Patents and the Promotion of Innovation

Topic 2: Strategies of Business Enterprises to Effectively Protect Patent Rights and Benefit from Patent Systems in a Globalized Economy:

Strategies for Public-Private Collaboration

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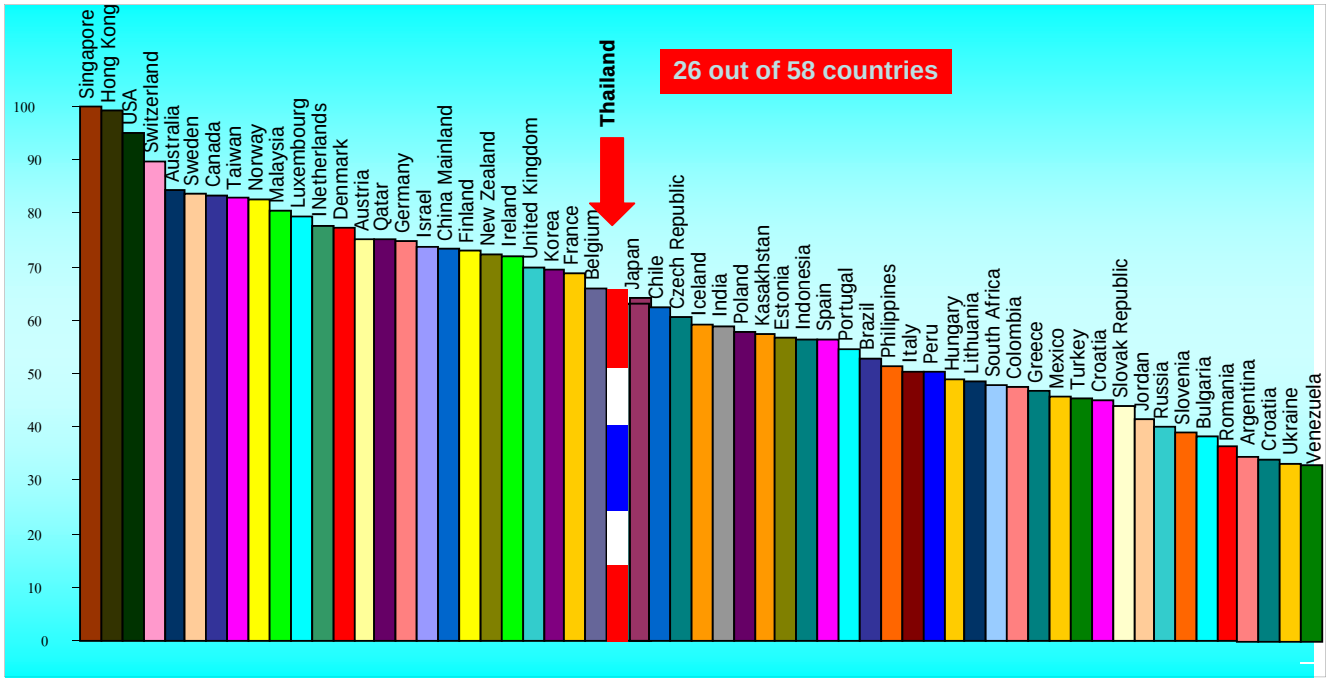
Sub-Regional Forum on Promotion of Innovation through Effective Co-operation on Patent Examination

4th October 2010

IMD's World Competitiveness Rankings (2010)



Source : International Institute for Management Development. World Competitiveness Yearbook 20.

Competitiveness Ranking of Thailand 2004-2010 (By Factor)

