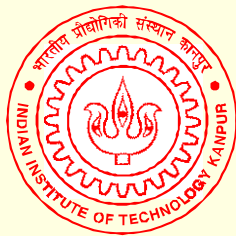# *Research-driven Strategy in Higher Education*

Sanjay G Dhande

Indian Institute of Technology Kanpur

October 12, 2010

Triad of a Research University

- Dissemination of Knowledge – Teaching
- Creation of Knowledge - Research
- Conversion of Knowledge to Social Wealth - Innovation

- University is a generic term used in this presentation. It indicates any institution of higher education.

Different Colors of Research…

- Discovery of knowledge
- Generation and verification of new information
- Modeling, Analysis and Simulation
- Development of new technologies, products and processes
- Innovation and Incubation

Indian Historical Perspective

- British Institutions – Low Investment, High Thinking Research, Universities in Calcutta, Bombay, Madras and Delhi
- National Institutions – Universities like BHU and institutions like TIFR, IISc
- Rise of Government funded research institutions like CSIR, DRDO, DAE, ISRO
- Growth of university system with affiliated colleges and lack of research infrastructure
- Research laboratories becoming deemed universities

IIT Kanpur at 25…..

- Consolidation of UG education model – science based engineering education
- Stable beginning of PG education
- Model research of advising Master's and Doctoral students with decent publication record
- Average infrastructure of research
- Novel beginning of computing culture and infrastrcture

IIT Kanpur at 50......

- Brand IIT established globally
- Rise in sponsored research activities
- Improvement in research infrastructure as well as networking – computing facilities
- Landmark work in Number Theory – a spark of potential future
- SWOT analysis – Strength – UG, Weakness – PG, Opportunity – Research, Threat – Internal
- National hero but global ?

Dreams of
an educational institution

- Create people who will be thought leaders
- Create people who will create wealth
  - Develop the knowledge to wealth chain
  - Social wealth, financial wealth, cultural wealth
- Development of creative environment
- Create people who will create jobs
- Create people who will attract young people

Classification Of Research Laboratories......

- Teaching Laboratories – e. g. Core Labs
- Personal Laboratories
- Subject Domain Laboratories
- Central Facilities – CC, ACMS
- Laboratories for Sponsored Research
- Interdisciplinary Research Laboratories
- Grand Research Laboratories (?)

Examples of Sponsored Research ...

- HAL Cell, ISRO Cell, RDSO Cell
- AGROGEDIA, ANGLA BHARATI, BIOMETRIC Projects
- Railway Technology Mission
- Boeing, Chevron, Intel Collaborations
- Autonomous Helicopter, Flame research
- National Ganga River Basin Management Plan project

Inter-disciplinary Research…

- Samtel Center for Display Technology
- Center for Environmental Sc & Engg
- SIDBI Innovation & Incubation Center
- National Wind Tunnel Facility
- National Information Center for Earthquake Engineering
- Ion Beam Complex, 4-I Laboratory, Nano-science Unit
- Solar Energy Research Enclave

Strategy for Research Eco-system

- Governance – Establish a Research Council
- Finance – Provide Plan as well as Non-plan Budget for research
- Infrastructure – Create exclusive space for grand research, acquire state of the art equipment
- Human Resource – Create a cadre of research scientists and engineers on a large scale, Create a cadre of technical staff on a larger scale
- Agenda – Research agenda should be evolved by faculty in an open forum and exchange of ideas
- Network – Connect with institutions in India

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THANK YOU!