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Tech Transfer Hub at Venture Center

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Only One Theme

Wave 3
An awareness campaign on Innovation Management

08 April 2025
4:00 PM to 5:00 PM

Online via ZOOM
Broadcasted from
TCG IBP Studio Room

Only

Setting up a Technology Transfer Office!

Premnath V

Director | Venture Center

About the Speaker

- Dr. Premnath is a Scientist in Polymer Science & Engineering at NCL and Founder Director of Venture Center, a deep tech incubator.
- He's a technology developer, innovation manager, and startup mentor with expertise in chemical engineering.
- Co-founder of two medtech startups, he developed materials for hip and knee joint replacements benefiting over a million patients worldwide.
- He also created porous maxillo-facial implant technology used in thousands of patients globally.
- Dr. Premnath led award-winning teams in technology development, IP management, and business incubation, and is an alumnus of MIT and IIT-Bombay, with a Chevening Technology Enterprise Scholarship in the UK.

FREE

Scan QR to Register
tinyurl.com/OOTWave3

For more info contact:
Mugdha Lele
+91- 7410045652
mugdha@venturecenter.co.in

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Only!

Setting up a TTO

Premnath V, PhD, RTTP, FSTEM

Head, NCL Innovations | Founder Director, Venture Center

8 April 2025 | Only One Theme @ TechEx.in

Outline

Outline:

- What is a TTO?
- Why do you need a TTO? What are its purpose and goals?
- How to set up and operate a TTO in your organization?

- Closing remarks

Personal Experiences

I will draw from my experiences:

- CSIR-NCL: NCL Innovations Resource Center; IP Group; Lab2Mkt program
- Venture Center: Incubation programs, funding programs, investment programs, IP Facilitation Center, TechEx.in (RTTO)
- CSIR-Tech
- Interactions with other TTOs as an inventor
- Advising other R&D organizations

Scope of this talk

Use of the term “Tech Transfer”

- Academia or R&D Labs → Industry/ startups/intermediaries

- Industry → Industry (for ex, Reliance buying technology from Union Carbide/ Dow)
- R&D → Production (for ex, in pharma industry)
- Technology translation entities → Industry (for ex, MMV or FIND Dx to industry)

Scope of this talk

Types of Tech Transfer organizations (relevant to academia/ R&D labs)

- TTO dedicated to an organization

- Technology Marketing Agencies/ companies (ex, NRDC, BCIL, SMC in India)
- Regional Tech Transfer Offices/ Centers (ex, TechEx.in at Venture Center and others set up by NBM/BIRAC in India; RTI in USA)

- Associations:
  - -- Tech transfer professionals (ex, STEMGlobal in India, AUTM in USA)
  - -- Tech transfer offices (ex, FLC for TTOs of federal labs in USA)

India's association for TTP

STEM Steering Technology Management

https://stemglobal.org

An opportunity to learn from:

- Ashley Stevens, PhD, RTTP, CLP (Former President of AUTM, TT at Boston University & Dana Farber)
- John Fraser, RTTP, CLP (Formed President of AUTM, TT at Florida State and Simon Fraser Univ)
- Richard Cahoon, PhD (Formed Board Member of AUTM, TT at Cornell)

Visit:
https://www.techtransfer.online/

Tech Transfer Online

What is a TTO?

Tech Transfer

Tech Transfer

Technology transfer (TT) is the process of **moving** ***industrially useful knowledge created in academia and research institutions*** and **putting it to practical use in industry and start-ups** in order to produce products and services that can eventually deliver socio-economic impact for society.

Knowledge Exchange

TT is a key component of a larger umbrella of Knowledge Exchange (KE) mechanisms that allow academia and research universities (as creators and disseminators of knowledge) transmit and industry and start-ups (as entities that utilize and exploit knowledge to create socio-economic impact) exchange knowledge and knowhow. The other components include movement of knowledge workers, consulting, scientific services and R&D collaborations.

Source: "TTO Handbook", under preparation by TechEx.in as part of the UNIDO program

Tech Transfer Office

Tech Transfer Office (TTO)

An office of an academic organization or R&D lab that facilitates TT and champions the cause of TT.

Forms of TTOs

- Part of department (ex, part of Business Development Divisions at CSIR Labs; IRCC at IIT Bombay, IC&SR at IIT Madras; TTO in BITS Pilani; TT function embedded in Office of Sponsored Research in many smaller US univs)
- Stand-alone department (ex, TMG at CSIR-NCL; TLO at MIT)
- Separate entity (ex: FITT at IIT Delhi; NRDC in early days for CSIR labs; BCIL for DBT labs; WARF at UW-Madison; Oxford Innovations in UK; Cambridge Enterprise in UK; Mass General Brigham for MGH & BWH of HMS)

Functions of a TTO

Roles a TTO may play:

