

EDUCATION, RESEARCH AND INNOVATION : THREE PILLARS OR AN EDIFICE ?



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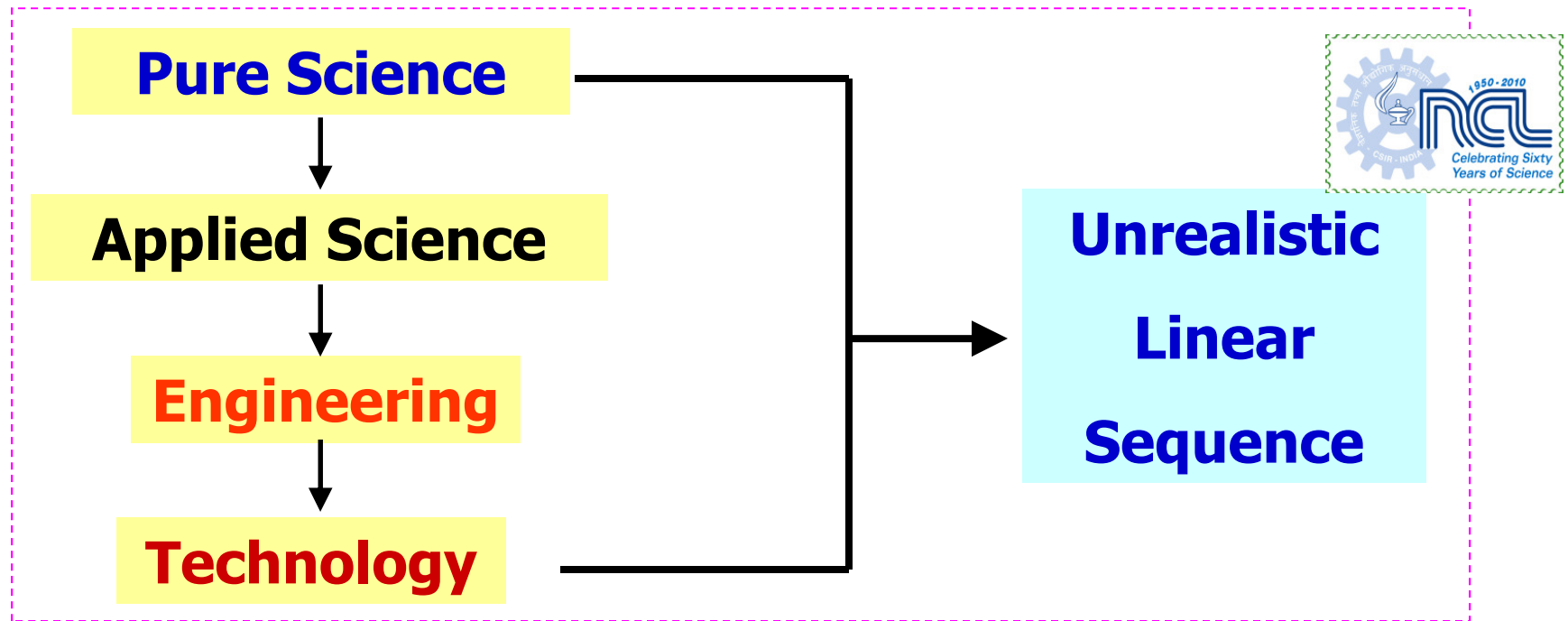
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Visit us at : <http://www.ncl-india.org>

**Developing Talent
Workshop
RSC Chemistry Leadership
Network, Pune**

September 16, 2010



Science by itself provides no panacea for individual, social and economic ills. It can be effective in national welfare only as a member of a team. But without scientific progress, no amount of achievement in other directions can insure our health, prosperity and security.

Vannevar Bush

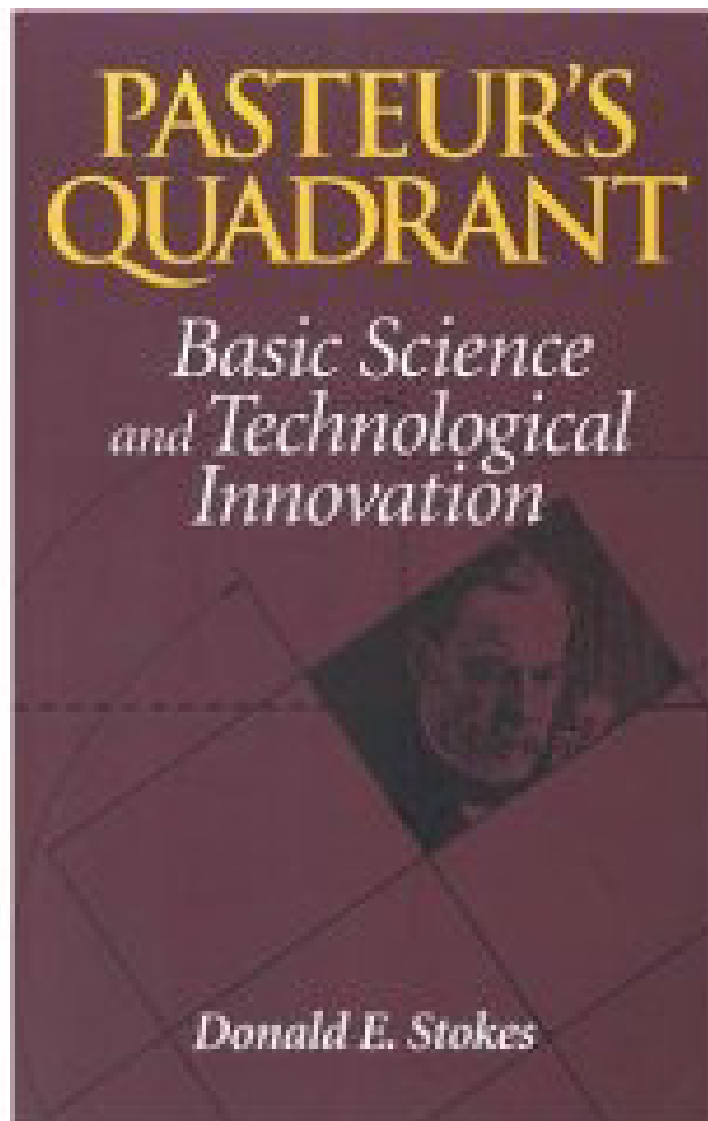
"Endless Frontier" -1945



THE NON LINEAR PROCESS : SEAMLESS INTEGRATION OF RESEARCH AND INNOVATION

- **Research** : ideas, concepts, principles, techniques, theories
- **Translation** : proof of concept, connecting solutions with needs, validation
- **Development** : defining the customer and his needs (met or unmet) and cost –performance targets, prototype development, customer acceptance, business plan, investment and economics
- **Marketable Product**

Success in the laboratory does not always translate into success in the market place



