

# Technology Transfer and Commercialization- Experiences from NRDC

Regional Workshop on New Paradigm in Technology Transfer and  
Commercialization

Organised by UN-ESCAP and CSIR

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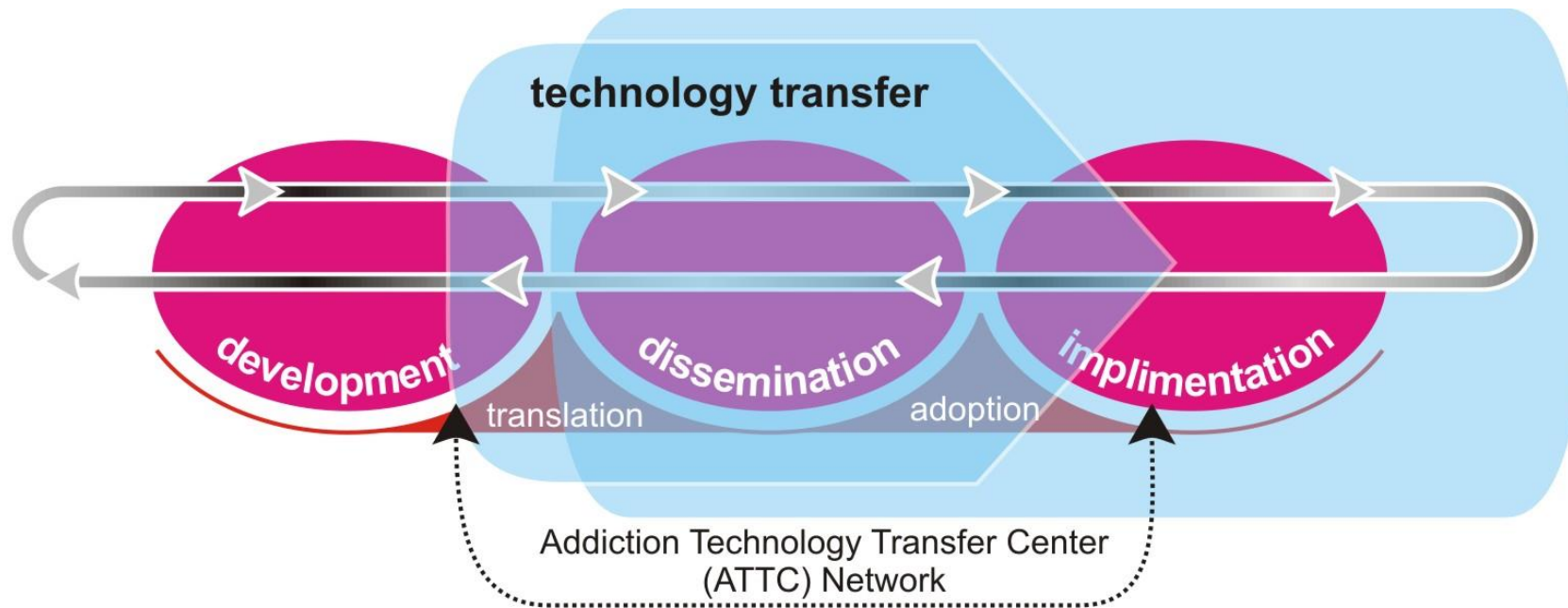
# What is Technology Transfer ?

**“The process of transferring R&D knowledge, IP, technical expertise or know-how developed by an individual, enterprise, university / academic institution or research institute to another individual, enterprise, university, academic institute or organization”**

# Benefits of Technology Transfer

- ❖ Results in manufacturing of R&D output
- ❖ Facilitates employment generation
- ❖ Boosts economic development
- ❖ Enables wealth creation
- ❖ Helps in enhancing the National competitiveness

