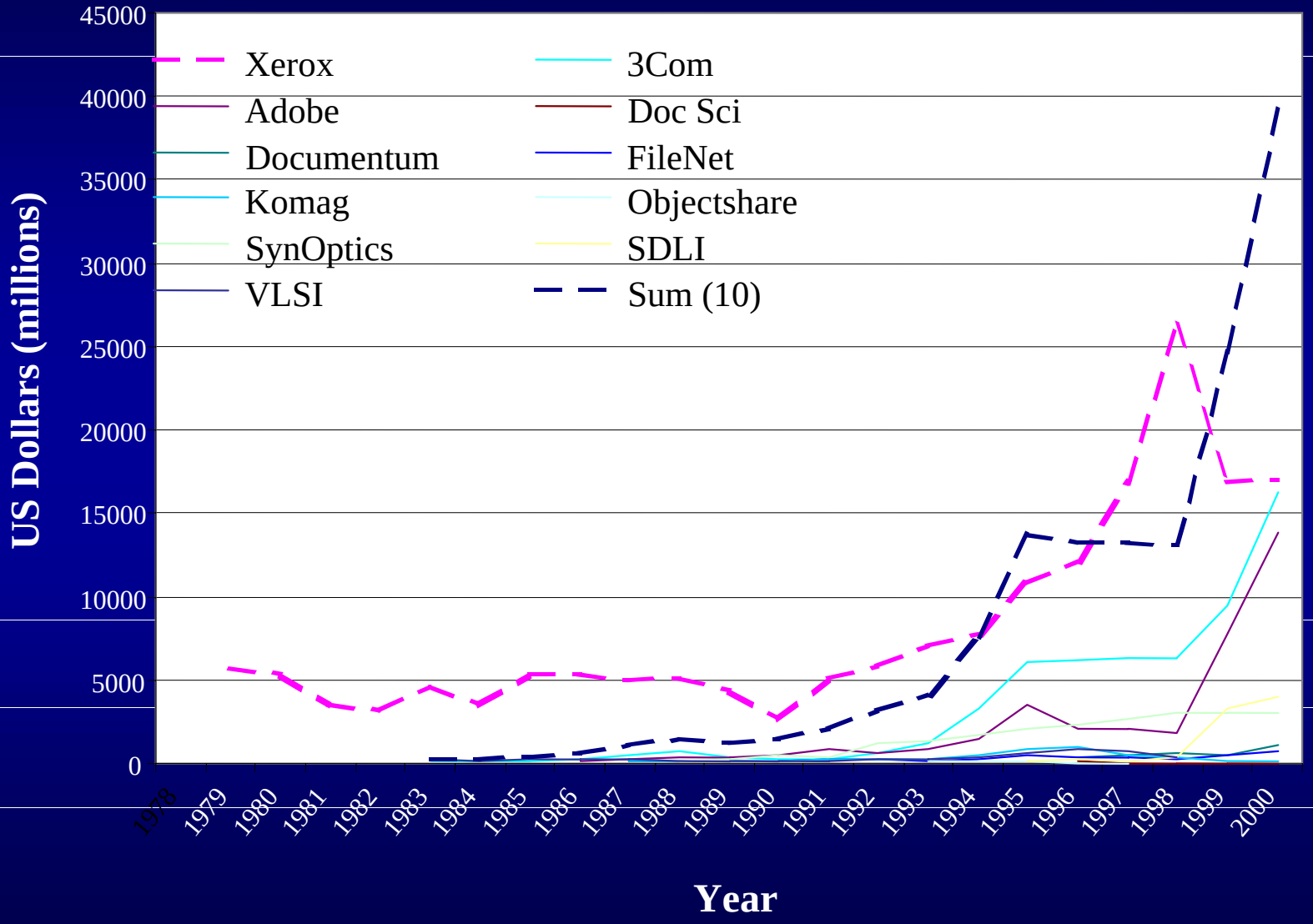
Shifts in the Research Environment

- Increasingly mobile trained workers
- More capable Universities
- Knowledge distributed more widely
- Diminished US hegemony in many leading technology fields
- Erosion of oligopoly market positions
- Deregulation
- Enormous increase in Venture Capital

