Introduction To Technology Commercialization

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Objectives of Tech Commercialization

- **Financial Support**
  - Diversify income sources
  - Increase incomes
  - Prepare rainy days
  - Develop self-sustainable institution

- **Regional Economic Growth**
  - Contribute to develop local economy
  - Create a local startup culture
  - Improve national competitiveness

- **World-Class R&D Institute Innovator**
  - Retain top scientists and engineers
  - Attract new talented technical staff
  - Invent innovative, high-impact technologies
  - Demonstrate big success in commercialization
  - Establish centers of excellence
  - Develop world-class reputation

- **World Impact**
  - Nurture culture of commercialization
  - Increase income sources
  - Achieve financial independence
  - Attract more R&D funds
  - Become a world-class R&D institute

- **Individual Rewards**
  - Contribute to develop local economy
  - Create a local startup culture
  - Improve national competitiveness

Source: SRI
Classical Role of TCO

- Invention is pure research with no market potential
- Market is too small
- Lack of interest and resource for application development
- Existing patents
- Researchers have unrealistic expectations

- Don’t know/understand state-of-art emerging technologies
- Technology is not matured for commercialization yet
- Single IP is not good enough for business development

Source: SRI International
Modern Tendencies

Must bridge the entire R&D spectrum

- Translation science & engineering research
- Business opportunity idea generation
- Technology maturation fund

- IP management and bundling
- Start-up acceleration fund and service
- Business incubation fund and service

Source: SRI
Key Success Factors

Aligning technologies with customer needs through product/service

- University R&D
- Value creation center
- New companies and licenses

- Fundamental Science
- Basic Research
- Applied Research
- Product Development
- Production

- Create innovative culture
- Recruit diversified talent
- Provide education and practical training
- Develop innovation principles & process
- Incentivize start-up and biz incubation
- Develop mentor program

Source: SRI
Commercialization Process

- **IP Management**
- **Technology/IP for Commercialization**
- **Commercialization Committee**
- **Commercialization Strategy**
- **Spin Off**
- **Spin Off Decision**
- **Spin Off Startup**
- **Incubation Support**
- **Technology Transfer (Licensing)**
- **Licensing Committee**
- **Passive Licensing**
- **Active Licensing**

- **Active Licensing Committee**
- **Passive Licensing Committee**
Technology Transfer

• Assess Commercial Potential
  – Patent Research
  – Market & Opportunity Research

• Business Development
  – Protect (patent)
  – Funding
  – Business Plan
  – Marketing

• Establish Strategy
  – Licensing
  – Incubation/Acceleration
  – Spin Off
Technology Commercialization Assessment

- Intellectual Property
- Technology
- Market
- Team
IP

• Why patent
  – Competitive advantage – 20 year monopoly with the right to exclude everyone else

• Invention is protectable
  – Novelty (not published)
  – Non-obvious

• Patent costs and timeline
  – Provisional (1 year, 2-4K)
  – PCT (18 months, 10-12K)
  – Office actions, issuance (50+K)
Technology

• Will it work?
• Scientific basis understood
• Scientific data is thorough
• Technology is well developed
• Team has product development capabilities
Market

- Need is well defined
- Product addresses the need
- Market is large and growing
- Competition and barriers are low
- Time to market is short
- Profit margin of product is high
Team

• Team has product development capabilities
• Team has time and is willing to support
• Team has realistic expectations
• Team has commercialization experience
Commercialization Options

• Understand strengths & weaknesses and plan accordingly
• Spin-Off’s versus Licensing
• Is Technology mature enough? Requires Incubation?
Licensing

• Sell technology to an established company
• Royalty (1-5% of sales)
• Repayment of patent costs
• If license is exclusive then minimum royalties typically apply as well as development milestones
Licensing

Royalty Licensing Opportunity

Worth Active Marketing? [No -> Passive Licensing, Yes -> Marketing Plan & Strategy]

From Spin-off Technology Venture Model

Active Licensing
Spin Off

• New Company (Startup) Created to License researchers technology and build a company around it
• Typically key researcher will be acting head of R&D
• Typically requires small but strong development teams
Spin Off

Spin-off Venture Opportunity

Need Internal Incubation?

Yes

Internal Virtual Spin-off

Not Ready

Active Licensing

Other Options

No

Ready to Spin-off?

Yes

Spin-off New Company

Exit Strategy?

