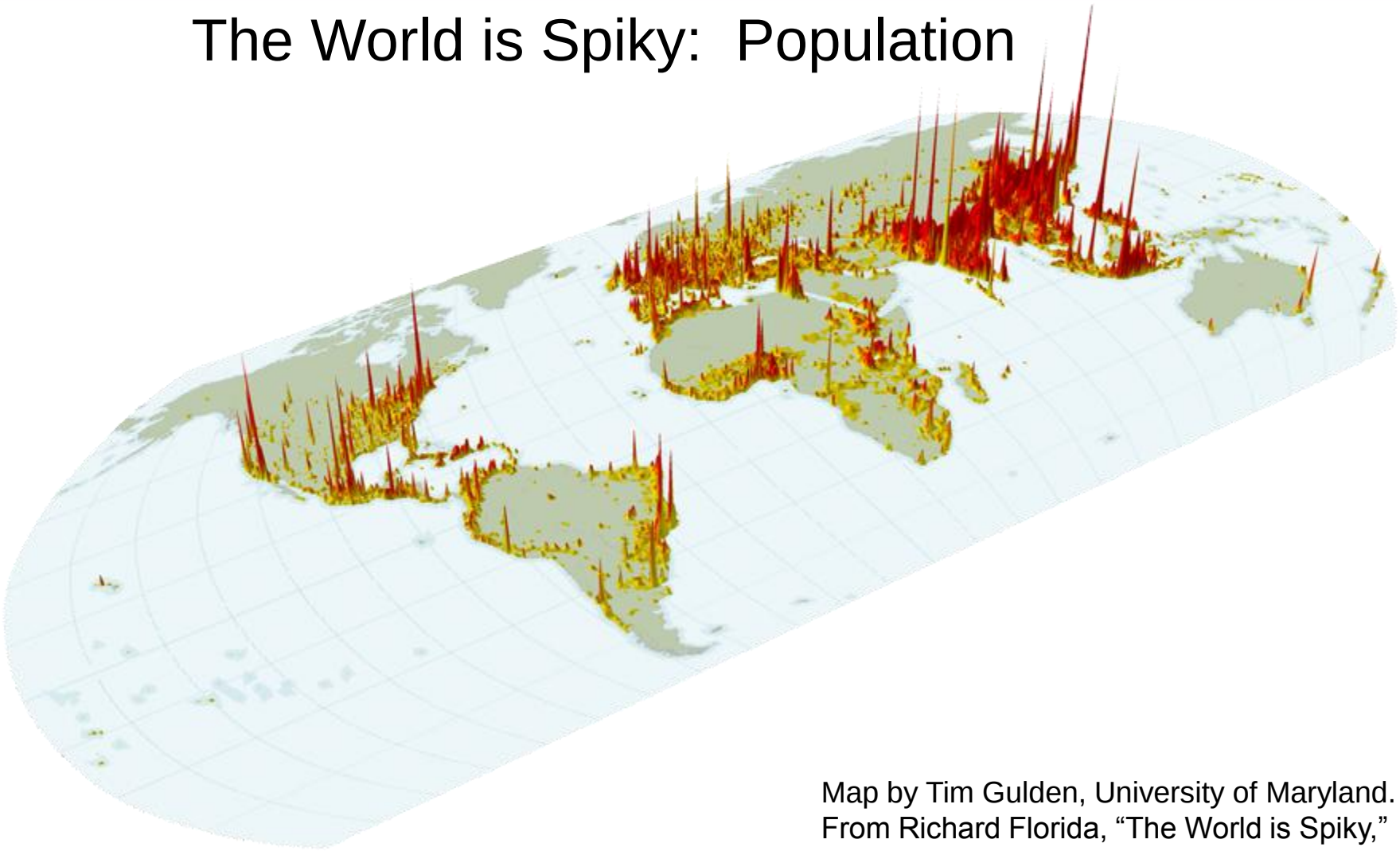
Technology Transfer and Valuation of Intellectual Property Assets

February, 2012

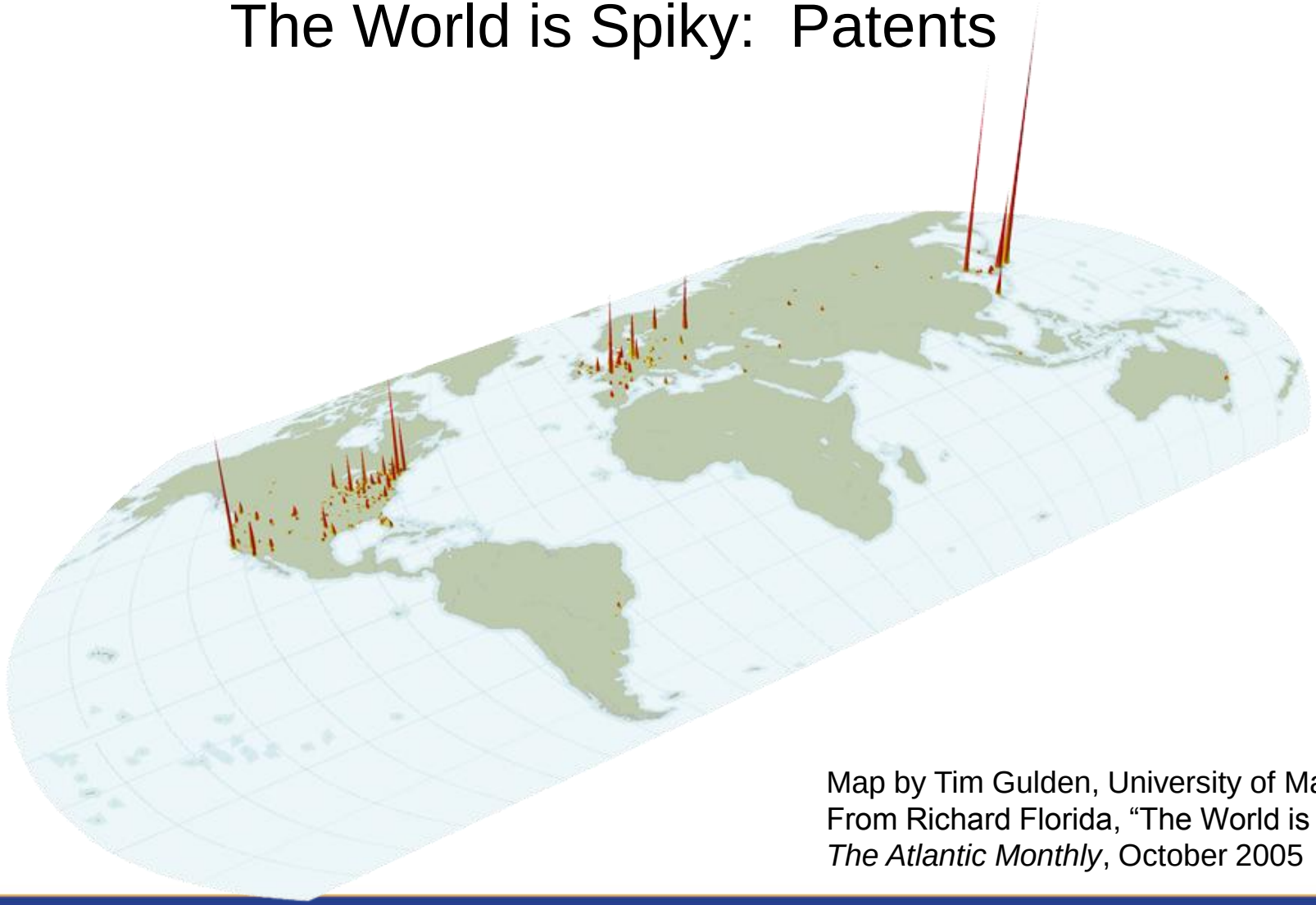
Dipanjan Nag, Ph.D., MBA, CLP
Executive Director, Office of Technology Commercialization
President, IPShakti LLC
Vice President Elect for Professional Development, AUTM

