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

Enterprise/Consumer Network Revenues ($ Billion) –
Leading Vendors By Quarter 2008-2012

Notes: this data is shown in logarithmic scale

Source and Copyright: ITCandor, 2012
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 ...]
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

Source: Chesbrough, 2004
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!)
“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.
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 outflows 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
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

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 arrangements
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 purchase)
• updates, maintainance, 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
<table>
<thead>
<tr>
<th>Category</th>
<th>Model</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment</td>
<td>Support</td>
<td>Revenue derived from sale of customer support contracts.</td>
<td>JBoss</td>
</tr>
<tr>
<td></td>
<td>Subscription</td>
<td>Revenue derived from annual service agreements bundling open source software, customer support and certified software updates delivered via Internet.</td>
<td>Red Hat Enterprise Linux</td>
</tr>
<tr>
<td></td>
<td>Professional Services/Consulting</td>
<td>Revenue derived from professional services, training, consulting, or customization of open source software.</td>
<td>IBM</td>
</tr>
<tr>
<td>Hybridization</td>
<td>Proprietary Extensions</td>
<td>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.</td>
<td>SugarCRM</td>
</tr>
<tr>
<td></td>
<td>Dual License</td>
<td>Vendor licenses software under different licenses (free “Public” or “Community” license vs. paid “Commercial” license) based on customer intent to redistribute.</td>
<td>MySQL</td>
</tr>
<tr>
<td>Complements</td>
<td>Device</td>
<td>Vendor sells and supports hardware device or appliance incorporating open source software.</td>
<td>Mazu Networks</td>
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</table>
OI current trends

• division of labor in the innovation process
• so long to the waterfall model
• user innovation
• crowdsourcing
• crowdfunding
• [...]
references

  