# Introduction To Technology Commercialization

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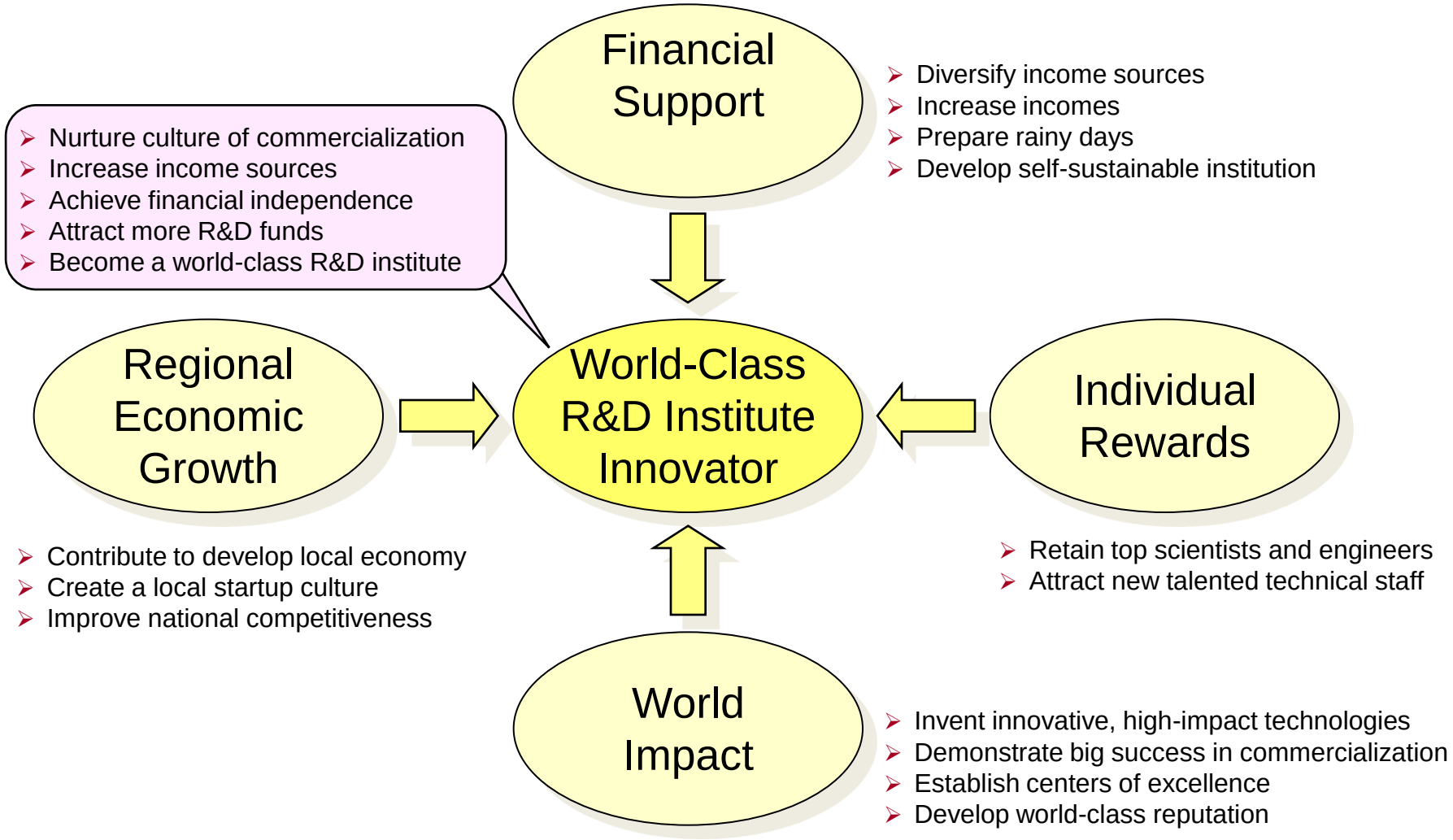
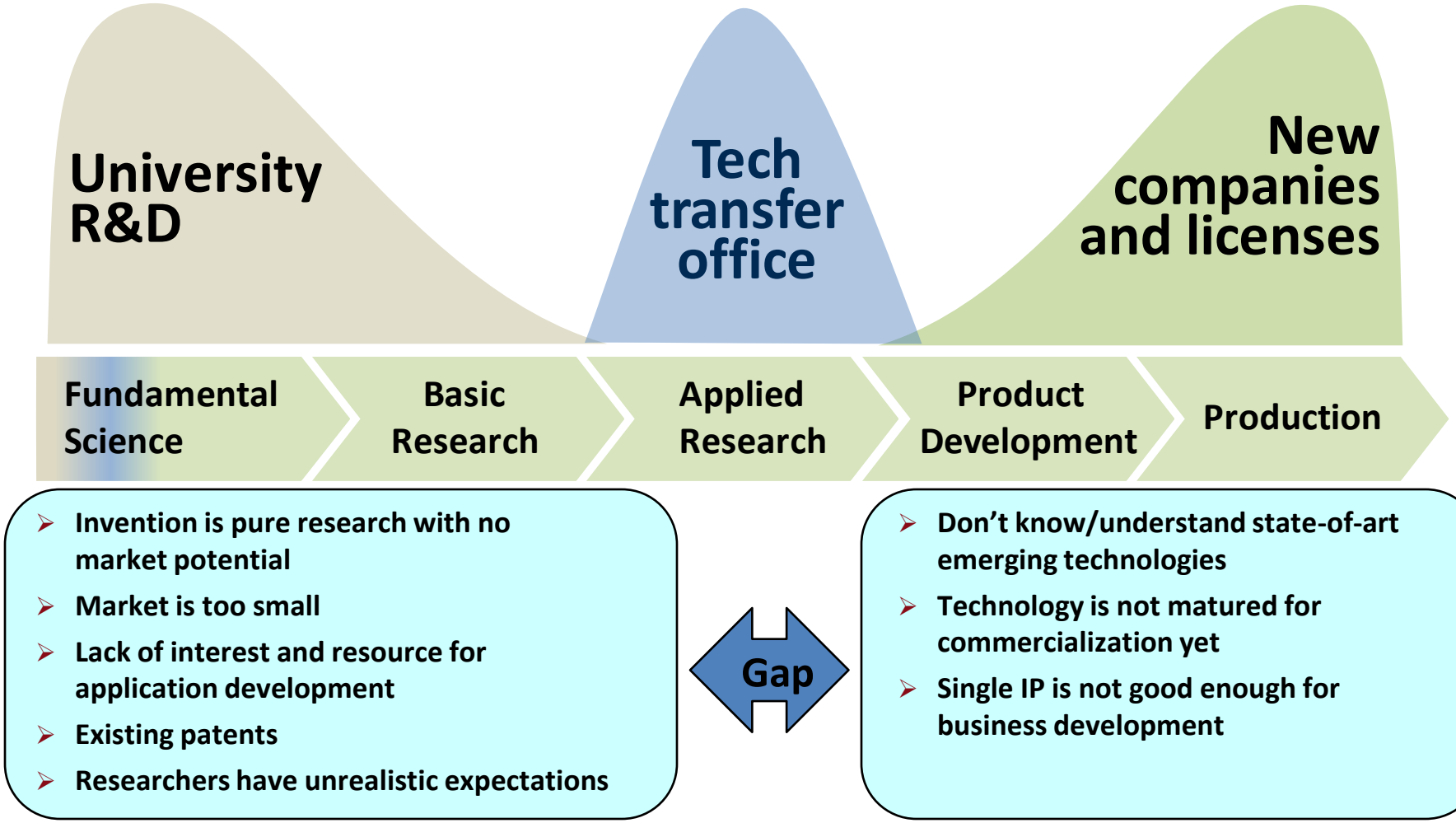
# Objectives of Tech Commercialization