The World is Spiky: Population



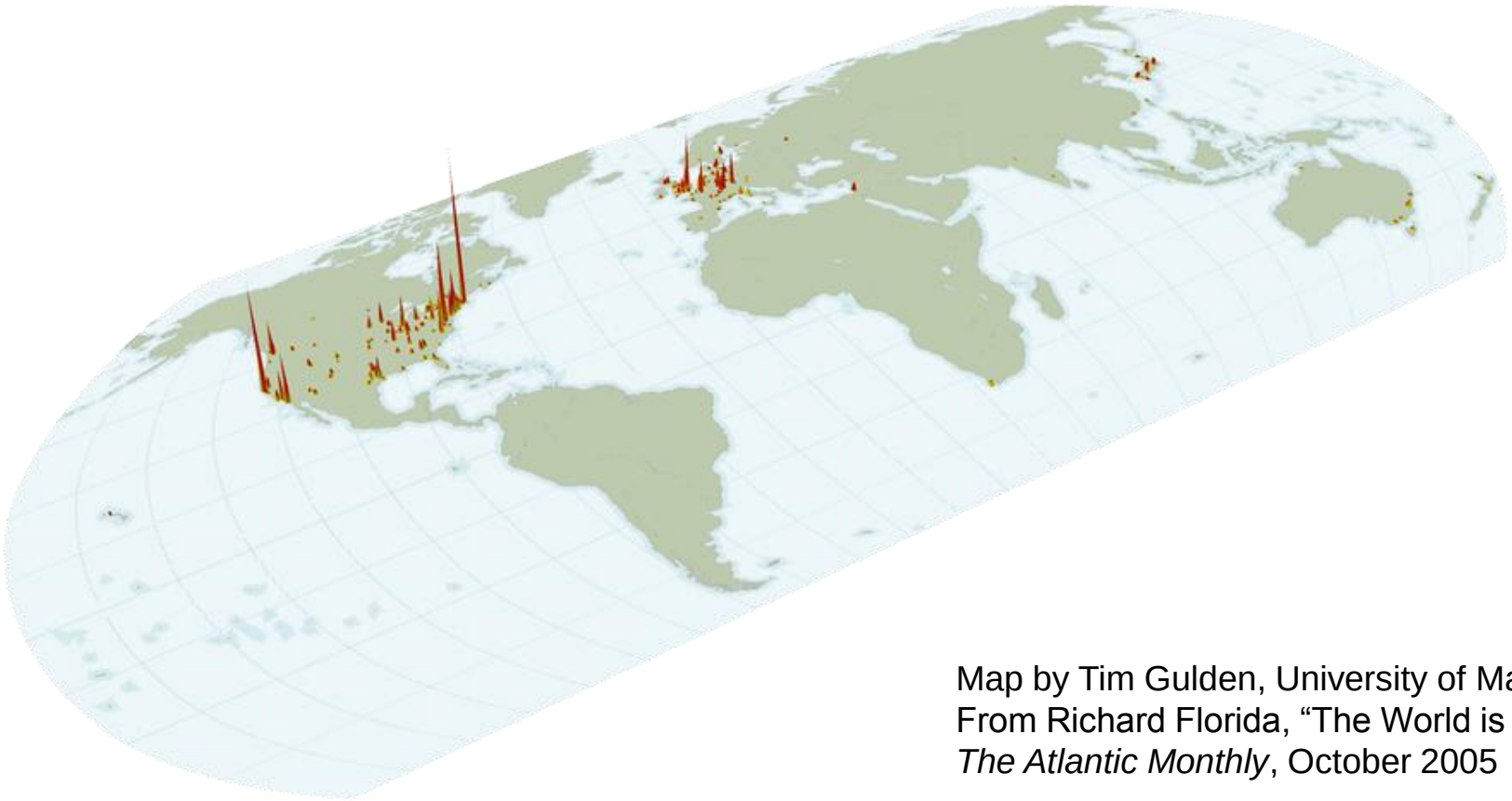
Map by Tim Gulden, University of Maryland.
From Richard Florida, “The World is Spiky,”
The Atlantic Monthly, October 2005

The World is Spiky: Patents



Map by Tim Gulden, University of Maryland.
From Richard Florida, “The World is Spiky,”
The Atlantic Monthly, October 2005

The World is Spiky: Scientific Citations

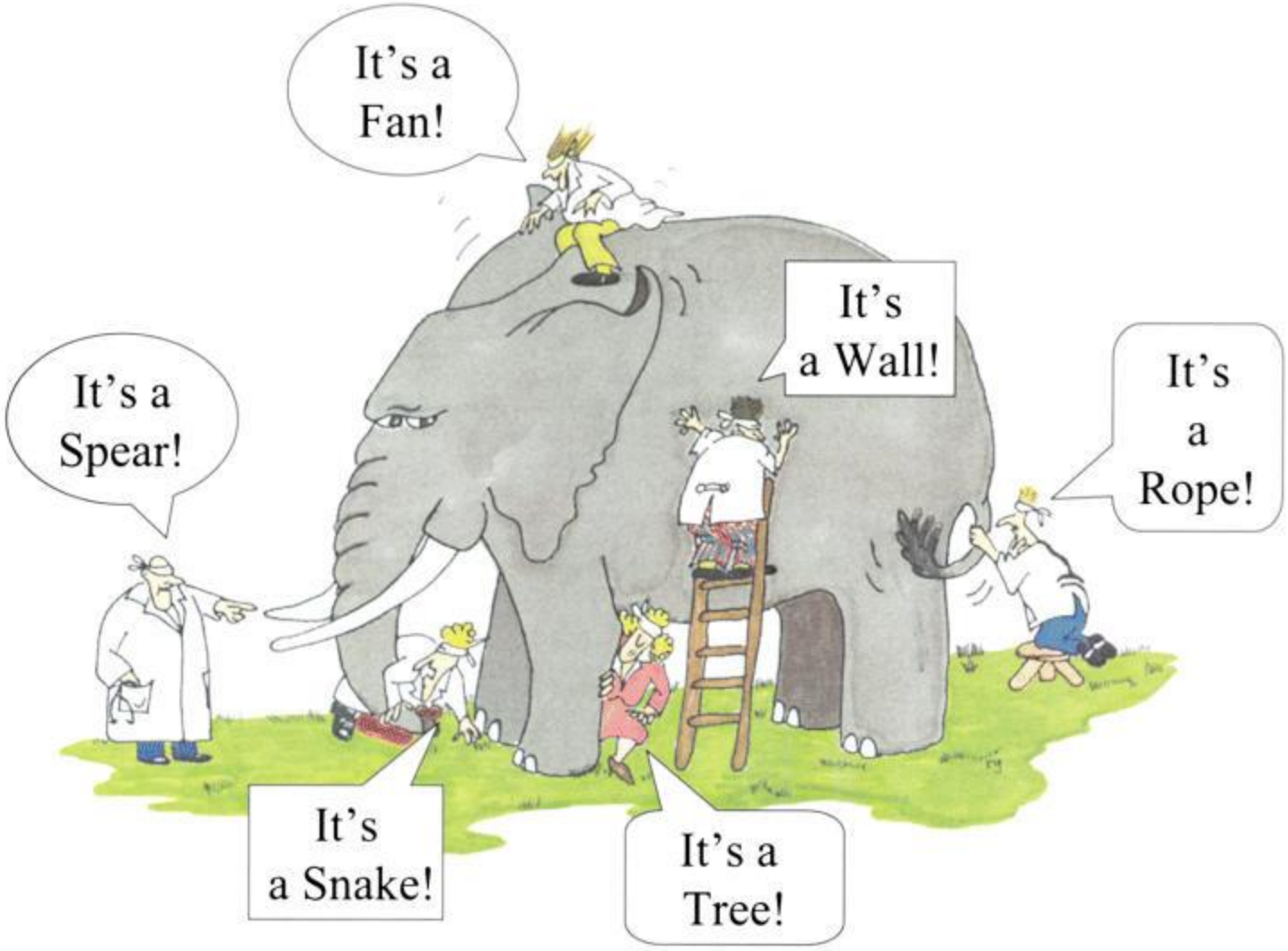


Map by Tim Gulden, University of Maryland.
From Richard Florida, “The World is Spiky,”
The Atlantic Monthly, October 2005

"Society, having funded much of the university based research, has an expectation that the fruits of that research will improve the human condition."

-- Niels Reimers, 1987

Founder and Director of Stanford Office of Technology Licensing


It's a Fan!
It's a Spear!
It's a Wall!
It's a Rope!
It's a Snake!
It's a Tree!

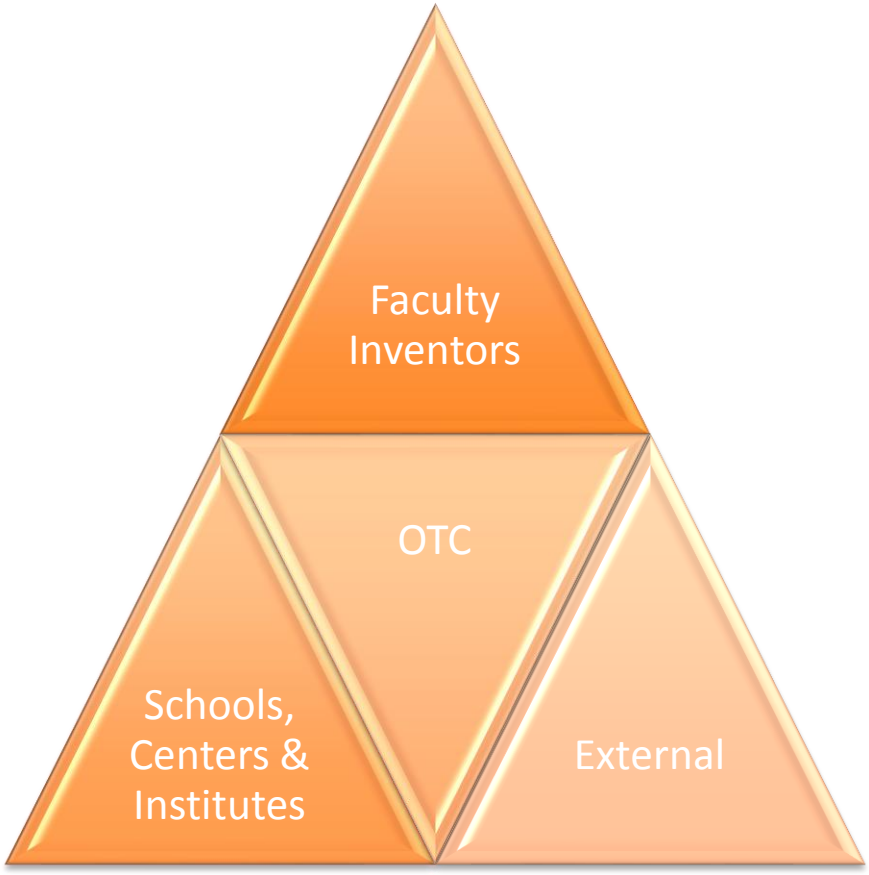
Perspectives of Technology Transfer

- University perspective
  - Disseminate technologies
  - Products to market from basic research
  - Enrich local economy
  - Generate revenues
- Large company perspective
  - Viable source of early stage IP
  - Running clinical studies
  - Collaboration with academia
    - For philanthropy
    - For goodwill
    - Access to accomplished researchers
  - Access to work force