- Awareness, training, enabling policies
- Identifying/ sourcing technology assets
- IP protection and management
- Patent analytics for decision support
- Technology translation and readiness; Innovation/POC funding
- Technology assessment
- Technology marketing
- Advancing a lead closer to deal making
- Technology transfer deal structures/ agreements
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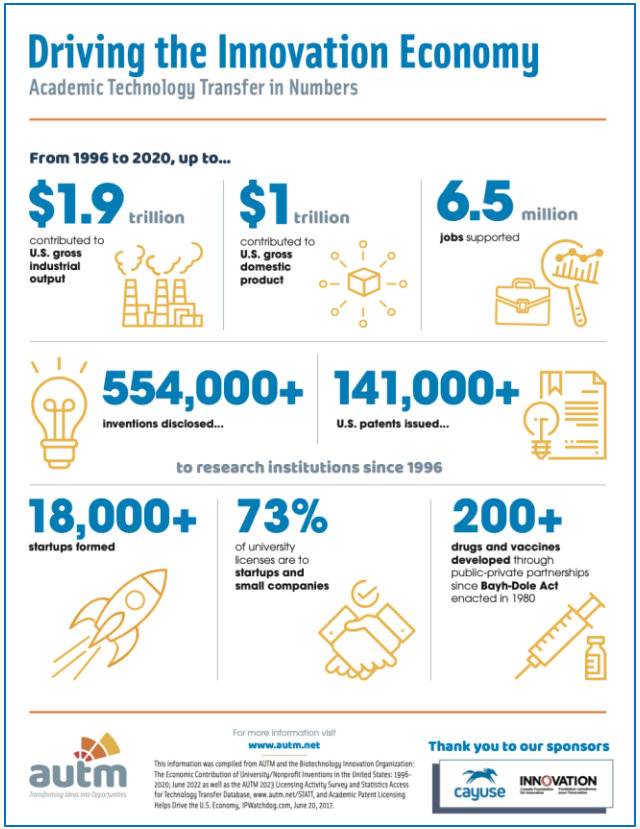
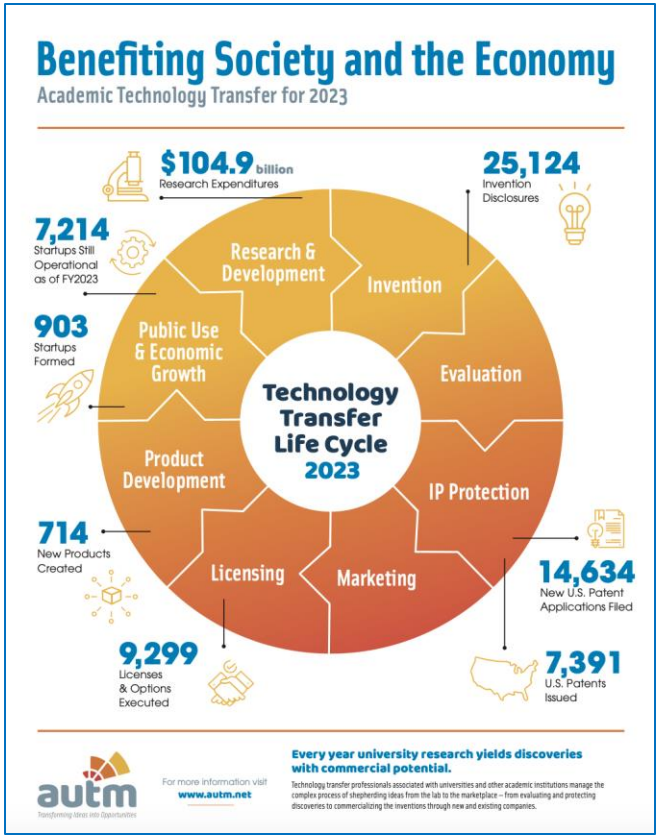
- Post-deal contract life cycle management
- Tech venturing and spinouts; seed funding
- Other models of technology commercialization

Why do you need a TTO?
What are its purpose and goals?