Source: SRI

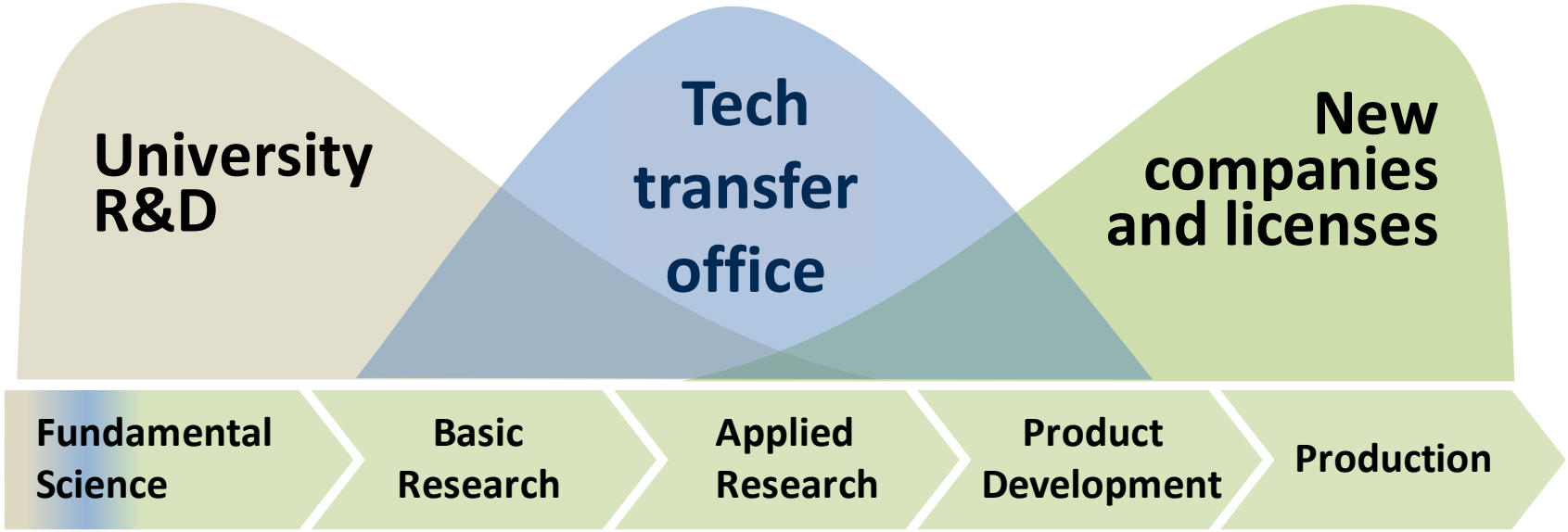
# Classical Role of TCO




Source: SRI International

# Modern Tendencies

***Must bridge the entire R&D spectrum***

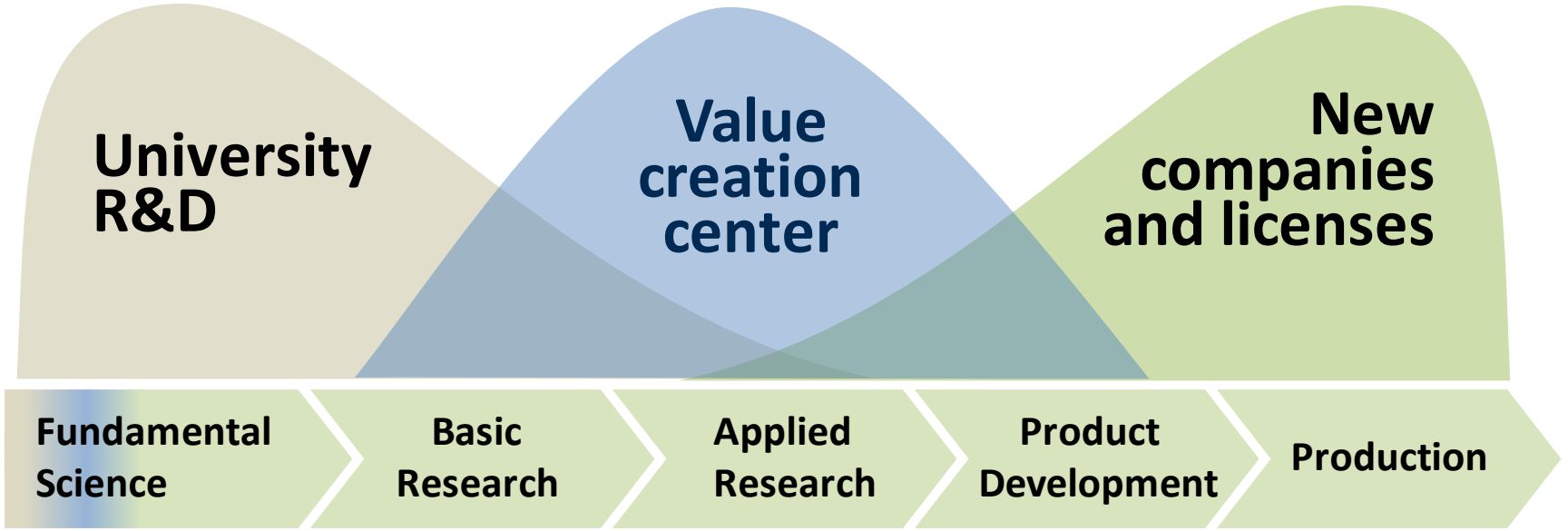



- Translation science & engineering research
- Business opportunity idea generation