Perspectives of Technology Transfer

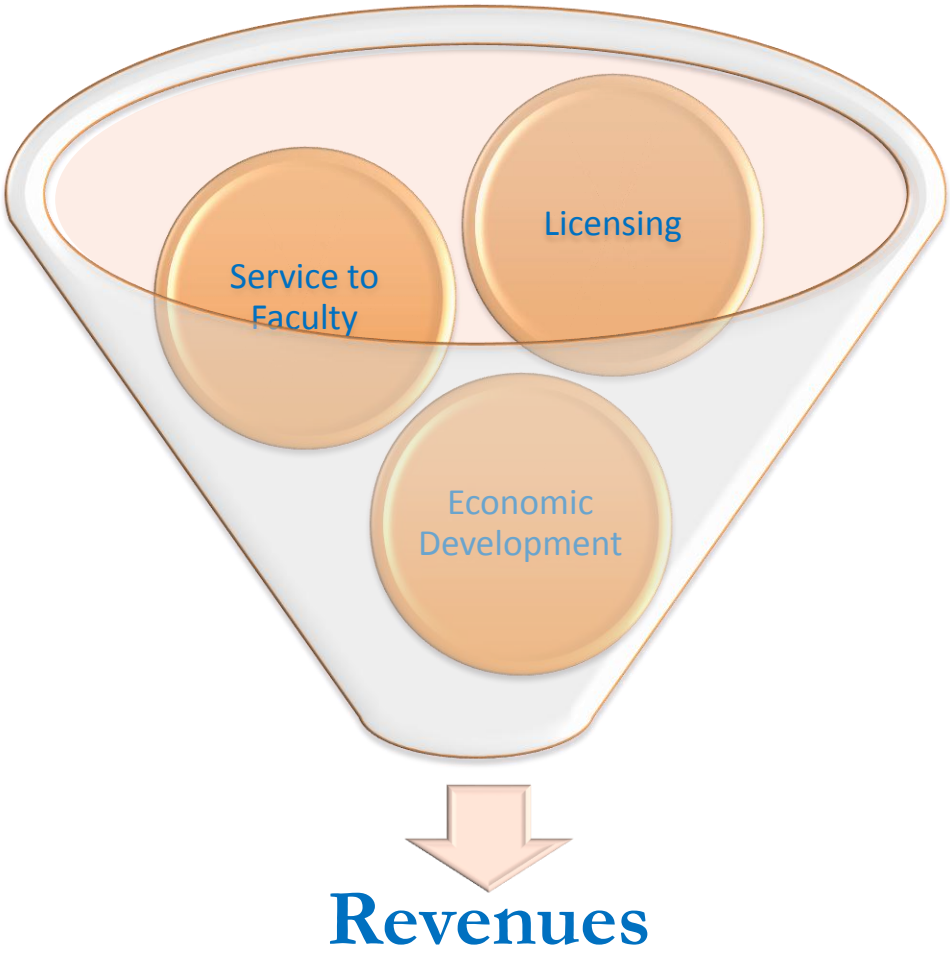
- Small company/startup perspective
  - Viable partner for early stage POC
  - Access to facilities and instruments
  - Access to faculty researchers
  - Increased brand value for fund raising
  - Access to work force

TTO Stakeholders

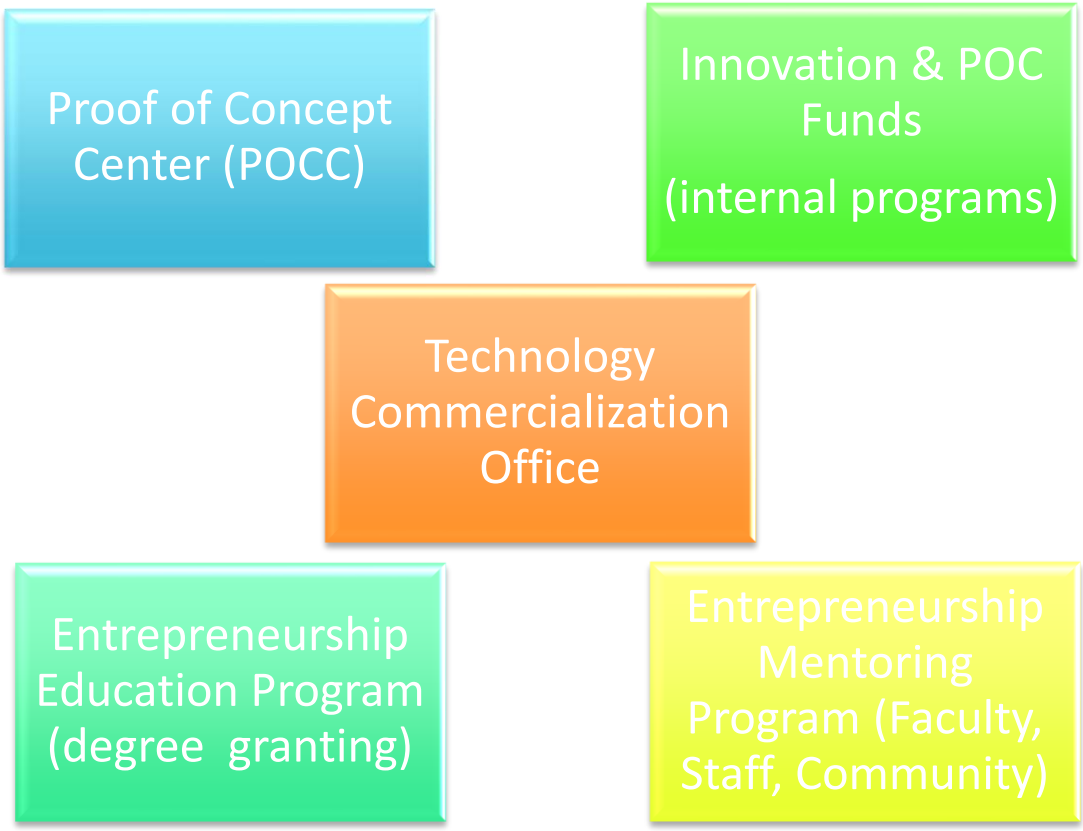


- Corporations
- Venture and Angel community
- State agencies (NJ EDA, NJBio, R&D Council, Others)
- AUTM, LES, Bio and other industry consortia