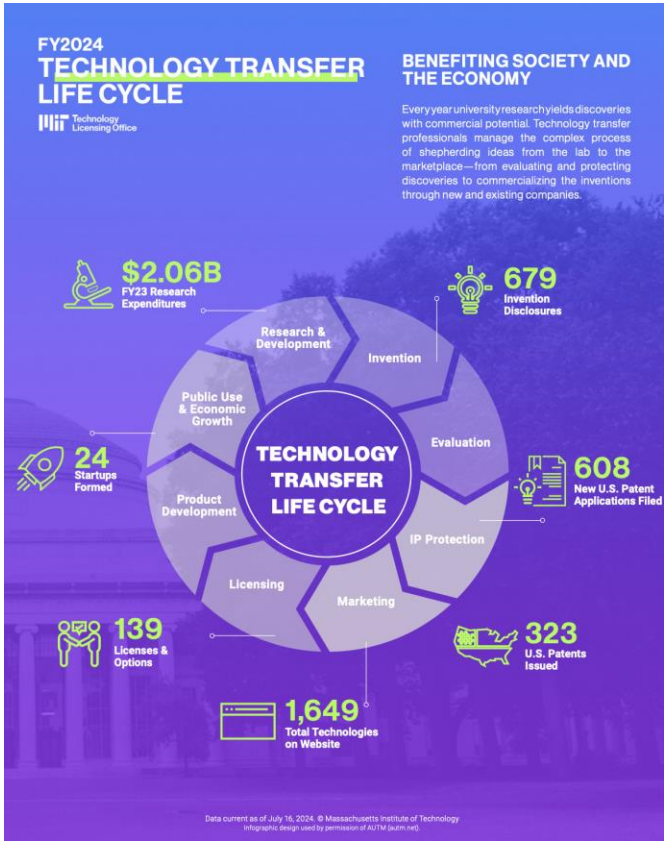
Role models – TTOs in USA





Source: https://autm.net/surveys-and-tools/tech-transfer-infographic

MIT TLO

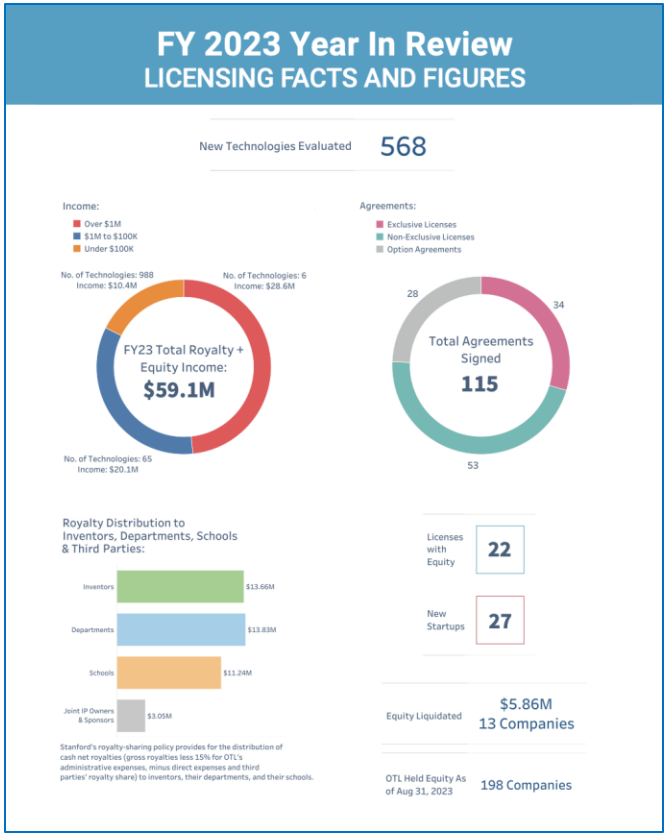


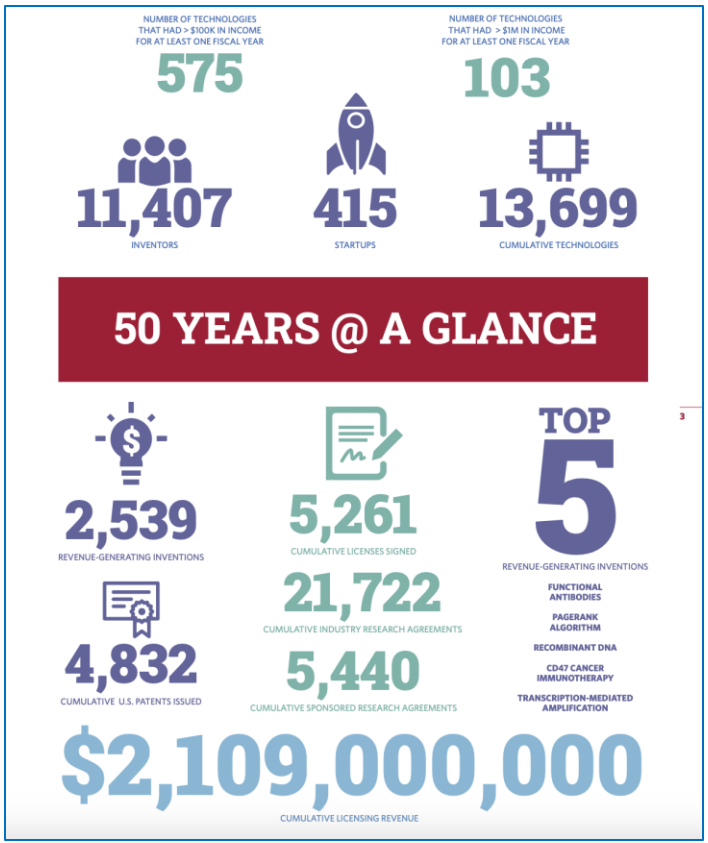
Source: https://tlo.mit.edu/

Also well known:

- Pioneering contributions to life changing tech
- Well known inventors, startup founders
- Famous companies
- Powering East Coast economy, Route 128

Stanford OTL





Also well known:

- Pioneering contributions to life changing tech
- Well known inventors, startup founders
- Famous companies
- Powering West Coast economy, Silicon Valley

Source: https://otl.stanford.edu/

Why is TT impt for academia/R&D labs?

- **Demonstrate their usefulness to society and economy** in many visible ways other than educating the next generation of leaders and workers for society. **Gain stakeholder support** and considerable funding support (that can often far exceed the direct technology transfer income of these organizations).
- **Attract faculty/ scientists/ students to academic and research organizations who are keen to see their research put to use for the benefit of the people**. Having innovators and entrepreneurs working in close association with researchers presents a considerable opportunity for researchers to advance their technologies closer to wide-spread use with potential societal and financial impact.
- Corporate engagement and thus help **bring real-world problems to academic researchers** thus adding new dimensions to their academic and research program which not only enrich the research but also bring the training of students closer to real-world situations.
- Technology transfer presents an opportunity for academic and research organizations to create new (albeit relatively smaller and unpredictable but unconstrained) **revenue streams** for the organization.

Myths

Myth: TT earnings can substitute grants and contracts

No. The best of global institutions earn up to 2-5% of their R&D budget

Myth: TT is a commercial activity

No. Tech transfer is a vehicle to realize the mandate of most academic / R&D organizations to disseminate knowledge and knowhow, and bring the benefits of knowledge to the society. TT is a delivery mechanism for impact.

Myth: TT is a distraction to the main activity of teaching

No. Technology development and its translation to actual products/ services of use to society not only provides access to real-world problems to researchers, but also trains students in real-world topics. It also inspires and attracts faculty/students who are motivated by serving society through technology.

