



How to Measure and Communicate Your Impact and Value

How to Measure and Communicate Your Impact and Value

A webinar with John Fraser, Tony Raven and Vijay
Vijayaraghavan

Thursday September 29, 2022. Noon – 1:15 EDT



How to Measure and Communicate Your Impact and Value

FRASER Comments



Who is John Fraser ?

President of Burnside Development, a personal technology transfer consulting firm. Work with colleagues in Brazil, Chile, Malaysia, Mexico, Thailand, the Philippines, Serbia, Sri Lanka, USA. And the World Bank and WIPO. Focus on Policy, TTO setup, Strategy and Operations, Licensing, Spinout companies, Financing.

Expert Witness in several University–Industry lawsuits.

Entrepreneur-in-Residence, NIST National Lab, Washington DC.

President of AUTM (2006-2007) the association of Technology Transfer professionals.

Created/Headed 4 academic TTOs – 2 in Canada, 2 in USA. 2 for-profit, 2 not-for-profit. 250+ licenses and midwife to 40+ spinoff companies.

Retired as Assistant Vice President of Research and Economic Development, Florida State University, Tallahassee, Florida.

Cofounded 3 start-up companies – sold 1, buried 2.

VP of a venture capital investment firm.

Senior officer in NSERC, the Canadian counterpart to the US NSF.

Masters in Biochemistry, University of California, Berkeley 1973.



How to Measure and Communicate Your Impact and Value

To remind Everyone:

- In the US, there are approx. 4,000 Universities and Colleges.
- Of these, there are 146 institutions classified as "R1: Doctoral Universities – Very high research activity" in the 2021 Carnegie Classification of Institutions of Higher Education.
- There are approximately 190 consistent respondents to the AUTM Annual US Licensing Survey from universities and hospitals, which implies a formal technology transfer activity, if not an Office.



How to Measure and Communicate Your Impact and Value

In spite of widespread activities in US universities since the mid 1980's, many of theTTO key stakeholders in our activities do not yet have an appreciation of the positive impact of academic technology transfer on their institutions and the US economy.

Why is there still a perceived lack of understanding by many of our stakeholders of the impact of our activities?



How to Measure and Communicate Your Impact and Value

Possibly because our stakeholders (elected officials, senior leadership of research institutions) have turnover in their positions and also have a very broad scope of responsibilities in which oversight of technology transfer is a small part. Thus, understanding of our impact is modest to begin with and lost to that Office as they leave their posts and move on.



How to Measure and Communicate Your Impact and Value

It is also clear that we TT practitioners have previously communicated primarily using Transaction Metrics (numbers of Disclosures, Patent applications, Licenses, etc.) and later using Stories as well.

This is fine as far as it goes, but I believe that primarily using Transaction Metrics severely limits the way in which we can communicate the Impact and Value of what we do!

Why?



How to Measure and Communicate Your Impact and Value

Communicating using primarily Transaction Metrics forces the audience to understand the mechanisms of how we practitioners do things.

The audience asks themselves ‘why are disclosures and patents so important’?

In reality, the audience is not overly concerned with the mechanics of how we do things.

What they do care about is how our activities can help them do their job of achieving their own institutional goals and advancing their own careers.



How to Measure and Communicate Your Impact and Value

So, to Communicate, I focus on the specific audience, tell them the BENEFITS for their job responsibilities of TTO activities, then use STORIES to put names and faces to the BENEFITS and finally describe the METRICS to show the scale and scope/IMPACT of the BENEFITS.



How to Measure and Communicate Your Impact and Value

Let us divide the Impact/Value conversation for different audiences:

Inside the Research Institution:

Determine who your Audience is and describe the benefits of what your office does for that Audience: For example:

- To Researchers – Engagement with commercialization can ‘Accelerate your research career’ by connecting you with new partners, new important challenges and new financial resources.
- To Senior University Leadership – TTO activities can ‘Enhance the Reputation of the Institution’ by demonstrating how on-campus research is addressing real societal problems.



How to Measure and Communicate Your Impact and Value

Outside the Research Institution:

- To Government – TTO activities can ‘Demonstrate a productive response’ to State and Federal government challenges to each Institution to ‘do what you already do but do more to help with the Economy and build the Innovation Culture’.
- To the Local or regional Community – TTO activities can ‘Achieve Results’ in terms of money external to the community coming into the Institution via Sponsored Research Office grants, via royalties from local Licensees and via Job creation in local spinout companies. Much of this external money is then spent locally via salaries, etc. I learned that to describe one of the benefits of spinouts to the local Tallahassee community, I had to describe it as offering new employment opportunities for students who graduated, left for the big City, but now want to ‘come back home’ to raise a family.