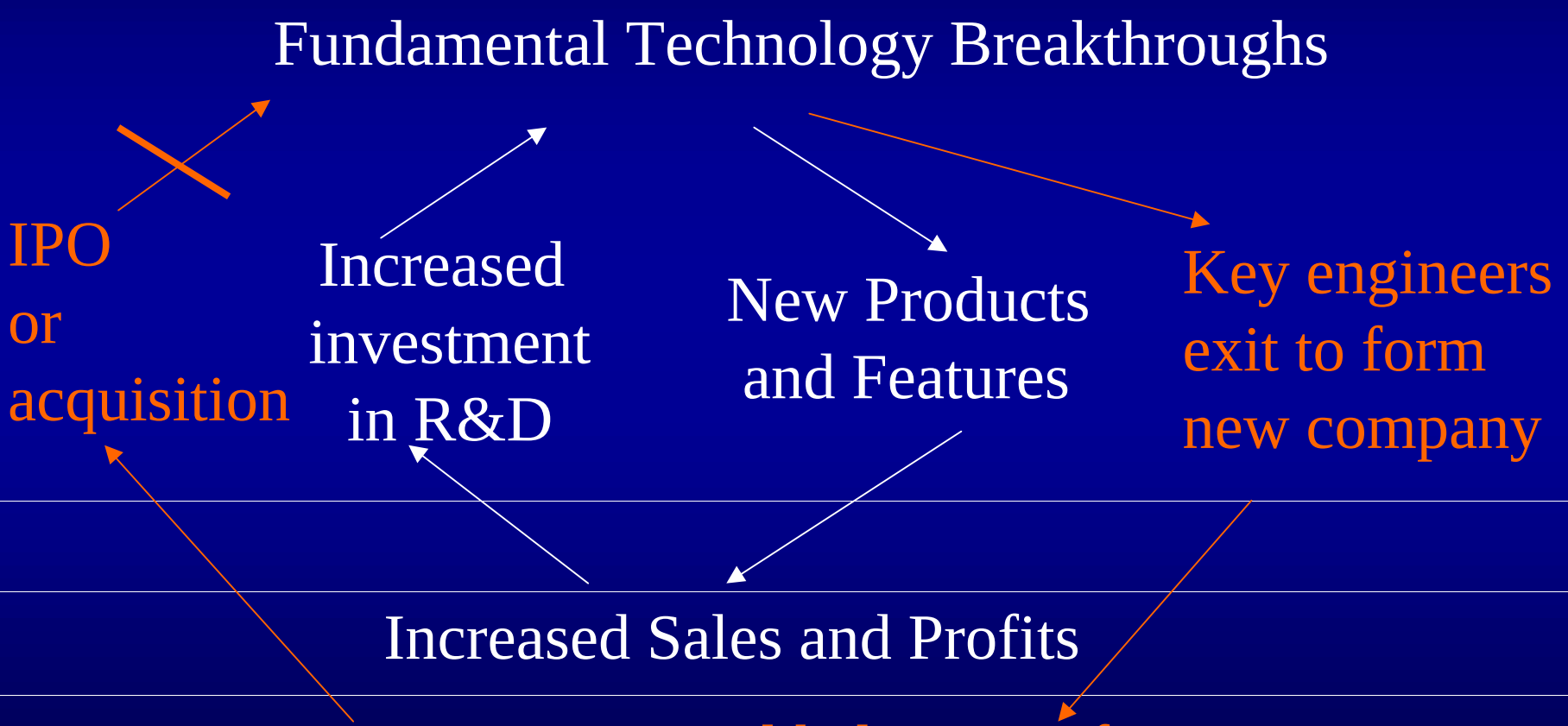
Xerox's Innovation System