- Technology maturation fund
- IP management and bundling
- Start-up acceleration fund and service
- Business incubation fund and service

Source: SRI

# Key Success Factors

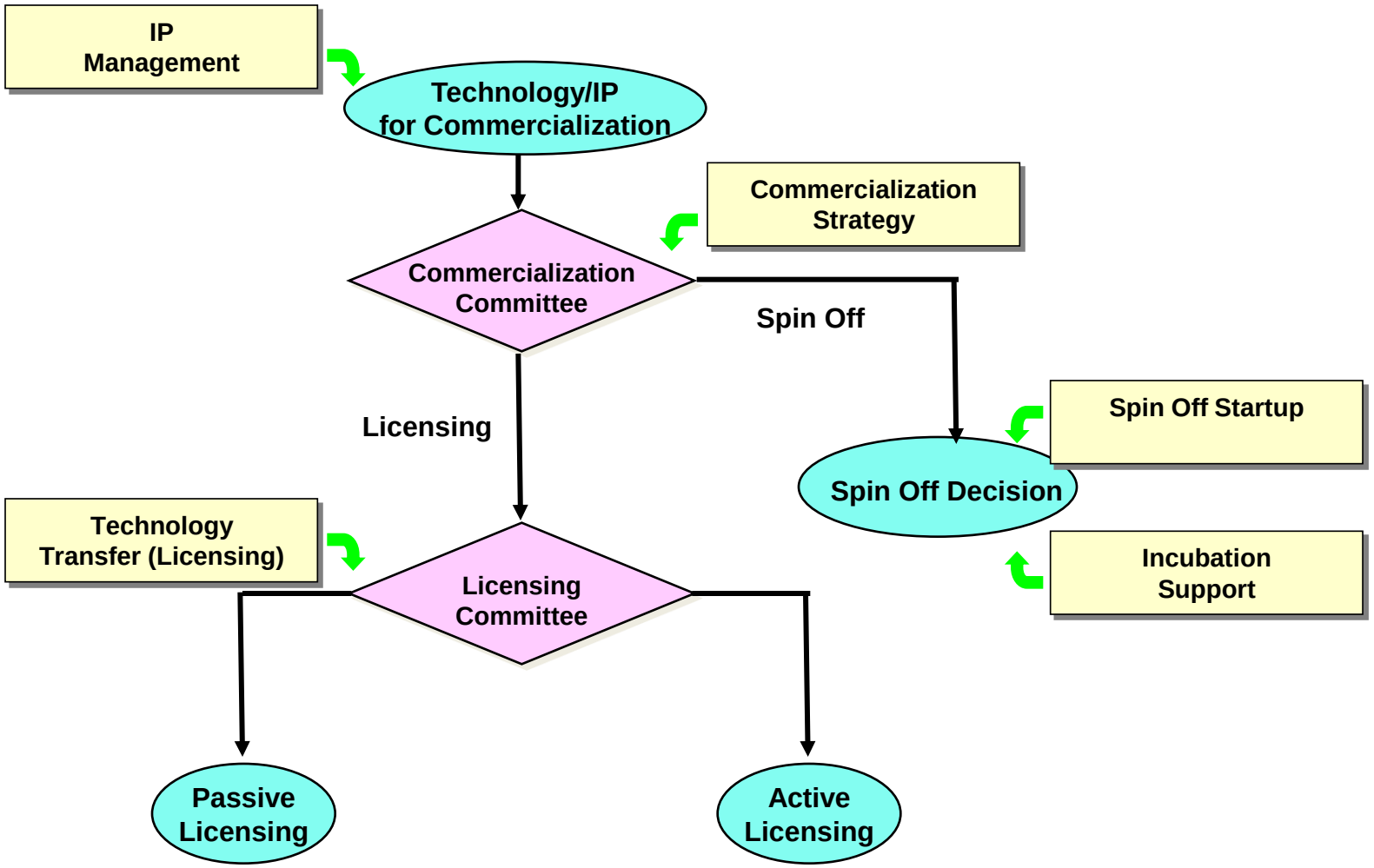
***Aligning technologies with customer needs through product/service***




