

INFORMATION TECHNOLOGY RESEARCH ACADEMY (ITRA)

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Our UPS (Uninterruptible Prerna Supply)

“He who sees Shiva in the poor, in the weak, and in the diseased, really worships Shiva They alone live, who live for others.”



“What I want is brave, bold people ... muscles of iron and nerves of steel, inside which dwells a mind of the same material as that of which the thunderbolt is made... not softening namby-pamby ideas.”

ITRA OBJECTIVE

- 1 Strengthen the academic institutions
2. Specifically, Enhance Quality and Quantity of
 - a. IT [Information, Communication, Electronics] Research and Development
 - b. IT Applications

Achieved in Part

by

Building and Linking Research Groups Across the Country
and

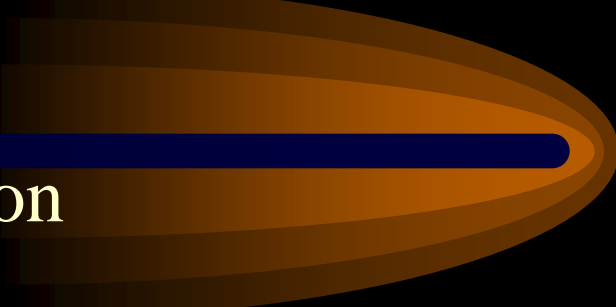
Ensuring Growth of Each

SO ALL INSTITUTIONS, TOGETHER

1. Perform State of the Art Research
2. Develop Sensitivity to Societal Problems
3. Develop Creative Solutions to Societal Problems
4. Develop Knowledge-equipped, Research-experienced, Socially-responsive Researchers – Skill Development
5. Convert Solutions to Technologies – Industrial Interaction
6. Engage in Technology Transfer – Start ups
7. Build Collective Self-Esteem via Teamwork
8. Increase National Capacity of Quality Researchers