How to Measure and Communicate Your Impact and Value

- To Corporations: Access to new possible product opportunities to expand your market presence. It is a High Risk to develop a Product, but such expenses are likely tax deductible in the US. Collaborate with creative people in the academic world at a cost much reduced from contracting with a private sector product developer.

Test out product opportunities. If they do not look promising prior to market entry, you can abandon the project with minimal repercussions. By accessing an academic collaborator, you can be accessing an academic network with information about where the whole market/application might be going in the mid- and longer- term future.



How to Measure and Communicate Your Impact and Value

Having described how the TTO activity *benefits* a particular audience, I have then found it effective to:

Present Stories of successful TT Deals – give examples with names and faces which show that this activity actually does work! The AUTM Better World Project is a great source of stories.

bit.ly/3qoCyiP.



How to Measure and Communicate Your Impact and Value

Having presented Stories, I have then found it critical to:

Present the TT Metrics for your Institution or State or use national AUTM stats to show skeptics that this activity is scalable and has a meaningful /measurable Impact.



How to Measure and Communicate Your Impact and Value

Incidentally, AUTM and BIO have authored recent studies that show the **macroeconomic Impact** of 22 years of academic technology transfer results in the US. In summary:

“Using an updated, more complex, and most current input-output “I-O” approach to estimating the economic impact of academic licensing, assuming no detrimental product substitution effects, and summing that impact over 22 years of available data for academic U.S. AUTM Survey respondents:

- total contribution of these academic licensors to industry gross output ranges from \$723 billion to \$1.7 trillion, in 2012 U.S. dollars;
- contributions to gross domestic product (GDP) range from \$374 billion to \$865 billion, in 2012 U.S. dollars; and
- estimates of the total number of person years of employment supported by these academic licensors’ licensed-product sales range from 2.676 million to 5.883 million over the 22-year period.

The high end of the above ranges, is based on an assumption of a 2% earned royalty rate on licensees’ product sales. The low end of the range is based on an assumption of a 5% earned royalty rate on licensees’ product sales.

bit.ly/355V3Bs , bit.ly/36GKB3O



SOCIETAL IMPACT

Edwin Mansfield, University of Pennsylvania professor published papers in the 1980s and early 1990s. See <https://drive.google.com/drive/folders/1UVyWWbuValN5k4WWBVg0BfNPfFnAaLm> p.

One study concluded that a company that invests in new products, will capture only about 25% of the benefits of the investment (financial and otherwise). Society captures twice as much at 54%, with the rest too diffuse to measure.



How to Measure and Communicate Your Impact and Value

Hopefully by the end of your Presentation, the audience is aware, educated and interested. You must then be ready to respond to their question: “This is great, how can we help you?”. i.e., What is your ASK of the audience?



How to Measure and Communicate Your Impact and Value

Let me stress again, the importance of gathering and using Transaction Metrics!

- The Metrics can be used to convince the audience that our activities are not simply one-off deals, but an ongoing activity that over time builds relationships with the private sector, helps the Institution respond to government requests to help build economic activity and enhance the Institution's reputation.
- The Metrics allow the TTO to put names and faces to these activities in specific understandable terms.
- Metrics have a key role but cannot be the sole means of communication.



How to Measure and Communicate Your Impact and Value

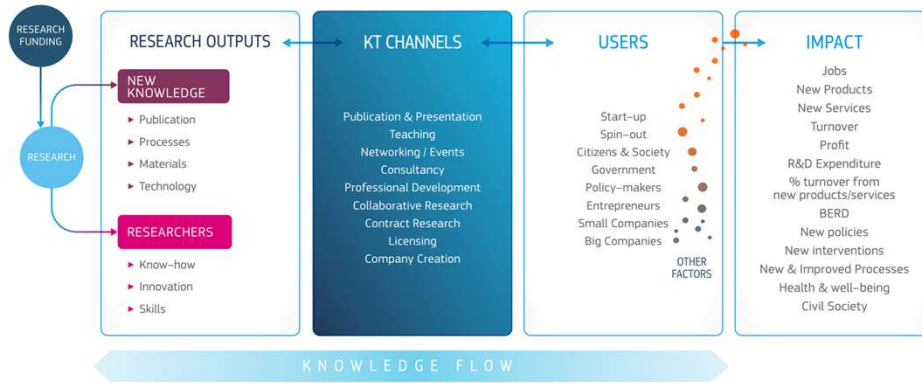
But these are still Transaction Metrics. Are we thinking broadly enough? Consider the many ways that knowledge and technology is transferred (KT & TT) off campus as in this graphic. These are formalized, papered arrangements – the KT channels See following slide.

FROM: “KNOWLEDGE TRANSFER METRICS.” Towards a European-wide set of Harmonised indicators. Alison Campbell, Chair. bit.ly/3L7jaz6.