## ATTC network model (Heather, 2011)



# Challenges in Technology Transfer & Commercialization from R&D Labs

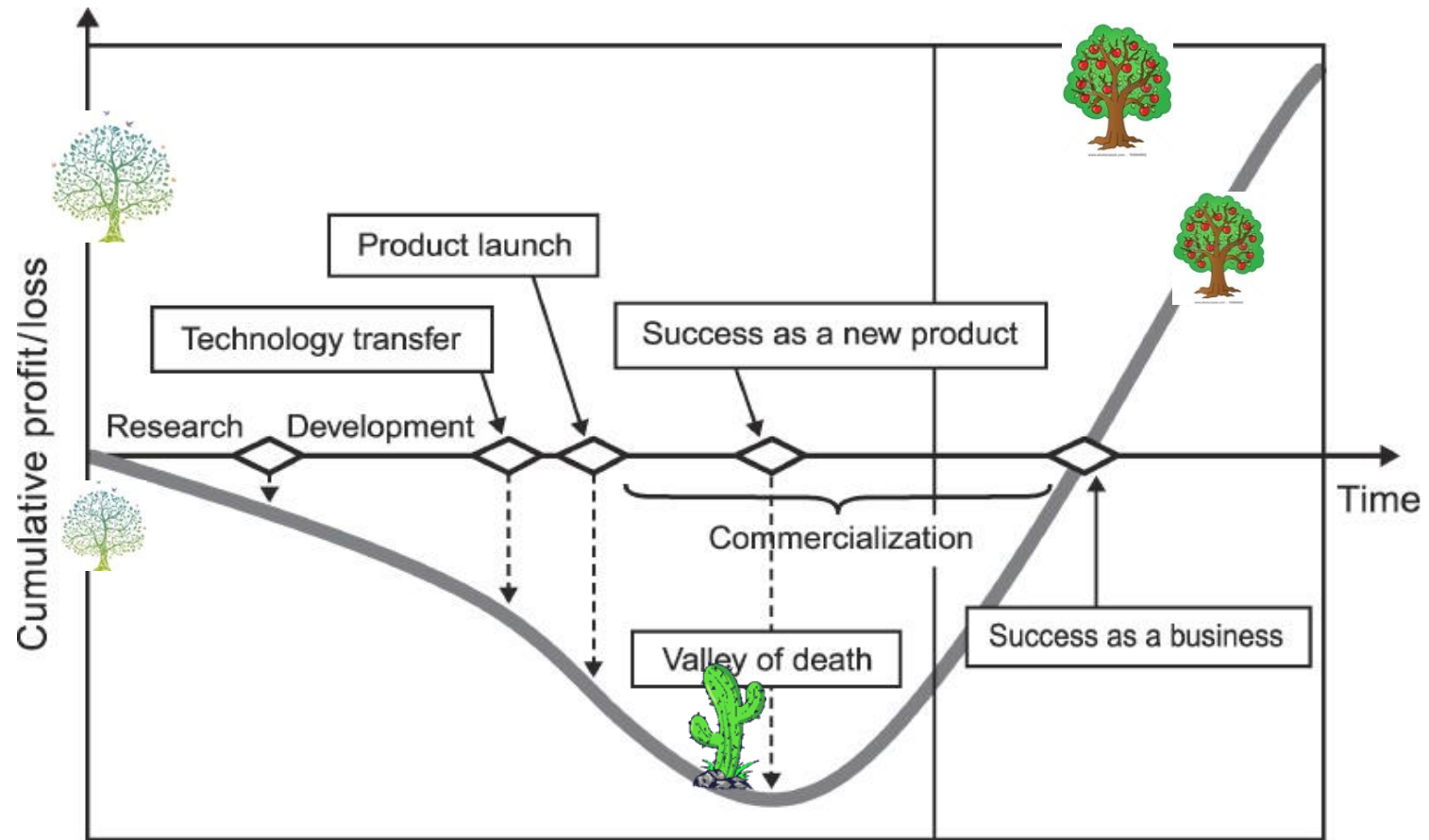
- **Low TRLs**
- **Lack of Funding for Scale up and Pilot Plant Studies**
- **Limited Commercial Prototype Market Validation/Field testing**
- **Lack of Market Research Studies**
- **Lack of TEFRs/Technology Profiles**
- **Limited Access to Risk Capital**
- **Inadequate /Lack of IPR Protection**
- **Limited Technology Transfer/Commercialization Professionals**
- **Lack of Legislative support**
- **Complex Regulatory Compliances**
- **Inadequate Incentives**
- **Higher Technology Transfer Costs/**
- **No National Guidelines for IP/Technology Valuation**
- **Need for understanding 4Ps of TOT:Product,Price,Promotion,Place**

