Challenges and opportunities in managing open innovation

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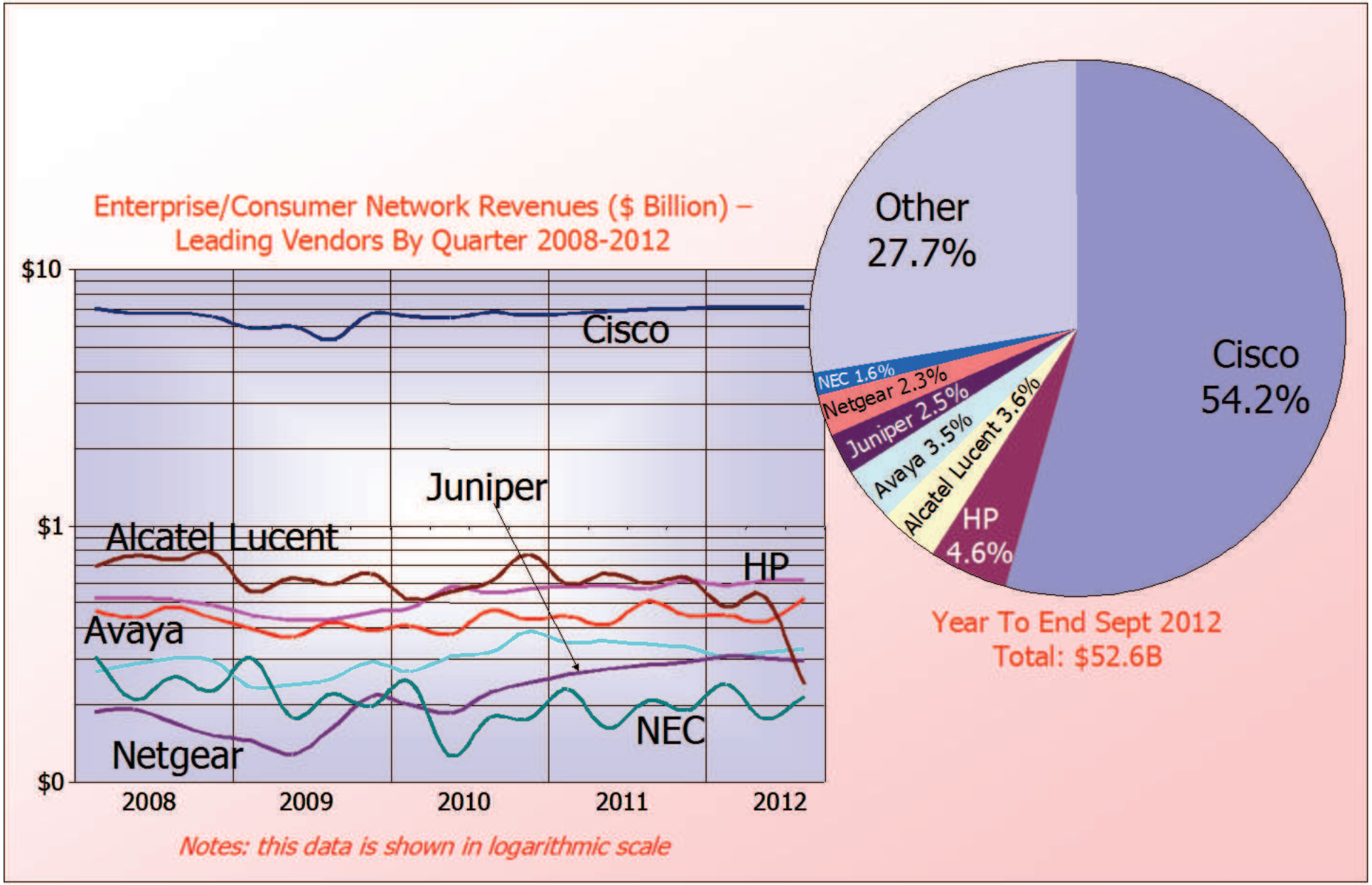
Crash Course on Research Funding, Intellectual Property and Start Up Creation

University of Trento

just to break the ice

- Internet router / switch business
- name the market leaders

Figure 2 – Enterprise/Consumer Network Market Share ($US Billion) – Year To End Of September 2012 And Leading Vendor Development By Quarter –2008-2012



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how did Cisco become the leader?