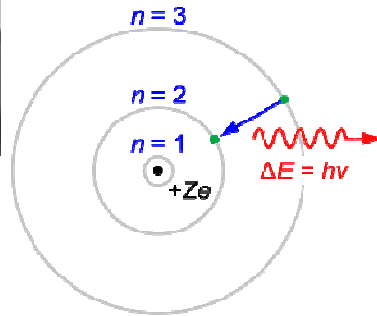
1997

Pasteur's Quadrant

Fundamental Research



Bohr



Pasteur



**Average
Academic
and
Industrial
R & D**



Edison

Use Inspired Research





CSIR`s INNOVATION FOCUS

- **Affordable health care**
- **Sustainable energy solutions**
- **Resource conservation**
- **Converting waste to wealth**
- **Water for the millions**
- **Protecting the environment**



NCL : A SNAP SHOT

• Established	:	1950
• Location	:	Pune, India
• Total personnel		
• Permanent Staff	:	730
Scientific	: 206	
Technical	: 330	
Administrative	: 194	
• Research Fellows (CSIR, UGC)	:	440
• Project Staff (M.Sc's)	:	382
• Post doctoral fellows	:	24

One of the largest publicly funded research institution in India
One of the oldest research institutions of independent India

CHEMISTRY AT CROSSROADS



- **Chemistry is at the end of one wave of development and struggling to begin another**
- **There are still many important opportunities in both fundamental and applied science**
- **Chemistry offers fewer puzzles to solve; What confronts are number of problems**
- **Longer term curiosity driven research is more important than in the past, but harder to justify**



Only the chemistry prize has preserved the traditional aura of obscurity. It goes to Gerhard Ertl for his studies on the role of surfaces in catalysing chemical reactions. Since an awful lot of industrial chemistry is catalysed and the chemical industry lies at the base of most manufacturing, there is good argument this is the most important prize. But glamorous? Sadly not .

The Economist , October 13, 2007

FUTURE OF CHEMISTRY



- **Systems, not molecules**
- **Functions, not molecular structure**
- **Problems, not puzzles**

No longer “What is it?” but “What does it do?”

LINKING SCIENCE TO SOCIETY



- Learning to connect principles of science to the concerns of society ; emphasis on application and functions
- Balance breadth with depth, creation of knowledge with delivery of solutions to the stakeholders
- Integrate disciplines : Chemistry-biology, material science – physics, earth and atmospheric science and engineering
- Communication : ability to “sell” the solution, not merely “solve” the problem
- Globally competitive and yet be locally relevant