How to Measure and Communicate Your Impact and Value

Figure 1: Knowledge Transfer: from research to impact



- 1 There are several terms in use to describe the processes of knowledge valorisation. Knowledge Transfer (KT) and Knowledge & Technology Transfer (KTT) are often interchangeable. Technology Transfer (TT) tends to refer to research commercialisation and may be considered a subset of KT. This report will use the KT terminology.
- 2 Publicly Funded Research Organisations (PROs) includes universities, colleges and other governmentally research institutions. The term PRO is used in this report.
- 3 Available at: <http://www.innovationbycollaboration.se/wp-content/uploads/2015/09/Kevin-Cullen.pdf>



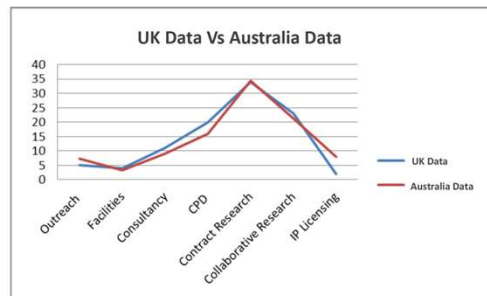
How to Measure and Communicate Your Impact and Value

Australian and UK Data



	UK Data	Australia Data
Outreach	5	7
Facilities	4	3
Consultancy	11	9
CPD	20	16
Contract Research	34	34
Collaborative Research	23	21
IP Licensing	2	8

of agreements 99 98



REF: <https://www.sciencedirect.com/science/article/abs/pii/S0048733307001199>



How to Measure and Communicate Your Impact and Value

Based on the preceding, when you measure the number or the dollar value of the contracts, as in the graphic below, the commercialization activities (IP Licensing, Company Creation) are only a very small part of the entire Knowledge Exchange (KE) process (2% in the UK, 8% in Australia) but very focused on improving the economy via the use of IP licensing to both existing and to newly created spinout companies.

As an aside, is it any wonder why the VP Research with a wide Scope of responsibilities might not be giving the TTO, the highest priority?



How to Measure and Communicate Your Impact and Value

The Solution?

Determine who is in the audience we are addressing and describe the benefits for them of our activities, next reinforce understanding by using a story or two to put a name and face to the successful activity and finally use the Transaction Metrics to show how the activity scales to have a very measurable economic impact.



How to Measure and Communicate Your Impact and Value

An out-of-the-box suggestion as to how to Improve our Communications?

- Within the technology transfer community there are likely people who have relatives who work on 'Madison Avenue' in New York City. Why not gather a group of 'Madison Avenue' marketers in a brainstorming session and ask them: "How to communicate our Impact and Value?"
- It is highly likely that they will create a response that covers issues we have not thought about as we are 'too close' to the activity.
- It is also very likely that they will suggest an appeal to the emotions of the audience, something that we TT practitioners tend not to do! Most of us have scientific backgrounds and we tend to rely on measurable data and not on appeals to emotions. Professional marketers/communicators are not so constrained.



How to Measure and Communicate Your Impact and Value

Thoughts from the United Kingdom:
Tony Raven Comments



Who is Tony Raven?

- "Retired" from CEO of Cambridge Enterprise, the research commercialisation office of the University of Cambridge (2011 – 2021)
- Chair, Spinouts Denmark IAB (2021-Present)
- Adviser to UK (2021 – Present)
- Architect of TenU partnership {2018}
- Creator of SETsquared Incubation that has supported over 5,000 nascent entrepreneurs in raising \$3Bn (2002)
- Founder of Cambridge Innovation Capital with now \$1Bn of assets under management (2012)
- Co-creator of IP Group (2001)
- Serial Deeptech Entrepreneur with \$1.5Bn of combined exits (1985-2000)
- Highly cited researcher at Oxford and Osaka Universities (1975-1982)



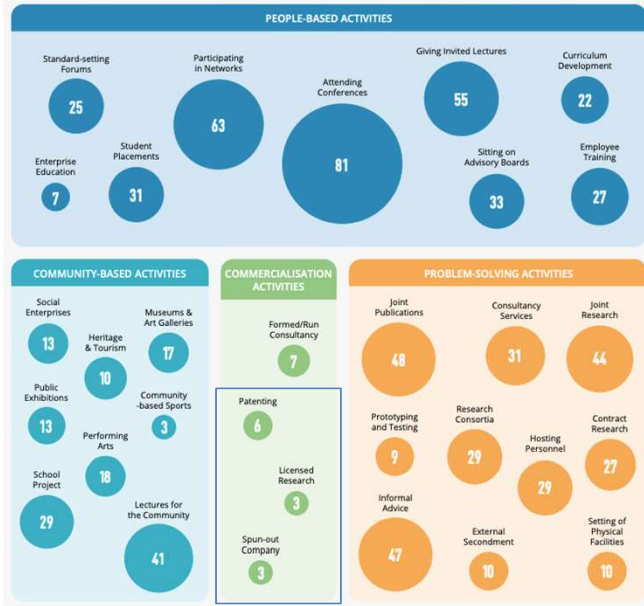
UK universities profile

To set the context:

- In the UK, there are approx. 157 (US: 4,000) Universities and Colleges.
- Of these, there are 24 Russell Group universities that receive 75% of research funding.
- There are approximately 130 respondents to the HEBCIS survey of which about 110 receive KE Funding (HEIF)



Knowledge Exchange not Tech Transfer



From: "The Changing State of Knowledge Exchange" NCUB 2016

[NCUB The Changing State of Knowledge Exchange Feb16 WE B.pdf](#)



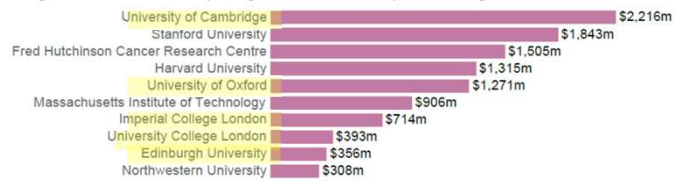
UK and USA are comparable but very different

Metric	2020	
	USA	UK
Spinouts per £100m of R	2.07	2.05
IP/R income	3.1%	2.2%
%Industrial R	7.5%	7.7%

Source: Report on IP-related and commercialisation activities in England in 2019/20, Nov. 2021

Source: Global University Venturing (2018)

Top universities by capital raised by their spinouts 2013-17



Coming to a Government near you?

For over 20 years the UK has consistently and increasingly funded both University Research and Knowledge Exchange

That funding comes with **Impact** expectations and "trust me" is not an acceptable answer for evidence those expectations are being met

Hence a range of approaches – metrics to stories - to demonstrate the Government is getting policy objectives met and value for money

With the US Government investing \$3Bn in tech transfer under the CHIPS Act you might anticipate similar evidence requirements being introduced.



Research & its Impact



First Attempt c. 2006

Research Grants applications should include the potential Impact of the research if it is successful to encourage academics to think about Impact

BUT

Research Grants are awarded by expert panels of.....academics who.....
.....completely ignored the Impact section in awarding funding.



BBC Radio Conversation (paraphrased)

Minister: “We need to know the money we invest in research is creating the impact we’re looking for”

Academic: “But I can’t predict what impact my research might have in the future!”

Minister: “So don’t. But tell us about the impact your research we funded ten years ago is having today”



Dual Stream Research Funding

Research Grants individually funded at **80%** of Full Economic Cost (FED) (\$9.5Bn)

Quality Related (QR) university top up based on assessed quality of university's research (c\$2.3Bn)

Higher Education Innovation Fund (HEIF) to support research translation to Impact (Economic, Social, Environmental) (c\$300m)



Research & Impact Assessment

Research Excellence Framework:

Assessed by expert panels based on 34 "Units of Assessment",

60% on **Research Quality** based on published research

25% on **Impact* Case Studies†** (20% in REF2014)

15% on "Research Environment"

* The effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life **beyond academia**

† One good impact case study in worth, monetarily, four papers in Nature.



Types of Research Impact – UK definition



REF2021 Research Excellence Framework

Key facts

157

number of UK universities whose research was assessed

1,878

submissions including:



76,132

academic staff



185,594

research outputs

6,781

impact case studies

34

expert sub-panels reviewed the submissions

4

main panels overseeing including:

900

academic members

220

research users

The overall quality of submissions was judged, on average to be:

41%
world-leading



43%
internationally excellent



14%
recognised internationally



2%
recognised nationally



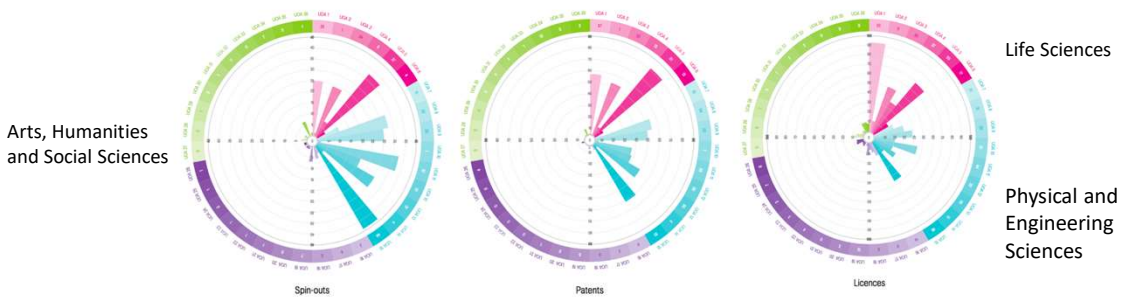
QR Funding Allocation

Based on number of Research Active staff and quality of research/impact

★★★★★	World leading	Weighting 4
★★★★	Internationally Excellent	Weighted 1
★★★	Internationally Recognised	Weighted 0
★	Nationally Recognised	Weighted 0
	Unclassified	Weighted 0