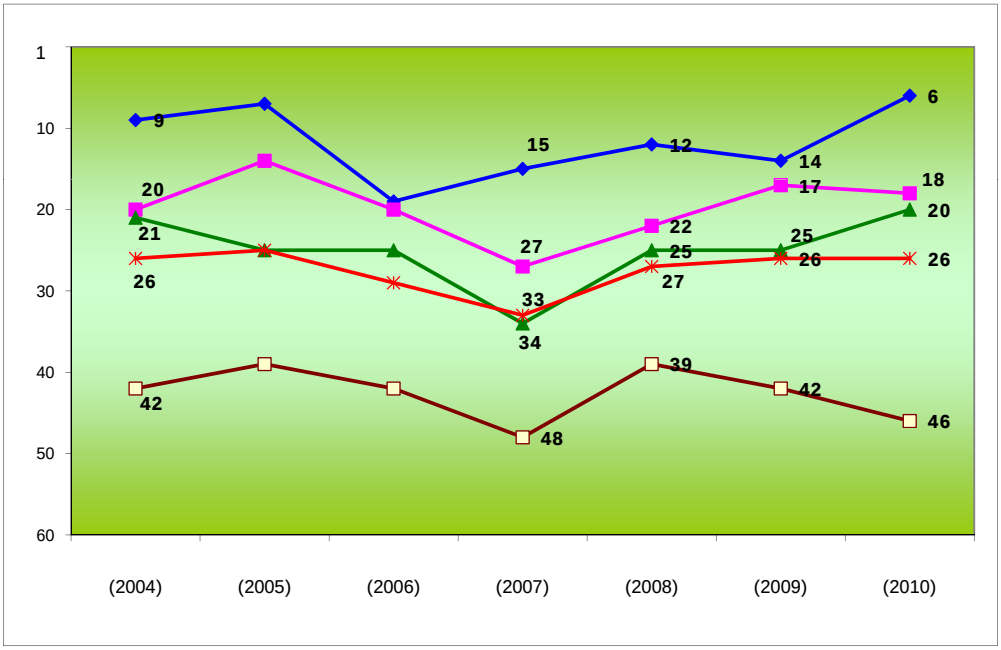
Economic Performance

Government Efficiency

* Overall

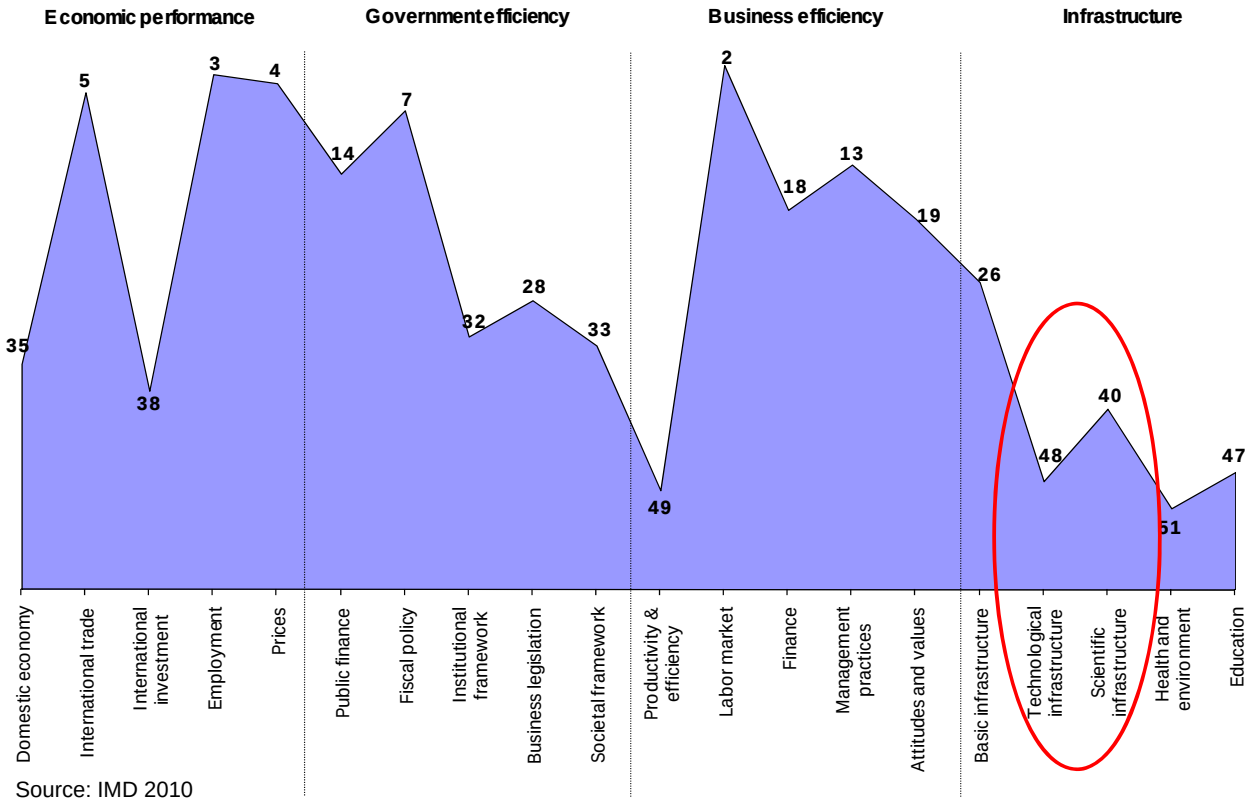
Business Efficiency

Infrastructure