STAKEHOLDER EXPECTATION : TRANSLATING RESEARCH INTO APPLICATIONS AND CREATING WEALTH (SOCIAL OR ECONOMIC) IN SOCIETY

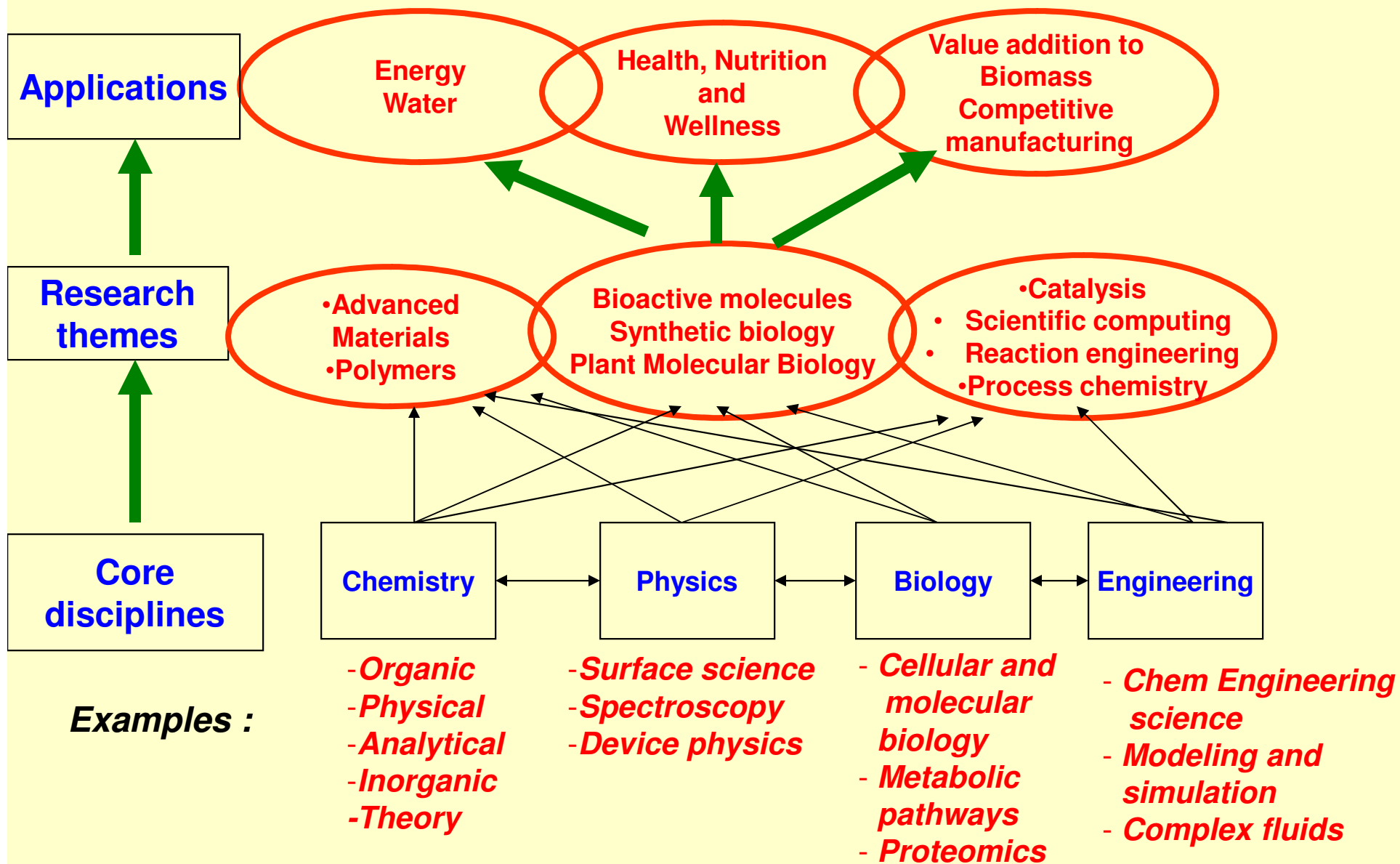


NCL'S FUTURE VISION

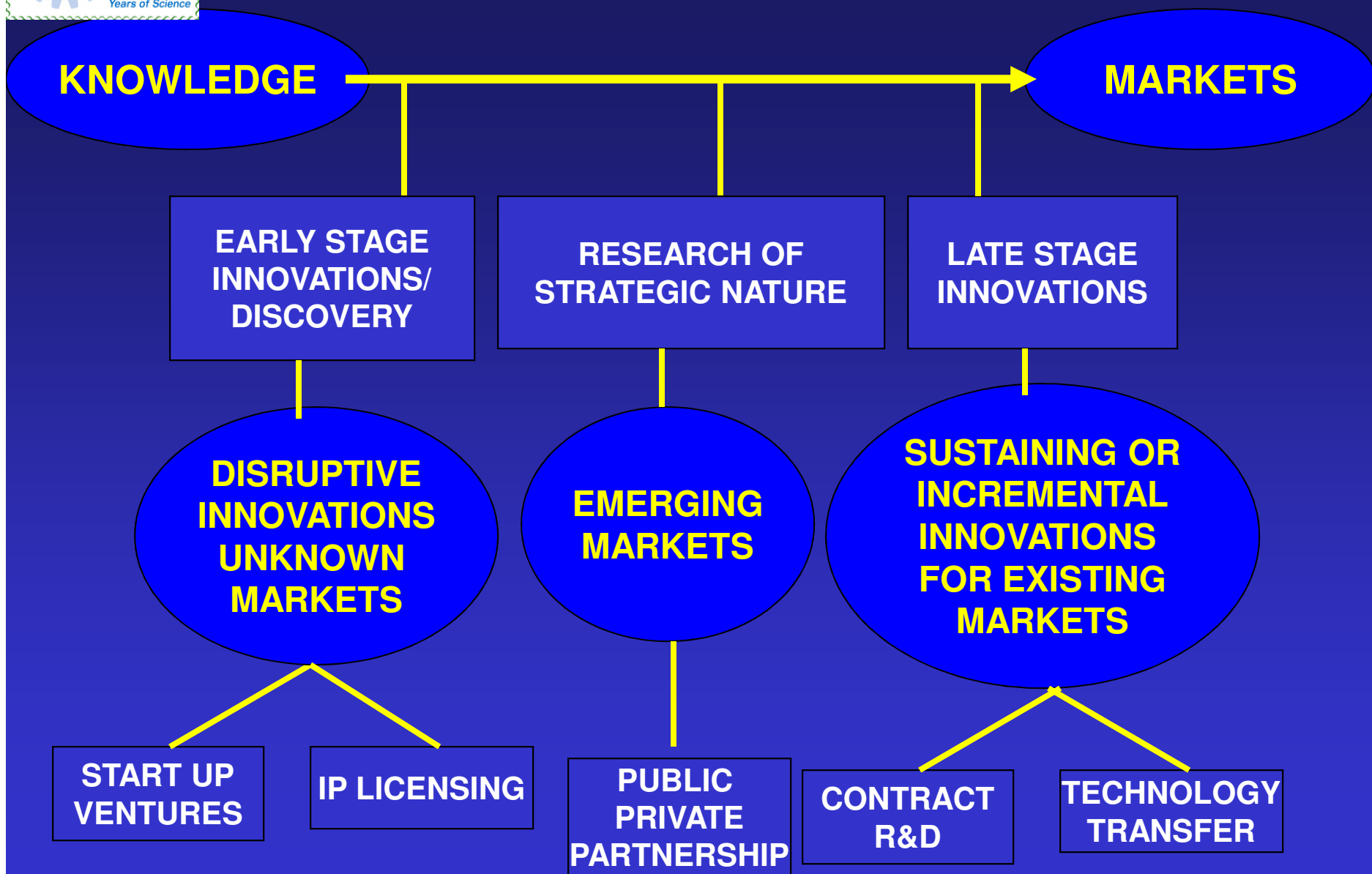
- **Crossing Intellectual Barriers**
 - *Use the best global bench marks*
- **Serving National Agenda**
 - *Relate to the national agenda*
- **Innovating for Industrial Competitiveness**
 - *Participate in the global knowledge economy*
- **Redressing National Shortfalls**
 - *Remain socially relevant*

TO CREATE AN INSTITUTION WITH ENDURING VALUES OF EXCELLENCE DEVOTED TO ACQUISITION, TRANSMISSION AND APPLICATION OF KNOWLEDGE

LINKING CORE SCIENCE TO APPLICATIONS



LINKING KNOWLEDGE TO MARKETS



TODAY'S SCIENCE SEEDING TOMORROW'S TECHNOLOGIES



- **Advanced and functional materials including nanomaterials**
- **Nano-structured materials and catalysis for energy conversion and storage (electrochemical, solar)**
- **Novel hybrid materials for harvesting solar energy**
- **Environmentally friendly polymers**
- **Biomaterials, tissue engineering and bio-conjugates for therapeutics**
- **Catalysis, chemical engineering and computational science to leverage clean technologies**
- **Establishing sustainable and /or renewable feedstocks for chemical manufacturing**
- **Harnessing modern biology to create a more sustainable chemical industry**
- **Selective separation processes for a diverse range of applications**



***SIGNIFICANT OPPORTUNITIES FOR
DISRUPTIVE INNOVATION. HOWEVER,
TODAYS CHEMICAL SCIENCE WILL
REQUIRE A COMPLETELY DIFFERENT
TRANSLATIONAL MODEL TO CONVERT
KNOWLEDGE TO WEALTH***



NEW INITIATIVES

- **Mission mode programmes through public-private partnership (NMITLI - New Millennium Initiative for Technology Leadership for India)**
- **Knowledge alliances through public-private partnership; creating jointly owned and managed research entities with industry**
- **Encouraging knowledge driven entrepreneurship**
- **Co-share / co-locate industry R& D and R&D service organizations in CSIR laboratories**