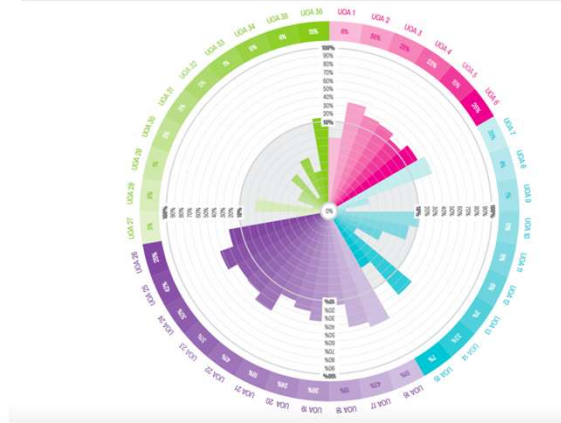


Where do spin outs, patents and licenses come from?



Where does policy advice come from?

Figure 23: Impact wheel ('Informing government policy', n=1,233)



KE/TT & its Impact



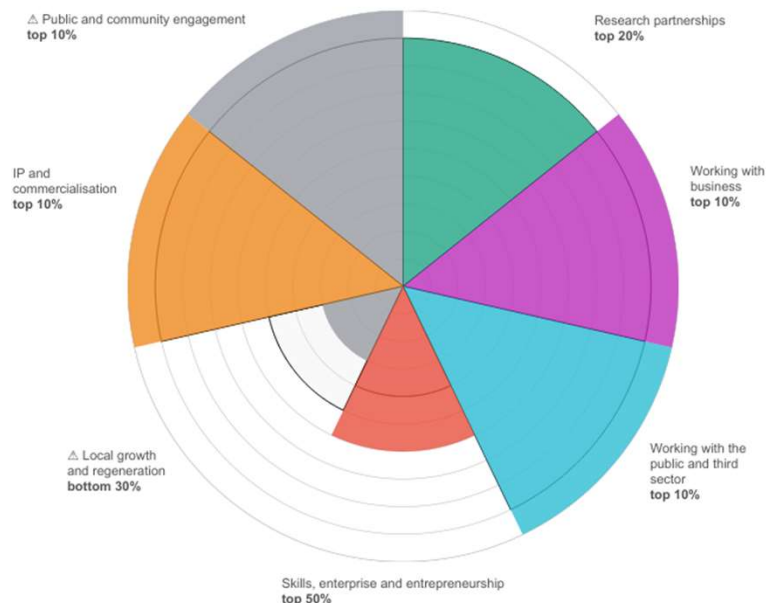
Measuring University TT/KE Performance

- Initially metrics through the Higher Education Business and Community Interaction Survey (HEBCIS)
 - (Metrics started by TTOs in 2001 using AUTM template)
 - Started c2003 as a non-mandatory return to the four Higher Education Funding Councils (RE , HEFCW, SFC, DfENI)
 - Moved in 2006 to a statutory return to the Higher Education Statistics Agency (HESA)
 - HEIF funding allocated formulaically based on HESA data
 - Bottom up allocation model – “This is how much you have been allocated, tell us what you are going to do with it”



Next iteration, KEF & KEC

- REF, TEF (Research/Teaching Excellence Framework) and KEF (Knowledge Exchange Framework) (kef.ac.uk)
- KE Concordat of Eight Guiding Principles (keconcordat.ac.uk)
- Under KEF, universities are compared to their peer group, not everyone



The big BUT

All these schemes and data are great for policy wonks, encouraging engagement and incentivizing universities/TTOs

BUT

A few good stories/soundbites simply told are far more effective at influencing politicians and policy

"For every complex problem there is an answer that is simple and wrong"

HL Mencken



Just three numbers can change the environment !

The University sits at the heart of one of the world's most successful innovation and technology clusters.

23 
billion-dollar businesses born in Cambridge

£18bn 
In total annual turnover generated by knowledge-intensive firms

5,300+ 
Knowledge-intensive firms

67,800+ 
people work for knowledge intensive firms



Thank you.



How to Measure and Communicate your Impact and Value

Vijay K. Vijayaraghavan
vijay@sathguru.com
vk2@cornell.edu



My fortunate journey through the world of Knowledge Transfer

Chairman and Chief Executive of Sathguru Inc, a global knowledge transfer organization with presence in four continents

Academic affiliation to Cornell University – Regional research – Technology Transfer – Deliver Graduate level course on KM.