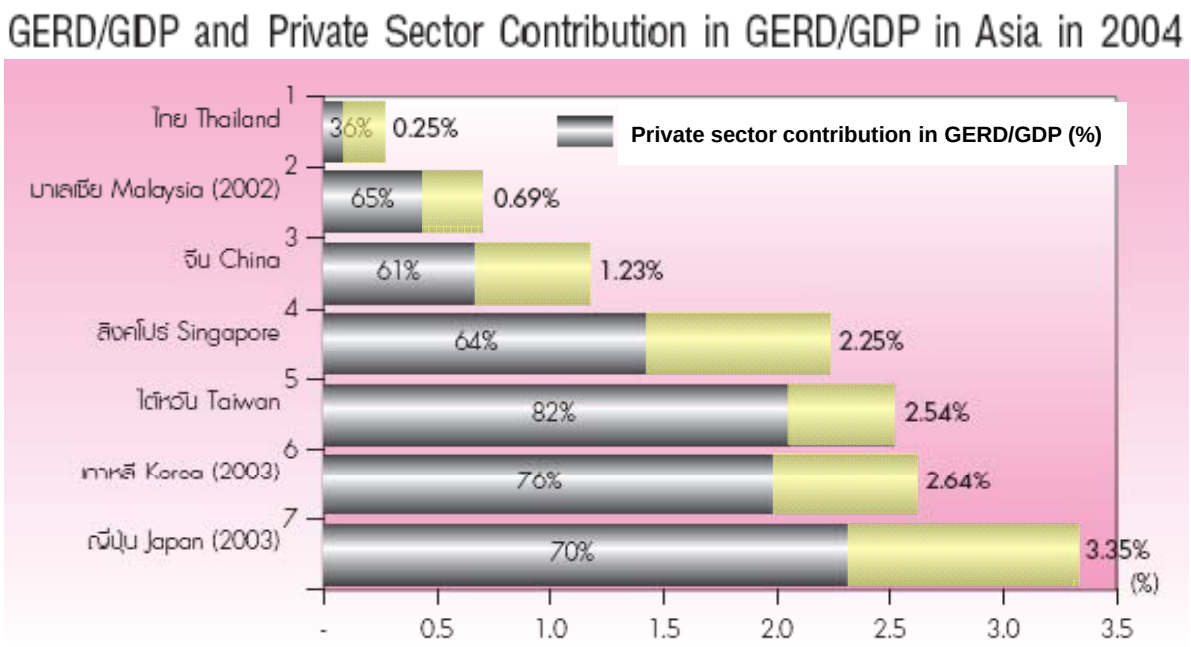
Source: International Institute for Management Development (2004-2010). World Competitiveness Yearbook 2004-2010.

Competitiveness Ranking of Thailand 2010 (By Sub-factor)