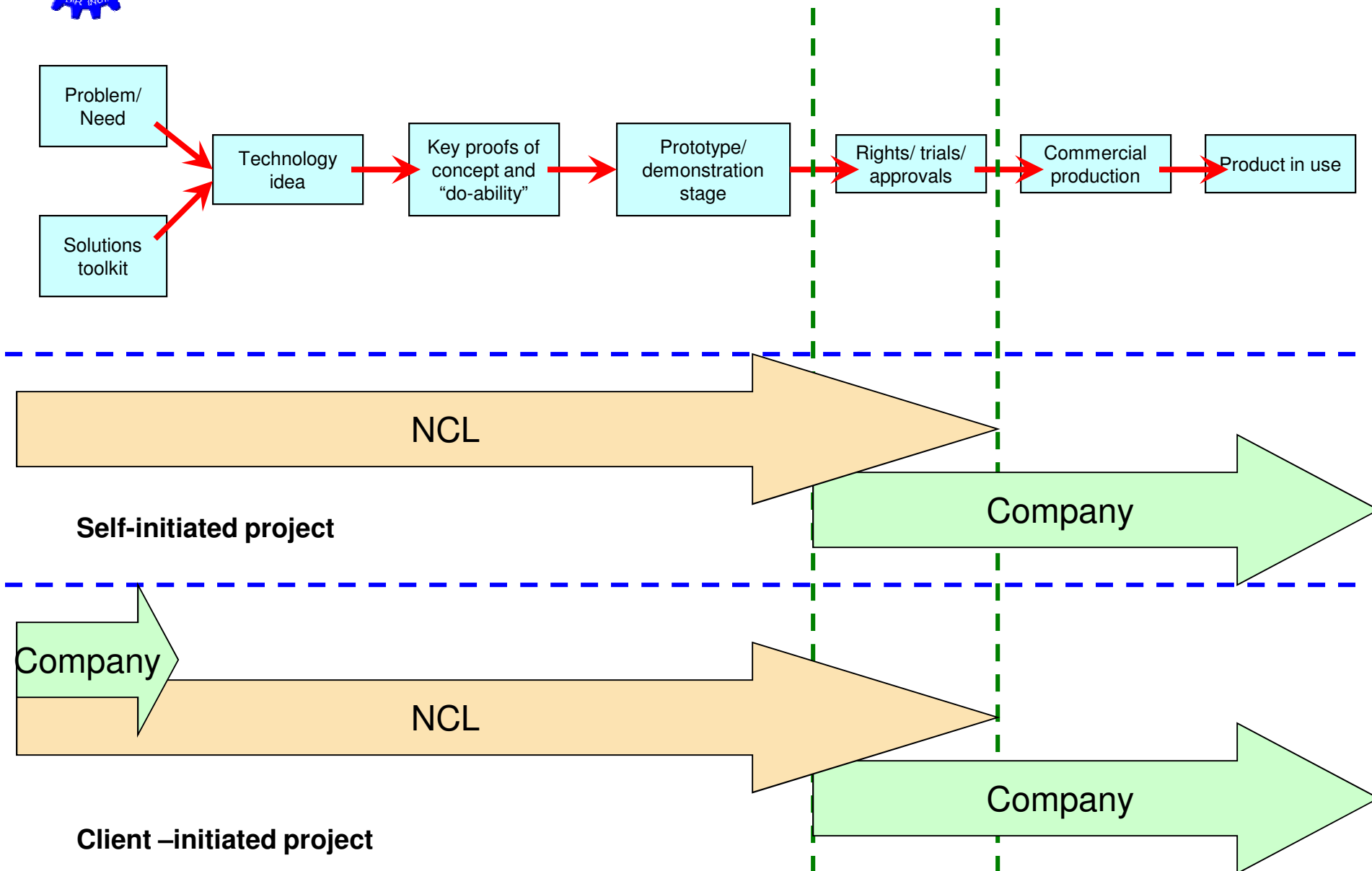


EXISTING TRANSLATIONAL MODELS

- **Sponsored / Collaborative /contract research**
- **Technical service**
- **Consultancy**
- **IP licensing**
- **In-house development of processes and products followed by licensing (with or without IP)**