President of Society for Technology Management, the Indian association of KT managers

Fortunate to deliver professional services in 30 countries in developed and developing regions

Board position in global bodies focused on public good knowledge transfer

Three decades of transaction advisory for KM with over 100 licensing transactions - Leader among private enterprise KM managers

Professional education and training in IP management, bio-sciences, finance and strategic management

Member of ATTP Council & Regional Chair – AUTM International Strategy Committee



Innovation in India - Historical approach 1947-1991

Public Innovation in India - Historical approach 1947-1991

- Quest for self reliance.
- - Agriculture, health care, defense technologies
- Socialistic economic policy within a democratic political framework
- Federal control - State production – control of private production.
- No focus on IP creation
- Federally funded research institutions
- Universities confined to teaching
- Rudimentary private sector research
- Innovation was constrained by lack of competitive markets
- National Research Dev. Corporation created in 1956 as sole Technology Transfer body for all publicly funded IP generation



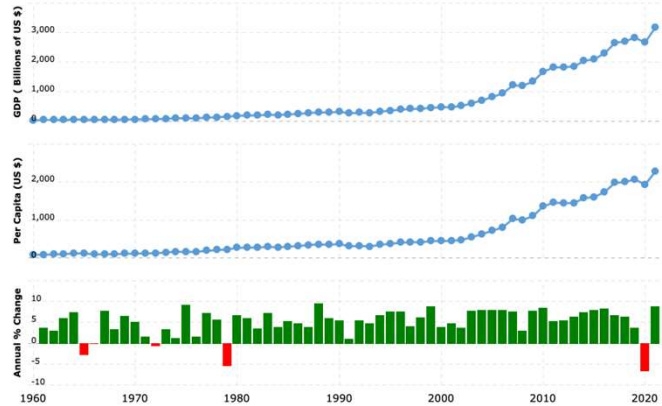
India reforms and the growth story

In 1991 India changed gears and initiated reforms for open markets

Indian growth since 1991 is unprecedented

India emerges as 5th largest economy

GDP grows from \$ 270 Bn in 1991 to \$ 3.2 Tn in 2021



India's intensity in research investment

Gross domestic expenditure on research @ 0.7% of the GDP provided thrust for innovation

India stands third in global scientific publications
Public research is pursued in Centrally administered research Institutions & research universities

Extra-mural research investment in private research gaining emphasis

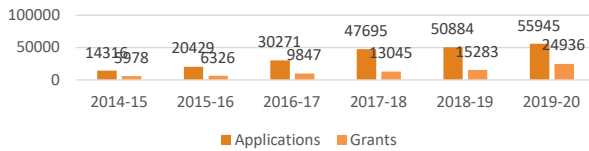
National Science and Technology and Innovation policy reflects emphasis on creating IP

Goal set to increase research investment to 2% of GDP by 2030 gradually

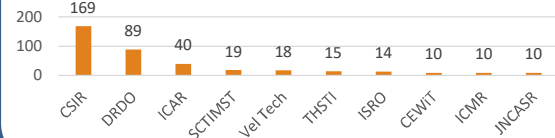


Composition of IP generation public research Institutes

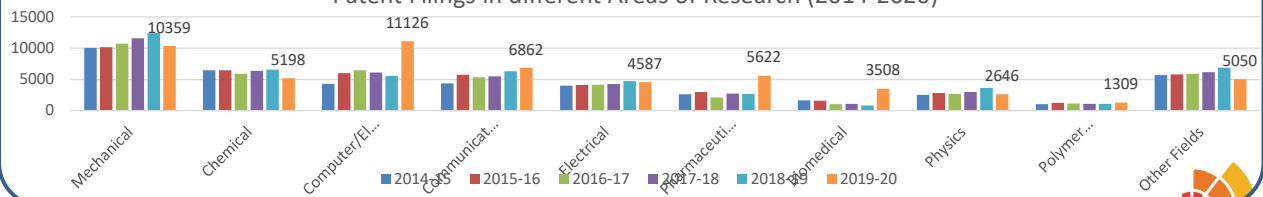
Patent Applications at Indian Patent office (2014-2020)



Top applicants from scientific & research development organizations (2019-20)



Patent Filings in different Areas of Research (2014-2020)