Lesson:

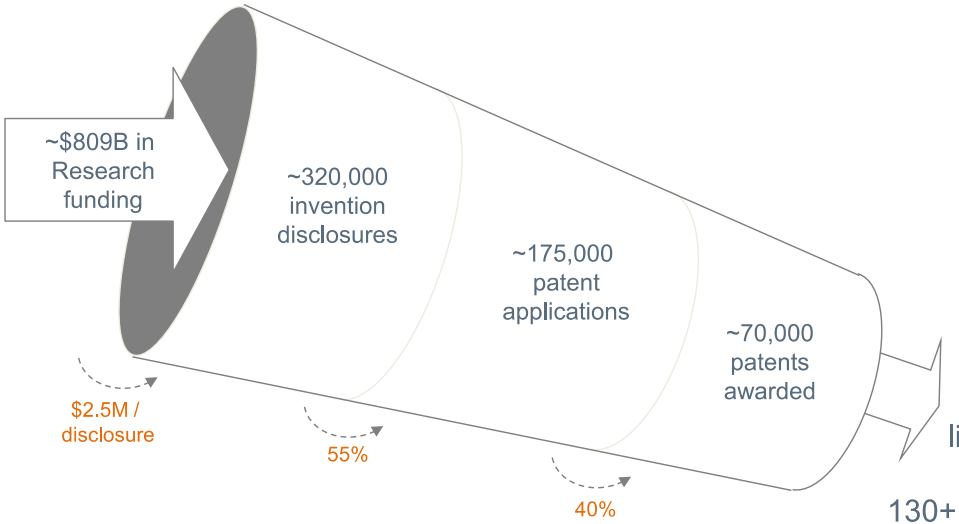
Innovation is a portfolio game of numbers and odds.

No evidence that one can pick winners upfront.

Investment in innovation should not be treated as an investment in a production process. It is like an investment in a defense forces. It is done to create “options”.

Where Do Universities Play in This Space

Cumulative Inputs and Outputs, 1991 – 2014, US Universities



37,349 active license & options,
9,261 start-ups,
130+ new drugs & devices,
300,000+ new jobs

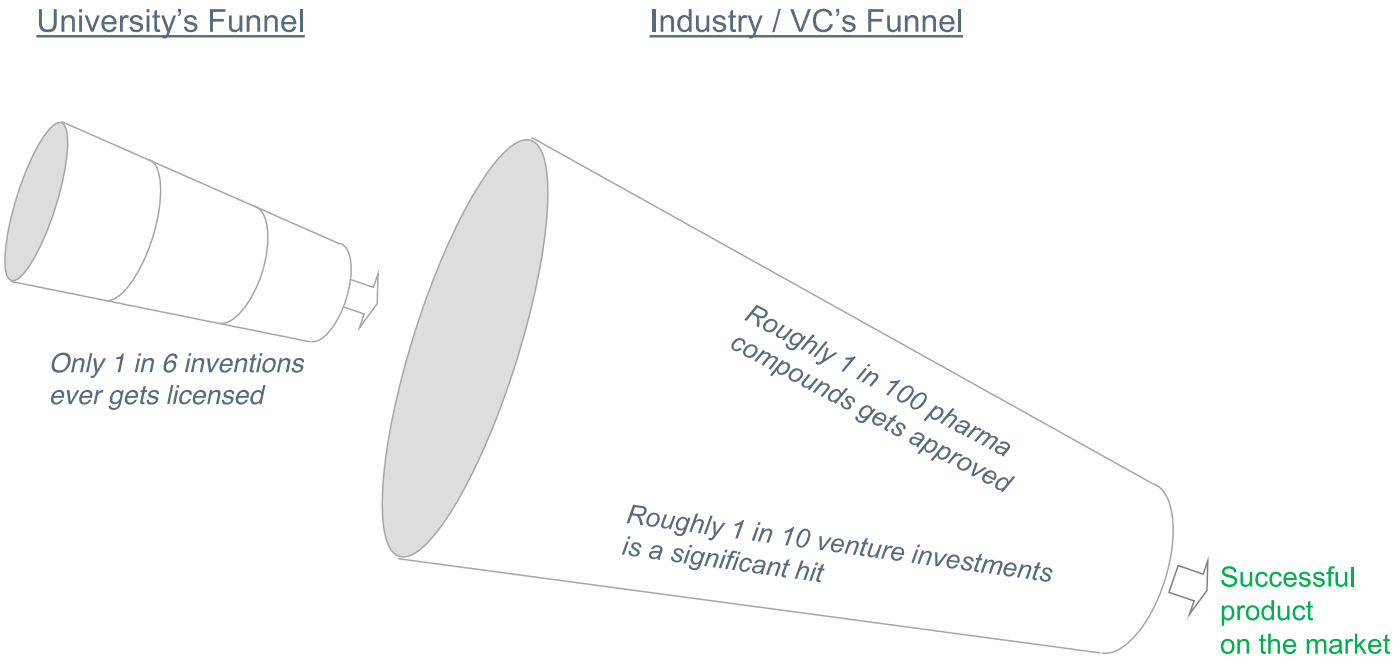
AUTM CY 2018 data:

- RE: $72 billion
- INV/RE: ~ 4 per $10M
- New products/ RE: ~ 0.12 per $10M
- New startups/RE: ~ 0.15 per $10M
- Most licensing to SME

Source: AUTM Licensing Surveys (FY91- FY14)

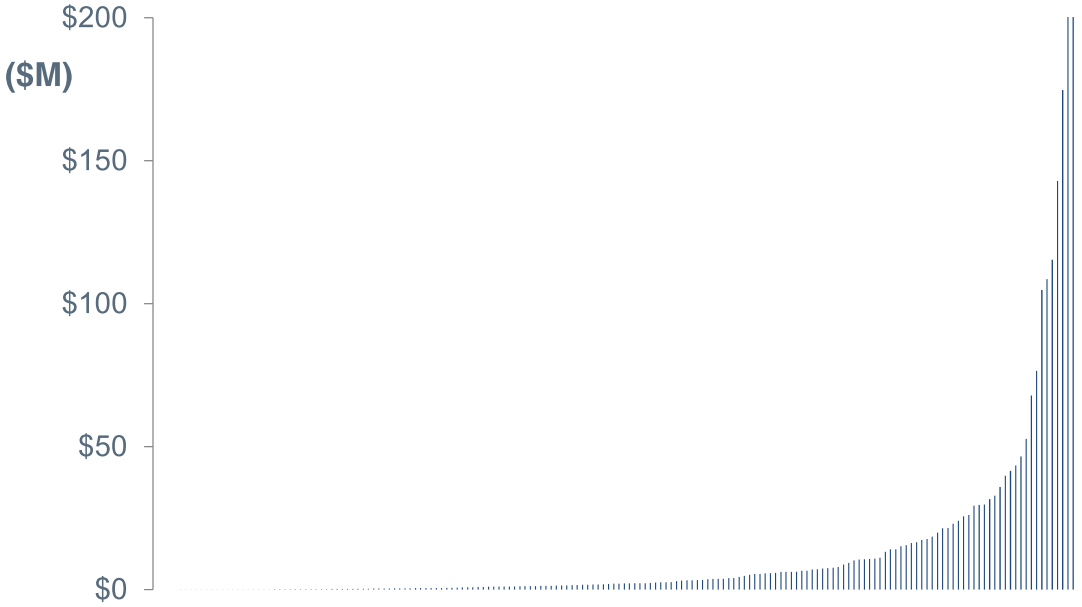
Courtesy: Orin Hershowitz, Columbia Technology Ventures