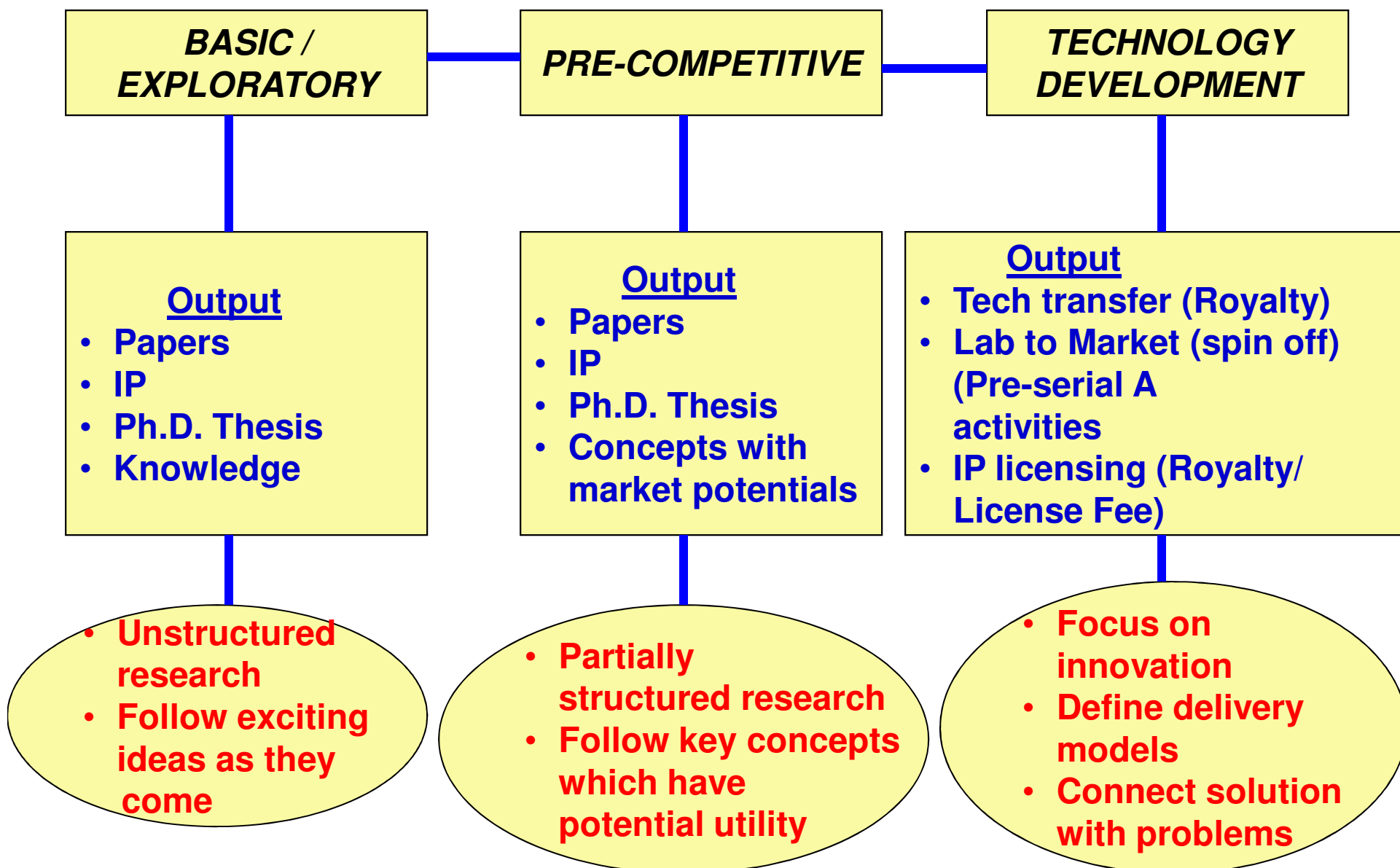


Technology development & transfer: Conventional models





NATURE OF RESEARCH





NEW INITIATIVES

- **Mission mode programmes through public-private partnership (NMITLI - New Millennium Initiative for Technology Leadership for India)**
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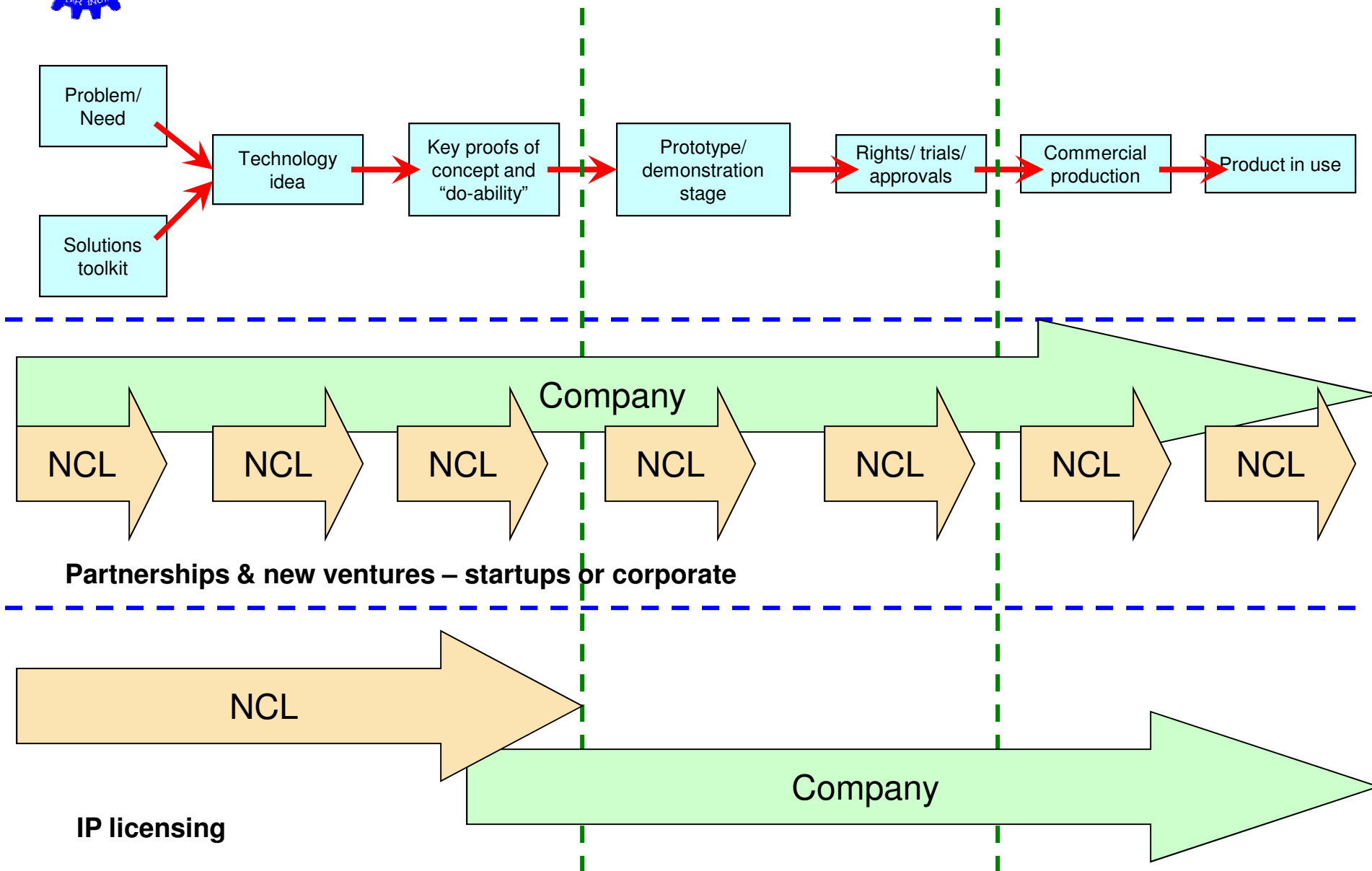


PUBLIC-PRIVATE PARTNERSHIP : CONSORTIUM MODEL

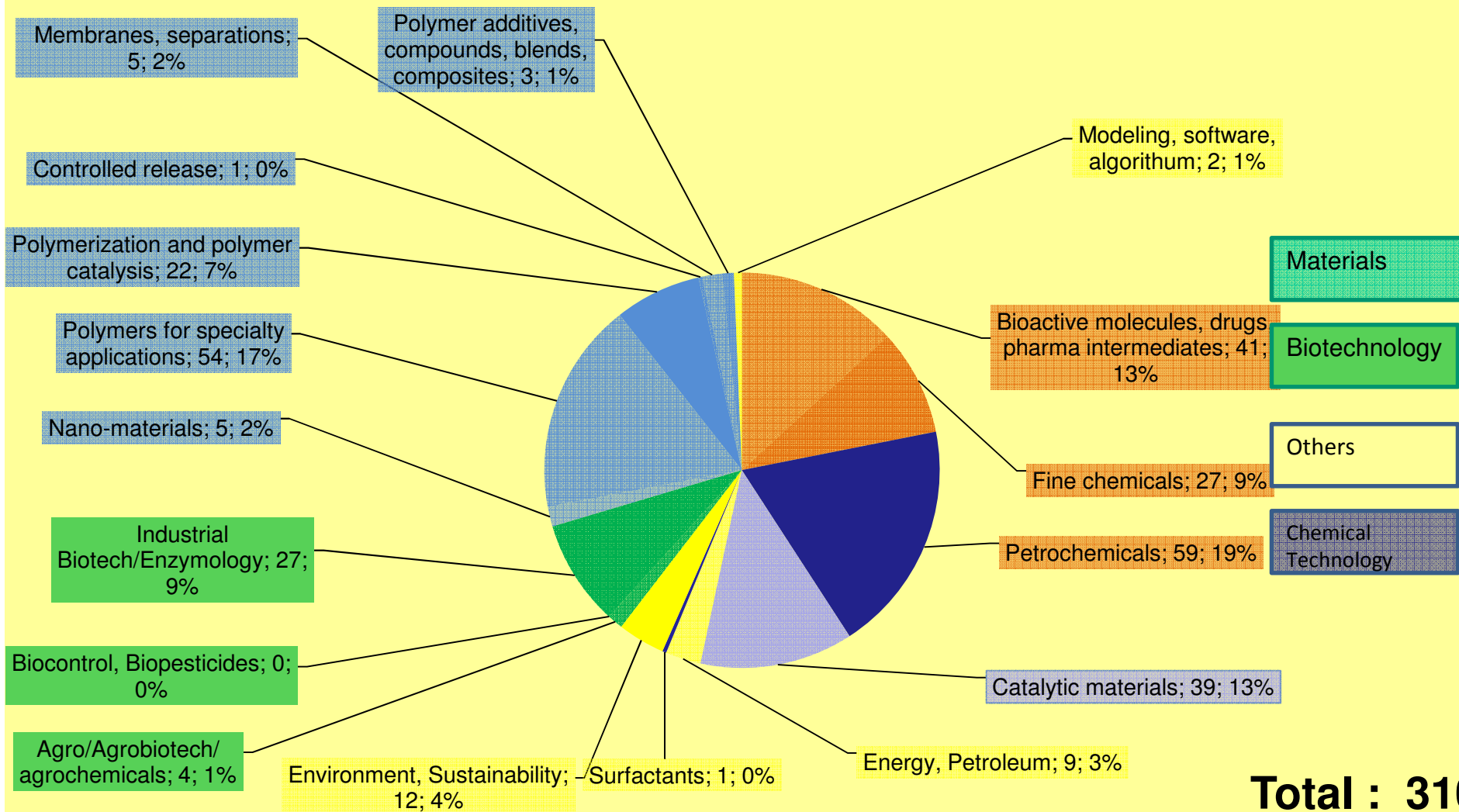
- **Areas of common interest to a few companies – access to generic knowledge**
- **Consortium agreements with service modules**
- **Project Advisory Boards with company participation**
- **Benefit sharing and possibility of bilateral projects**
- **Ownership of IP and proprietary knowledge vests with NCL/CSIR**
- **Rights of first refusal to consortium partners**



Technology development & transfer: Newer models



FOREIGN PATENTS IN FORCE : BY MARKETS





US005969167A

United States Patent
Sivaram et al.