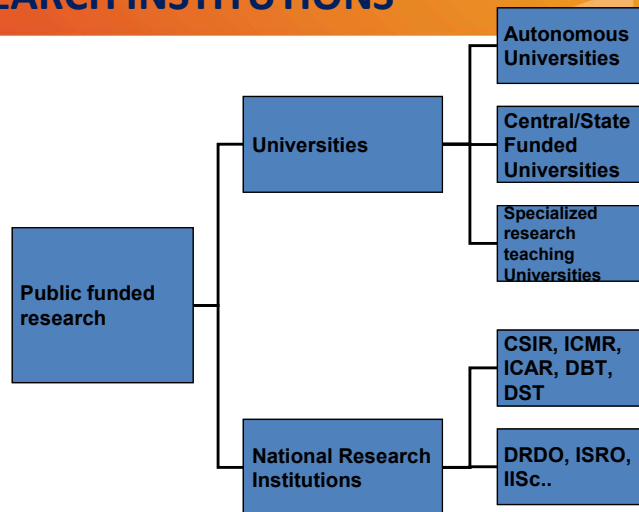
autm

Institutional / legal policy on IP protection and technology transfer

- No legal framework exists currently on IP ownership of publicly funded research and transfer of technologies
- Institutional Policies determine specific approach to IP Protection, technology transfer and benefit sharing
- Heterogenous policies have been preferred to due varied focus of institutions, their priority research and extent of engagement in translational research
- Pioneering effort by a few national institutions to create sustainable TTOs
- IP Cells formed in numerous institutions focused on IP filing
- Surge in IP filing provides critical need for IP assets management
- Institutions create dedicated TTOs not depending on NRDC to steer transactions

autm

LARGE, EXPANDING NETWORK OF NATIONAL RESEARCH INSTITUTIONS



Sponsored research – Vital backbone for Innovation

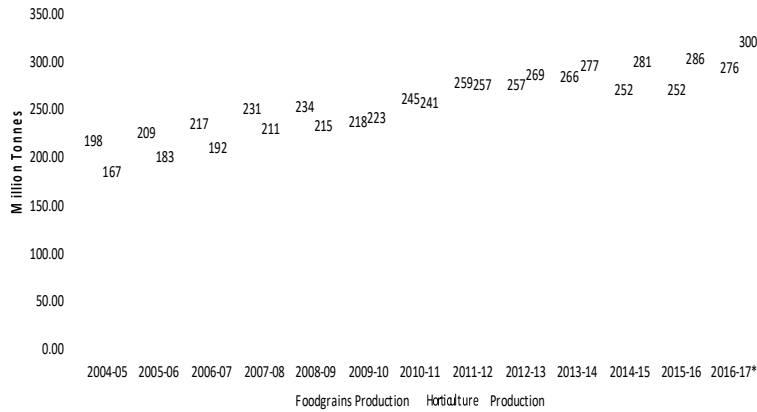
- Institutions enlarge capacity for sponsored research
- National Institute Ranking framework rates institutions factoring sponsored research and IP generation
- Institutions provide very vital research support to domestic private sector, a vital support for SMEs with limited in-house research capacity
- Top fifteen Institution secure about 1 Bn annually in sponsored research
- Very liberal terms for sponsored research conferring complete IP to sponsor with nominal monetization of IP assets generated



Impact of public research is seldom quantified beyond absolute outcome

Impact of public research in agriculture

Chart 6(a): Trends in Foodgrain and Horticulture Production



- India emerged from the great famine to be a major food exporter

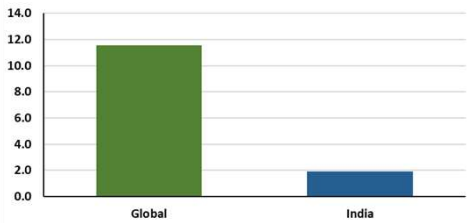
- Surge in agriculture productivity was possible due to public research in agriculture

- With economic prosperity, enhanced food consumption is supported by productivity enhancement and sustainability



Indian pharma industry is a global leader

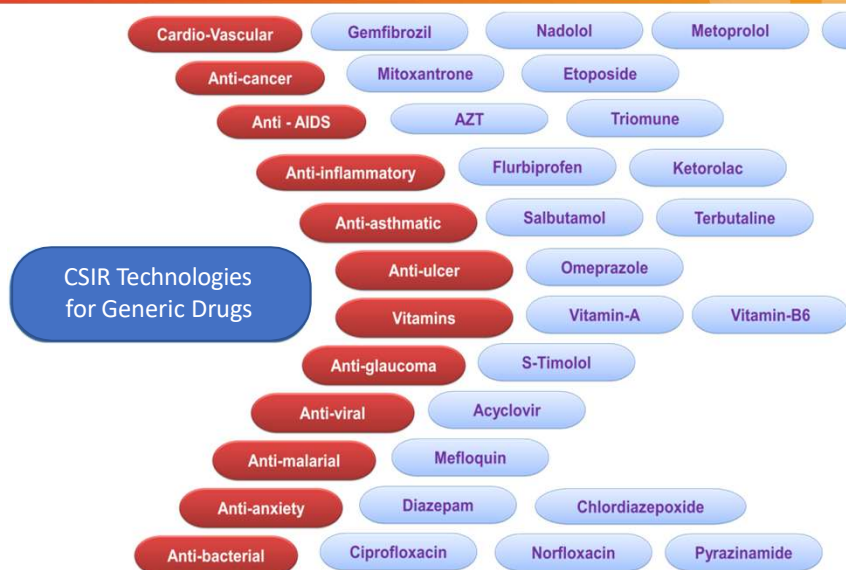
Total number of vaccination doses administered (in Billion)