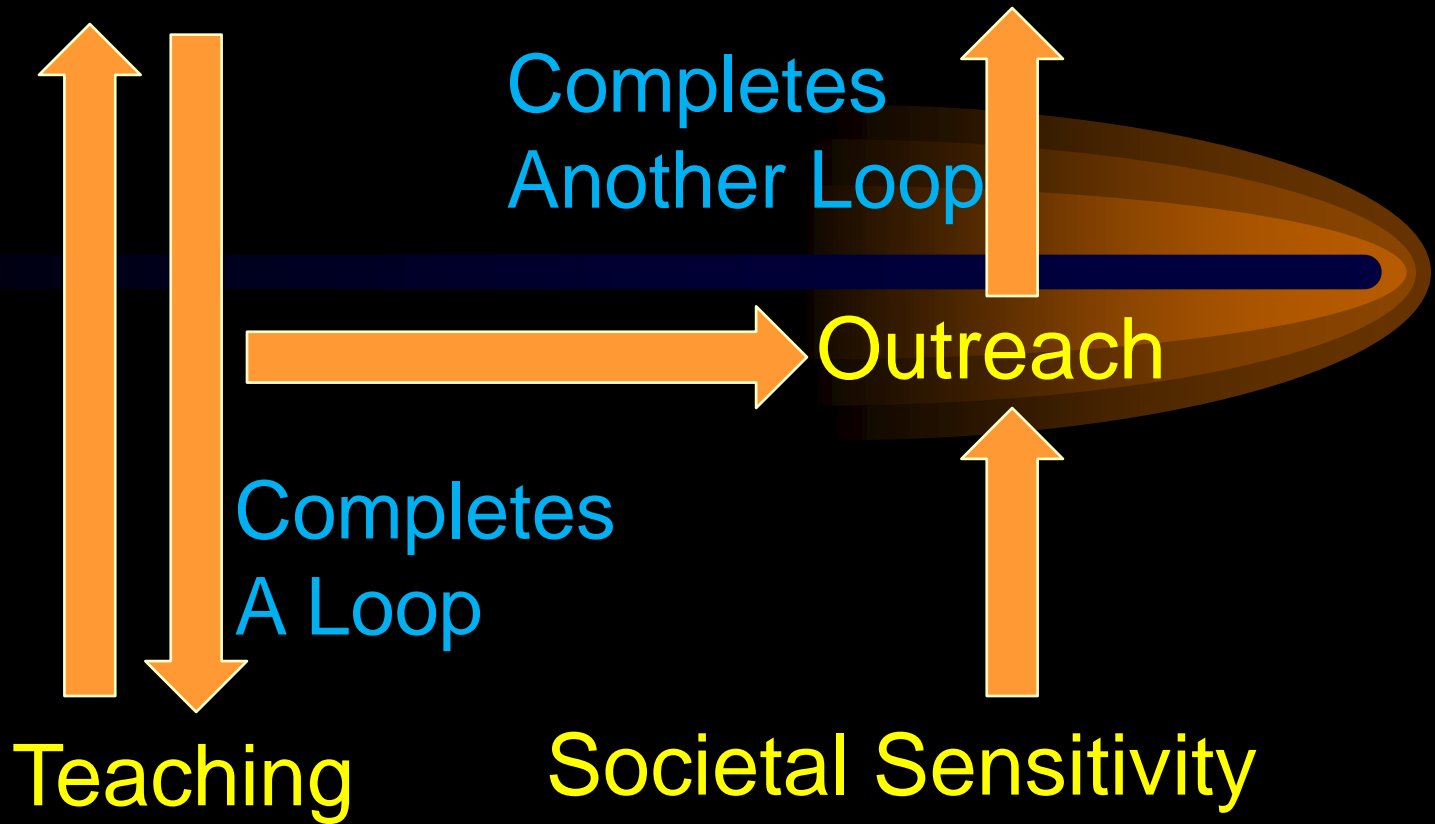
QUALITY ENHANCEMENT METRICS

Objectives Mapped on to Four Quality Metrics
To Guide all Quality Enhancement Activities

1. R&D itself
 2. Impact on Curriculum/Instruction
 3. Development of Societal Sensitivity
(Urge for Problem Spotting and Solving)
 4. Outreach: Entrepreneurship, Engagement with industry, government, NGOs, ...
- 

APPROACH

Through Research Projects



APPROACH

Serve as a Means of

- Problem Oriented Team Based R&D by
- Forming Multi-institutional Teams/Centers of Excellence,
- Providing Funding, and
- Post-Funding Engagement for
- Sustained Progress in
- Each Quality Metric

Scope of ITRA Activities

1. IT Areas

Research Centers



2. Interdisciplinary, IT-in-X Areas

Problems Solving Labs

Choice of IT/X focus areas

Driven by Priorities and Opportunities

CHALLENGES IN STRENGTHENING RESEARCH CULTURE

1. Scale
2. Inclusion of Less Accomplished Institutions
3. Teamwork (vs. Individual Efforts)
4. Drive

A MODEL TO MEET THE CHALLENGES

Challenge 1: Scale

Met via a Pyramid Model of Exponential Growth

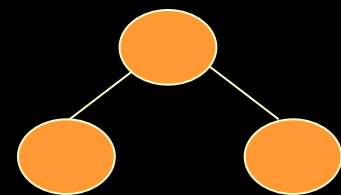
Institutions Organized as Pyramids

Begin each Pyramid with a Pyralet:

- One institution, and
- A layer of 2-3 children institutions beneath

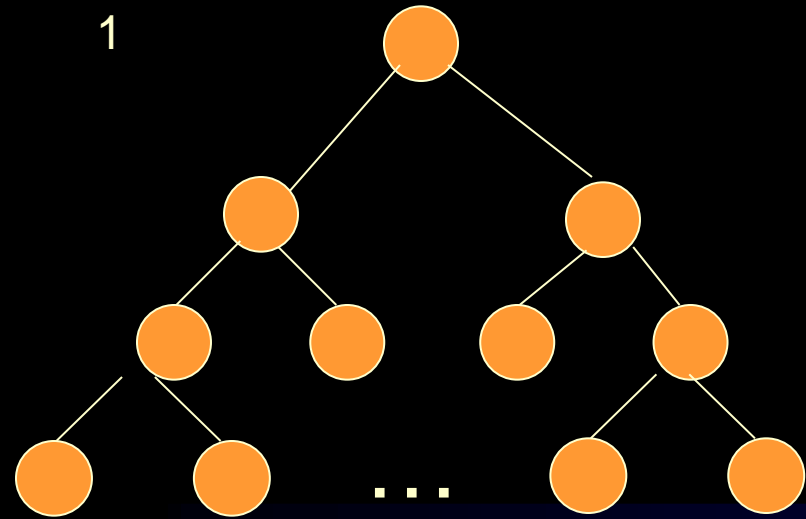
Grow by deepening the Pyramid

- Add a new layer of children institutions
 - 2-3 beneath every bottom layer institution
 - Every (cycle of) 2-3 years
 - Thus achieving exponential growth



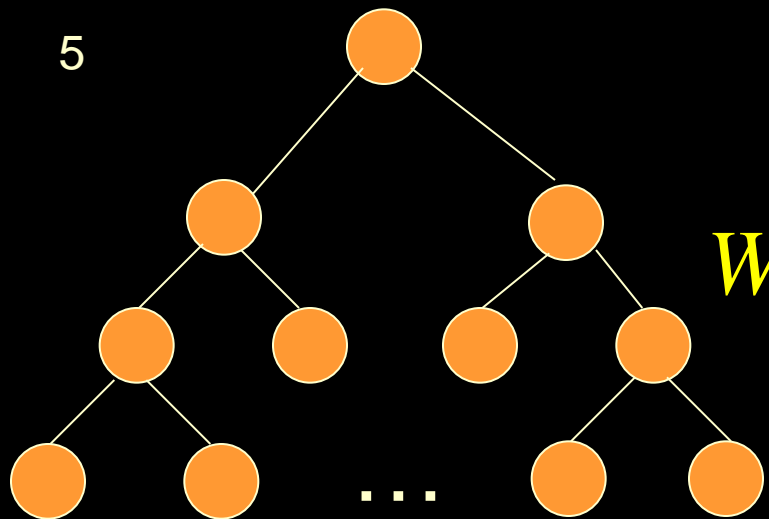
The Binary Growth Case

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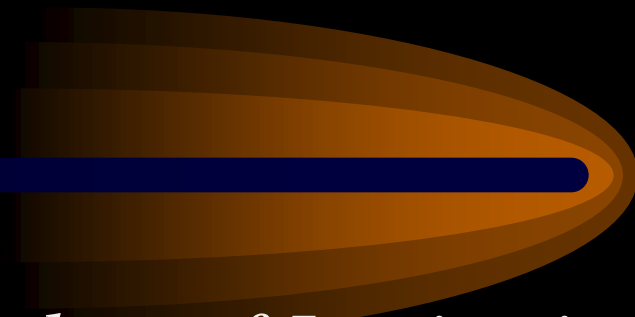
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*Number of Institutions
Doubles Every Two Years*

*Would Triple Every Two Years
For Ternary Mentoring*



Challenge 2:

Inclusion of Less Accomplished Institutions Met via Simultaneous Mentoring and Learning

Each institution picks
slightly less-accomplished institutions as children
and mentors them



Adjacent Layers of Pyramid Defined by
Mentor-Mentee Relationship



All Institutions Improve by Learning AND Mentoring

Challenge 3: Teamwork

Met via Solving Large Problems Together

Having Pyramids form Teams and

Different Teams Solving Different Sub-problems (Parts)
of a Large Problem

Pyramid Nodes are:

1. Institutions = Academic Institutions or R&D Labs
2. With Strong Linkages to Relevant Industry, Govt, NGOs, ... as Translators, and
3. Mandatory and Integral Inclusion of
4. World Class Experts as Mentors from Universities, Research Labs,...