- “large R&D expenditure…”
- “…premier industrial research organization…”
- “devoted enormous resources to exploring the world of new materials and state-of-the-art components and systems, seeking fundamental discoveries that could fuel future generations of products and services”
- [all quotes referred to …]

Alcatel·Lucent

Bell Labs

Bell Laboratories

Bell Labs: A Hive of Invention

A selection of its most important innovations in the decades leading up to the breakup of its parent company, AT&T, in 1984, and how they helped lead to some of the latest technologies.

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The Murray Hill, N.J., buildings opened in 1941.

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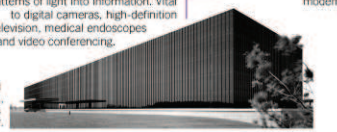

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BILL MARSH/THE NEW YORK TIMES

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AT&T
Bell Laboratories

how Cisco was different?

- external acquisition of technologies
- partnering with subcontractors
- investing in promising startups
- (some of them even founded by ex-Lucent veterans)

the death of internal R&D?

- once a strategic asset
- a formidable barrier to entry
- only for large multinational corporations…
- …reaping most of the industry profits…

the age of the underdogs / upstarts?

- once: huge direct R&D new investments
- today: not so much, different ways to bring new ideas to market

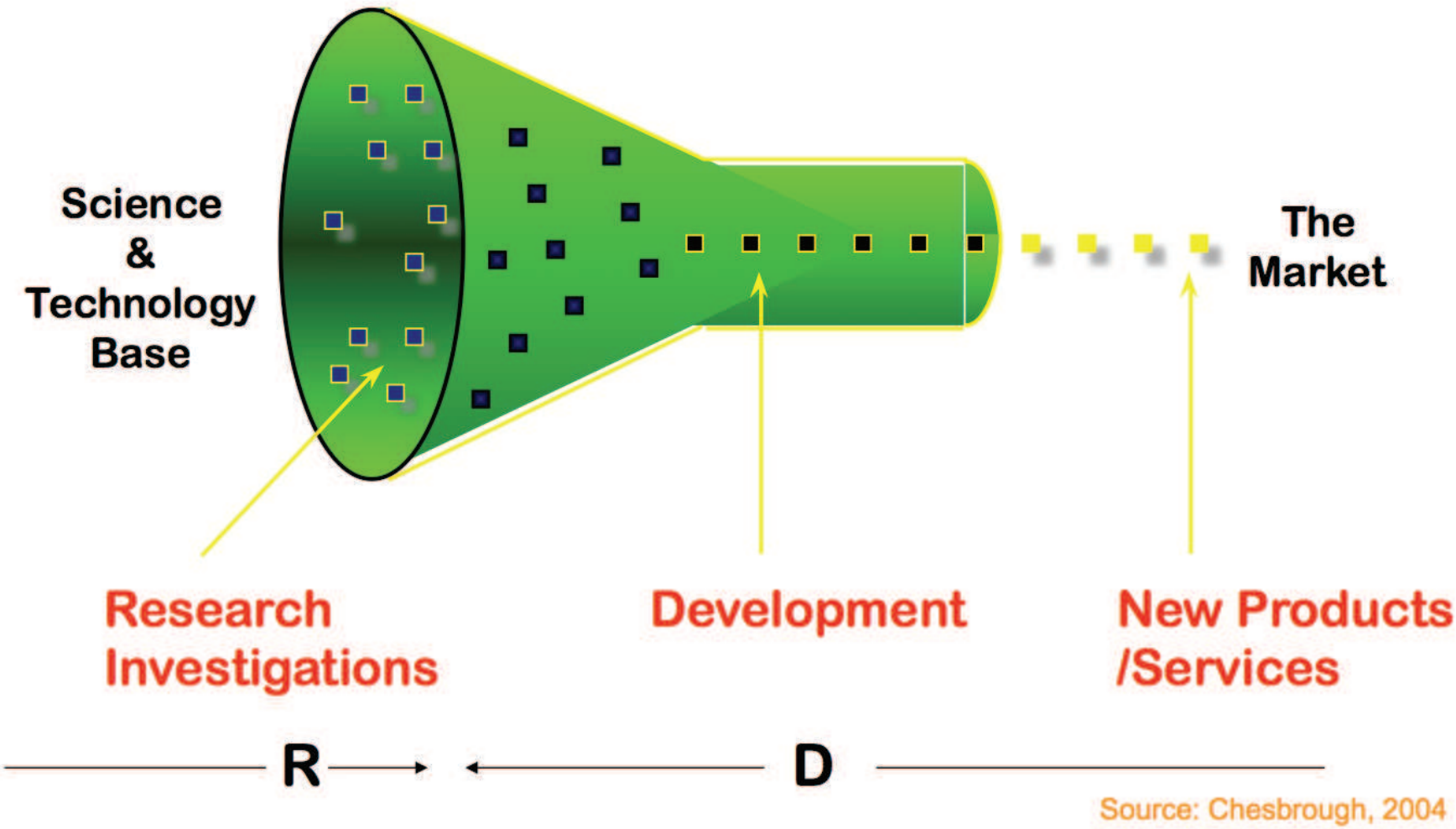
how come?