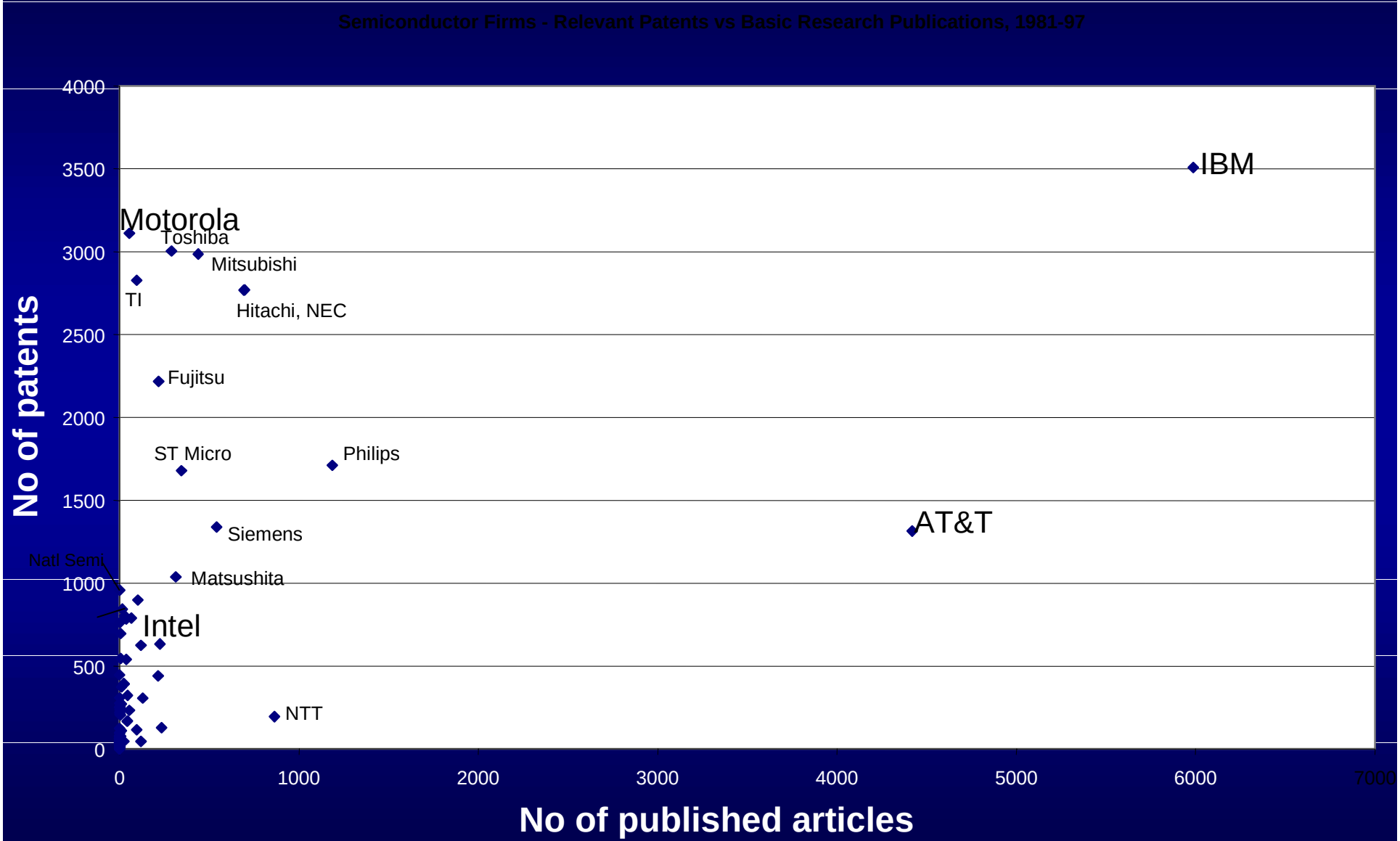
Graceful Exits and Foregone Opportunities