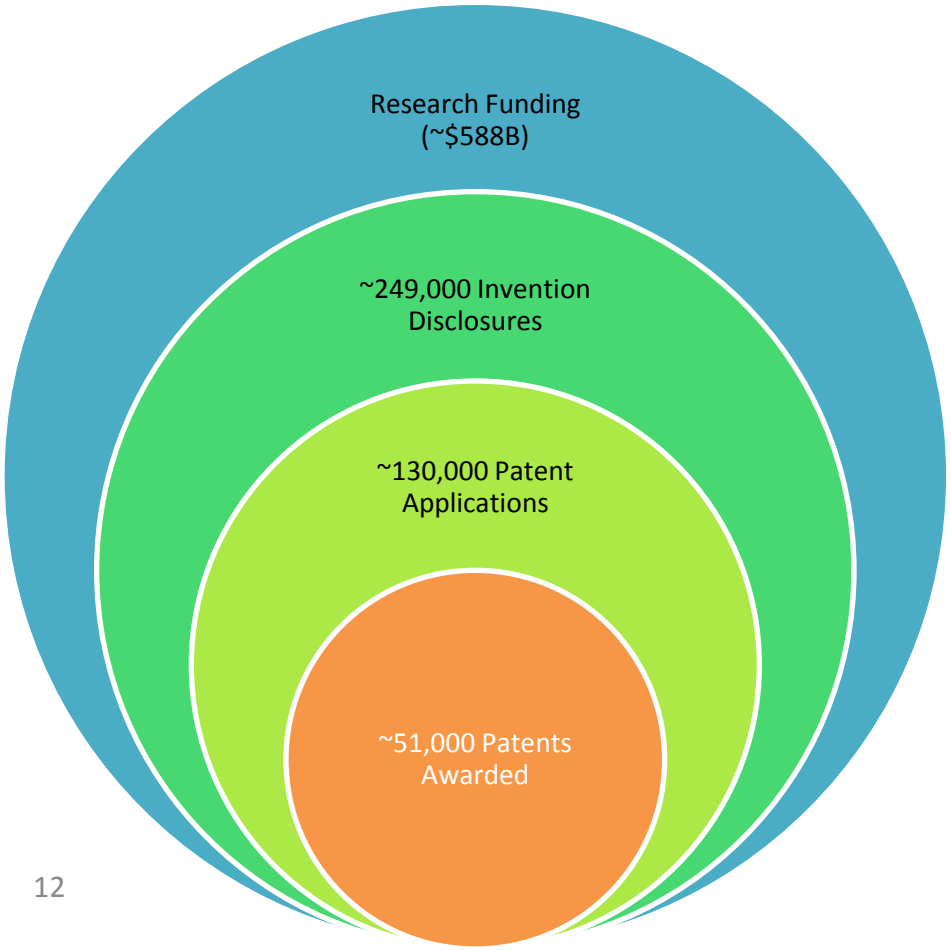
The Model


Licensing
Service to Faculty
Economic Development
Revenues

Facets of the Innovation Ecosystem

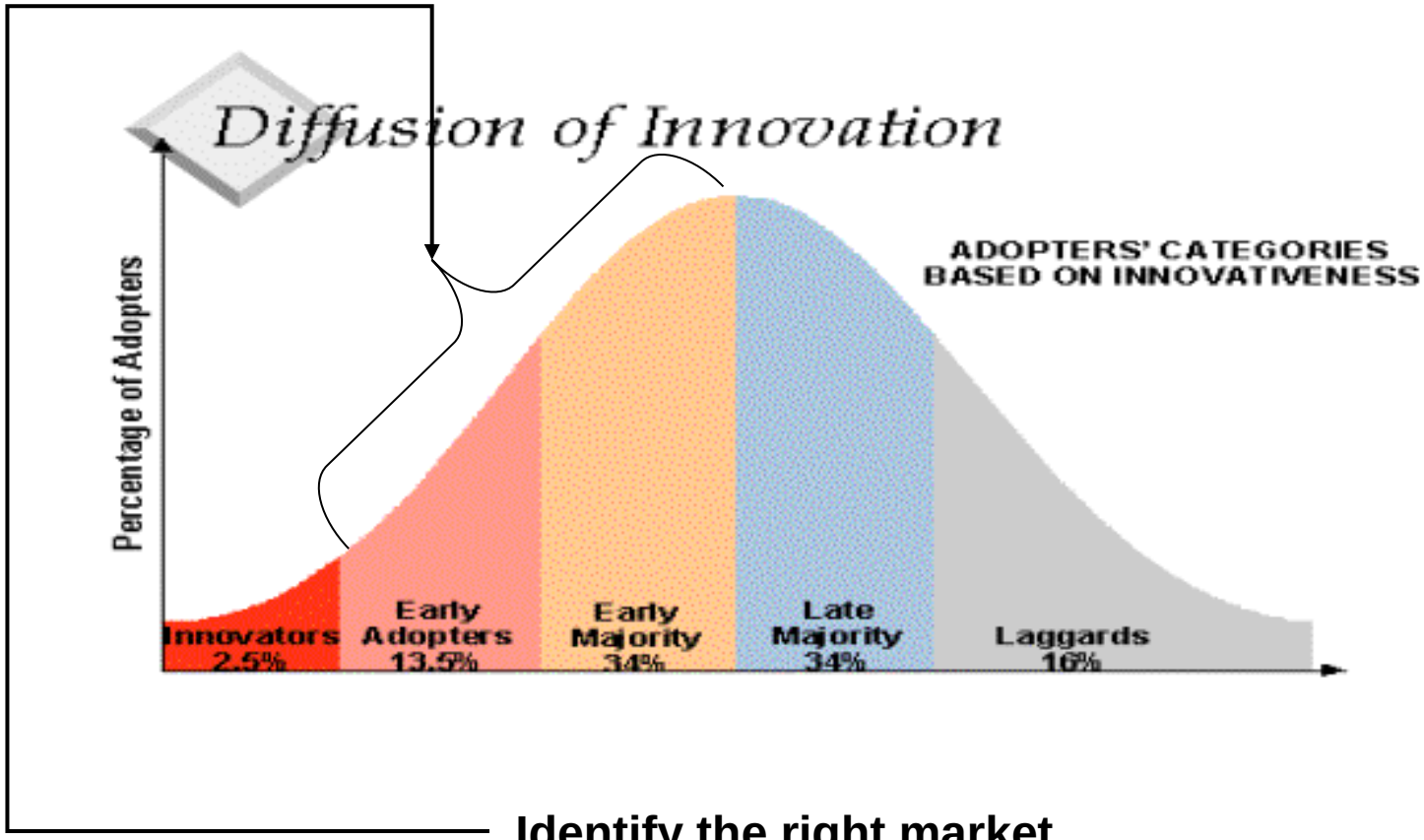


Tech Commercialization in Numbers*

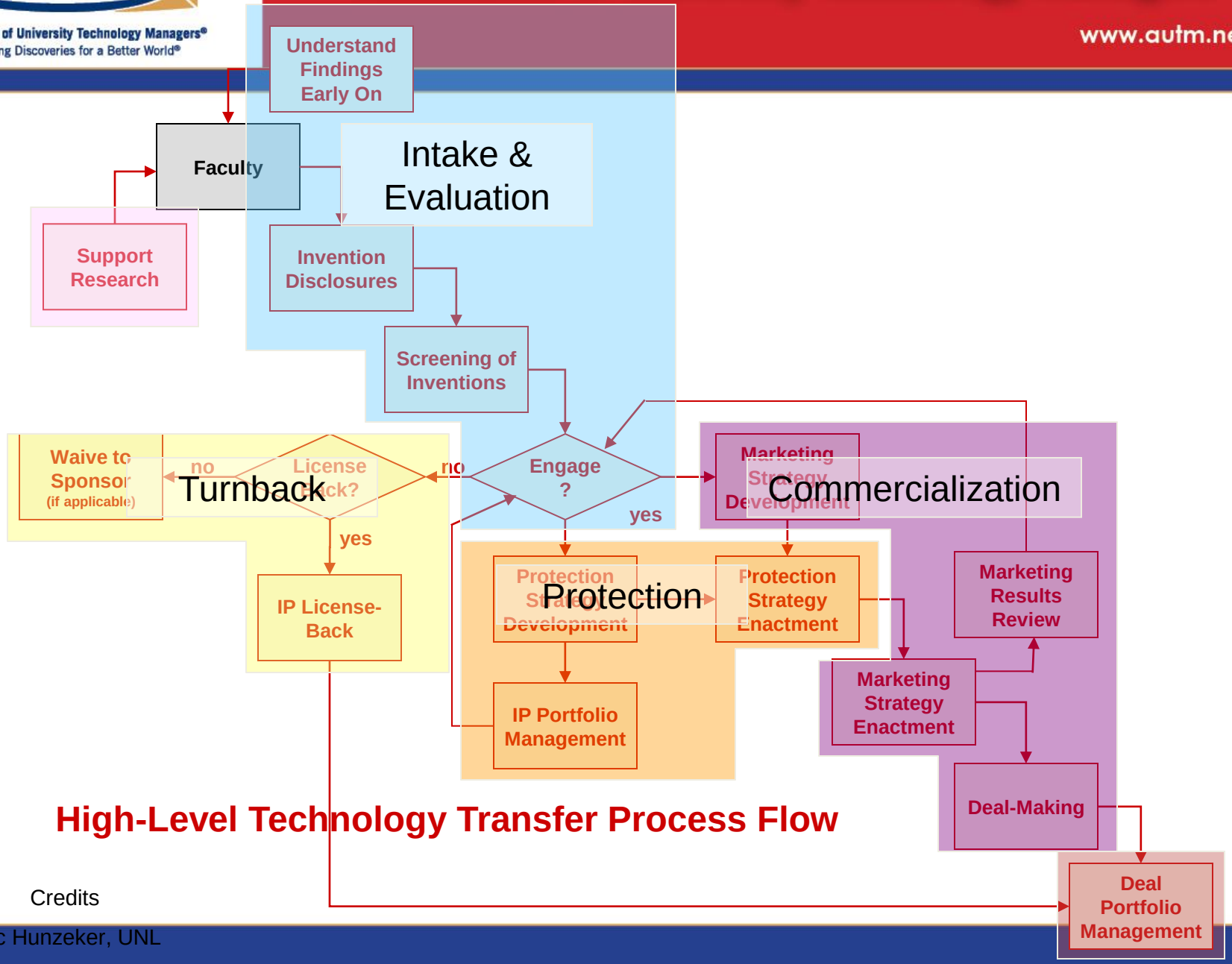


38,030 active license & options, 6,272 start-ups

* Source AUTM Licensing Survey 1991-2009



Rodger's Diffusion of Innovation



High-Level Technology Transfer Process Flow

Credits

Eric Hunzeker, UNL

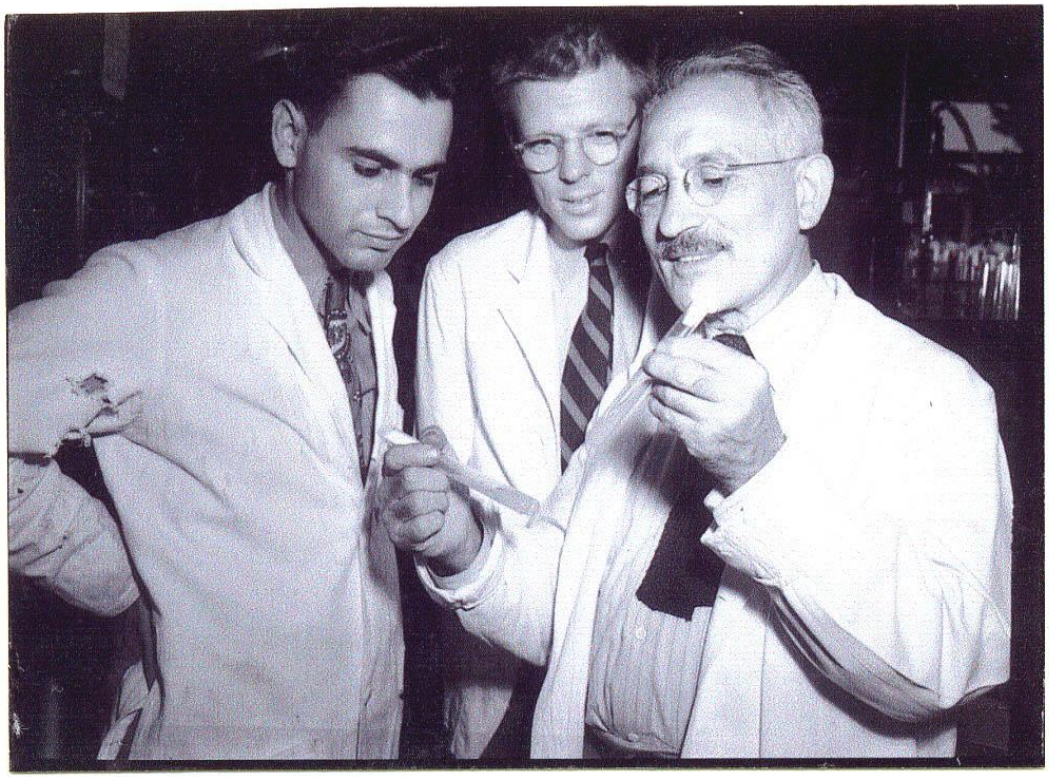

addiction additives adhesion adjuvant african alginate alternative alzheimer analysis animal anthocyanin
anti-hiv antibacterial antibiotics anticancer antifungals antimicrobial antiobiotic
antioxidant antiviral apoptosis applications bacteria bacterial bars battery
biodegradable bioengineering bioethanol biofuels bioimaging bioinformatics
biology biomarkers biomedical biosensors bone breast bypass cancer
cardiology cardiopulmonary care cell-cell cells chagas chemical chemistry cholesterol
ciliopathy circuits clinical cns coatings colic color companion complement composites computer controlled
cord corn cranberry crop ct damage degenerative delivery development
devices diagnostics differentiation digital disc discovery
disease displays dogwood drug drug-resistant efficacy electronic energy
engineering feed flavor fluorescent food formulation fruit garden gene genetic gram-
negative gram-positive green headache healing home identification image-guided imaging