[11] Patent Number: **5,969,167**
[45] Date of Patent: ***Oct. 19, 1999**

[54] METHOD FOR MAKING TRIS (HYDROXYPHENYL) COMPOUNDS USING ION EXCHANGE RESINS
[51] Int. Cl.⁶ C09B 11/04
[52] U.S. Cl. 552/115
[58] Field of Search 552/115

[75] Inventors: Swaminathan Sivaram; Vishnu R. Ramade; Srinivasan Chakrapani Prakash P. Wadgonkar, all of India; Paul D. Sybert, Gaylord; Kissinger, both of Evansville, Ind; Ashok K. Mendiratta, Westlake,

[56] References Cited

United States Patent
Gurjar et al.

(10) Patent No.: **US 7,109,353 B2**
(45) Date of Patent: **Sep. 19, 2006**

[54] PROCESS FOR PREPARING 5,6-DIHYDRO-4-(S)-(ETHYLAMINO)-6-(S) METHYL-4H-THIENO[2,3-B]THIOPYRAN-2-SULPHONAMIDE-7,7-DIOXIDE HCL
4,863,922 A * 9/1989 Baldwin et al. 514/232.5
5,688,968 A * 11/1997 Blacklock et al. 549/23
7,030,250 B1 * 4/2006 Losada et al. 549/23

[75] Inventors: Mukund Keshao Gurjar, Pune (IN); Madhusudan Nagorao Deshmukh, Pune (IN); Vincent Paul, Pune (IN); Venkatasubramanian Radhakrishnan Tarur, Mumbai (IN); Dhananjay Govind Sathe, Mumbai (IN); Santosh Pratap Pardeshi, Mumbai (IN); Sanjay Janardhan Naik, Mumbai (IN); Tushar Anil Naik, Mumbai (IN)

FOREIGN PATENT DOCUMENTS

EP 0 296 879 12/1988
EP 0 453 288 10/1991
EP 0 617 037 9/1994

* cited by examiner

Primary Examiner—Deborah C. Lambkin
(74) Attorney, Agent, or Firm—Ladas and Parry LLP

(57) ABSTRACT

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 134 days.

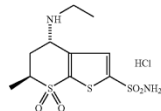
The present invention relates to an improved process for the preparation of 5,6-dihydro-4-(S)-(ethylamino)-6-(S)methyl-4H-thieno[2,3b]thiopyran-2-sulphonamide-7,7-dioxide hydrochloride of formula (I) commonly known as Dorzolamide Hydrochloride useful as an agent to reduce intraocular pressure by inhibiting carbonic anhydrase enzyme

(21) Appl. No.: 11/024,029

(22) Filed: Dec. 28, 2004

(65) Prior Publication Data
US 2006/0142595 A1 Jun. 29, 2006

(51) Int. Cl. C07D 335/04 (2006.01)
(52) U.S. Cl. 549/23
(58) Field of Classification Search 549/23
See application file for complete search history.



(56) References Cited
U.S. PATENT DOCUMENTS
4,797,413 A * 1/1989 Baldwin et al. 514/432

34 Claims, No Drawings

(19) **United States**
(12) **Patent Application Publication**
Darbha et al.

(10) Pub. No.: **US 2007/0004599 A1**
(43) Pub. Date: **Jan. 4, 2007**

(54) PROCESS FOR THE PREPARATION OF LUBRICANTS

(30) Foreign Application Priority Data

Jun. 16, 2005 (IN)..... 1561/DEL/2005

(76) Inventors: Srinivas Darbha, Pune (IN); Rajendra Srivastava, Pune (IN); Paul Ratnasamy, Pune (IN)

Publication Classification

(51) Int. Cl. C10M 173/02 (2006.01)

(52) U.S. Cl. 508/216

(57) ABSTRACT

The present invention provides an improved process for the preparation of lubricants from vegetable oil or fat obtained from animal source. The present invention involves a reaction of vegetable oil or fat with an alcohol in the presence of a double metal cyanide catalyst, at a temperature in the range of 150° to 200° C. for a period of 3-6 hrs to obtain the desired bio-lubricant.

Correspondence Address:
MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C.
700 LAVACA, SUITE 800
AUSTIN, TX 78701 (US)

(21) Appl. No.: 11/442,651

(22) Filed: May 26, 2006



US006208951B1

(12) **United States Patent**
Kumar et al.

(10) Patent No.: **US 6,208,951 B1**
(45) Date of Patent: **Mar. 27, 2001**

(54) METHOD AND AN APPARATUS FOR THE IDENTIFICATION AND/OR SEPARATION OF COMPLEX COMPOSITE SIGNALS INTO ITS DETERMINISTIC AND NOISY COMPONENTS

(56) References Cited

U.S. PATENT DOCUMENTS

5,392,255 * 2/1995 Lebras et al. 367/50
5,757,700 * 5/1998 Beak et al. 742/200



US006504050B1

(12) **United States Patent**
Barve et al.

(10) Patent No.: **US 6,504,050 B1**
(45) Date of Patent: **Jan. 7, 2003**

(54) PROCESS FOR THE PREPARATION OF 2-ACRYLAMIDO-2-METHYL-1-PROPANESULFONIC ACID

(51) Int. Cl.⁷ C07C 309/00
(52) U.S. Cl. 562/105
(58) Field of Search 562/105

(75) Inventors: Prashant Purushottam Barve, Maharashtra (IN); Sunil Shankar Joshi, Maharashtra (IN); Ravindra William Shinde, Maharashtra (IN); Milind Yashwant Gupte, Maharashtra (IN); Chandrashekhar Narayan Joshi, Maharashtra (IN); Shrikant Madhukar Ghike, Maharashtra (IN); Raghavendra Venkatrao Naik, Maharashtra (IN); Rajendra Ananttrao Kulkarni, Maharashtra (IN); Aruna Narayan Bote, Maharashtra (IN)

(56) References Cited

U.S. PATENT DOCUMENTS

3,506,707 A * 4/1970 Miller
3,544,597 A * 12/1970 Killam
3,547,899 A * 12/1970 Adt
6,448,347 B1 * 9/2002 Quinn

* cited by examiner

Primary Examiner—Michael L. Shippen
(74) Attorney, Agent, or Firm—Nixon & Vanderhyc P.C.