- 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



# 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

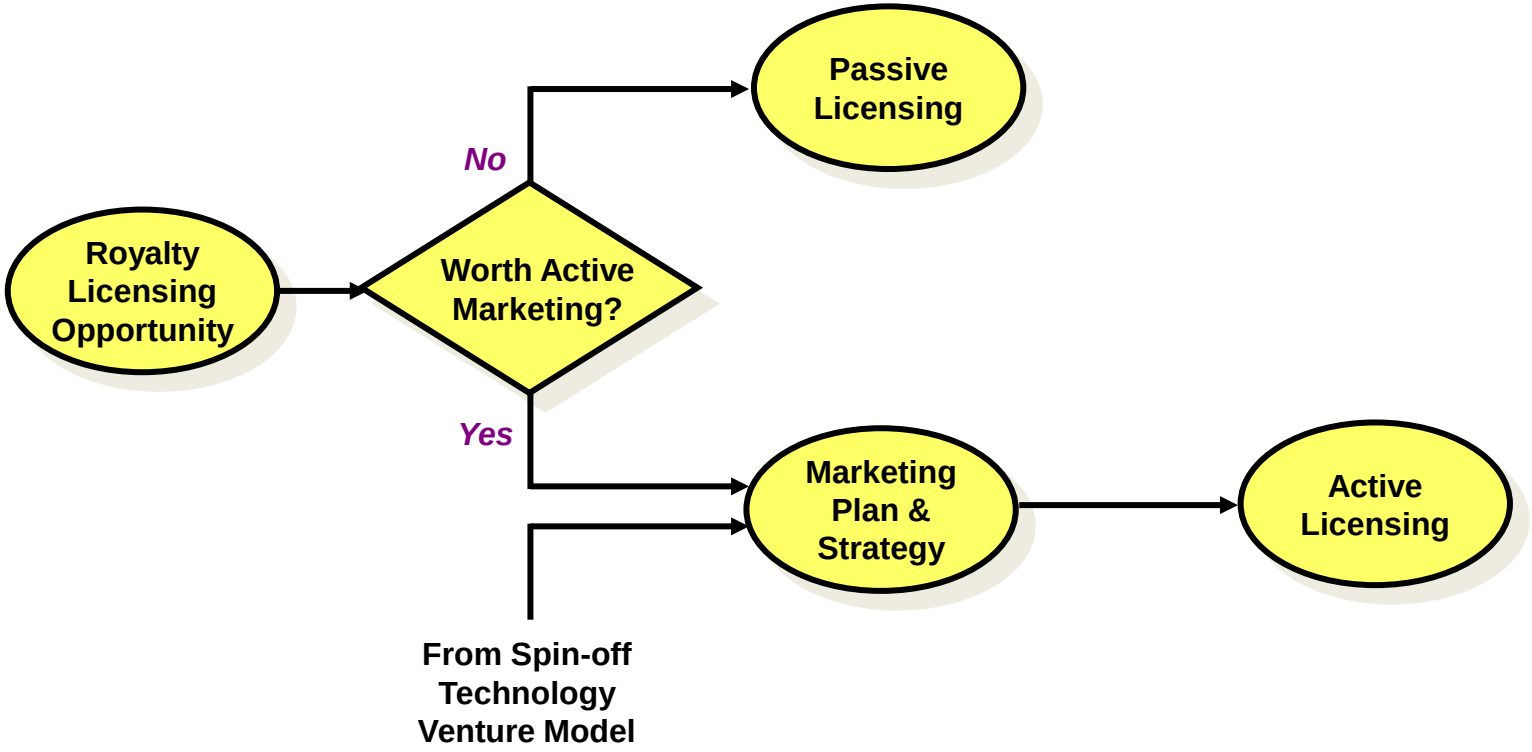
# Commercialization Options

- 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

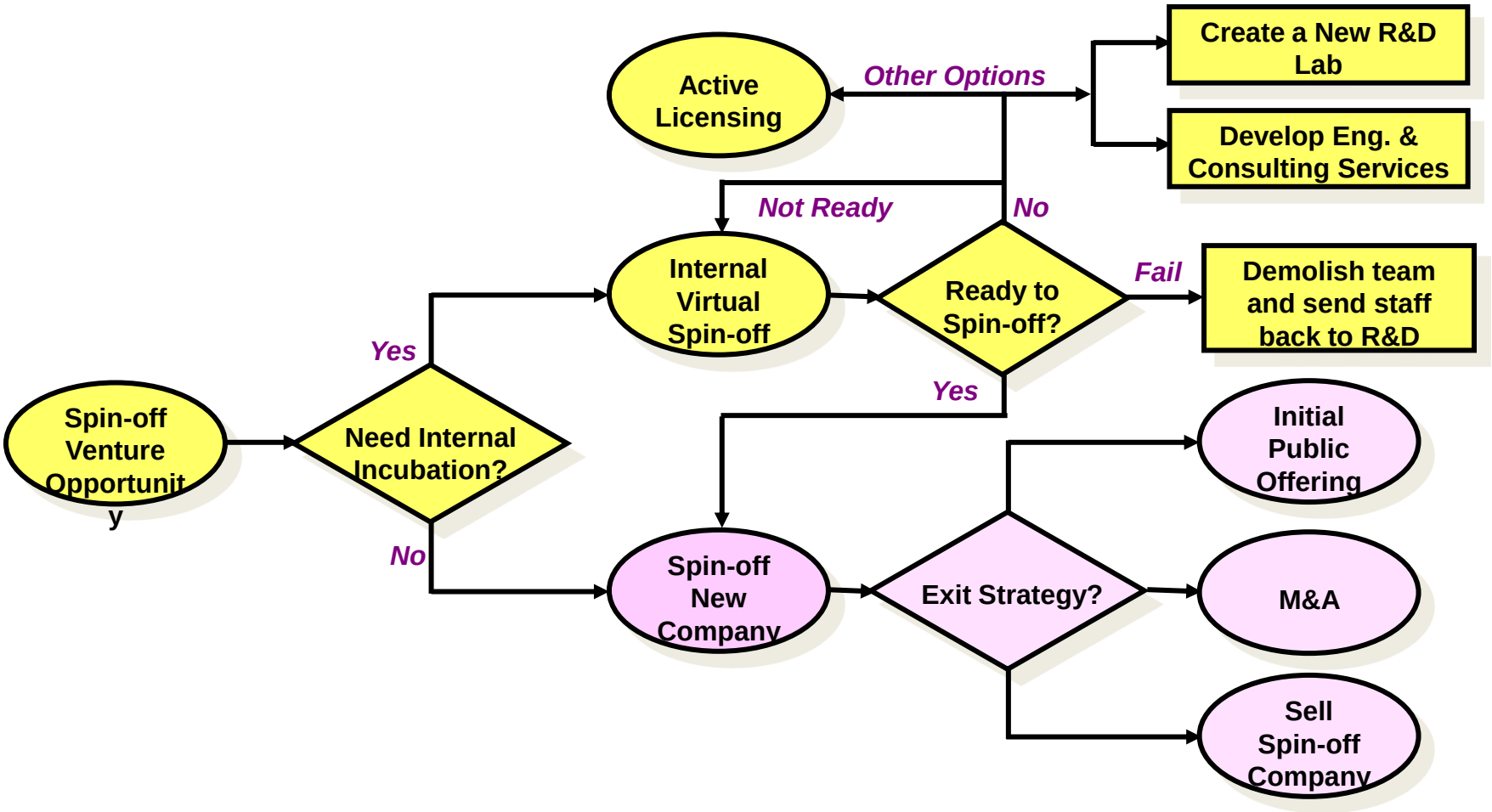
# Licensing


Passive Licensing
No
Royalty Licensing Opportunity
Worth Active Marketing?
Yes
Marketing Plan & Strategy
Active Licensing
From Spin-off Technology Venture Model

# 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
No
Internal Virtual Spin-off
Active Licensing
Other Options
Create a New R&D Lab
Develop Eng. & Consulting Services
Not Ready
No
Ready to Spin-off?
Fail
Demolish team and send staff back to R&D
Yes
Spin-off New Company
Exit Strategy?
Initial Public Offering
M&A
Sell Spin-off Company