# Means of Technology Transfer

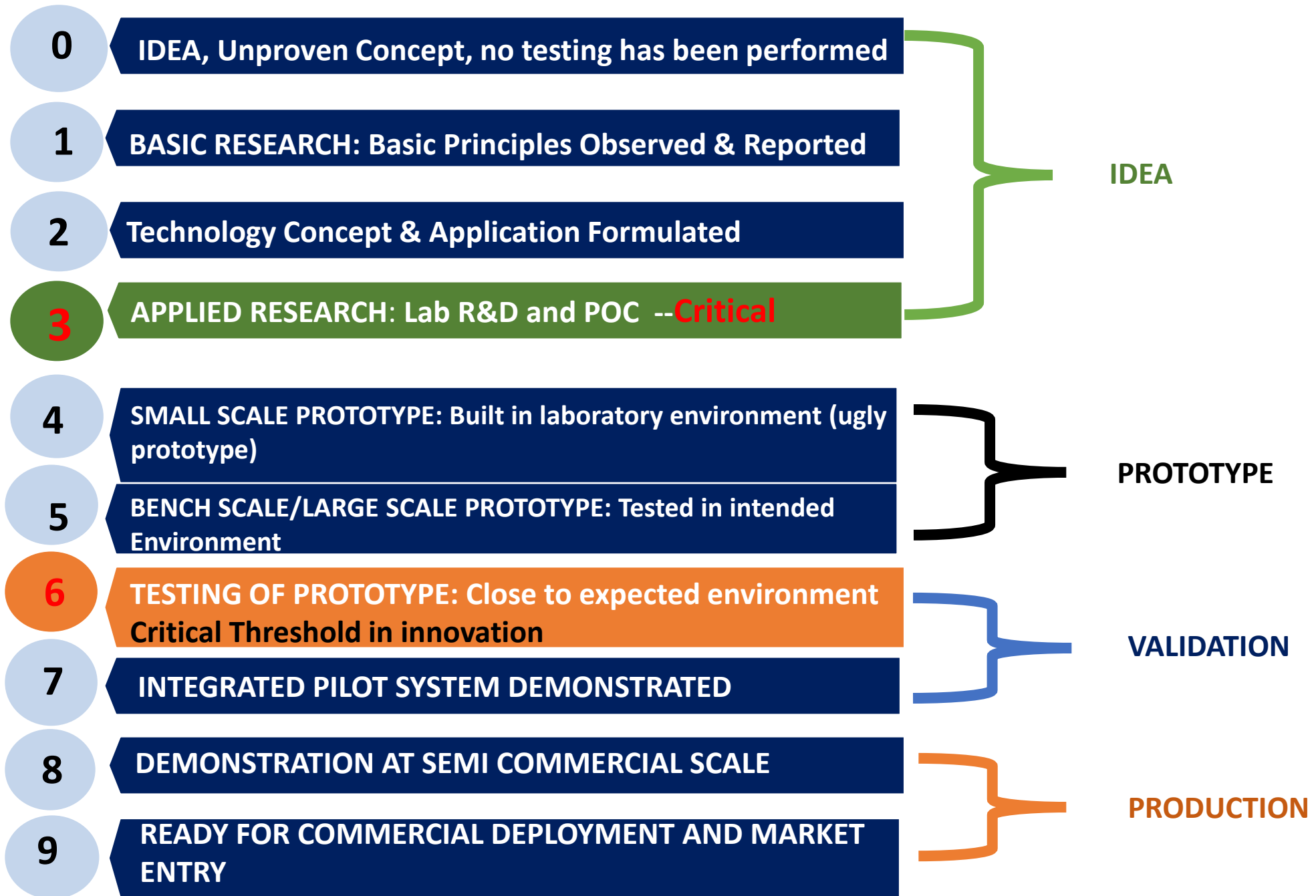
- Through movement of people
- Through equipment
- Through knowledge transfer
- **Through licensing of technology**

# Financing of Commercialization of Technologies - Valley of Death

Source: Osawa and Miyazaki (2006)



# MEASURE YOUR TECHNOLOGY READINESS LEVELS-TRL





Innovation &  
Technology  
Business  
Promotion  
Organization

- Incorporated in 1953; as a **SECTION-8 (Not for Profit Company)** with a mandate

- ✓ to Promote

- ✓ to Develop

- ✓ to Commercialise

Indigenously developed technologies from universities, national R&D Institutions & individual inventors.