The Virtuous Circle Broken



The Payoff to Research - Semiconductors



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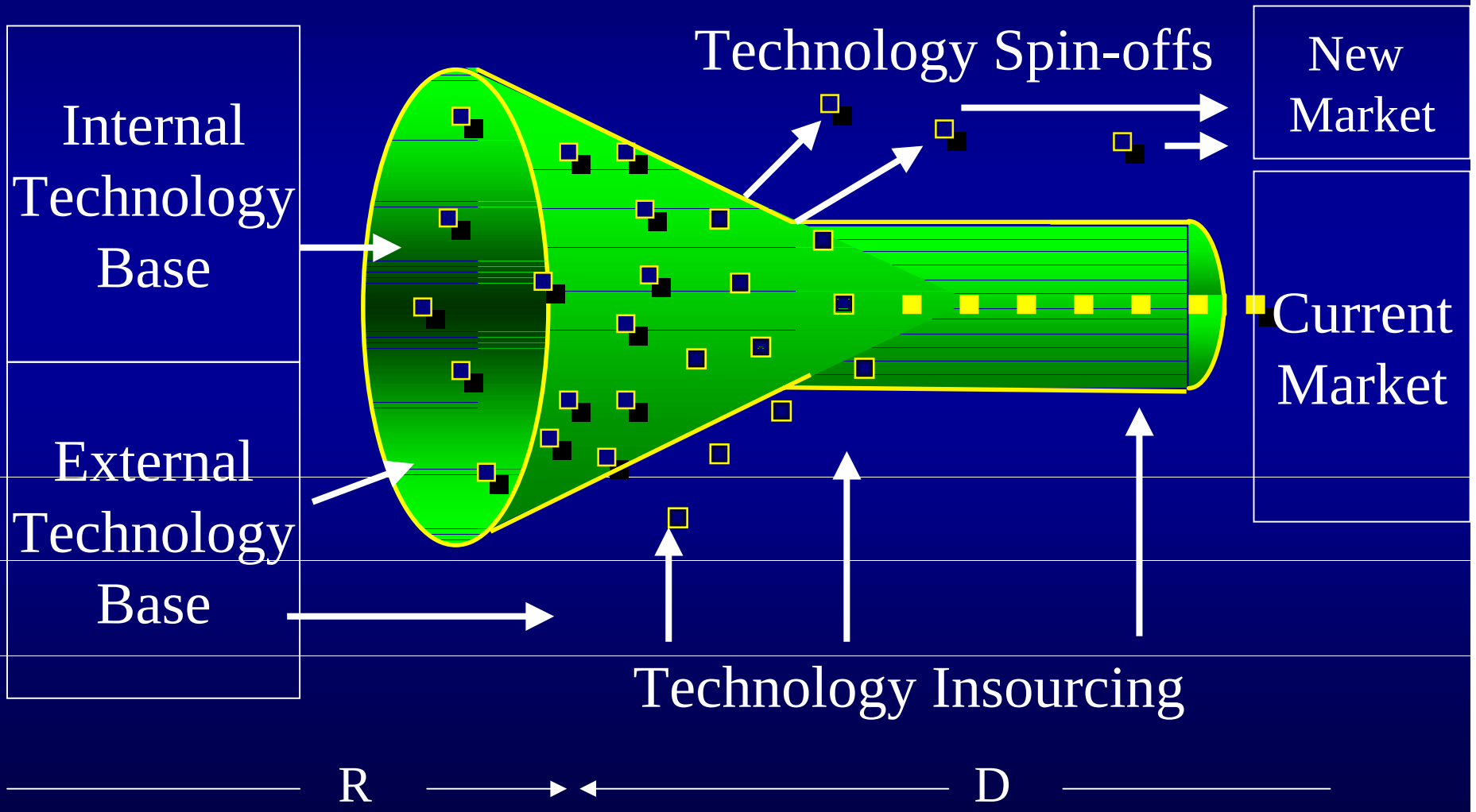
The Open Innovation Paradigm



Implications for Firms

- Can internal R&D continue to be justified, in a world of dispersed ideas, abundant capital, and a mobile workforce?
- If startups are generating numerous experiments, how can firms learn from their experiences?
  - Are startups parasitic, or mutualistic?
  - Should good research practice admit careful monitoring of startups' activities?
  - Should companies *promote* startup activity?

IBM's Innovation System

- Research internally *generated*, but externally *applied*
  - – Global Services supports multiple vendors
  - – Unbundling components of systems for sale to competitors
- Careful patenting and vigorous enforcement
  - – Leading US patent recipient for each of last 6 years
  - – Collected over $1.7 billion in patent royalties in 2000
    - – compared with ~$600 million in basic research