Problem Decomposition and Roadmap Designed at Strategy Formulation Meeting

Strategy Formulation Meeting (SFM)

of 50-70 Stakeholders

Defines the Problem and Sub-problem Space

Each Sub-Problem is Undertaken by a Team

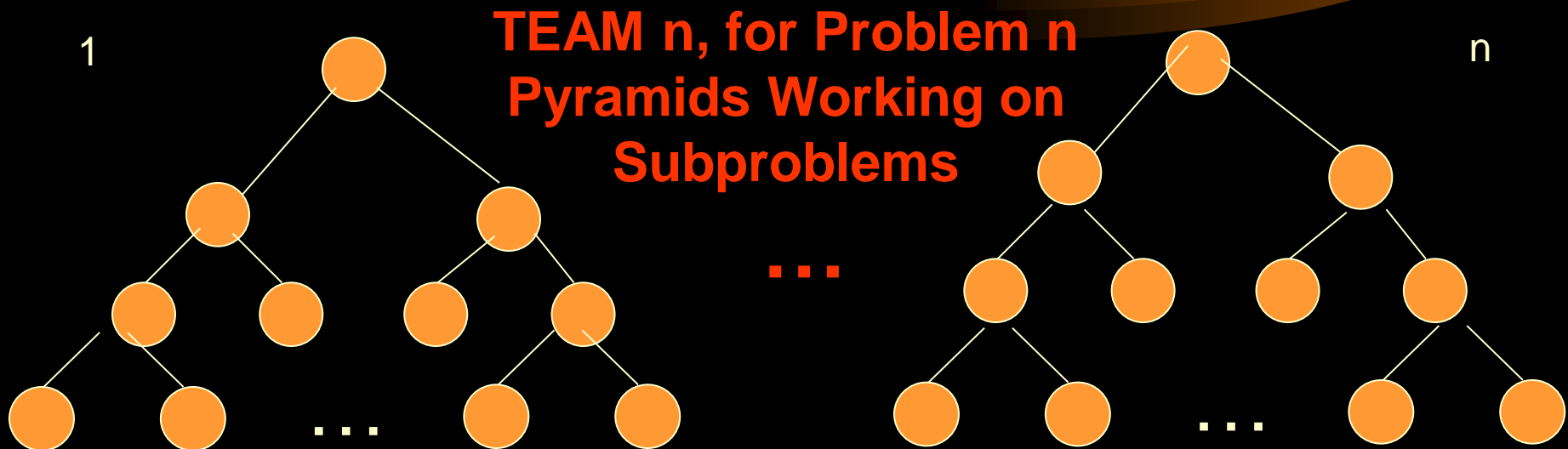
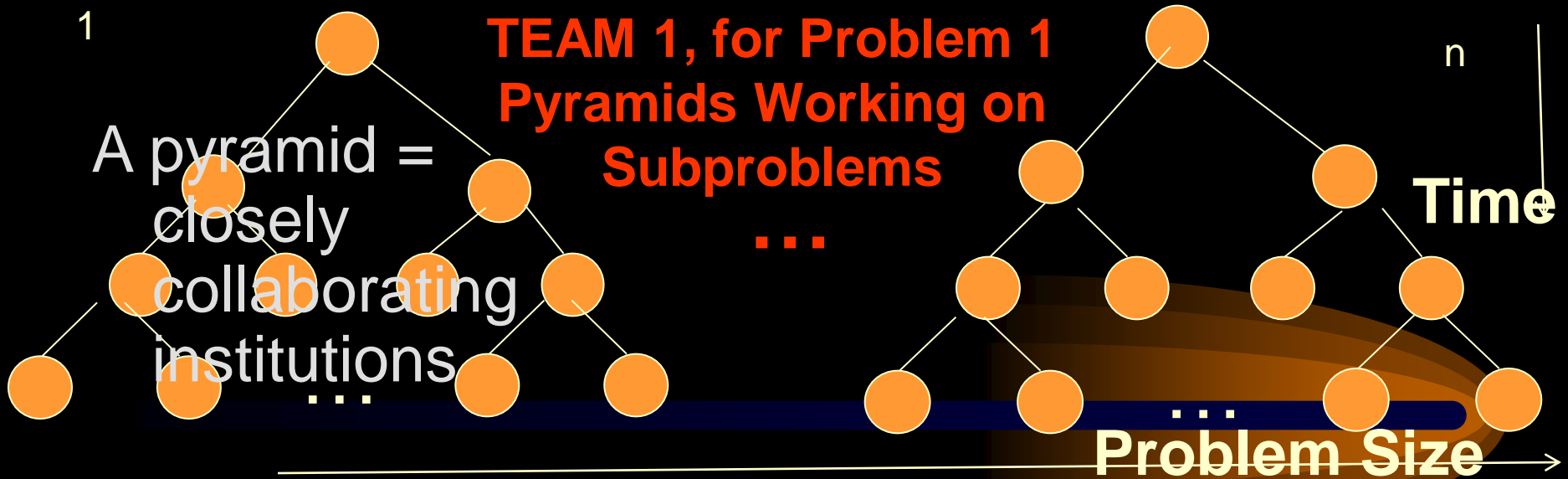
Team = A Set of Pyramids