- 3rd largest globally by volume
- Self – Reliant India in Pharmaceuticals
- Largest global producer of generics
- Largest vaccine producer
- Surging ahead with biologicals, the next gen therapeutic products
- Most affordable health care among G 20
- Contributed to a third of vaccines administered outside USA for COVID
- Lowest cost producer for COVID vaccines and diagnostic kits



Indian Public research – key contributor to leadership in generics - CSIR contribution



CSIR-IICT; CSIR-NCL; CSIR-CDRI



IP Assets monetization @ CSIR

Research institutions often have large portfolios of unenforced and underutilized patents
 Monetization of patents by universities is typically at nominal value
 Access to technology driven by motive of providing affordable products and services & not maximising monetization
 In contrast, Indian industry in-license from global sources come at enormous cost – India today leads in global in-licensing next to China
 Aspiration to bring assets to fore driven by Indian entities aggressively in-licensing assets from global innovators

CSIR active patents	India	Abroad
Pending for Grant	1380	579
Granted & In force	1286	2220

Patents Licensed: 158

Percentage Licensed: 12.29%

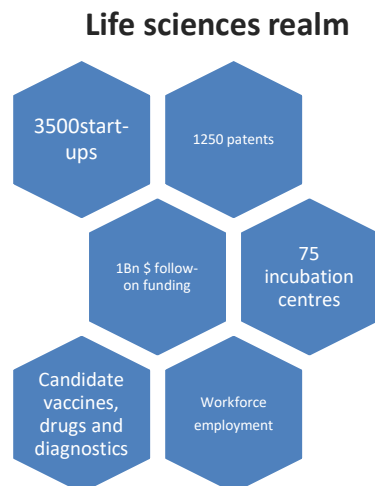


Catalyzing and building start-up eco-system

Three-fourth of start-up enterprise incubation is anchored in academic institutions

Access to technology – research contracts – mentorship – IP services – validation & scale-up – out-licensing

Can't imagine the burgeoning start-ups without the public research support



Focus emerging on enhancing the Knowledge Transfer opportunity with a culture of commercialization

As it stands now

- Knowledge transfer has been the core driver of Indian economic prosperity
- Most institutional research results have been delivered to communities without material monetization to institution
- Benchmarking Indian Innovation deliverables is not yet in vogue
- IP function is internalized in most institutions with minimal budget
- Technology delivery for public good is the key goal and not monetization

Going forward

- Indian in-licensing from global sources trigger Indian Institutional quest to greater monetization
- Indian industry aspiration to enlarge global footprint provides greater opportunity for Indian academic research to deliver impact
- The Government policy change to nurturing research results to market rather than measuring publications
- Growing focus on knowledge transfer function as necessary pillar for economic growth



Constitution of additional tech. transfer offices – Regional Technology Transfer Offices

With numerous IP generators in public institutional system, Department of Biotechnology initiated the model of Regional Technology Transfer Offices in March 2020

8 major Regional Technology Transfer Offices created and supported with long term resource

RTTOs engage with numerous institutions as service provider to them to manage the transfer of IP assets

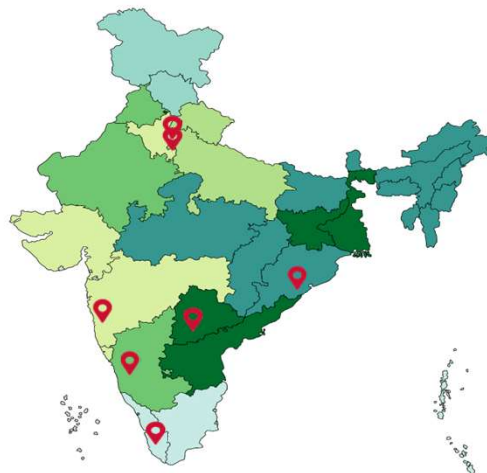
Skilled, RTTP qualified professionals drive technology transfer

Several fold efforts on these lines are needed for Indian research results to deliver greater value

Impact metrics designed can bring to fore the enhanced contribution of academic inventions

STEM, the KT Association in India is focused on creating metrics that will nurture the KT ecosystem with requisite appreciation from all stakeholders

Location of RTTOs



How to Measure and Communicate Your Impact and Value

THANK YOU FOR
LISTENING!

Q & A Session