- from closed to open

closed innovation model

- successful innovation requires control
- self-reliance: “If you want something done right, you’ve got to do it yourself”
- companies must generate their own ideas that they would then develop, manufacture, market, distribute and service themselves

closed innovation model



the closed innovation cycle

- invest in (internal) R&D
- more heavily than competitors
- hire the best and the brightest
- discover the best and greatest number of ideas
- get them to the market first
- protect them by aggressively controlling IP
- reinvest profits in new R&D…
- (…or die trying!)

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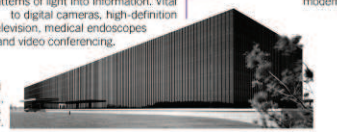

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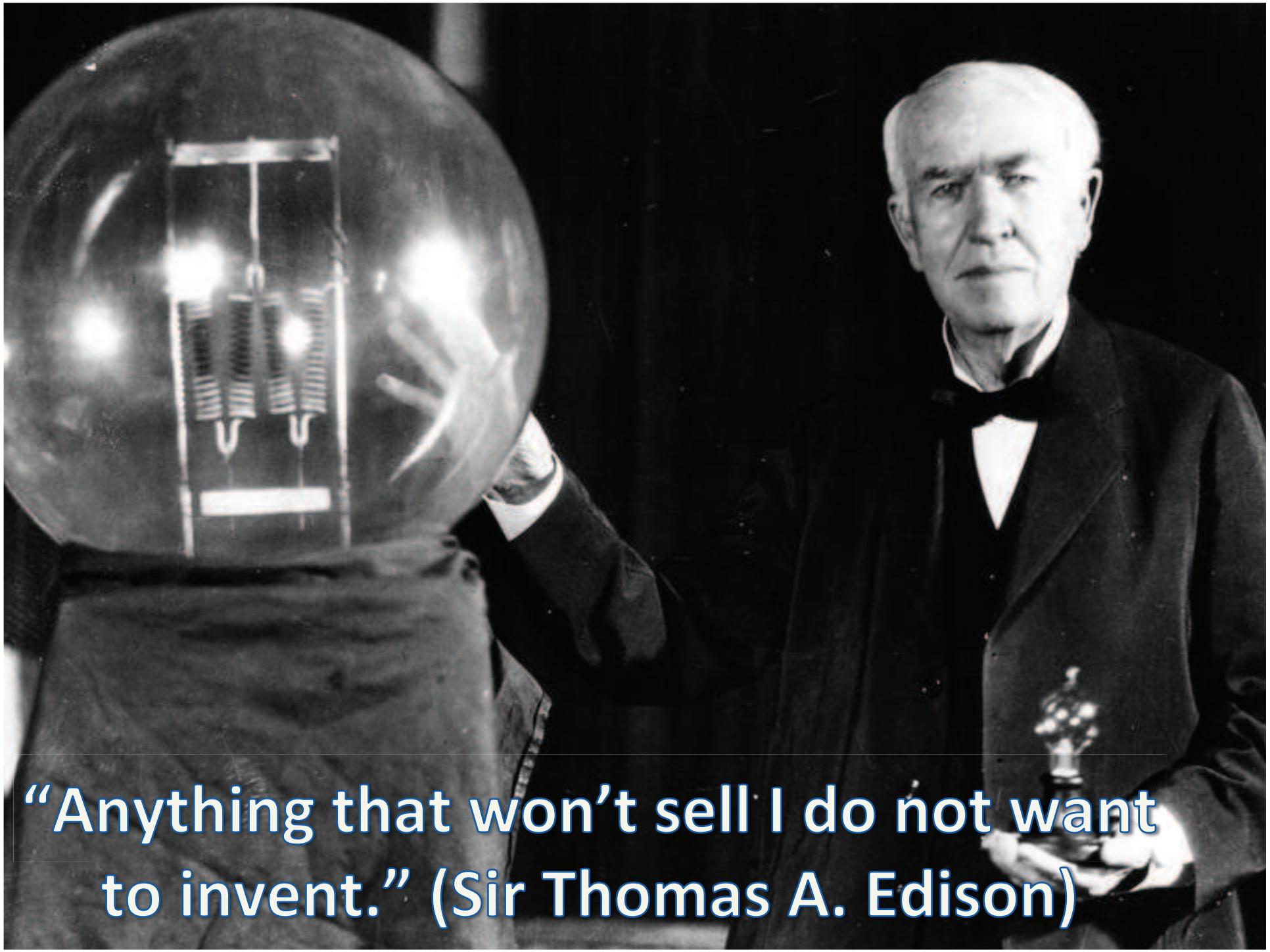