Deepens by a Layer Every Growth Cycle

Teams Activities are Carried Out while

Maximizing the Four ITRA Metrics

A FOCUS AREA = Multiple Teams



Each Team = One Problem in Focus Area

Challenge 4: Drive

Met via Providing Motivation

Through

1. Opportunities for Drawing Inspiration
 2. Incentives
- 

INSPIRATION

1. Top-Down

- a. Supervision/Co-authorship/Classes with World Renowned Researchers as Mentors

2. Lateral

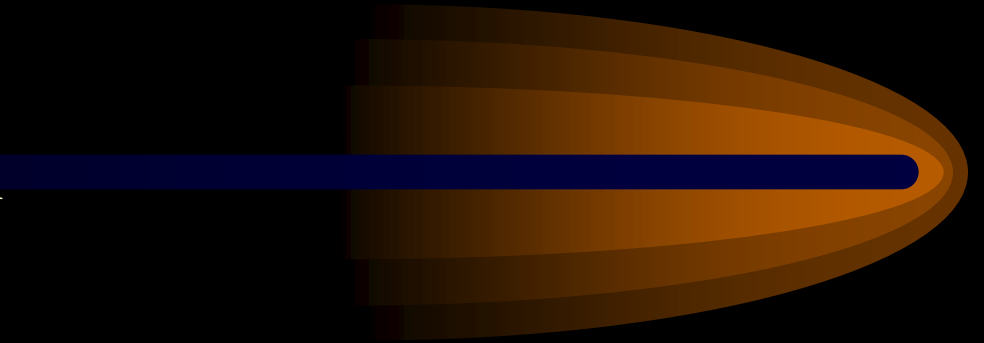
- a. Teams making a difference together
- b. Self Improvement (Not just Competition)

3. Bottom-Up

- a. Satisfaction from Societal Engagement
 - Rooted in Societal-Sensitivity
 - Enhanced by Societal Sensitivity Programs

INCENTIVES

1. Monetary Awards
2. Flexible Grants
3. Other Recognition



PERFORMANCE METRICS USED TO FORM AWARD CATEGORIES

1. *Jin Khoja Tin Paya*

Awards for Research Excellence

2. *Jyot-Se-Jyot*

Awards for Curricular-Impact

3. *Tere-Aansoo-Mere-Aansoo Teri-Hansee-Meri-Hansee*

Awards for Development of Societal Sensitivity

4. *Nerves-of-Steel and Muscles-of-Iron*

Awards for Outreach

CURRENT SCHEMES AND POLICIES

1. Internships to UG and PG Students
2. Monetary Awards to Students
3. Award Grants to Teams
4. Interactions between Teams and Mentors
5. International Travel of Researchers
6. Interactions with Adjunct Faculty

[*Click to See Details*](#)

Focus Areas Initiated with the Seed Support

Rs. 150 Cr from DeitY over 5 Years as a Project in MLA

Teams in Place in Two Focus Areas:

- 1. Mobile Computing, Networking and Applications (ITRA-Mobile)*
- 2. IT Innovations in Sustainability of Water Resources (ITRA-Water)*

Details

Teams to be in Place ASAP in Two New Focus Areas:

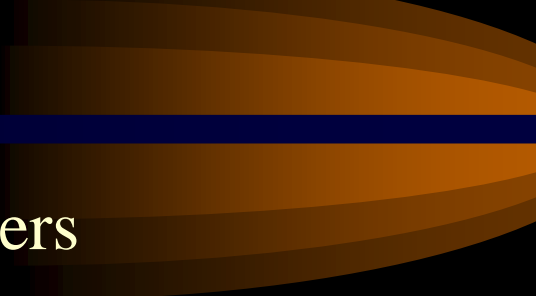
- 3. IT Based Transformations in Indian Agriculture and Food (ITRA-Ag&Food) (Jointly with Indian Council of Agricultural Research)*
- 4. Human Simulator for Amyloids Based Diseases (ITRA-HuSim)
(Jointly with Dept. of Biotechnology)*

The Existing Two Focus Area Ecosystem

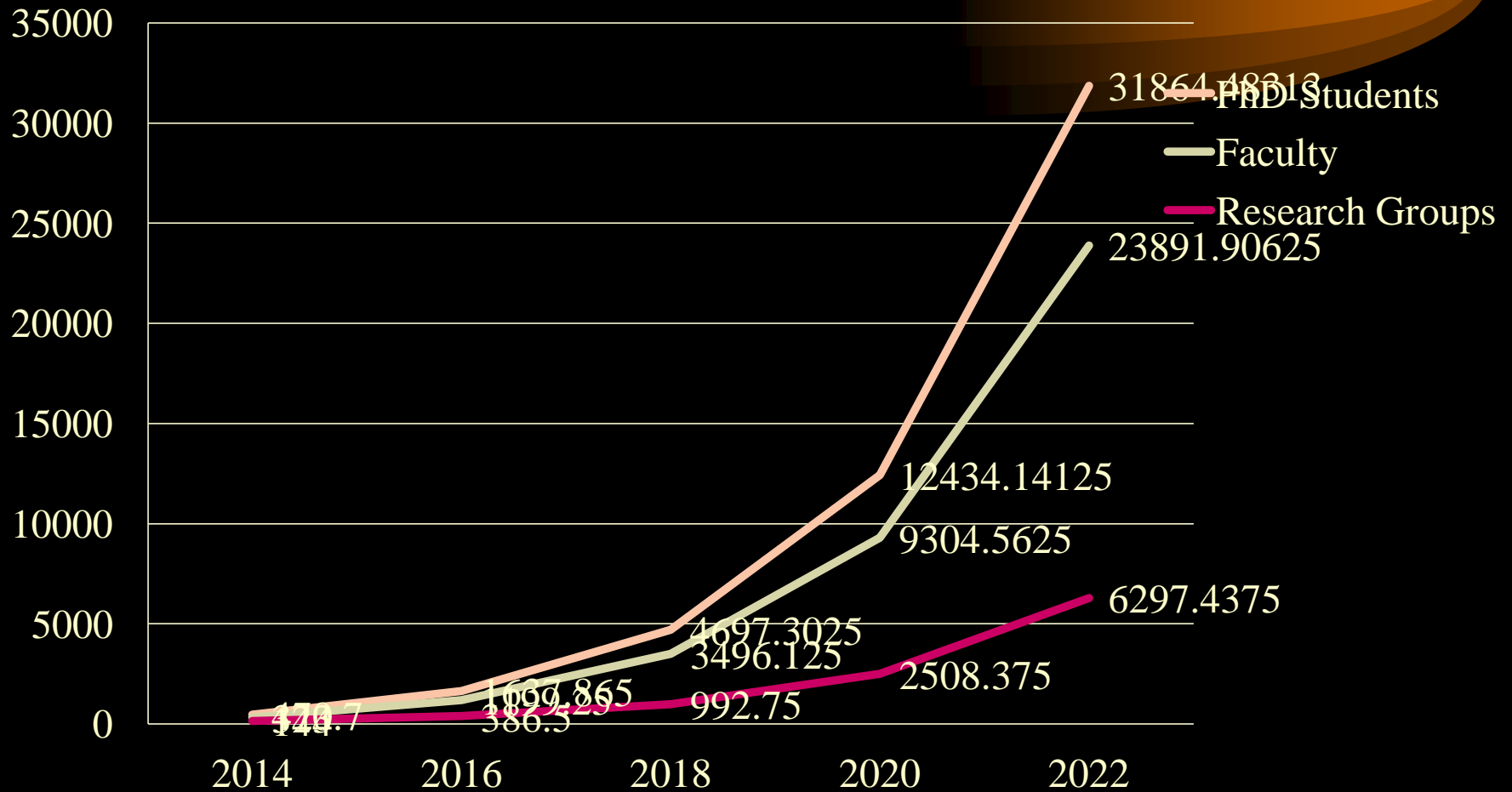
1. 60 research groups/institutions
2. 100 faculty/researchers
3. Over 120 PhD students (to grow in Year 3)
4. 43 Mentors (eminent researchers) from India and abroad, and Translators (research to industry)
5. Led to 290 papers, 40 new/modified courses, 58 workshops, 11 researcher visits abroad
6. 15-18 startups in the making (teams developing business plans, for founding in '16)