- Specialize in **Technology Transfer, IP & Innovation Management and Project Consultancy**

- Catalyze conversion of lab-scale R&D into marketable technologies

- Offer effective linkages with

- ✓ R & D Institutions (Public & Private)

- ✓ Industry

# NRDC : BRIDGE BETWEEN R&D AND INDUSTRY

LARGEST TECHNOLOGY TRANSFER ORGANISATION in INDIA

Licensed over 5000 Technologies

- Technology Evaluation
- Pilot Plant Studies
- IPR Protection & Management
- Prototype Development
- Field Testing
- Market research TEFR/DPR/BEDP



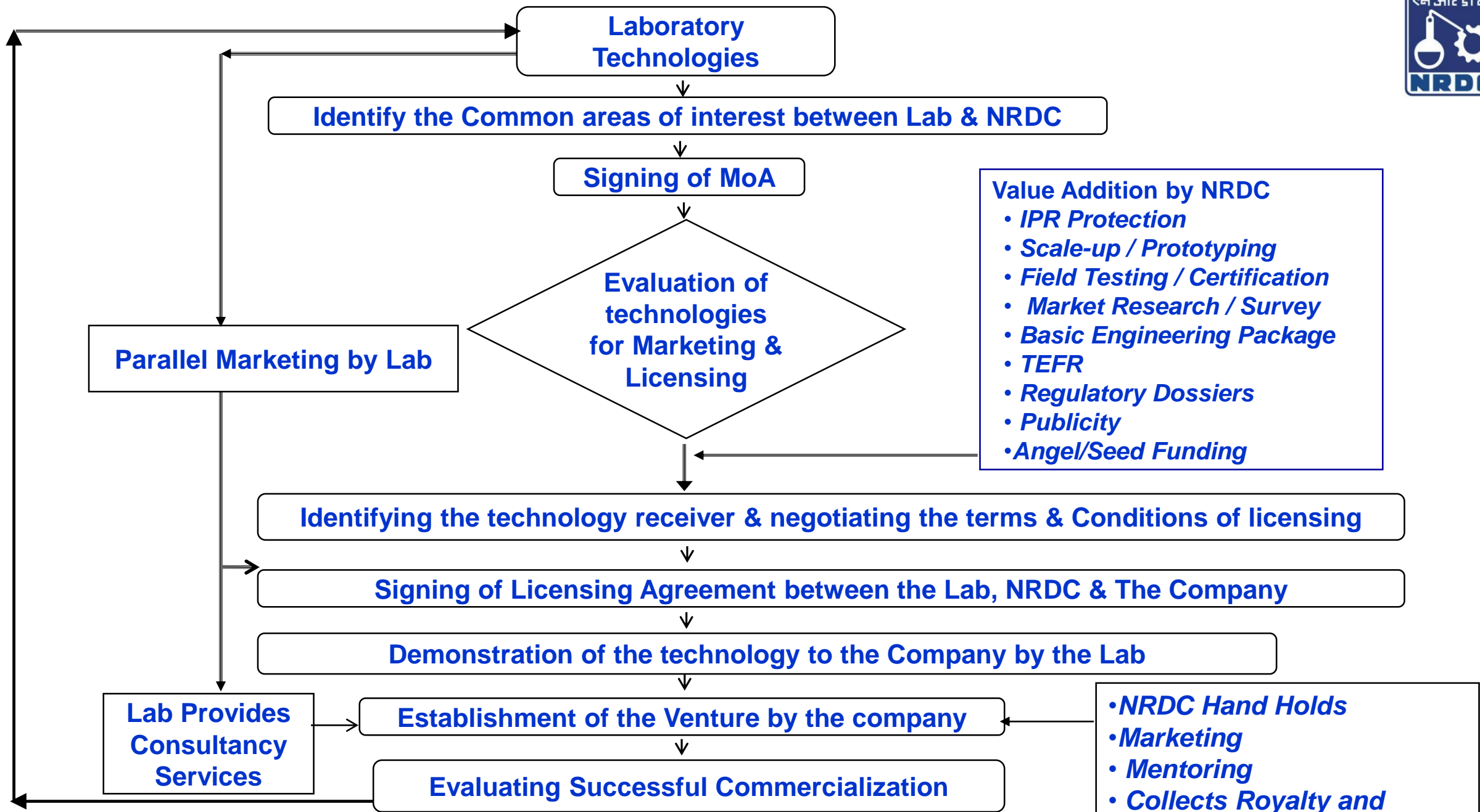
- Regulatory Approvals
- Marketing
- Seed Funding
- Skill Development
- International Technology Transfer
- Start-up India
- Incubation Services
- National Awards
- Licensing & Royalty Collection