Source: IMD 2010

Limited Investment of Thai Private Sector in R&D

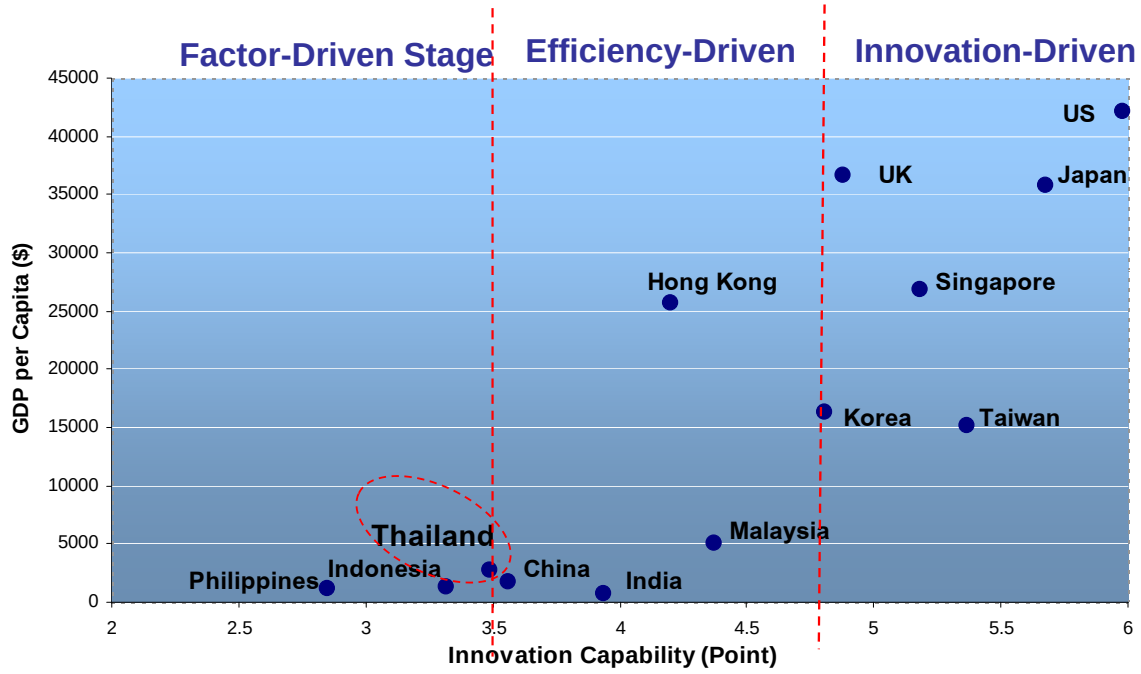


Source: 1. National Research Council of Thailand

2. Malaysian Science and Technology Information Center (MASTIC), Malaysia
3. The Ministry of Science and Technology (MOST), The People's Republic of China
4. Singapore Department of Statistics, Agency for Science, Technology and Research
5. The National Science Council, Taiwan
6. The Ministry of Science and Technology (MOST), Korea
7. The Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan

Innovation development in Thailand is at the early stage

"Where do we want to be in the global arena ? "



Source : WEF Report 2005-2006/ CMU 3 Analysis

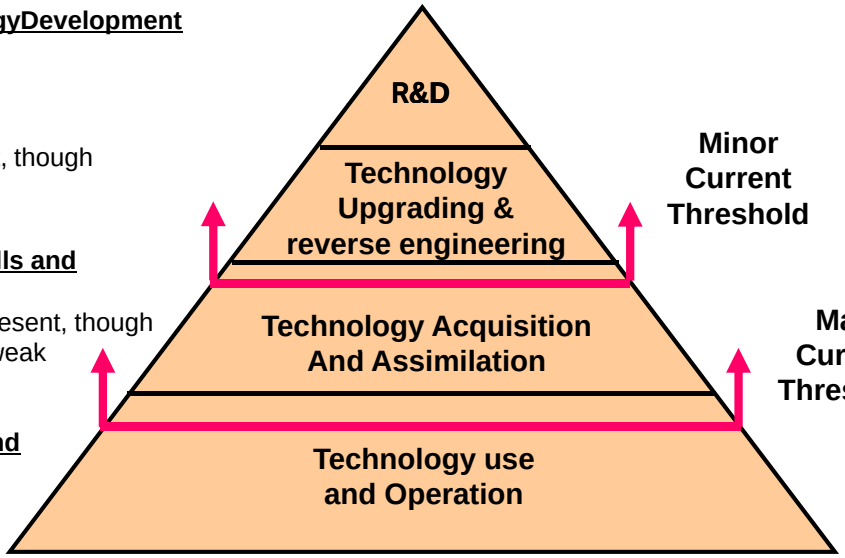
Technology Capabilities of Thai SMEs

Research and TechnologyDevelopment
Very rarely present

Design and Engineering
Capabilities rarely present, though emerging some firms

Technician and Craft Skills and Capabilities
Strong skills sometimes present, though key skills often absent or weak