immunity immunoassay implants improved industrial infarction infections infectious
inflammation inflammatory inhibitors injury innate insect integrated joubert lab-on-a-chip labeling
landscape leds light lipidomics loading manufacturing materials matrix medical
medicine memory metabolism metal microfluidics mimetics mosquito myocardial nanoparticles nanotips
nerve non-surgical oncogenes oncology opiates optical oral organic oxide pain
parkinson parks pathogenesis pathology peg peptide personalized pharmacokinetics pharmacological
photovoltaic pkd plague plants polymer polymer-matrix porous postoperative preservative process product
prognostics prophylactics prostate protection protein proteomics pyrexia
reconfigurable reconstructive regeneration regenerative release renal research resistance
scaffolds security semiconductor sensor sequestration snack solar specimen spinal sports
staph stem stents stroke structural supply surgical synthesis system target
technology telomeres testing therapeutics therapy thrombosis
tissue toxicology tracking transistors treatment trees tuberculosis uses vaccine veterinary virulence
white wound zinc

NUANCE®

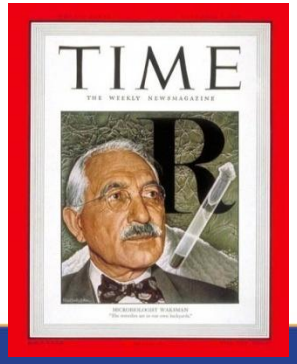
WHERE IS YOUR GOOGLE?

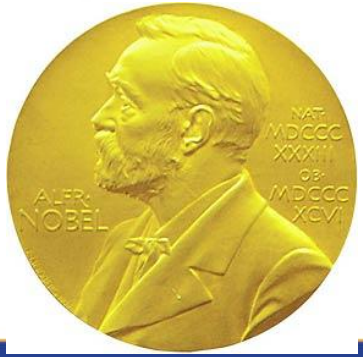
Ask™ .com

STREPTOMYCIN



Waksman is seen here in 1943, at the time of the discovery of streptomycin, with co-discoverer, Albert Schatz (left) and D. Montgomery Reynolds.