(73) Assignee: Council of Scientific and Industrial Research, New Delhi (IN)

(57) ABSTRACT

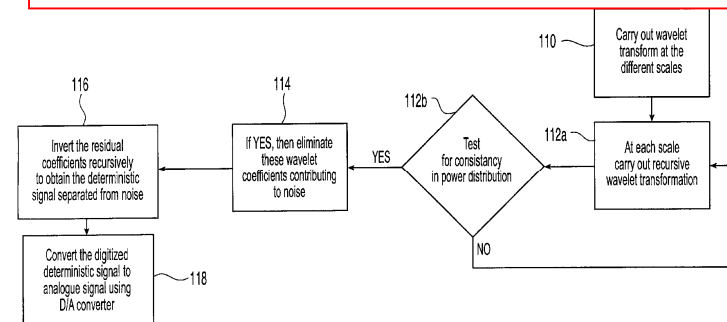
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

The present invention provides a process for the preparation of highly pure 2-acrylamido-2-methyl-1-propanesulfonic acid in high yield, with improved appearance, by the reaction of acrylonitrile with more than 98% sulfuric acid or oleum and liquefied isobutylene in presence of weak inorganic acids or organic sulfonic acids.

(21) Appl. No.: 10/096,070

(22) Filed: Mar. 13, 2002

12 Claims, 1 Drawing Sheet



Gallery of selected licensed patents



NCL INNOVATION PARK

www.innovationpark.org



NCL Innovation Park ... the transformed campus



The planned home for technology innovations and PPPs





www.venturecenter.co.in

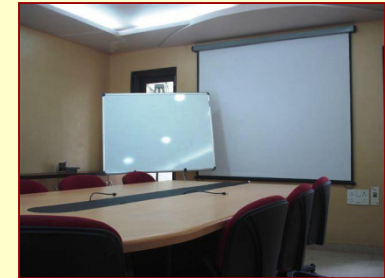
Seeding Tomorrow's Enterprises Today

To become the hub for nucleating innovation focused entities of Indian companies, and thus give birth to innovation-focused companies in the chemical and allied disciplines for India