“Anything that won’t sell I do not want to invent.” (Sir Thomas A. Edison)

A suit made for moon walking

Saluting an American flag planted in the lunar terrain, Astronaut James Irwin is protected from the hostile environment by a 21-layer moonsuit made almost entirely of materials developed by Du Pont.

*REG. U.S. PAT. & TM. OFF.

more closed innovation “mantra”

- if I discover it, I will find a market for it
- if I discover it first, I will own it
- the important technologies I will need can be planned in advanced
- the best people in the world work for me

the mantra dispelled, or the ill fate of some internal R&D

- more and more
  - > solutions in search of a problem! (Segway)
- inventing is one job
  - commercializing is a completely different one (Xerox Parc)
- time to market is key
  - external sourcing the only practical way
- the not invented here syndrome
  - opportunities of
    - expertise / knowledge

    from a wide range of external sources

the dawn of the closed model

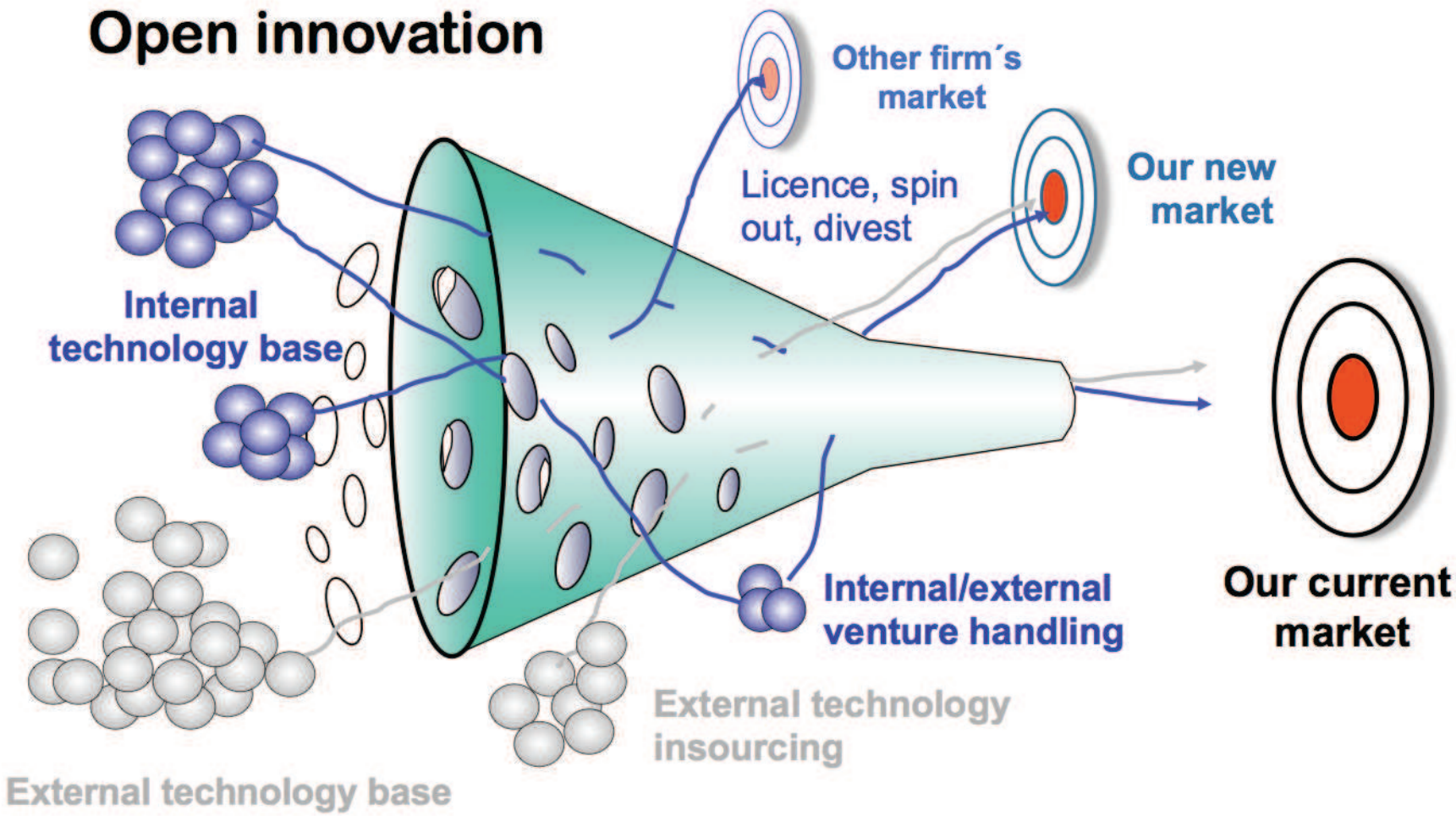
- declining traditional advantages of internal R&D
  - mobility of workers
  - cognitive division of labor
  - focus of science in academia
  - increase in venture capital
  - focus on IPR management