All Areas  
of S&T

5000  
Technologies  
Licensed

2000 Patents  
Filed

500 MoUs in  
Force



## **NRDC'S Model for Licensing of Technology**

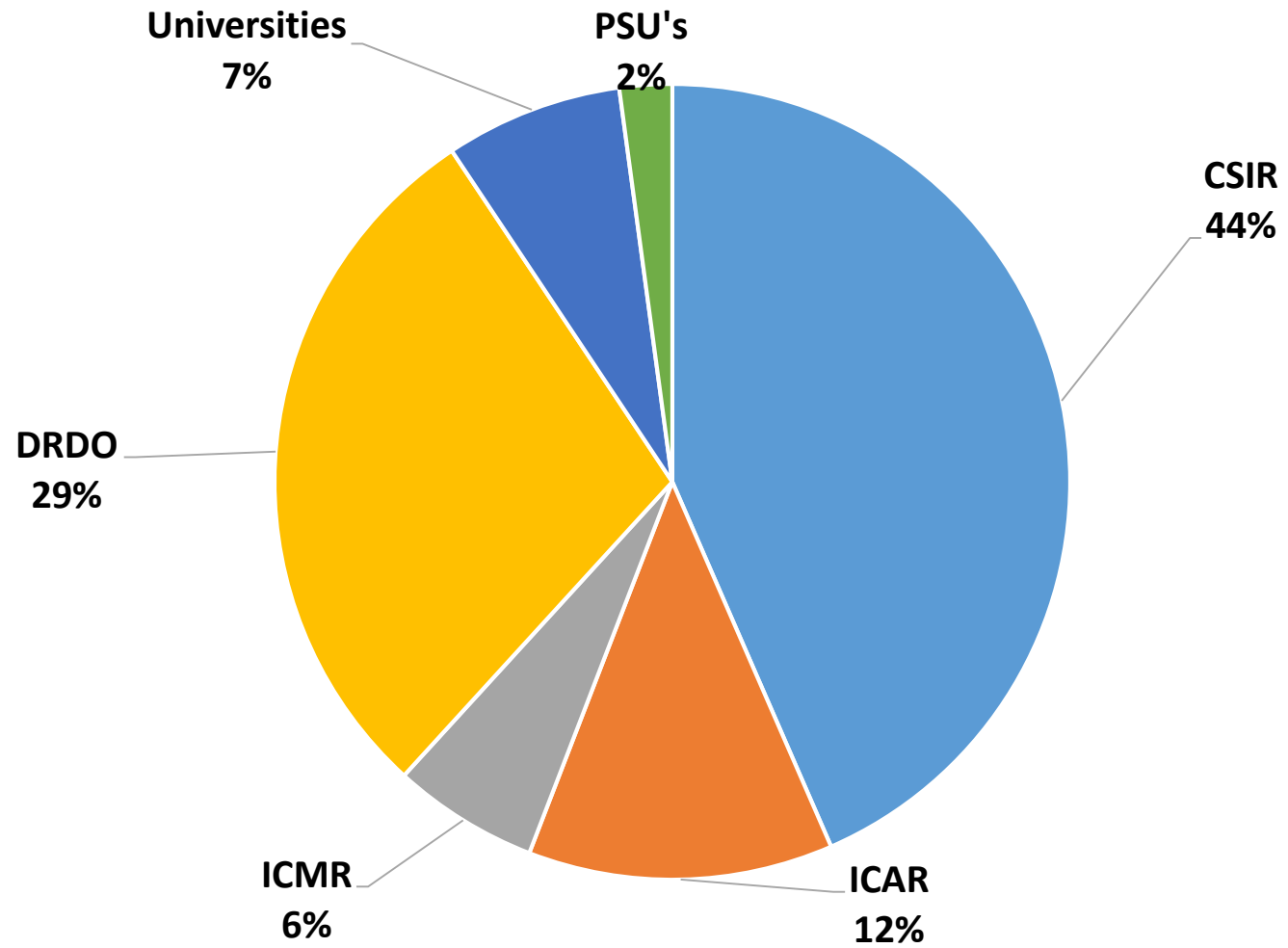
## **Value Addition by NRDC to ENTREPRENEURS**