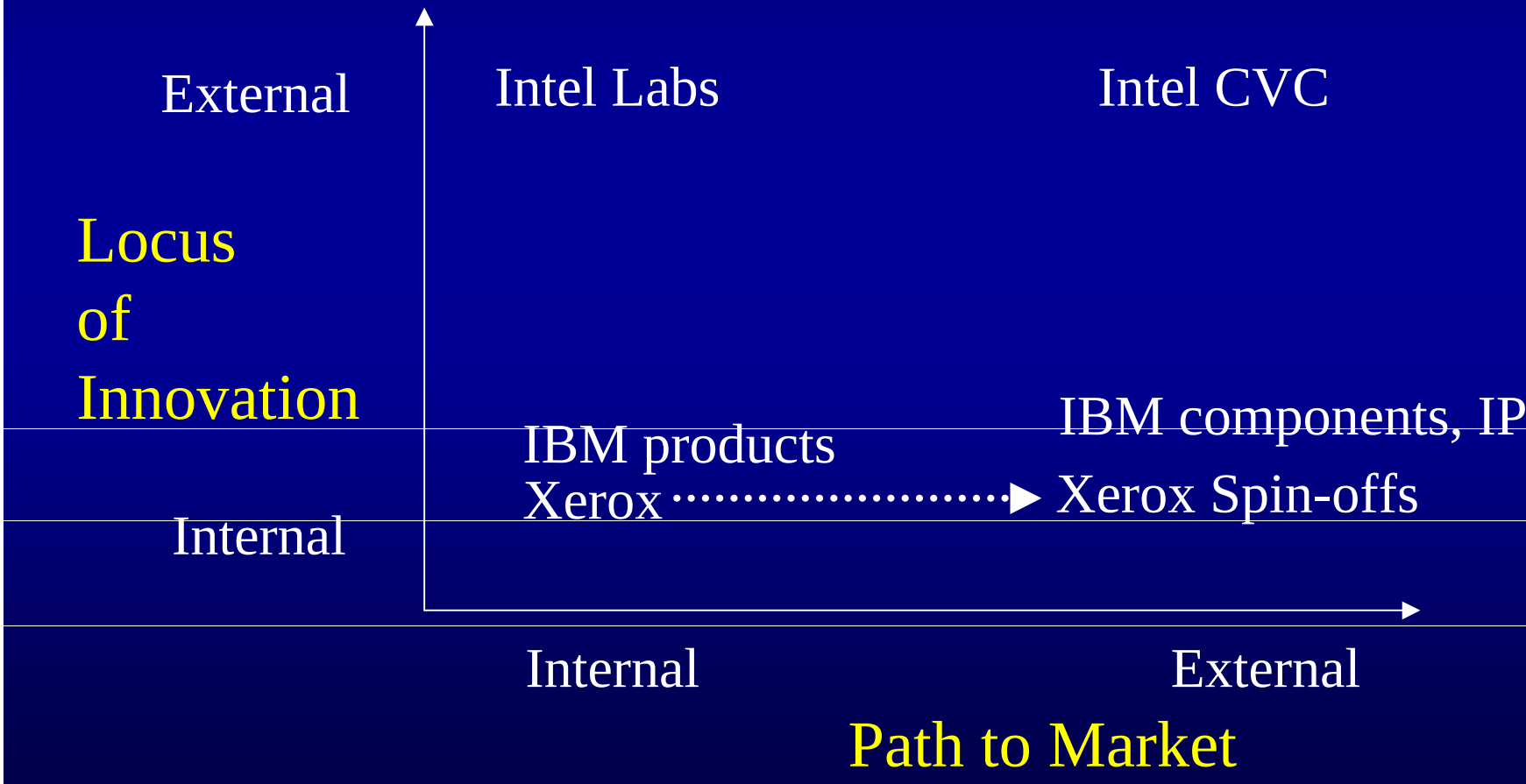
Intel's Innovation System

- Little investment in basic research
  - in an industry driven by Moore's law
  - internal labs focused on taking research into mfg.
- Aggressive program to sponsor academic research
  - monitor external research developments
  - stimulate research in areas of interest
  - manage the institution, as well as the researcher
  - create an Intellectual Commons
    - "we don't have to own it to profit from it"
- ~~Intel had 600 internal researchers in 1996~~
- Intel spent over $100 M in external research in 1996

Intel's Innovation System - part II

- Intel pioneered the use of corporate venture capital to stimulate the growth of markets for its products
  - spent <$50M in 1994, spent $1.3B in 2000
- Intel has achieved good returns from its investments (until this year)
- Intel's corporate investments also stimulate the search for new markets and new technologies
  - communications market a prime example
- Intel Labs and Intel Capital report to same person!

Locus of Research/Paths to Market



The Logic of “Open Innovation”

- We should not restrict research to internal pathways to market.
- We must manage IP in order to manage research:
  - need to access external IP
  - need to profit from our own IP
- Our researchers must expand their role: knowledge brokers, as well as knowledge generators.
- We don’t have to own the research to profit from it.
- Not all of the smart people in the world work for us.
- We must have enough smart people to recognize excellent research. Therefore we must do some internal research.
- We must compete and collaborate to advance our technology. Research can help define how we collaborate.

Implications for Science & Technology Policy

- Open Innovation will generate lots of recombination, due to wide diffusion of knowledge.
- Where will the "seed corn" for fundamental breakthroughs come from in future?
- What institutions are needed?
  - Labor markets: training, education, univ. research
  - Capital markets: startup formation, discipline
  - IP: access to public, limited protection of private
- To what extent should policy promote diffusion, vs. protect invention activity in this new environment?