Basic Operation Skills and Capabilities
Often weak, with limited and irregular upgrading



Source: World Bank, Arnold *et. al.*, 2001:.58

Thailand Intellectual Infrastructure
Master Plan 2008-2012

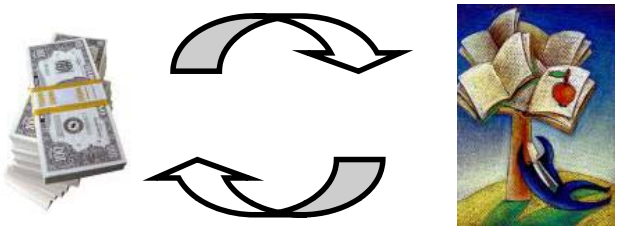
Target 1
The proportion of innovating firms increases to 35 percent

Target 2
The collaboration among private sector, academia, and research units

Target 3
Competitiveness index of R&D personnel and number of patents is above the mid point of the IMD's competitiveness league tables

Philosophy for Creating and Commercializing Patents

Cycle of Sustainability



Researcher turns Money into Knowledge

Business turns Knowledge into Money

How to manage:

- *From Lab to Market???*
- *From Market to Lab???*

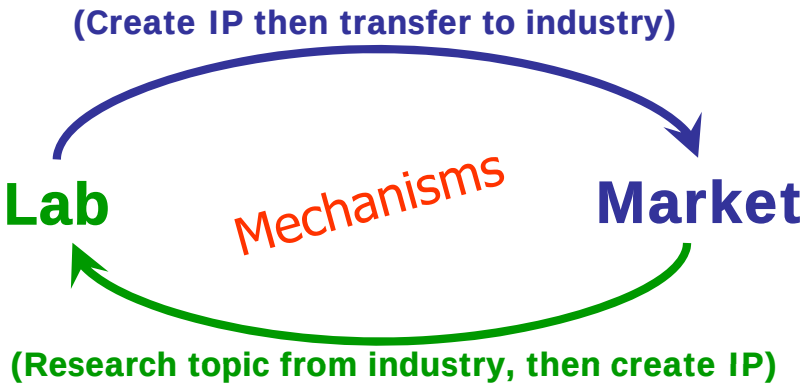
Challenge for Thailand

- Small percentage of industry with R&D capability
- Low investment in R&D by Private Sector
- University R&D not market-driven
- Lack effective mechanism for university-industry linkage/collaboration
- Low incentives and support for university researchers to link with industry
- Others.. e.g. bureaucratic system, low credibility, lack of IP understanding, etc.

Strategies for PP Collaboration in Creating and Commercializing Patents

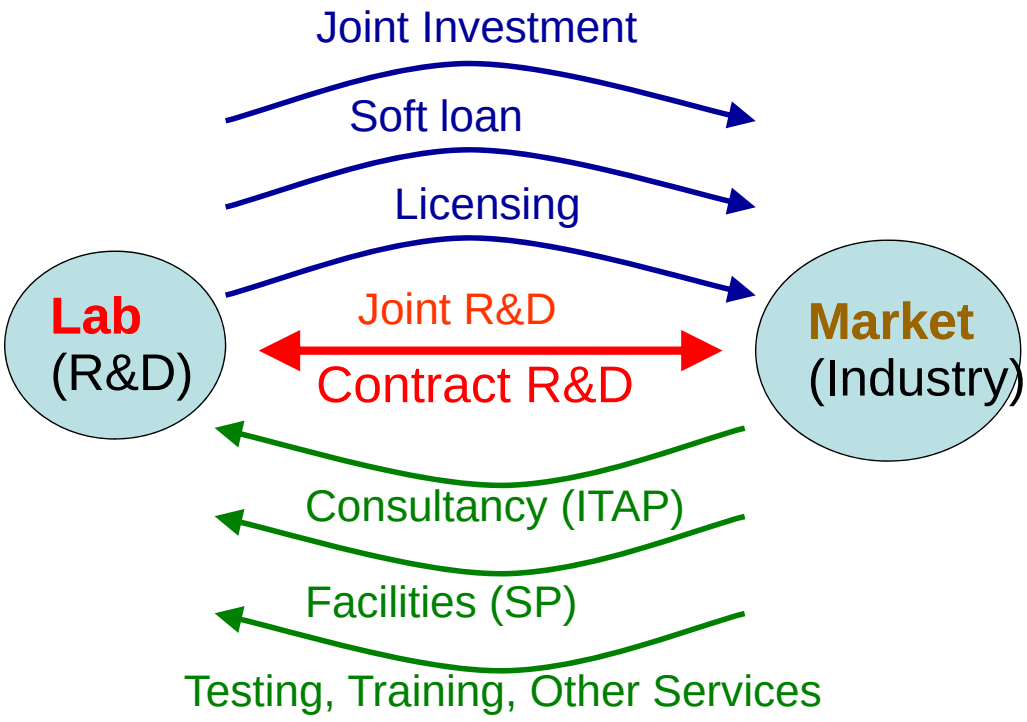
1. **From Lab to Market**
2. **From Market to Lab**