- **Technology Assessment**
- **Pilot Plant Studies**
- **IPR Protection**
- **Prototyping**
- **Field Testing/Clinical Trials**
- **Market Research / Survey**
- **Basic Engineering Package**
- **TEFR, DPR**
- **Regulatory Dossiers/Approvals**
- **Publicity/Marketing**
- **Angle / Seed Funding**
- **Incubation Services**
- **Mentoring, Handholding**
- **Connecting to Start-up India & Networking with VCs**
- **Out Licensing**



**NRDC - TRANSFERRED TECHNOLOGIES TO 24 NATIONS ACROSS THE GLOBE**

# SOURCES OF TECHNOLOGIES FOR NRDC



# FEW MAJOR TECHNOLOGIES COMMERCIALIZED BY NRDC

## 1. Licensing: Some success stories

- i. Indelible Ink
- ii. Amul Baby Food
- iii. 10 & 20 HP Tractor
- iv. Sodium Azide
- v. Artificial Heart Valve
- vi. Ayush-82 (Anti Diabetic Herbal )
- vii. Anti Arthritis Herbal Ointment
- viii. Remote Operated Vehicle
- ix. Glycol based Anti-freeze coolant
- x. Microbial quality test kit for drinking water
- xi. Invert Sugar
- xii. Liposomal Amphotericin B (“FUNGISOME” )
- xiii. Bti-Larvicide
- xiv. Solar Power Tree
- xv. Potassium Humate

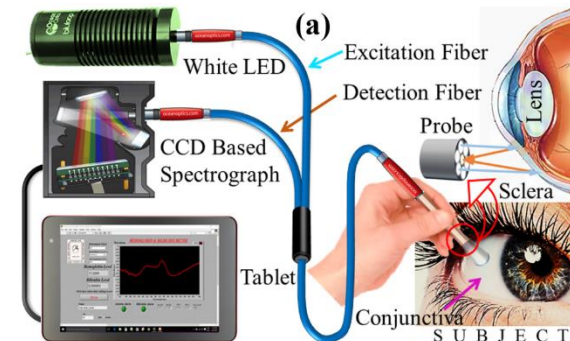
## 2. Co-Development, Value Addition & Joint Licensing

- i. Hydrogel
- ii. Auto-Dipper
- iii. Rice Husk Particle Board
- iv. Blood Bag
- v. Spirulina Algae
- vi. Azadirachtin



# FEW SUCCESS STORIES OF TECHNOLOGY LICENSING

- Ayush 82 – Anti Diabetic Herbal Formulation
- Anti-Arthritis Ointment
- Artificial Heart Valve
- Disposable Blood Bag System
- Glucose Bio-Sensor
- Omeprazole (Anticid)-Brazil
- Fenugreek (Methi) for Anti-diabetic Drug-USA
- AZT (Anti AIDS Drug)-Brazil
- Liposomal Amphotercin-B
- Targeted Gene Delivery System
- PPR Vaccine
- Goat Pox Vaccine
- FMD Vaccine
- Bio-pesticide Based Bacillus Thuringiensis
- Thrombinase
- Theileriosis Vaccine
- Eye Drops For Ketorolac And Other NSAIDS
- Cyclosporin A
- Sperm Function Test Kit
- AJO Device





# PILOT RESEARCH PROJECT FOR TOMATO PRODUCTION IN GHANA (3 LOCATIONS)

At a glittering ceremony on 5th June 2017 attended by Hon'ble Ministers, High Commissioner of India, DG CSIR and Secretary, DSIR, Govt. of India, DG, CSIR, Ghana, CMD, NRDC and eminent scientists from India and Ghana, the Pilot Research Project for Tomato Production was declared successfully completed. The Project Completion document highlighting the research findings was handed over to DG, CSIR, Ghana by CMD, NRDC in the presence of the dignitaries.