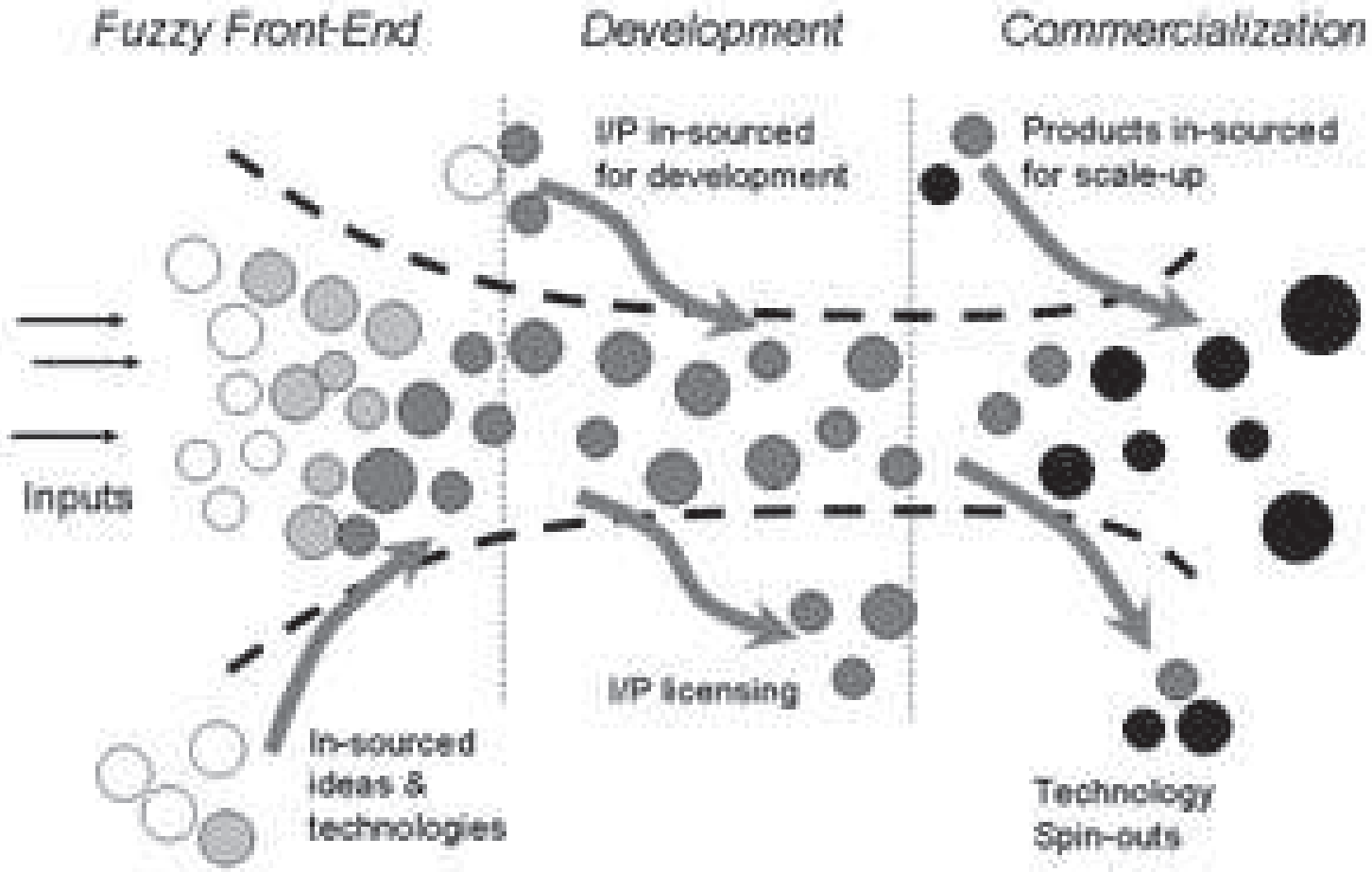
enter open innovation

- distributed nature of knowledge
- Joy's Law:
  "No matter who you are, most of the smartest people work for someone else"
- Chesbrough (2006)
  "The use of purposive inflows and ouflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively"

open innovation “credo”

- we must find and tap knowledge from smart people outside us
- internal R&D is instrumental to external R&D