Need mechanisms to link Lab and Market



Examples of Mechanisms

L2M and M2L



Lab to Market

MECHANISMS for commercialization:

- **IP Protection**
- **IP Licensing**
- **Soft Loans for Technology Transfer from IP**
- **Joint Investment (JV Company)**
- **Spin off Researchers**

Licensing:
Commercialization of Dental Implant

- **ADTEC (Advanced Dental Technology Center) carries out collaborative research with NSTDA**
- **Creates technology for making titanium dental implant (currently 100% imported)**
- **User of product needs service from dentist**
- **Dentist needs training in use of new product (implant by surgery)**
- **TLO (NSTDA) helps ADTEC license to local company and sign MOU with 10 Dental Schools to implement workshops for dentists and students**

Soft Loan:
Commercialization of Biogas Technology

- Tapioca flour mill needs appropriate technology for their waste water treatment
- BIOTEC (NSTDA) has technology for Biogas Generation from waste water from tapioca mills
- NSTDA partners with bank to provide low interest loan to enable flour mill to invest in the waste water treatment technology (approx. $1.5m)
- After *demonstrating* the viability of this technology, BIOTEC is able to commercialize the technology to many more companies

Joint Investment :
Commercialization of Advanced Ceramics

- NSTDA dispatches researchers to carry out collaborative research in advanced ceramics in a company in the U.K.
- The U.K. company has very strong links with Cambridge University labs
- After 4 years the U.K. company decides to bring its production base of advanced ceramic products to Thailand
- NSTDA partners with the U.K. company to set up a joint venture Thai company which will be a breeding ground for further R&D collaboration as well as commercialization of the fruit of R&D

Spin-off :
Commercialization of RFID Technology

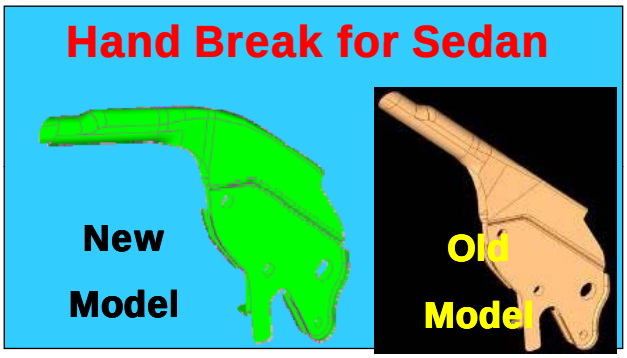
- NECTEC (NSTDA) researcher develops RFID technology
- Government procurement for RFID chips as animal tags
- NECTEC researcher spins off to set up company & NSTDA licenses technology to new start-up company
- NECTEC collaborates with start-up company to further develop RFID technology

Market to Lab

MECHANISMS for attracting industry to Lab

- **Contract R&D**
- **Joint R&D**
- **Consultancy Service (leads to contract R&D and joint R&D)**
- **Provision of Facilities *eg.* SP, SWP, Incubators**

Contract R&D



Project to improve performance of traveling unit of 155 mm towed howitzer

Rapid Testing Kit for Yellow Head Virus and GAV (Gill Associated Virus) in Black Tiger Shrimp