Seeding Tomorrow's Enterprises Today



Reception



Board room; Meeting room



Hot-desking facility



E-Class Room; Training Room



Training Room



Library

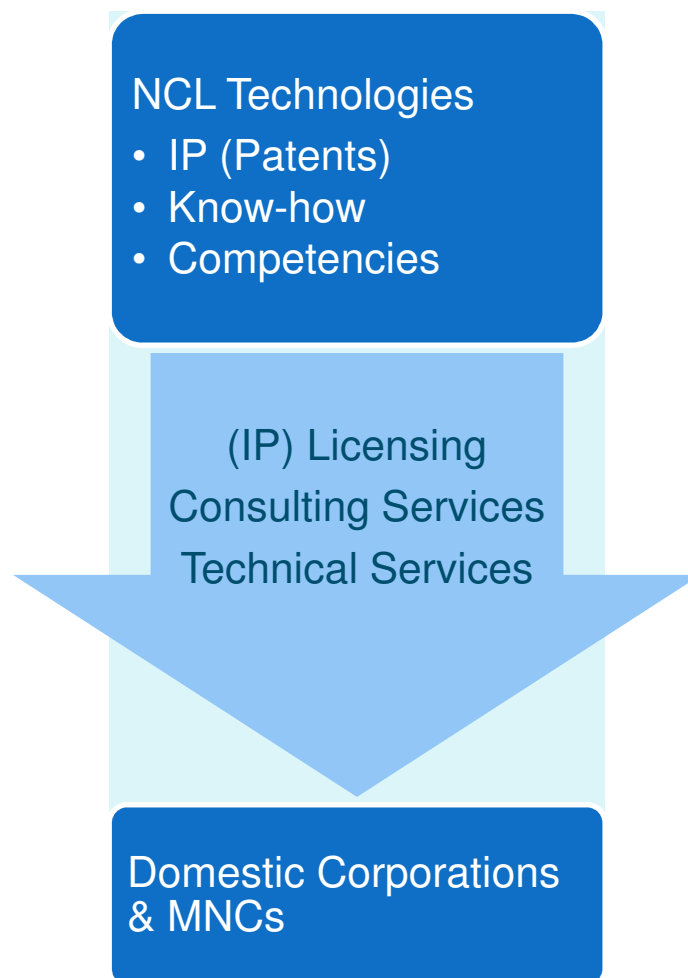


Lab block

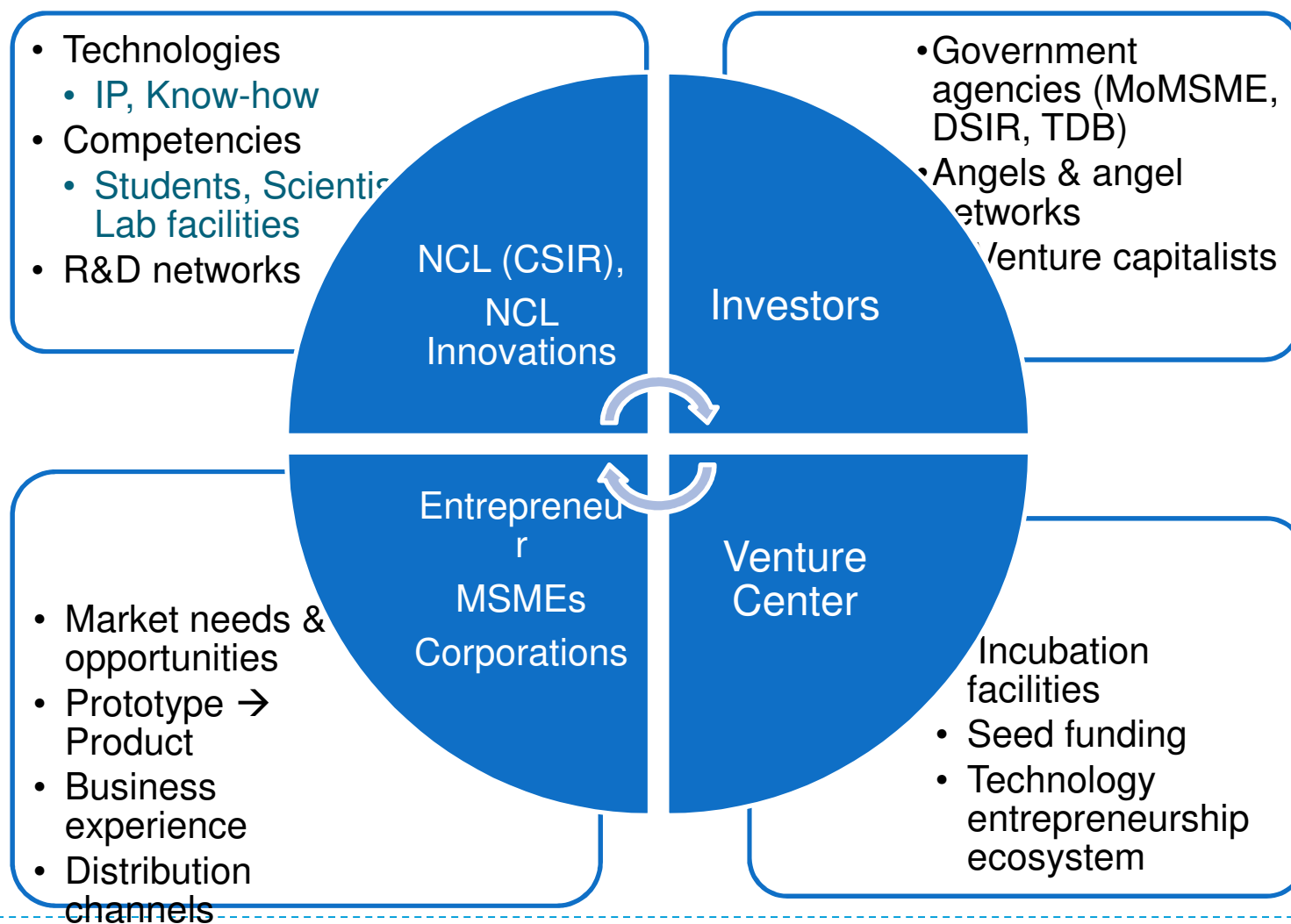




Technology Commercialization v1.0



Technology Commercialization v2.0



WHY SHOULD SCIENTISTS IN PUBLICLY FUNDED INSTITUTIONS BE INTERESTED IN TRANSLATING SCIENCE INTO PRODUCTS AND SERVICES

- Institutional compulsions
- Challenge of bringing good science to the market
- Becoming rich
- Altruism or doing good for the society which nurtured them; desire to act as agents of change in society
- Creating wealth at the bottom of the pyramid
- Self actualization and growth motivation (highest in the hierarchy of human needs according to Abraham Maslow)

At the end of the day, every scientist has this yearning to be useful

BARRIERS TO KNOWLEDGE DRIVEN INNOVATIONS



- **Cultural barriers (knowledge is free, making personal wealth out of knowledge is not right, separating the goddess of knowledge from the goddess of wealth in the Indian pantheon of gods)**
- **Immaturity of markets and risk averse**
- **Inability to connect basic discoveries with potential applications**
- **Weak innovation eco systems (mentoring, venture and angel funds, knowledge clusters)**
- **Peer recognition systems heavily biased in terms of abstract academic research; not enough incentives for individuals who wish to translate science into products and services**

SOME USEFUL LESSONS LEARNT

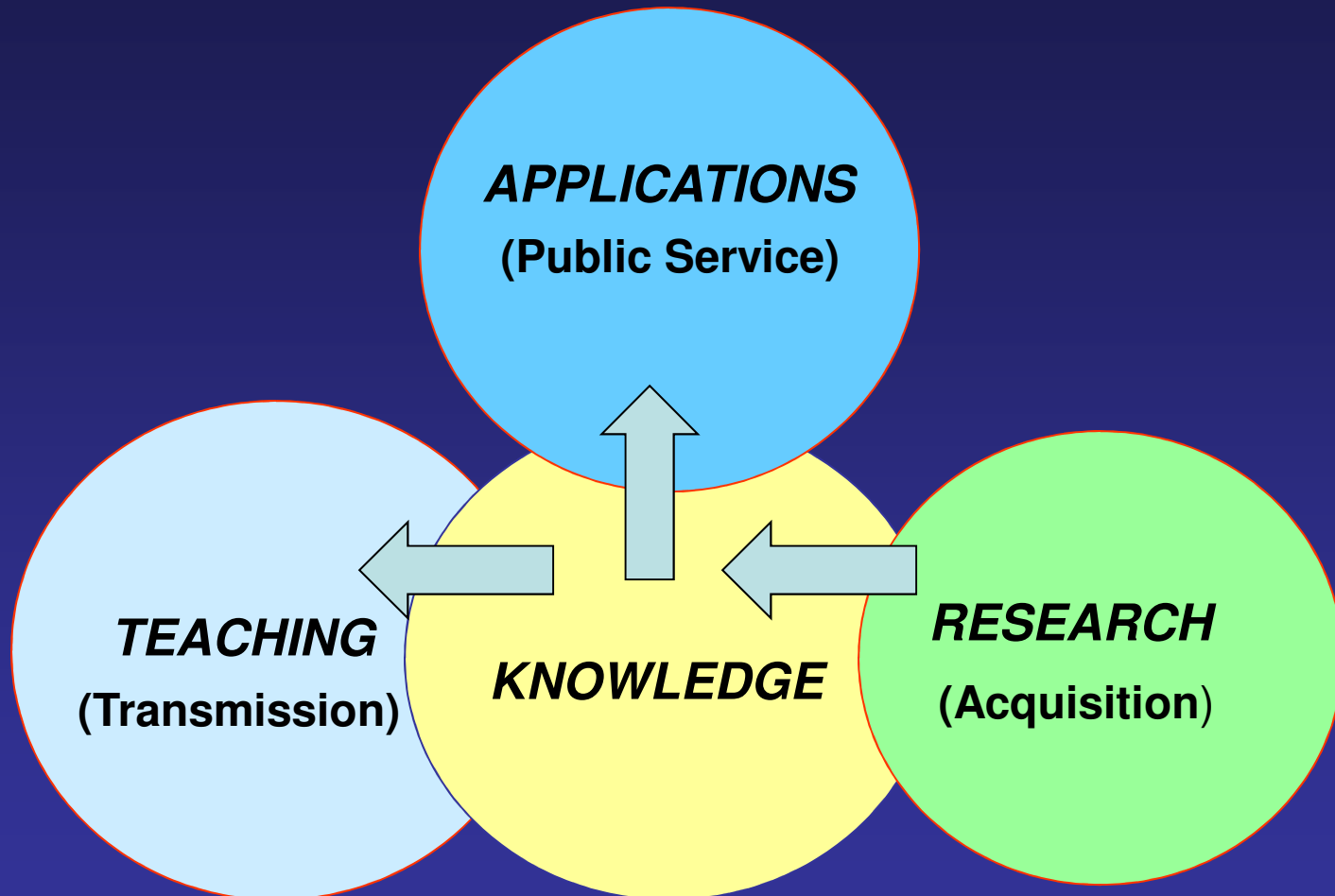


- Learn to walk the last mile
- Putting the team together and energising the team
- Patience , perseverance and failure tolerant
- Who gets the glory and who gets the blame
- The role of a champion; the leader as a champion
- Going beyond the written contract
- Passion to succeed; Are you ready to stake your reputation?

Science is an individual effort; technology is a collective endeavour



COMPONENTS OF A KNOWLEDGE INSTITUTION



EMERGING INNOVATION CLUSTER AROUND NCL

**OVER 1000 STUDENTS
PURSUING Ph D DEGREE**



**NCL
Innovation Park
Venture Center**

**OVER 500 RESEARCH
FACULTIES
IN CHEMISTRY,
PHYSICS,
BIOLOGY,
MATHEMATICS AND
CHEMICAL
ENGINEERING**

**Indian Institute
of
Science Education
and Research**



Pune

**Industry Research
Partners**

**A TRUE HOTSPOT FOR INNOVATION WITH
A SUPPORTIVE ECO - SYSTEM**



We must learn to happily progress together or miserably perish together. Man can live individually but can survive only collectively

Atharva Veda



THANK YOU