But the End of One Process is Just the Beginning of Another



Courtesy: Orin Hershowitz, Columbia Technology Ventures

Not Surprisingly, Commercial Success is Not Easy



155 U.S. Universities' 2014 Gross Licensing Revenue

Source: AUTM 2014 Survey Data

Few inventions see the light of day!

Fewer still make any money!

Courtesy: Orin Hershowitz, Columbia Technology Ventures

Lesson:

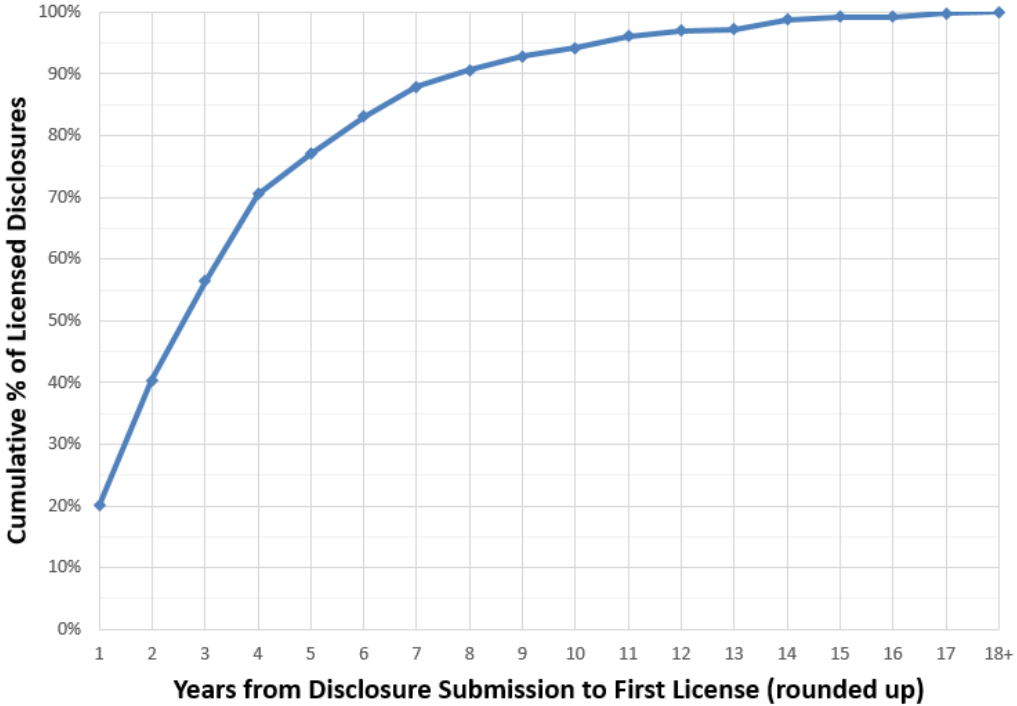
Taking ideas to market can take time.

One cannot drop IP assets in a hurry.

“Timing” is important but unpredictable.

Inventions Often Take Years to Get Licensed:

Only ~55% of Deals Done by Year 3, only 85% by Year 6

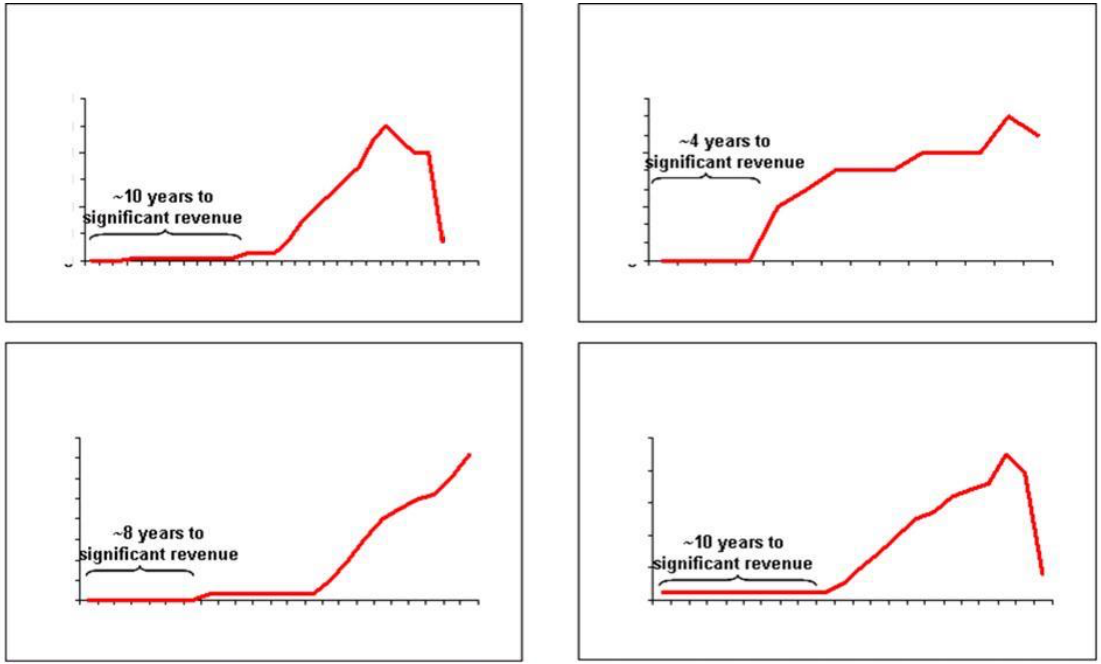


Source: Review of elapsed time from invention submission to executed license, for ~400 executed licenses covering ~700 inventions, 1982 until 2014 (32 years)

Courtesy: Orin Hershowitz, Columbia Technology Ventures

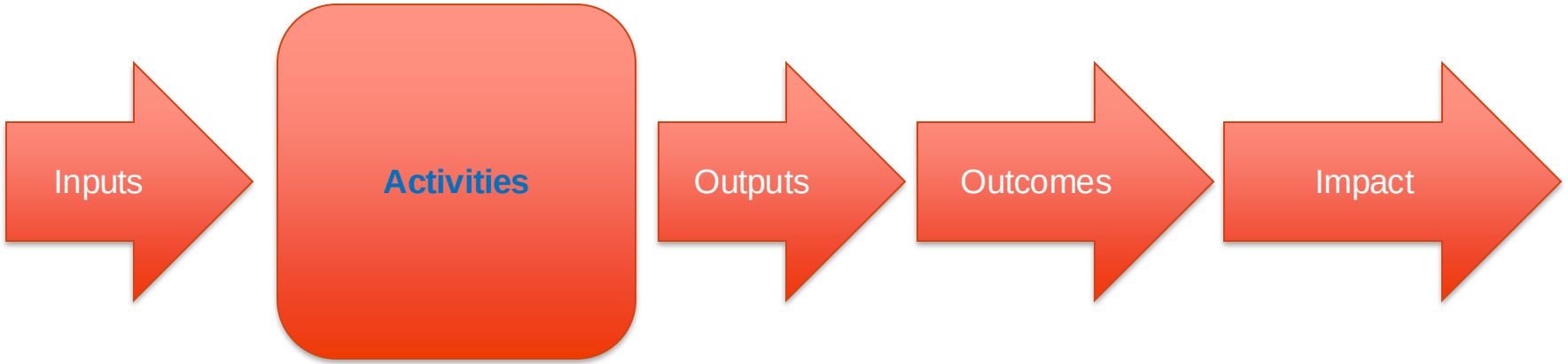
“Big Winners” Take Many Years To Develop ... And Aren’t Always Obvious at the Time

Columbia’s Four Biggest Revenue Producers
(Revenue per Year)



Courtesy: Orin Hershowitz, Columbia Technology Ventures

Designing your TTO



- Staff
- Funds

- ***Tech asset dB***
- ***IP mgmt.***
- ***Marketing***
- ***Deal closures***
- ***Contract mgmt***

- KH in dB
- Patent filed/ Invention capacity
- EoIs
- Agreements
- Earnings

- Patent grants
- Licenses
- New ventures
- Founders
- Follow-on fund raised
- Products in market

- Economic impact
- Societal impact
- New opportunities and assets created for nation/ region
- Reputation/ track record
- Leaders in industry/ entrepreneurship

NIRF Innovation: Parameter 3

nirf-Innovation
National Institutional Ranking Framework for Innovation
Ministry of Education, Government of India

NIRF Innovation Ranking Framework: 7 Parameters & 22 Key Indiacators		Weightage	%
Parameter 3: *Pre-Incubation and Incubation Infrastructure & Facilities are Currently in Operation to Promote I&E Agenda (AY 2020-21 & 2021-22):*		0.10	100
3.1	Existence of Pre-Incubation Facility (Tinkering Lab/Makers' Space/Design Centre/New Gen IEDC/IEDC/EDC/Innovation Cell/Startup Cell) (>= 600 Sq. Ft. Floor Area)		30
3.2	Existence of Incubation Facility (>= 1500 Sq. Ft. Floor Area)		50
3.3	Existence of IPR Cell / Patent Facilitation Unit / Technology Transfer Centre at the institute		20

Source: NIRF Innovation Rankings! (Part 1 of Only One Theme: Wave 3) by Dr Premnath V
https://www.youtube.com/watch?v=60X2uYnys-k&list=PL1QREBTFwupzTDBBH-VdXjflexNpYXI94&index=14

How to set up and operate a TTO in your organization?

What decides the structure of the TTO?

- Volume of technology development activities of the organization. Is there enough work?
- How important is the TT activity in achieving mandate/ mission of the organization?
- How the TT function is resourced (funds, people, in-kind support etc)?
- Availability of leadership for TT functions
- Parent organization's views/ strategy on
  - (sharp alignment of TTO with organization short term goals) vs
  - (creating long term opportunities by building/leveraging a larger ecosystem)
- National tax laws/rules and related laws/ rules
- Ability and willingness to engage supporting service providers

Functions of a TTO

Roles a TTO may play:

- Awareness, training, enabling policies
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- Tech venturing and spinouts; seed funding
- Other models of technology commercialization

Recall!

… may be organized differently!