- we don’t have to originate the research to make profit from it
- the business model counts more than being the first mover
- who makes the best use of internal and external ideas, will win
- we make profits by others’ use of our IP

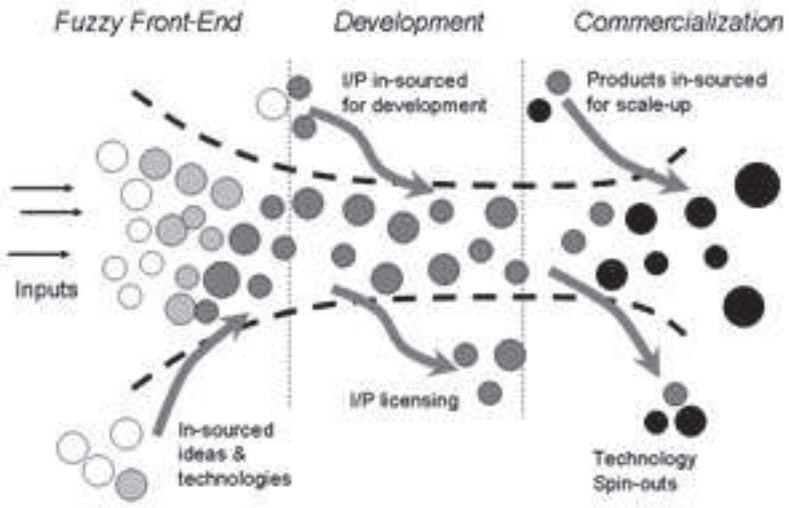

Open innovation
Other firm´s market
Licence, spin out, divest
Our new market
Internal technology base
Internal/external venture handling
Our current market
External technology insourcing
External technology base