# CENTRE FOR DEMONSTRATION AND PROMOTION OF TECHNOLOGIES (CDT), IVORY COAST, WEST AFRICA

Set up center, with 150 machine  
based technologies from India

Operated and maintained  
machines to produce numerous  
consumer products

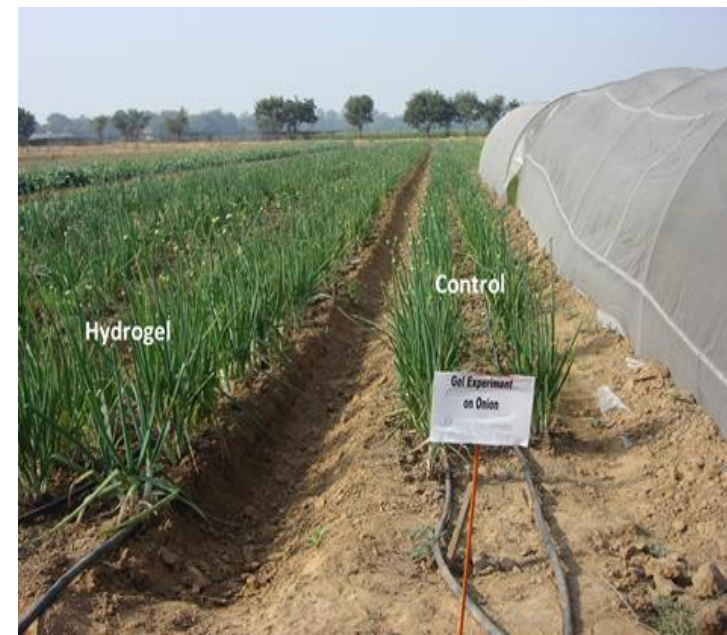
Trained local human resources to  
operate and maintain machines

**166 MSMEs emerged from  
this Centre**



Case study:  
**SUPER-ABSORBENT HYDROGEL FROM IARI**  
(More Crop for Drop)

- Possesses water absorption potential upto 350 times and remains stable(50-60°C) in soil for long period
- Huge potential for use in Agriculture as water economy arid in Dry-land agriculture
- Wide application in pharmaceutical, sanitary napkins, diapers, etc.
- NRDC did value addition in terms of Patent filing (India & PCT), field trials, Market survey, techno-commercial support for generation of data, etc
- Licensed to 8 companies.



## Successful Commercialisation – Case Study (3/4)

### **BT based Mosquito Larvicide** developed by VCRC, Pondicherry

- Formulation developed through fermentation route for the following species of mosquito namely
  - Culex species - Filariasis vectors
  - Anopheles spp.- malaria vectors
  - Aedes Spp. – Dengue vectors
- NRDC did value addition in terms of Patent filing (Indian Patent granted) Market survey, BEDP, Generation of data for CIB approval
- WHO certified and found to be safe and No harmful effects have been recorded in safety tests with bees, vertebrates, mammals and man
- NRDC licensed to 17 companies and obtained CIB approval
- License Fee is Rs.10 Lakh with Royalty 3% on Non-exclusive for 10 years
- Approval of the Technical Committee of National Vector Borne Disease Control Programme (NVBDCP) is under process.