[Start-Ups](#)

The Expected Four Focus Area Ecosystem

1. 160 research groups/institutions
 2. 220 faculty/researchers
 3. Over 340 PhD students researchers
 4. 100 domestic and international Mentors (eminent researchers) and Translators.
 5. About 35 startups at various stages of development
- 

An Illustration of Growth for 5 Focus Areas Over Four Two-Year Cycles




Expected National Impact Suggested by Pilot

1. Replicate ITRA model to the numerous domains X
2. Needed by various ministries but lack advanced IT expertise
3. Result: vibrant IT-in-X Communities/Think-Tanks
4. Many side products
5. IT + Domain Collaboration a Determining Factor
6. Drivers could be from everywhere
7. Government to Lead the Way
8. Have worked with ICAR and DBT
9. Details of financial collaboration model still emerging

Plan: A 20-Focus-Area Ecosystem

Over Five Years

1. 600 active research groups/institutions
 2. 1000 active researchers
 3. 1500 PhDs
 4. 150 start-up plans
- 

Large Enough to Develop Confidence in the Feasibility of
Initiating a National Problem Solving Culture
and Impact PM's Initiatives:

Digital India

Startup-India-Standup-India

Make-in-India

Skill-India

Areas for which have Developed Outlines

1. Railways
 2. Textiles
 3. Traditional and Small Scale Industry (Leather, Jewellery,,,.)
 4. Transportation
 5. Cleanliness and Hygiene
 6. Courts
 7. Power
 8. Disaster Management
 9. Literacy/Distance Education
 10. Heritage Preservation...
- 

Details

Interest and Dialogue with


1. Water Resources
2. ISRO
3. Petroleum
4. Power
5. Petroleum and Gas
6. Defense
7. Health
8. Railways
9. Textiles
10. Disaster Management
11. HRD

Lack of Mechanisms to Realize this Calls for Extra Work
Become a Show Stopper Currently



Desired Enhancements
Going Forward...

Effort So Far

- a. ITRA is a “Project” given by DeitY to Media Lab Asia
 - b. So All actions – big to small to very small
 - c. Go through an approval process
 - d. Through Delhi and/or Mumbai
- 

while

90% of the daily actions have trivial financial implications !

But they all take comparable times !!

To be approved or rejected !!!

It Would Help to Have

A Rigorous Evaluation of the Pilot's Performance
and
Scale Up if Deserving

But to Make Greater Impact, with Autonomy to

1. Create (even if temporary) ITRA positions
2. Fill the positions with the best matched people
3. Engage experts, including foreign ones, as needed
4. Establish national and international collaborations
5. Execute approved plans on a day-to-day basis