Project to improve quality of Small Pearl Tapioca for Beverage

Joint R&D

MTEC& Yamaha Foldable Side Mirror

MTEC & Tamrongthai 2003
Chassis Engineering Design for Motor Tricycle

TMEC & RADI Medical System
Blood Pressure Sensor MEMS

MTEC & Wichien Dynamic Industry
(Automotive Lighting)

NECTEC & PTT Electronic Control (ECU) & Energy Management

Consultancy Service

Industrial Technology Assistance Program (ITAP)

1 ***" …investigates and solves technical problems, upgrades technology in firms..."***

- **Diagnose production problems, source local or overseas experts to solve problems, subsidize expenses**
- **Attach local university people to overseas experts, help technology transfer to firms and universities**
- **Promote university researchers as experts, create industry-university linkage, *encourage collaborative and contract R&D***

2 ***" ... assists the private sector to search for, and acquire appropriate technology..."***

iTAP Network

Central Region
- Thailand Science Park, NSTDA

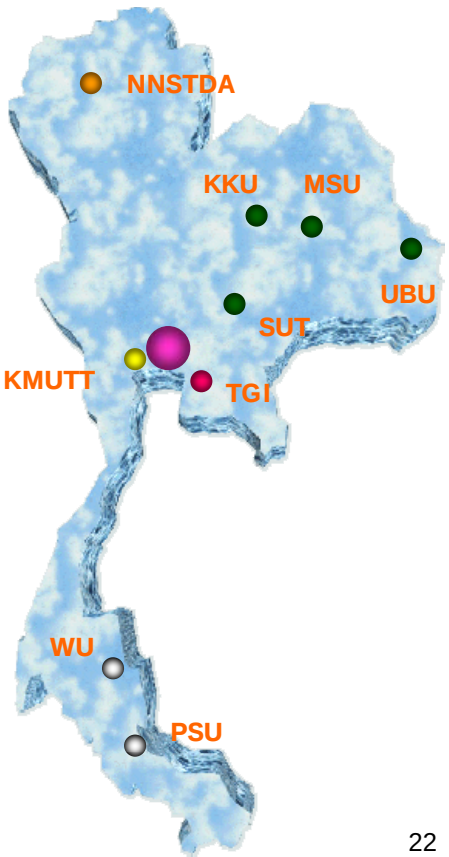
Northern Region
- Northern NSTDA (Chiangmai) (NNSTDA)

Northeastern Region
- Khonkaen University (KKU)
- Maha Sarakham University (MSU)
- Ubon RaJathanee University (UBU)
- Suranaree University of Technology (SUT)

Western Region
- King Mongkut's University of Technology Thonburi (KMUTT)

Eastern Region
- Thai-German Institute (TGI)

Southern Region
- Walairak University (WU)
- Prince of Songkla University (PSU) (2 Nodes)



iTAP Performance

Support SME

Contact SME ~15,000 firms

Diagnose technology-based problems 3,687 firms

Develop technology

In depth consultancy 2,377 projects

Technology Acquisition 72 projects 986 firms

HRD

Training/Seminar 585 courses 22,273 persons

May 2010 23

Great idea..
from discarded old wires..
to purified silver

Wua Lai Silp Co., Ltd.

Challenges

- High price of raw material (14,000-19,000 Baht/Kg)
- How to extract silver from discarded wires and obtain >96% purity

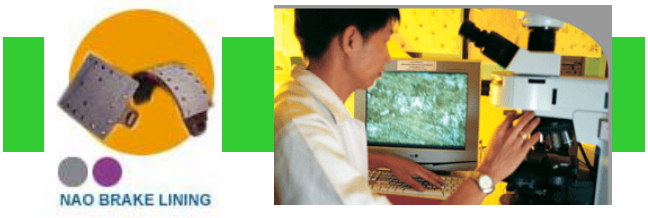
Support from iTAP

- Specialist from Chiengmai University
- Develops silver extraction process to yield 98% pure silver with comparable
- Properties to imported silver

Outcome

- 98% pure silver from old wires
- Import substitution
- Lowers cost of raw material 40%

Asbestos-free Brake Pads
Green Product Trend
Asia Compact Co.,Ltd.