# 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

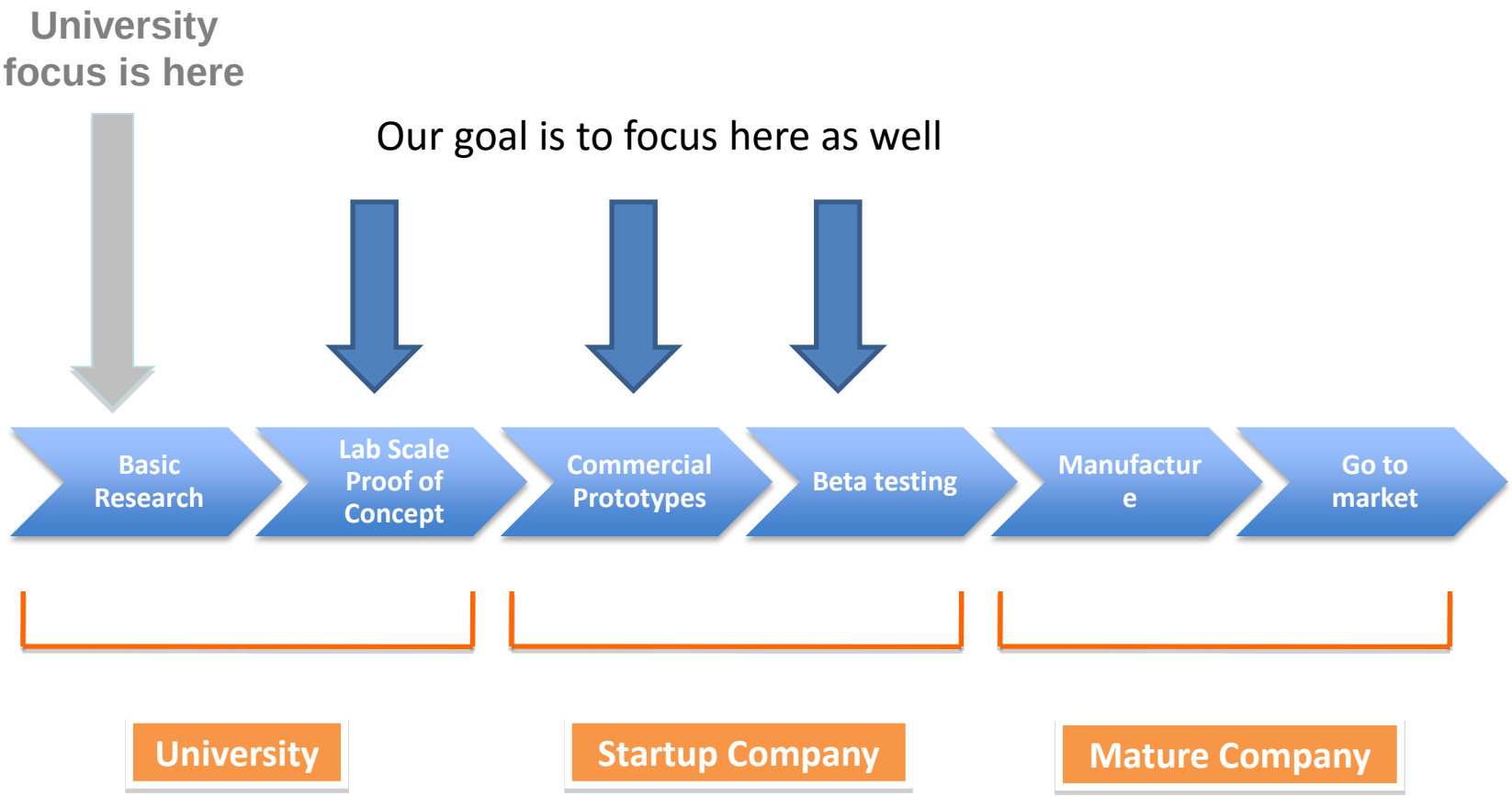
# Business needs to understand

- 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

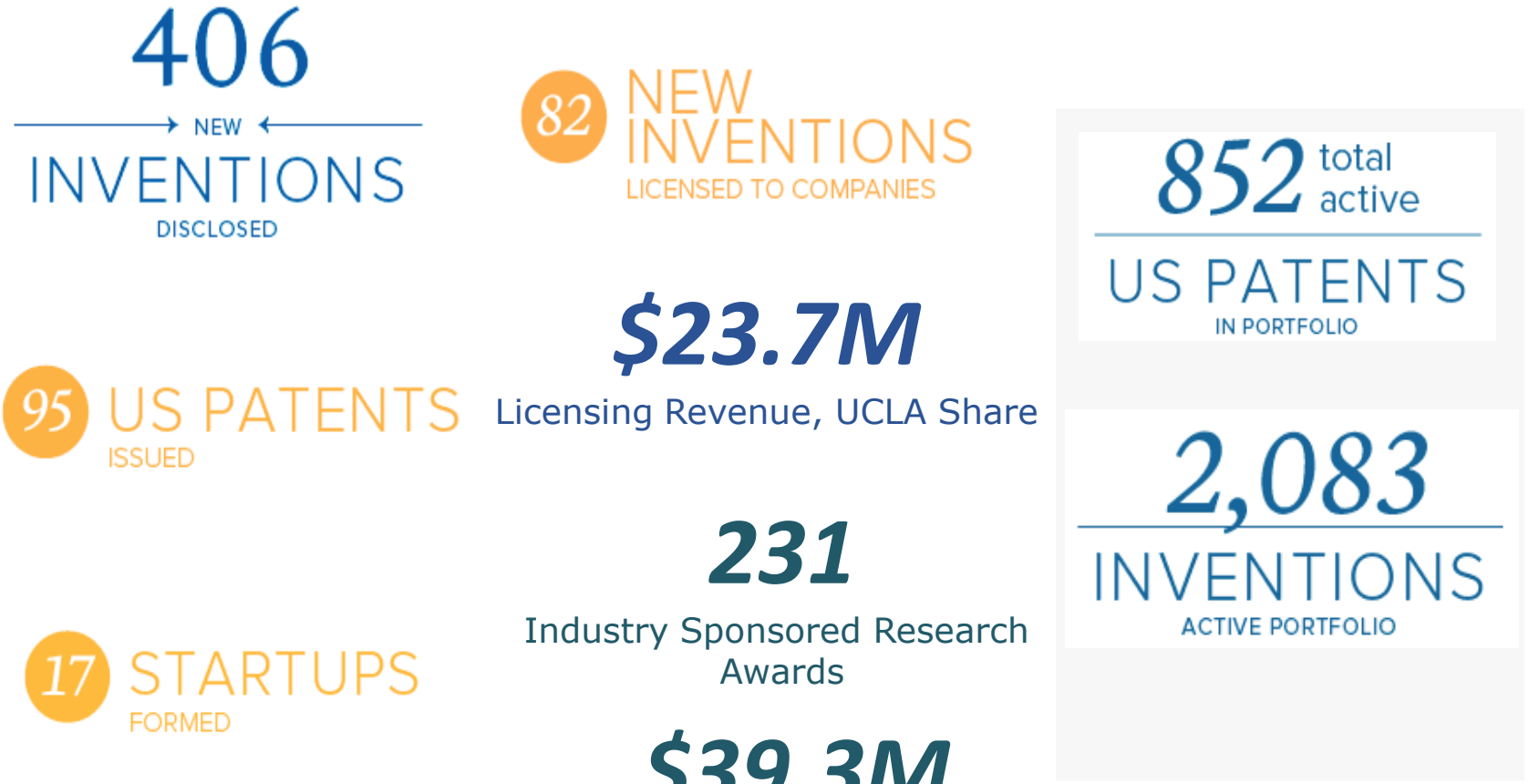
# The R&D Value Chain: From Lab to Market