Streptomycin sample

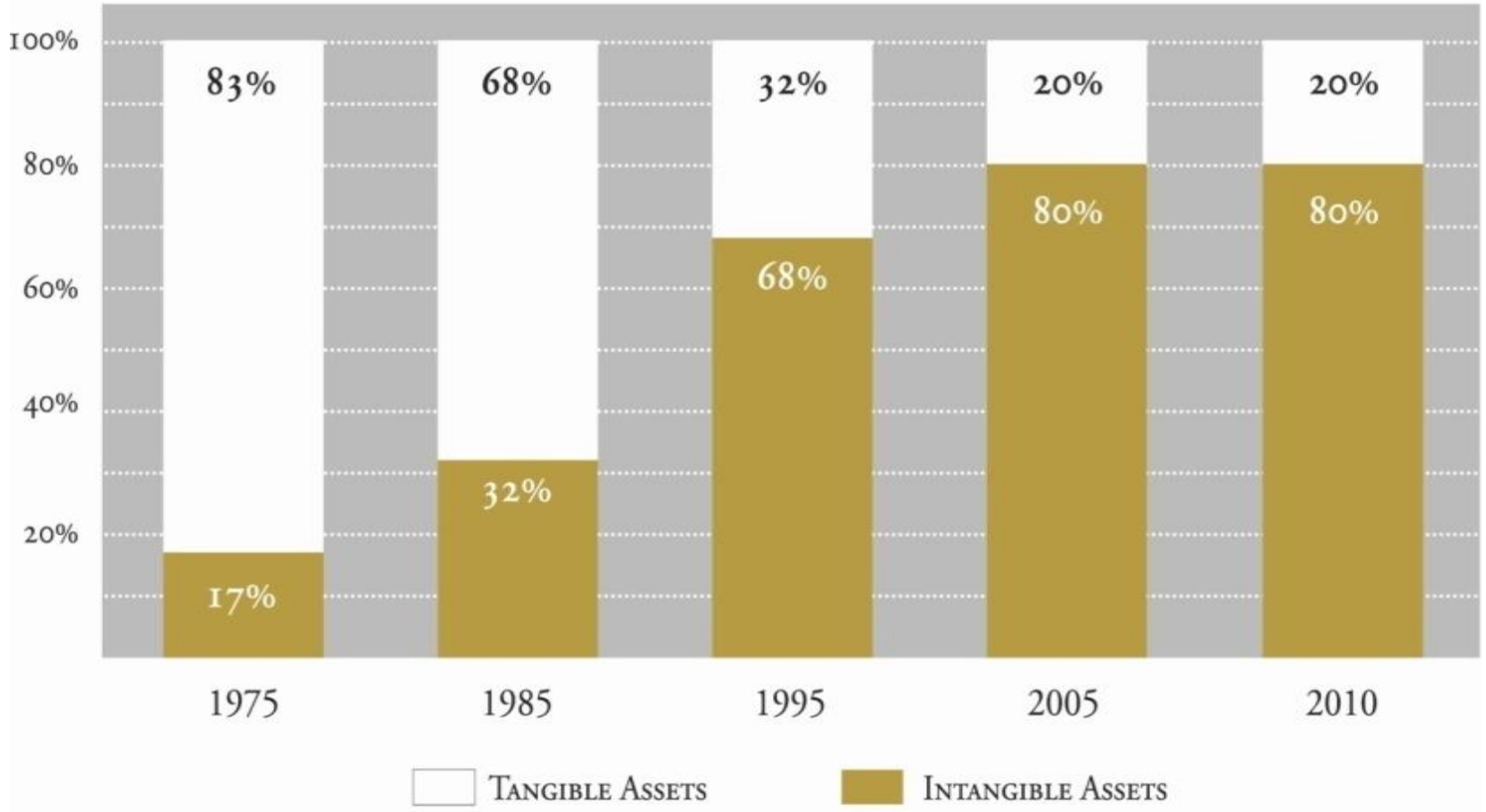
prepared by Albert Schatz

February, 1944

The Three R's of Technology Transfer

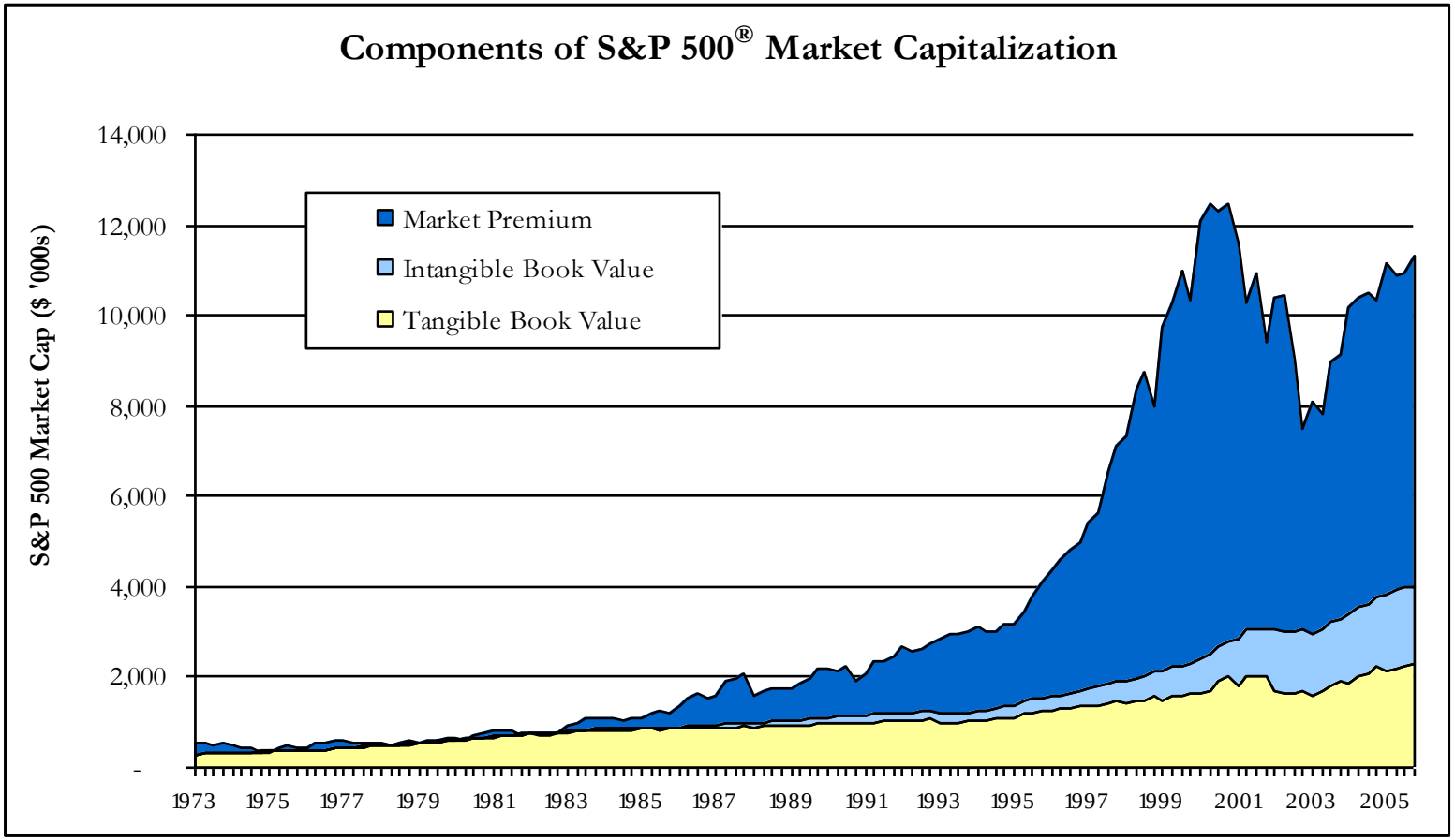
- Build relationships with **Faculty members**
  - Get high quality disclosures
- Build relationships with **local and national industry**
  - Create trust so that licensing will follow
- Build relationships with **fellow technology transfer professionals**
  - Data shared between offices about licensing experience
  - Establish efficient flow of information about royalty, agreements and deal structures

Components of S&P 500 Market Value



Source: Ocean Tomo

Components of S&P 500 Market Value



Data: Ned Davis Research, Inc.

IP Creates Value Through a Variety of Mechanisms

Numerous Sources of Value

Exclusivity Value:
- Price premium
- Reduced manufacturing cost
- Increased market share
- Enhanced customer satisfaction
- Blocking value

Option Value:
- Current technology and protection may provide an avenue for future investments

Defensive Value/
Freedom to Operate:
- Creates an IP arsenal to discourage lawsuits
- Provides ability to compete, but little advantage

Trading Value:
- Value in trade for entering into cross-licenses, for licensing-out, or for sale

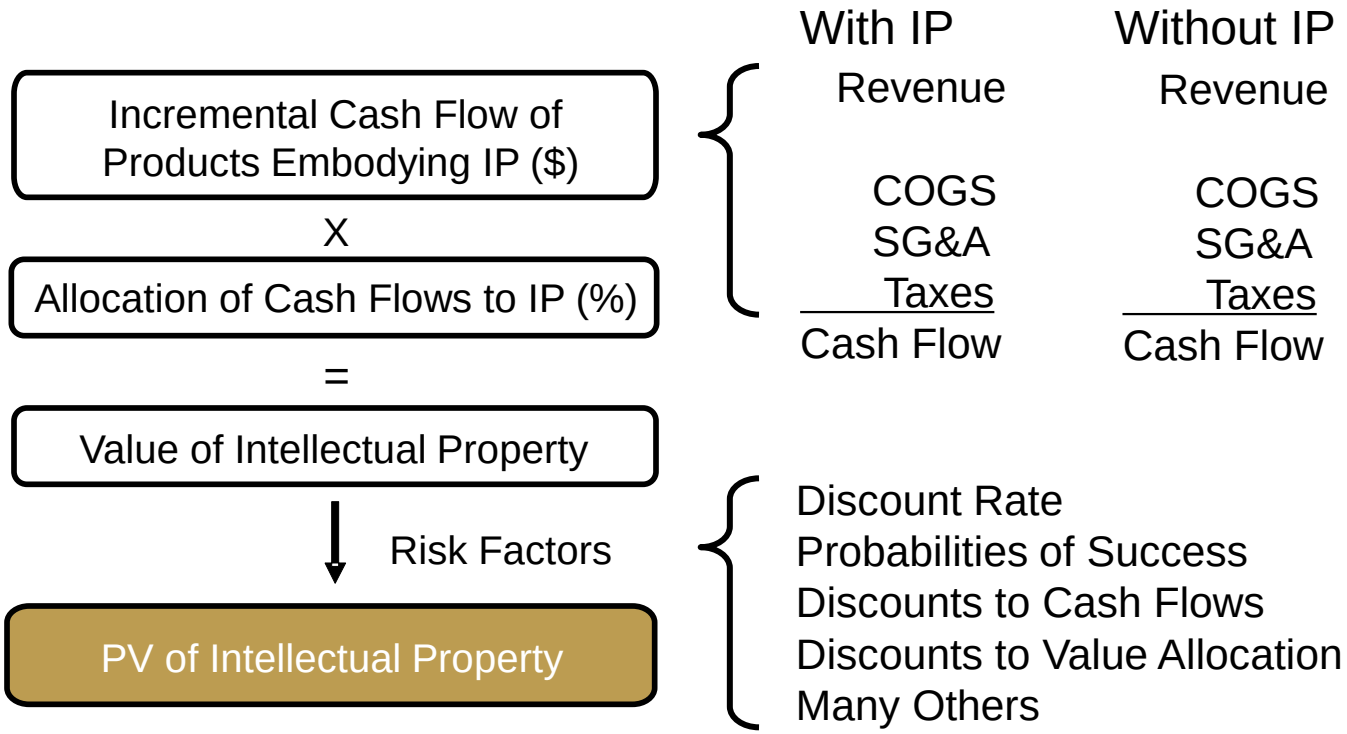
Basic Valuation Approaches – Income Approach

Income Approach

- Theory: Value is determined by the economic benefit expected from use of the IP
- Value of Patent = Present Value of the expected future income stream
- Three key parameters:
  - Amount of the income stream
  - Duration of the income stream
  - Risk associated with the realization of the income