Initial Public Offering

M&A

Sell Spin-off Company

Fail

Demolish team and send staff back to R&D

No

Other Options

Create a New R&D Lab

Develop Eng. & Consulting Services

No

Other Options

Create a New R&D Lab

Develop Eng. & Consulting Services
Licensing Considerations

• Good Licensee fit
  – Can Leverage development, sales and marketing capabilities of an established company
• Add-on technology
• Willing to pass control of your technology
Spin-Off Considerations

• Lack of suitable licensee
• Belief that you can advance the technology better than another company
• Potential to be a multi-million dollar public company
• Committed team with long term perspective
• Funding and management can be attracted
Formation of Startup team

• Manage small portfolio of opportunities into start-ups
  – Commercial business development plan and strategy
  – Coordination of R&D, venture planning, market research, and commercial development
  – Valuation of emerging technologies and business potential

• For each selected opportunity
  – Development of business plan
  – Launching new venture
  – Venture incubation: hiring new staff, venture financing
  – Management of venture business
  – Establishment of networks of technical, legal, accounting, consulting, and venture finance experts
Internal Incubation Consideration

• Technology is not mature yet for commercialization
  – Need to demonstrate commercial feasibility or viability
• Unclear target market or application/product
• Difficult to find potential investors for a spin-off venture
• Need to protect potential new business from IP disputes
  – File patents to protect your right to use for commercialization
• Have to provide continuous (on-site) support from its lab such as materials, equipment, and technical support
Common problems

• Overestimating the technology
• Patents rejected
• Researchers don’t invest time that is required
• Researchers lose interest over time
• Poor understanding of the customer
• Disconnect between business and the science
• Long time to market
Business needs to understand

- IP requires time and investment before ready to market
- Researchers want freedom of research and control over their IP
- Researchers need to publish results
Researchers need to understand

• Focus on a customer and market related issues is essential

• Significant funds need to be raised and invested to develop products and to market them

• Companies need to operate at an accelerated time scale compared to academia
The R&D Value Chain: From Lab to Market

- University
- Basic Research
- Lab Scale Proof of Concept
- Commercial Prototypes
- Beta testing
- Manufacture
- Go to market

University focus is here

Our goal is to focus here as well

University

Startup Company

Mature Company
Success Factors

• Focus/Concentrate resources (capital, R&D, commercialization) on a few selected areas
• Identify innovation connected to market needs
• Criteria should include — commercializable, capable, and competitive
• Develop technical and business mentors
• Pursue an aggressive IP strategy
  – Strategic patents
  – Patent ownership
UCLA – facts & numbers in 2014

406 New Inventions Disclosed

82 New Inventions Licensed to Companies

95 US Patents Issued

17 Startups Formed

$23.7M Licensing Revenue, UCLA Share

231 Industry Sponsored Research Awards

$39.3M Industry Sponsored Research Dollars

852 Total Active US Patents in Portfolio

2,083 Inventions Active Portfolio
NUMBER OF COMPANIES STARTED

Fiscal Year

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Companies

26 23 17 20 20 23 24 20 21 19
Notable Companies Started by MIT students

• **Akamai**
• **Appjet/EtherPad**: Hosted app service/collaborative editor, acquired by Google (Aaron B Iba, David Greenspan and J.D. Zamfirescu-Pereira)
• **Aspiring Minds**: (Varun Aggarwal)
• **AutoMob**: Mobile informatics (Amit Goyal)
• **DocVerse**: Cloud storage and collaboration add-on for Office (Alex DeNeui and Shan Sinha)
• **Dropbox**: Online backup service (Drew Houston and Arash Ferdowsi)
• **DuckDuckGo**: A new search engine (Gabriel Weinberg)
• **E La Carte**: Tablets on restaurant tables for ordering, paying, and playing games
• **Howcast Media**: (Sanjay Raman)
• **imo.im**: Messaging (Ralph Harik)
• **Justin.tv**: Live video streaming (Kyle Vogt)
• **Ksplice**: Updates to computer systems without rebooting (Jeff Arnold, Waseem Daher, Tim Abbott, Anders Kaseorg)
• **Meraki**: Ad-hoc wireless networking (Sanjit Biswas and John Bicket)
• **MessageParty**: Y Combinator Summer 2010 company; mobile LBS/messaging; based in NYC (Amanda Peyton and Jason Gavris)
• Pubget: Research paper search engine (Ramy Arnaout, Mike Anderson)
• Qwobl: Semantic Search and Advertising (Jawad Laraqui, Joe Presbrey, Christian Rodriguez)
• **PrivateCore**: Private computing (Steve Weis)
• **Redbeacon**: Local search (Yaron Binur)
• **ScanScout**: Video ads (Waikit Lau, Steve Lee)
• **Sconex**: High school social network (Jawad Laraqui, Joe Presbrey) acquired by Alloy
• **SiteAdvisor**: Service that reports on the safety of web sites (Matt Gattis)
Notable Companies Started by MIT professors

- Goby: Mike Stonebraker
- StreamBase
- Tilera: Anant Agarwal
- Tokutek
- Vertica (company): Mike Stonebraker
- DataXu
- Sun Catalytix
Graph 1. Innovative performance in Georgia and in the world 2012-2013 (1-7 scope)

- Availability of scientists and engineers
- Government procurement of advanced tech products
- University-Industry collaboration in R&D
- Company spending on R&D
- Quality of scientific research institutions
- Capacities for innovation

Source: SCImago, SCOPUS, 2013