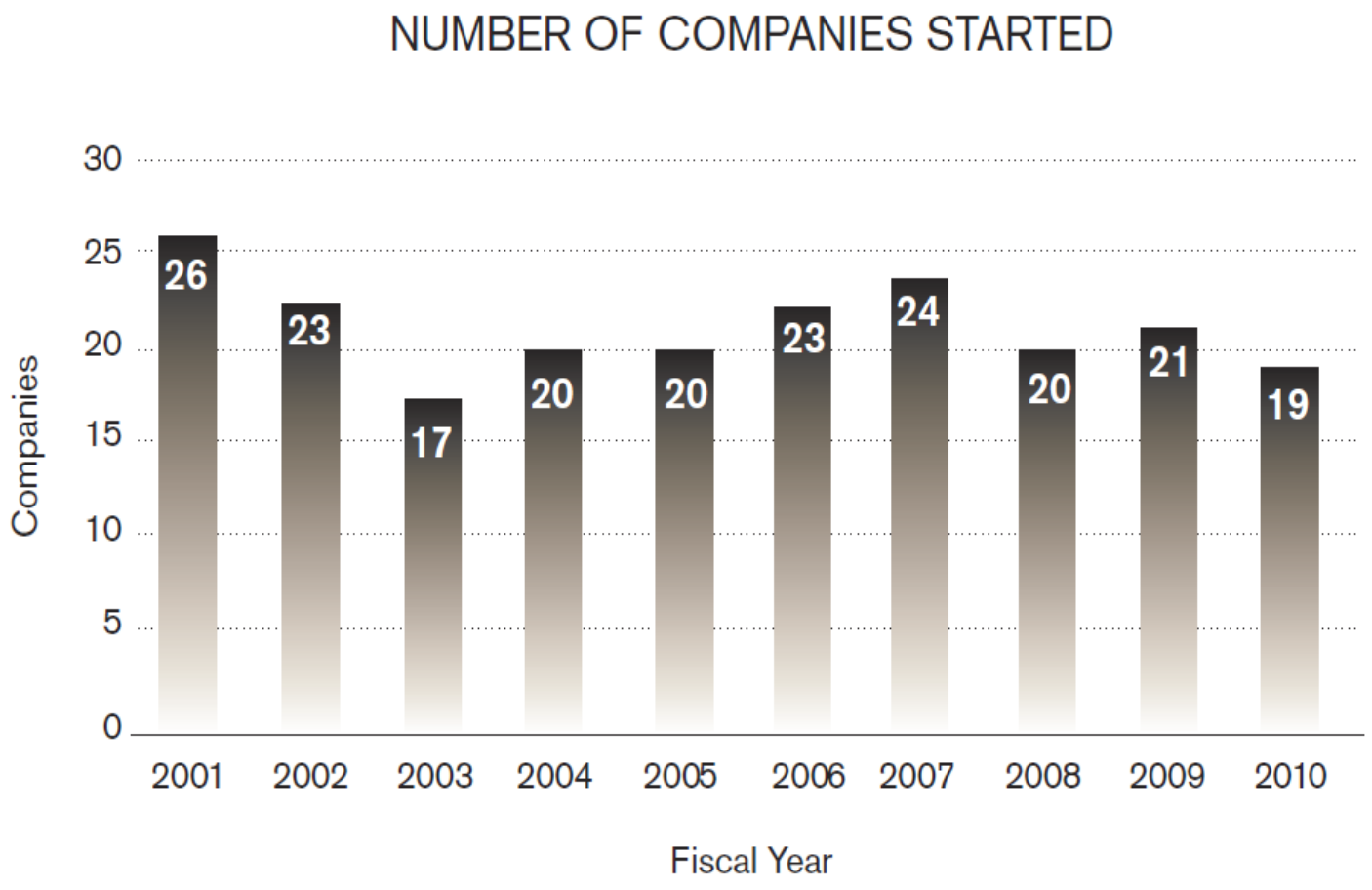
# Success Factors

- 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



# MIT


NUMBER OF COMPANIES STARTED
Companies
30
25
20
15
10
5
0
26
23
17
20
20
23
24
20
21
19
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Fiscal Year

# Notable Companies Started by MIT students

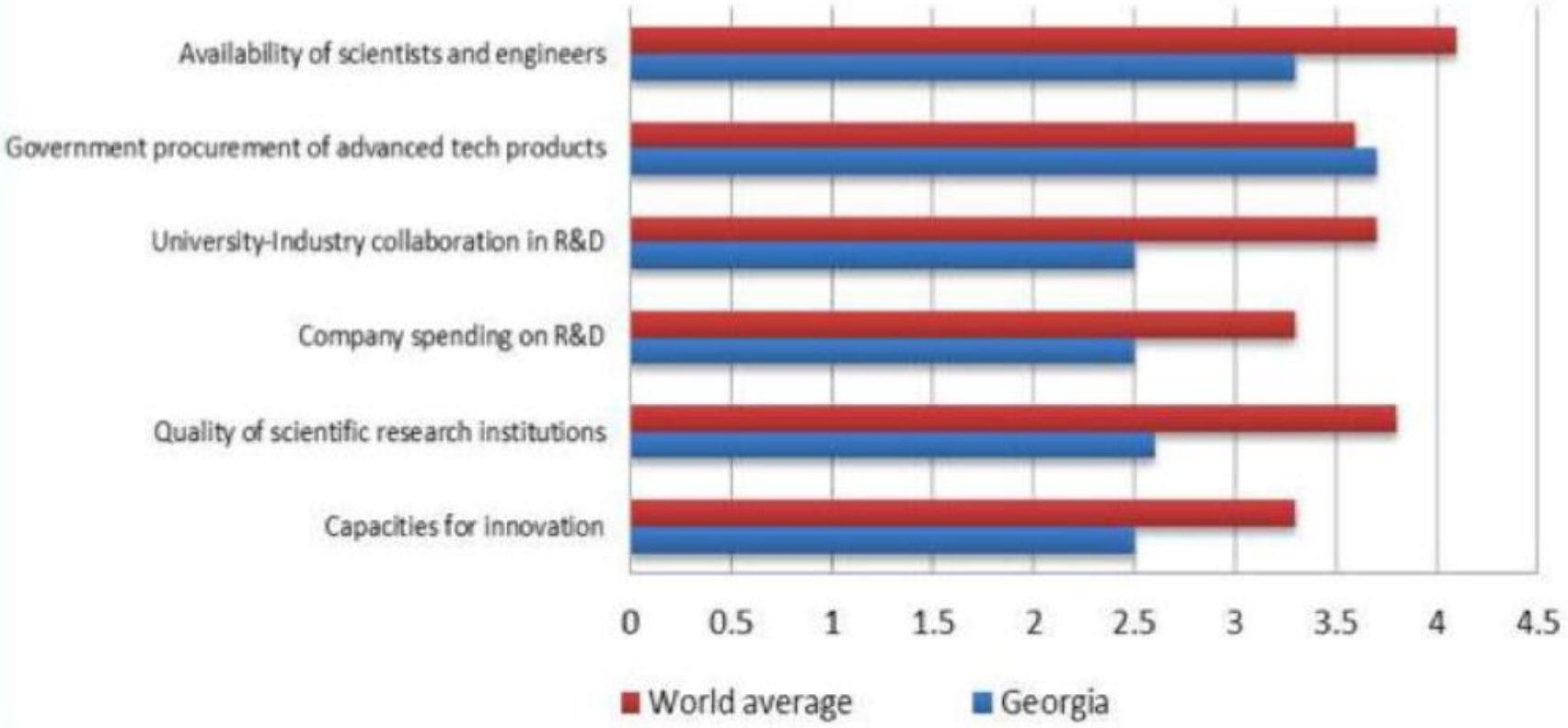
- Akamai
- Appjet/EtherPad: Hosted app service/collaborative editor, acquired by Google (Aaron B Iba, David Greenspan and J.D. Zamfirescu-Pereira)
- Aspiring Minds: (Varun Aggarwal)
- AutoMob: Mobile informatics (Amit Goyal)
- DocVerse: Cloud storage and collaboration add-on for Office (Alex DeNeui and 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)**




*Source*: SCImago, SCOPUS, 2013