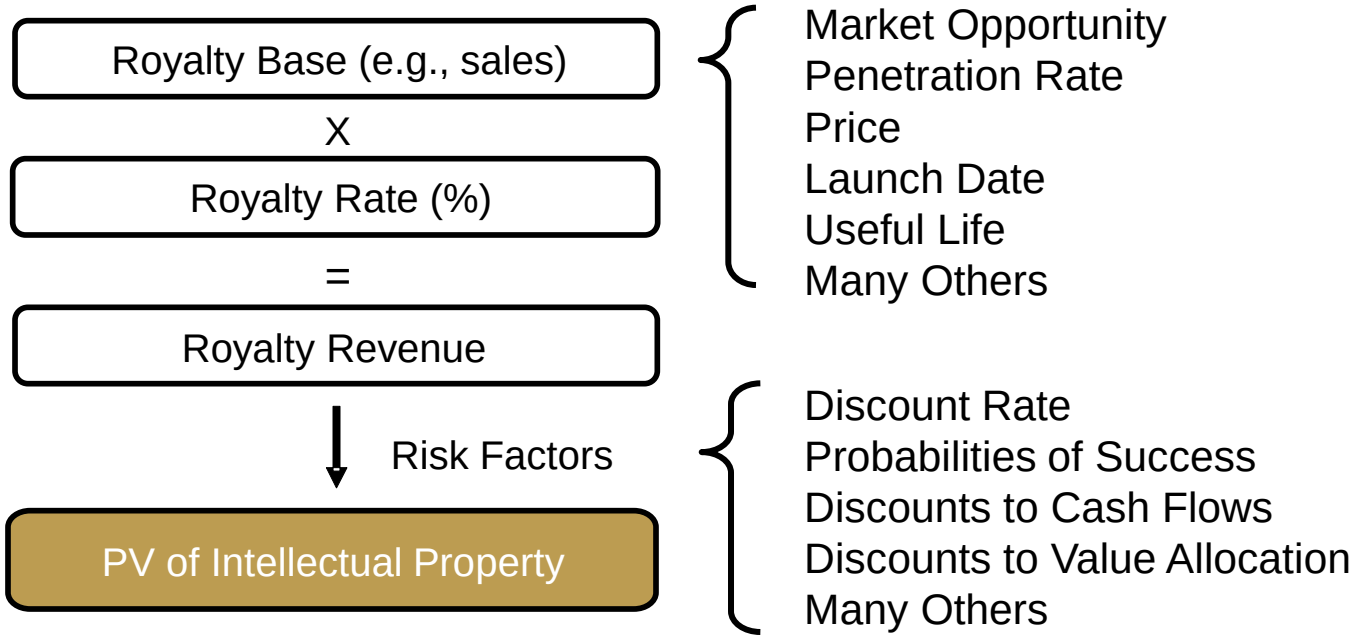
- How much can be earned from commercialization of the IP, and what is that value in today's dollars?
- Most commonly used valuation approach – Gold Standard
- Generally two types of analysis performed for the Income Approach: Excess Earnings and Relief from Royalty

Example Income Approach – Excess Earnings



Acknowledge Ocean Tomo

Example Income Approach – Relief from Royalty



Discount Rates

- Riskier projects require greater potential returns
- Discount rate usage: Present Value Factor = $1 / (1+DR)^{Years}
  - Risk-free rate (treasury bonds) – passage of time 5%
  - Weighted average cost of capital – standard risks 12%
  - Cost of equity 15%
  - Risk adjusted hurdle rates used in licensing
    - Very low risk 15-20%
    - Moderate risk 25-35%
    - Very high risk 35-45%
  - Venture capital rates
    - Bridge financing 20-35%
    - Second stage financing 30-50%
    - First stage financing 40-60%
    - Start-up financing 50-70%
    - Seed financing 80+%

Basic Valuation Approaches – Cost Approach

Cost Approach

- Theory: Value is determined by the cost to replace or the cost to re-create the IP
- Costs Include: R&D, materials, equip., marketing, advertising, delayed market entry
- Value of Patent = Fair market value of total investment to replace or re-create
  - A prudent licensee/buyer will not pay more for the IP than the amount for which the IP could be re-created
  - By licensing IP from others, the licensee avoids development costs and minimizes risk

- How do you replace or re-create a unique asset?
- Need to consider lost time-to-market due to re-creation
- These are sunk costs – are they relevant?
- Original costs to develop IP may be different than costs to replace or re-create IP
- Often used to value embryonic technology or technology easy to design around (e.g. software)

Example Cost Approach

Work Effort	Person Years	Expected Utilization of Existing System	Average Annual Salary	Total Costs
Developers				
Order Processing	14.0	80%	$95,000	$1,064,000
Market Data	20.0	100%	95,000	1,900,000
Web User Interface	27.5	50%	95,000	1,306,250
Streamer User Interface	9.5	100%	95,000	902,500
Backoffice	15.0	25%	95,000	356,250
Quality/Management				
Order Processing	7.0	80%	70,000	392,000
Market Data	10.0	100%	70,000	700,000
Web User Interface	13.8	50%	70,000	481,250
Streamer User Interface	4.8	100%	70,000	332,500
Backoffice	7.5	25%	70,000	131,250

Total Labor Costs	$7,566,000
Overhead Costs	756,600
Total Costs	8,322,600
Adjustment Factor for Implementation Expenses	100%
Total Cost to Replace	16,645,200
less Taxes (43%)	7,157,436
Fair Market Value of Technology (After-tax Costs to Replace)	**$9,487,764**

Acknowledge Ocean Tomo

Basic Valuation Approaches – Market Approach

Market Approach

- Theory: Value is based on the transactions of other purchasers & sellers in the marketplace
- Value of Patent = Arm's length price paid in equally desirable & comparable transactions
  - Licensee/Buyer is not willing to pay more than others have paid for similar IP
- Comparables: type of IP, industry, market size, terms, and profitability

- Based on the principle of substitution: assesses what the market will or should bear
- Comparables must be actual asset transactions
- Larger samples of comparable transactions can help smooth differences between firms
- Difficult to identify comparable because the patent market is illiquid
- Often used to determine licensing royalty rates for similar technology

Example Market Approach

Brand IP	Owner / Seller / Licensor	New Owner / Licensee / Infringer	Trademark Value ($M)	Revenue ($M)	Date	Notes
Commodore	Tulip Co.	Yeahronimo Ventures	$33		2005	Transaction believed predominantly IP based. Commodore has not had traction since the 1970s/early 1980s
Levis	Levis Strauss & Co.	N/A	$500	$4,091	2003	Loan: "In 2003, Levis Strauss completed a $500 million trademark-backed term loan, $200 million of which was priced with a hefty 10% interest rate through lead arranger Bank of America"
Fieldcrest, Cannon, Royal Velvet	Pillowtex Co.	GGST LLC	$121	$935	2003	Bankruptcy: bidders at bankruptcy auction primarily interested in brand IP, although some hard assets also purchased
Rolls-Royce	Rolls-Royce, PLC (aircraft company)	BMW	$65	$5,645	2003	Purchase: "BMW, having done its homework, knew that the aircraft company owned the valuable Rolls-Royce trademark…BMW, already a partner with Rolls-Royce PLC in an aerospace venture, purchased the Rolls-Royce trademark from the aircraft company for a mere $65 million"
Nautica	Nautica Enterprises	VF Corporation	$217	$694	2003	Total purchase price of $589.6M
Hotel del Coronado	Lowe Enterprises	CNL Hospitality Properties	$49		2003	Total purchase price of $385M, representing a 60% majority stake
Calvin Klein	Calvin Klein	Phillips-Van Hausen	>$300	$172	2002	Calvin Klein is selling the company that bears his name. Klein will be paid $400 million in cash, plus $30 million in stock and up to $300 million in royalties
Prime	Prime Restaurants of Canada, Inc.	PRC Trademarks, Inc.	$130	$127	2002	Plus a 3.25% royalty rate of gross revenues
Schwinn	Schwinn/GT	Pacific Cycle	$86		2001	Bankruptcy: primary asset was brand IP, but some inventory may also have been purchased
Rocket	Gillette Co.	Rocket Electric Co., Ltd.	$44	$8,084	2001	"Rocket Electric Co., a battery maker in Korea, entered into a 7-year license contract with Gillette Co. involving the use of trademark ROCKET…Of the total amount, US$44 million was attributed to the value of the trademark as determined by Brand Value Co."
Dean Foods	Dean Foods Company	Suiza Foods Corporation	$207	$5,974	2001	Upon the acquisition Suiza Foods Corporation changed their name to Dean Foods Company. Total purchase price of $683.9M.
DHL	N/A	N/A	$50		1992	Tax: opinions by the various experts as to U.S. value of the mark were $350.9, $102.0, $122.2, $18.2 million -- ultimately the Court allocated $50 million of value to the U.S. trademark rights
Speedo	Speedo	Pentland, UK	$37		1990	Worldwide license for Speedo swimwear

Looking for Value

PORTFOLIO ANALYSIS

Metrics for Analysis

- Market Size
- Timeliness of Technology
- Maturity
- Intellectual Property Strength
- Time to Market

Market Size

- Is the overall market large?
- What part of the market will this technology capture?
- Is the market evolved?
- Will this be a discontinuous invention?
  - Requires displacement of current technologies?
- What is the expected market penetration?

Timeliness of Technology

- Is the technology ahead of its time?
- Is there a need for the technology in the market right now?
- Will this plug into a current technology?
- Will this be disruptive in the marketplace?
- Does the government of other regulatory bodies mandate use of this technology?
  - Prohibiting the use of cell phones in car
    - NHTSA

Maturity of Technology

- Is the technology in an early stage of development?
- How long will it take to take the technology to a product concept?
- How long will it take it to take the technology to a prototype?
- What amount of resources will it take to get the technology evolved for a company to take it to market?