Roles a TTO may play:

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IP protection & portfolio management:

- Awareness, training, enabling policies
- Identifying/ sourcing technology assets
- IP protection and management
- Patent analytics for decision support

Valorizing technology assets:

- Awareness, training, enabling policies
- Technology assessment
- Technology translation and readiness; Innovation/POC funding

Tech marketing and transactions:

- Technology assessment
- Technology marketing
- Advancing a lead closer to deal making
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Venturing & other routes to market:

- Awareness, training, enabling policies, clubs
- Tech venturing and spinouts; seed funding
- Other models of technology commercialization

Skills & Orientation

IP protection & portfolio management:
- Awareness, training, enabling policies
- Identifying/ sourcing technology assets
- IP protection and management
- Patent analytics for decision support

- *Science, engineering and allied disciplines*
- *IP law & procedures of IP offices*
- *Collaboration agreements*
- *Networks with IP attorneys*
- *Cost management*

Valorizing technology assets:
- Awareness, training, enabling policies
- Technology assessment
- Technology translation and readiness; Innovation/POC funding

- *Technology translation experience*
- *Industry experience*
- *Project management*
- *Grant sourcing & management*

Tech marketing and transactions:
- Technology assessment
- Technology marketing
- Advancing a lead closer to deal making
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- *Value proposition analysis*
- *Marketing; Communication*
- *Lead development*
- *Networks with tech scouts in industry/ industry leaders*
- *Deal structuring; Licensing; IP law*
- *Valuation*
- *Negotiations*
- *Contract management and enforcement*
- *Revenue management*

Venturing & other routes to market:
- Awareness, training, enabling policies, clubs
- Tech venturing and spinouts; seed funding
- Other models of technology commercialization

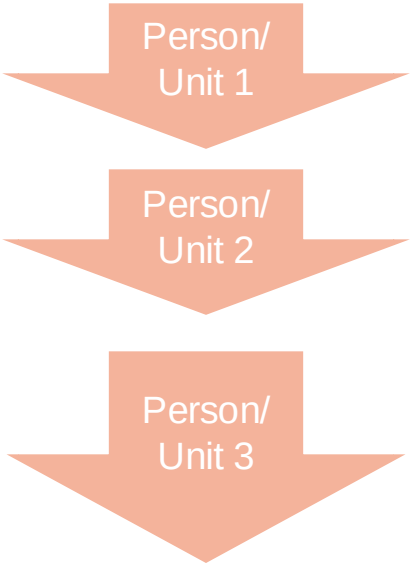
- *Startup experience*
- *Seed investing*
- *Raising investments*
- *Networks with incubators, accelerators, investors*
- *Equity portfolio management*

Two approaches

Case Management Approach

- Sourcing tech asset
- IP protection
- Tech marketing
- Lead development
- Deal structuring, valuation
- Negotiation, deal closure
- Contract management

Pass-the-baton Approach



- Sourcing tech asset
- IP protection
- Tech marketing
- Lead development
- Deal structuring, valuation
- Negotiation, deal closure
- Contract management

What can be outsourced?

Activity	Potential partners
• IP awareness, training • IP filing, prosecution, maintenance • Patent analytics and opinions	• IP attorney firms • IP Facilitation Centers • Patent strategy consulting firms/ organizations
• Technology marketing • Lead identification and development • Technology showcases	• Technology marketing agencies/ firms • RTTOs
• Technology/ IP valuation	• Specialist consulting organizations/firms
• Agreements drafting and suggesting suitable clauses	• Law firms • Agreement support by RTTOs
• Management of royalty agreements • Management of equity portfolios	• Tech asset management firms • RTTOs • Incubators
• Venture creation	• Incubators
• Seed fund	• Incubators

Internal functions, if you outsource

Core internal functions:

- **Awareness, training, enabling policies**
- **Identifying/ sourcing technology assets**
- Contracts/ agreements with service providers
- Portfolio management of technology/ IP assets
- Internal workflows and decision points
- **Decision making bodies/ individuals; decision support**
- **Funding allocations and cost management**
- Technology translation and readiness; Innovation/POC funding

Closing remarks

Technology Transfer In India

LES

The Origins Of Organized Technology Transfer In India: The NRDC Story

By Premnath Venugopalan and Hanumanthu Purushotham

NRDC's Origins–the Vision of Sir Shanti Swarup Bhatnagar

Organized technology transfer in India traces its origins back to the creation of the National

envisioned CSIR as a research organisation that would accelerate the economic development of India and set a personal example by leading the organisation in inventing several new processes and filing patents be-

The Origins of Organized Technology Transfer in India: The NRDC Story
les Nouvelles - Journal of the Licensing Executives Society, Volume LVIII No. 1, March 2023

India was one of the earliest in championing Organized Technology Transfer in the world!

In the context of current imperative to build an innovation-led economy for India, Organized Technology Transfer is expected to play an important role in the development of the country again!

Time to strengthen TT capabilities!

Read at:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4335728

Upcoming events/ opportunities

An opportunity to learn from:

- Ashley Stevens, PhD, RTTP, CLP (Former President of AUTM, TT at Boston University & Dana Farber)
- John Fraser, RTTP, CLP (Formed President of AUTM, TT at Florida State and Simon Fraser Univ)
- Richard Cahoon, PhD (Formed Board Member of AUTM, TT at Cornell)

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Also coming up:

- 16 June 2025 (2 hours): Tech Transfer Essentials for Decision Makers, New Delhi
- 17 -21 June 2025 (5 days): Tech Transfer in Practice, Pune (an In-person Certificate Course)
- In planning: Advanced half day modules for specialist Tech Transfer Professionals

- TTO Handbook
- Online Manual

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Implementation Partners

VENTURE CENTER

TechEx.in Tech Transfer Hub

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Connect to TechEx.in for help

TechEx.in offerings for academic organizations & their TTOs/IP Cells:

- Awareness, inspiration & training
- Mentoring of innovation/IP/TT managers
- Drafting/ vetting policies
- Facilitation of IP filing, prosecution
- Decision support via reports
- Agreement support
- Technology marketing
- Technology licensing
- Valuations
- New venture creation support
- Incubator manager training
- Mentoring for raising funding

Contact:

Dr Kavita Parekh
Lead person for academic programs
TechEx.in team, Venture Center
kavita.parekh@venturecenter.co.in
+91 8956457042

TechEx.in

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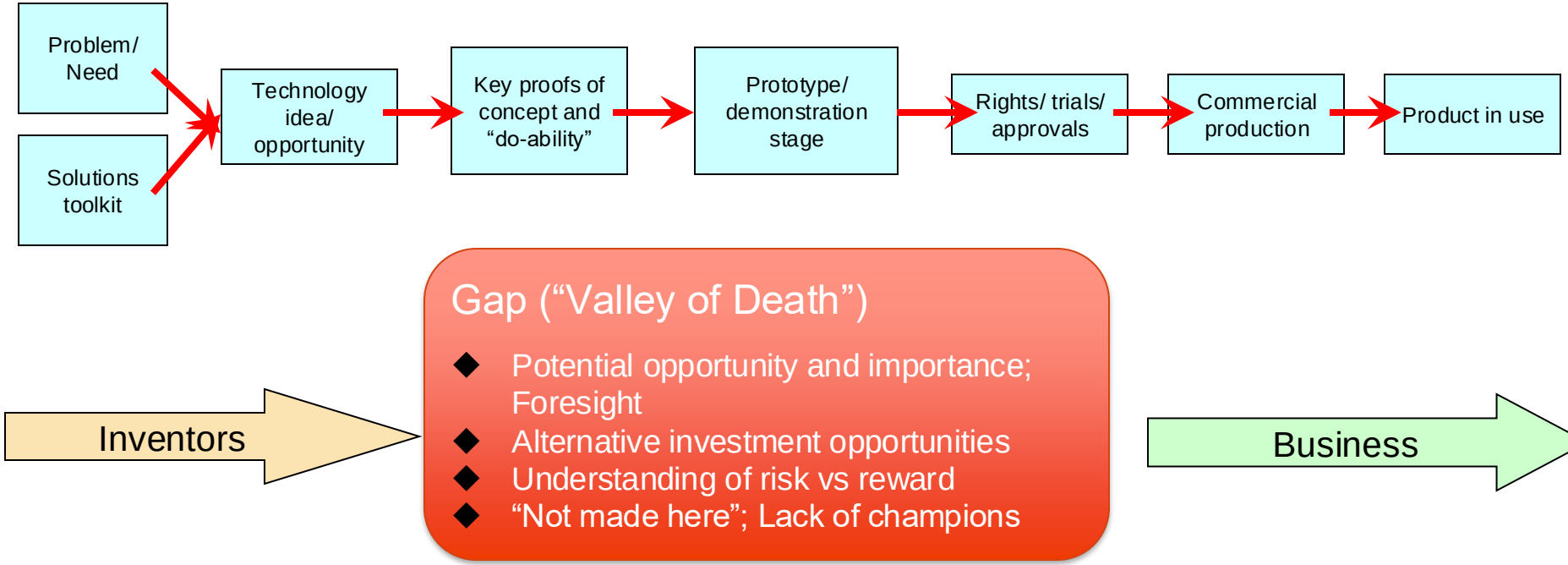
THANK YOU

Contact for more details

Premnath V, *PhD*

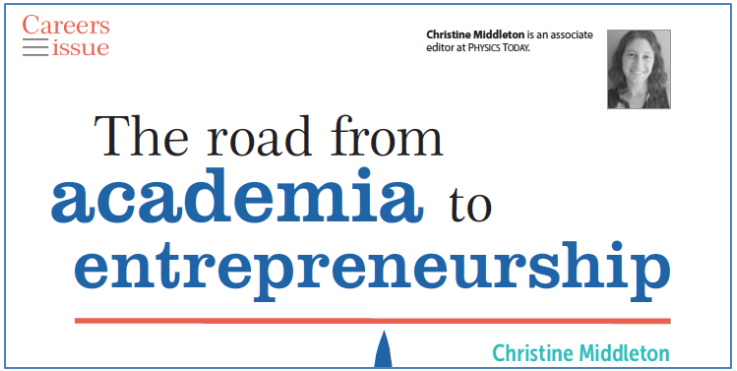
director@venturecenter.co.in

The gap: Interests, motivations, expectations, trust



1	Basic principle observed
2	Technology concept formulated
3	Proof of concept established
4	Small-scale prototype in the lab
5	Large-scale prototype in the intended environment
6	Prototype system verified at near-intended performance
7	Pilot demonstration at precommercial scale
8	Technical and manufacturing processes in place
9	Product commercially available

FIGURE 4. AN INNOVATION'S MATURITY can be characterized by its technology readiness level (TRL). Research at low TRLs (1–3) is typically performed at universities and funded by grants from foundations and the federal government. Work on technologies at high TRLs (7–9) is often funded by corporations. Startups can help bridge the gap between those development levels.



Physics Today, Oct 2021

Startups can be the ”best friends” of researchers

BULLETIN ON ENTREPRENEURSHIP: NO. 1, APRIL 2023 | Subscribe

Startups Drive Commercialization of High-Impact Innovations

Patents commercialized by startups are more likely to be disruptive than those commercialized by incumbent firms or universities.

“Start ups have more incentive than incumbent firms to engage in potentially disruptive R&D because large, established firms have more to lose from the discovery of new technologies that replace traditional ways of doing things. With no existing operations, startups have nothing to lose and much to gain from disruptive innovation.”

NBER | NATIONAL BUREAU of ECONOMIC RESEARCH

https://www.nber.org/be/20231/startups-drive-commercialization-high-impact-innovations