Production of Active Ingredient



Preservation of Seed lots



Fermentation for large scale production



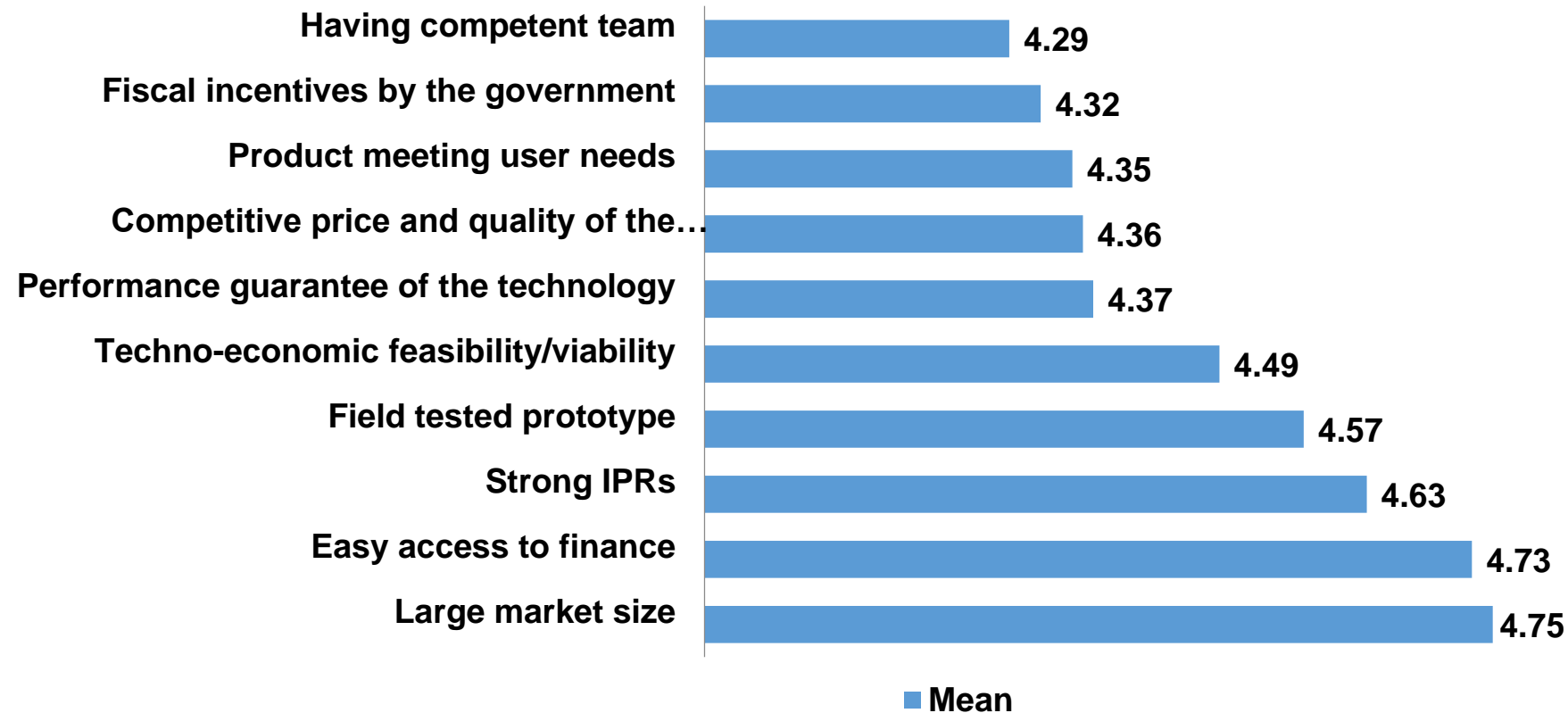
**NRDC Pays Royalty of Rs. 7.6Cr to Secretary, DSIR and DG, CSIR (2017-18)**



**NRDC Pays Royalty of Rs. 9.87Cr to Secretary, DSIR and DG, CSIR (2018-19)**

## Critical Success Factors for successful Technology Transfer

- The study found that 10 critical variables or conditions that need to be met minimum and managed to achieve successful technology transfer. They are:



# CONCLUSION

- India's No. 1 Technology Transfer Organisation with over **6 Decades of Experience**
- Promoting IP, Innovation, Entrepreneurship, Incubation, Start-ups
- Managing **Technology Databank of over 2500 Technologies**
- Concluded **5000 Licence Agreements** and filed **over 1800 Patents**
- Exported technologies and services to **24 Countries**
- Created Wealth of about **Rs. 3000 Crores** and Generated **Employment for over 100 Thousand** personnel
- **Ploughed back over Rs. 100 Crores** to Technology Generators
- Organised about 100 EDP/Skill Development Programmes to improve the livelihood of rural population
- NRDC is keen to work with all the stake holders of the Medical Technologies

# IPR: Bridge between Academia & Industry



"IPR"



Act as Catalyst





**THANK YOU**