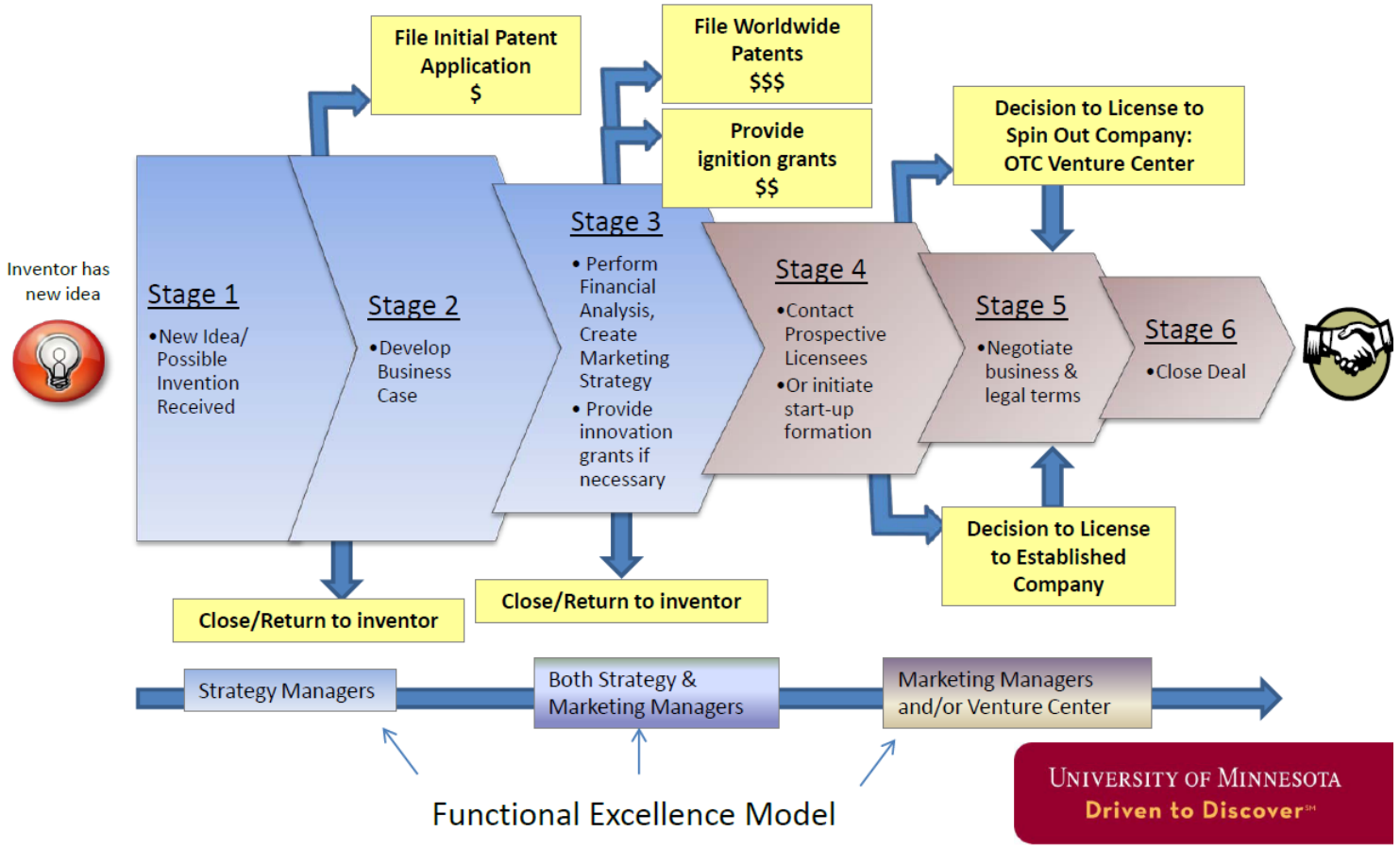
Intellectual Property Strength

- What is the status of intellectual property protection?
- Is there an issued patent in the portfolio?
- Are there other forms of technology protecting it?
  - Copyright
  - Trademarks
  - Know-how/trade secret
- What is the quality of patent around the technology?
- Are there international patents in the appropriate regions for the technology?
- Cost of protecting the technology appropriately

Time to Market

- How long will it take to get the technology to market?
- How long does it typically take a technology of a similar nature to get to market?
  - Is this a pharmaceutical or medical device?
- Is there a regulatory body which mandates particular standards for the product to get to market?
- How long will the development take to introduce the product?

OTC uses a systematic process to invest in IP with strong commercialization potential



UNIVERSITY OF MINNESOTA
Driven to Discover℠

Models for Technology Transfer

- Within the University
- Outside the University
  - A non-profit foundation
  - A TLO model (prevalent in Japan and other countries)

THANK YOU!

Outline

- Introduction
- Role of Public and Private Sector in Patent Quality
- Strategic Development of Patent Quality
- Patent Quality Determination
- IP portfolio management and patent quality

INTRODUCTION:

- What is Patent Quality?
- Patent Quality vs Quantity?
- What is Patent Value?
- Patent Quality = Patent Value?
- What are the metrics for measuring patent quality?

Metrics for measuring patent quality

- Backward citations (prior art)
- Number of claims
- Length of claims
- Breadth and quality of claims
- Litigation(s)
- Quality of inventor(s)
- Disclosure
  - Completeness of disclosure to support the claims
- Pendency of the patent (it depends)
- Law firm used
  - Specific attorney technology expertise
- **Forward citation (Most critical metric)**

Role of Public and Private Sector in Patent Quality

A. Is patent quality an active measure people look at when filing patents?
B. How much does the law firm contribute to the improvement of patent quality?
C. As a University tech transfer office what can you do to ensure higher quality patents?
D. Does private sector care that much about patent quality?
E. Does due IP diligence come before or after filing patents?

Is patent quality an active measure people look at when filing patents?

- Most entities do not have patent quality checks when filing
  - Do you ask for the minimum number of claims?
  - Do you ask for a certain number of independent claims?
  - Do perform a prior art search?
  - Do you ask counsel to perform “white space” analysis?

How much does the law firm contribute to the improvement of patent quality?

- The law firm/counsel has the ultimate responsibility in ensuring high quality of patents
  - The prior art search could be done with law firm or with outside entity
  - The inventor needs to weigh in on the invention
  - Sometimes the inventor is more focused on a narrow part of the invention
  - GOOD INVENTION ≠ HIGH QUALITY PATENT
  - Getting counsel who preferably understand IP litigation
  - Have you considered invalidation of the patent?
    - Has your counsel considered invalidation of the patent?
  - Looking at the patent family rather than the single patent

As a University tech transfer office what can you do to ensure higher quality patents?

- Always opt for a higher number of claims in a patent (does not cost you that much more!)
- Have a robust set of prior art (it helps rather than hurting your patent)
- Independent claims should obviously be as broad as possible (making sure they are not too broad so as to get the patent invalidated)
- The claims should be supported by a robust disclosure/embodiment
- Avoid “paper clip provisional” as much as possible
  - They do hurt your patent quality!

Does private sector care that much about patent quality?

- YES!
  - Licensee or acquirer does care about patent quality
  - But quantity is also critical

Does IP due diligence come before or after filing patents?

- Looking at some of the IP due diligence checkpoints
  - Pending litigation
  - Completed litigation
  - Licenses granted
  - Infringement
  - Invalidity
  - Complete prosecution history (PAIR is your friend!)
  - Check assignment (then check again, USPTO assignment database)
    - Check Espace (most complete)
    - Check Patent Lens

Does due IP diligence come before or after filing patents?

- Invention disclosures
- IDS and searches performed
- Patent application (provisional or non-provisional or PCT)
- Inventor declaration
- Filing receipts.
- Inventor assignment(s) – confirmatory assignment
- Security interests or liens
- Office actions
- Notice of allowance
- Issue fee
- Ribbon patent

Strategic Development of Patent Quality:

A. Knockout Prior Art Search
B. Patent Reexamination
C. Benefits vs Limitation
D. Favor patent challengers?
E. Deter NPE assertions?
F. Timely assessment of technology

Patent Quality Determination:

A. Technique: Claim Interpretation

B. Tools:

- Article One Partners
- Patent Ratings
- Patent Indices
- Peer to Patent

C. New Business Models

- RPX
- AST
- Ocean Tomo
- Intellectual Ventures

IP portfolio management and patent quality

A. Technology evaluation vs. IP portfolio management (maturity of technology vs. maturity of IP)

B. How to extract value from high quality patents?

C. Is selling high quality patents an option?

D. The 1 hour IP portfolio triage - Does it work?

Technology evaluation vs. IP portfolio management

- Technology evaluation is not the same as IP evaluation
  - A “hot” technology might not necessarily have a high quality patent
  - A high quality patent might not be necessarily tied to a “timely invention”
- A technologist should perform a technology portfolio evaluation
  - A tool suited for performing an IP portfolio evaluation has to be used to address quality of a patent
- IP portfolio management is essential from time to time for trimming the portfolio of unlicensed techs
  - Non-exclusively licensed techs can be licensed again if there are high quality patents
  - Stick vs. carrot licenses

How to extract value from high quality patents?

- Based on technology maturity
  - Older technologies with large number of forward citations
    - Stick license – non-exclusive
  - Timely inventions with high number of forward citations from a single company
    - Stick license – exclusive
  - Patents in mature markets which are not necessarily platform technologies
    - Larger number of forward citations
    - Might be worth exploring product claims
    - Might be further worth exploring claims charts or evidence of use
    - Companies will not license unless there is direct evidence of infringement