Source: M. Docherty, Venture2 Inc. (with concepts adapted from the book by Henry Chesborough, Open Innovation: The New Imperative for Creating and Profiting from Technology, Harvard Business School Press, 2003)

OI: the funnel is no more!

- open innovators:
  - commercialize both their own and external ideas
  - seek ways to bring ideas to market, by deploying pathways outside its current business
  - activate loosely-coupled networks of different actors, collectively and individually working toward commercializing new knowledge
- firms too focused internally are prone to miss a number of opportunities:
  - many will fall outside the organization's current business
  - they will need to be combined with external technologies to unlock their potential



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quirky

yes, but what is Quirky exactly?

- focused on invention
- a social network
- a online retailer
- industrial designer
- manufacturer

→ hybrid organizations with a complex business model

bye bye funnel

- so long to the waterfall development model
- the rise of specialists:
  - markets for crowdsourcing ideas:
    - Quirky
    - InnoCentive
  - fabless model: selling the design
    - semiconductors
- the rise of flexible OI arrangments

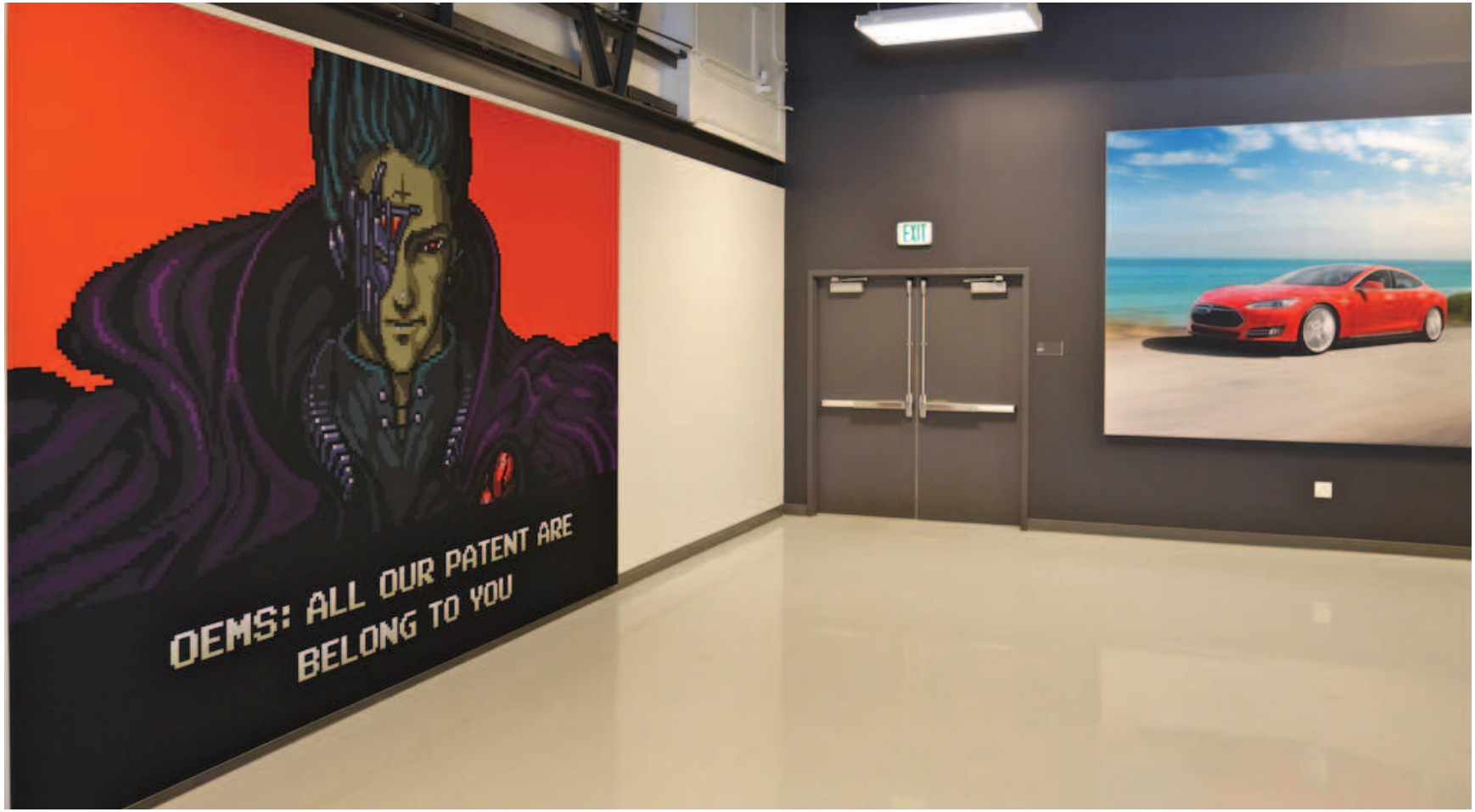
appropriability

- extent to which a firm is able to capture the rents from its innovation
- determined by how easily or quickly competitors can copy the innovation
- some innovations are inherently difficult to copy
  - tacit knowledge
  - complexity
- firms may also attempt to protect innovations

how to protect an innovation?

- patents
- trademarks
- copyrights
- trade secrets

yeah right, whatever, but explain this!



effectiveness of protection

- in some industries, legal protection mechanisms are more effective

⇨ e.g., in pharmaceutical patents are powerful

- difficult to protect manufacturing processes and techniques
- in some situations, diffusing a technology may be more valuable than protecting it -> e.g., TESLA
- once control is relinquished it is difficult to reclaim

protect/control vs. diffusion trade off

- whether and how to protect their technological innovations
- protecting innovation helps a firm to
  - retain control over it
  - appropriate the rents from it
- not protecting a technology is to the firm's advantage:
  - it may encourage others to support the technology
  - increase its likelihood of becoming dominant

OI new business models

- business model: abstract, simplified representation of how a firm create and capture value
- from simple to complex models
- extreme example:
  - Open Source Software companies

closed source software business model

- distribution of binaries only (no source code!)
- IPR system (copyright, EULAs, etc.)
- user license (pay once)
- usage license (pay as you go)
- subscriptions (pay repeateadly)
- free to play (add-ons purchaise)
- updates, mantainance, improvements and compatibility

open source software business models

- source code released along with binaries
- copyleft and liberal license terms
- typical technical and IPR protection to appropriability are absent
- exploiting openness in value creation (code contribution by users, Linus' law)
- lessening value capture by external sources

Category	Model	Description	Example
Deployment	Support	Revenue derived from sale of customer support contracts.	JBoss
	Subscription	Revenue derived from annual service agreements bundling open source software, customer support and certified software updates delivered via Internet.	Red Hat Enterprise Linux
	Professional Services/ Consulting	Revenue derived from professional services, training, consulting, or customization of open source software.	IBM
Hybridization	Proprietary Extensions	Firms broadly proliferate open source application and monetize through sale of proprietary versions or product line extensions. Variants include mixed open source/proprietary technologies or services with free trial or "community" versions.	SugarCRM
	Dual License	Vendor licenses software under different licenses (free "Public" or "Community" license vs. paid "Commercial" license) based on customer intent to redistribute.	MySQL
Complements	Device	Vendor sells and supports hardware device or appliance incorporating open source software.	Mazu Networks

OI current trends

- division of labor in the innovation process
- so long to the waterfall model
- user innovation
- crowdsourcing
- crowdfinancing
- […]

references

- Chesbrough, H.W. “The era of open innovation”(2003) *MIT Sloan Management Review* http://sloanreview.mit.edu/article/the-era-of-open-innovation/
- Chesbrough, H.W. & Appleyard M.M “Open Innovation & Strategy”(2007) *California Management Review*, Vol. 50, No. 1, 57-76.