Challenges

- More countries are banning asbestos in brake pads
- Need to build up knowledge to strengthen brand

Support from iTAP

- Specialist from Japan to transfer non-asbestos technology to serve as foundation for design development and formulation improvement

Outcome

- Production of REM products that meet international standard comparable to OEM manufacturers
- Increase in sales
- Led to further R&D which has resulted in the first Thai nanotechnology brake pad

Example

ITAP Technology Development for Para Wood Industry Project

Job Creation > 200,000
Targeted industry for export
8,000 Factories involved in supply chain
Revenue Creation >1.4 Billion USD/year
Area for Para wood planting > 10 Million Rai (4 m acres) Para wood cutting 230,000 Rai/Year (92,000 acres)

Regional Related Projects

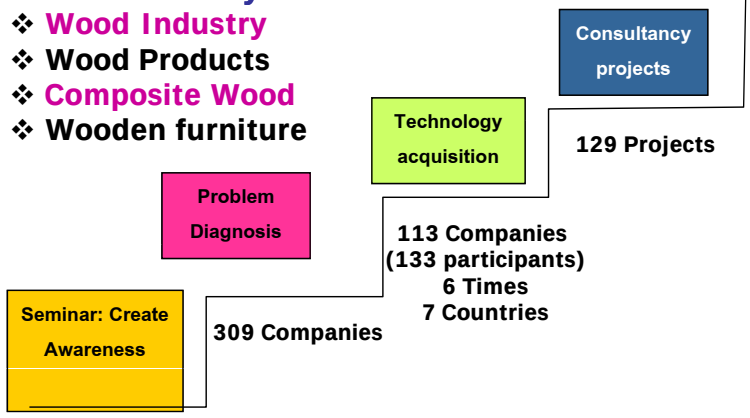
1. North ~ Teak wood
2. East ~ Reed Mat
3. Others ~ Other Tropical wood

Research Projects

1. Wood Cement
2. Thermo Wood
3. Oriented Strand Board production
4. Solid Wood Bending
5. Glulam Production for Construction

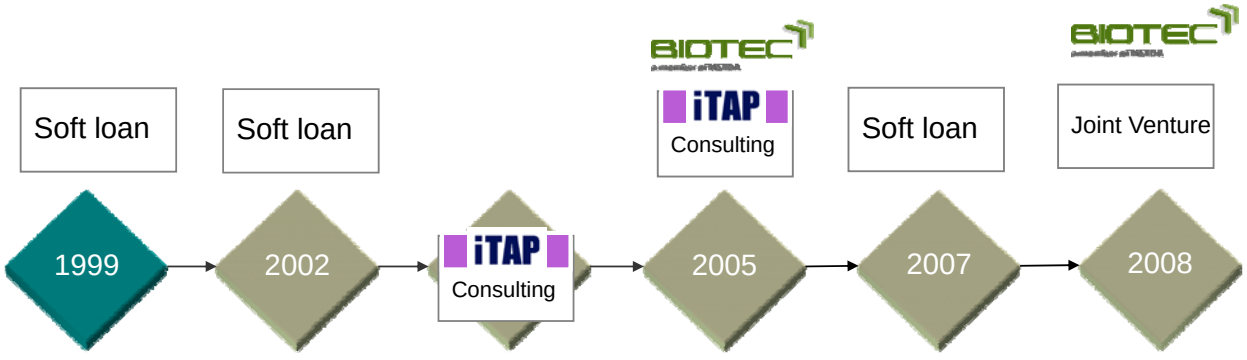
Related Industry

- Wood Industry
- Wood Products
- Composite Wood
- Wooden furniture



From Pig Farming to Probiotics

Pig feed production	Waste water treatment Biogas production	Fertilizer from waste sediment	Lab scale production of probiotics	R&D on industrial scale production of *Bacillus subtilis* for animal feed	*Joint investment with NSTDA 100 m baht*



Capital investment 20 M baht 17.1 M baht loan	30 M baht loan	Income 517 M baht	income 663 M baht Estabished New Co.	30 M baht	*Increased capital investment' 100 M baht*

ITAP helps all the way

Facilities to Support R&D and Commercialization

Thailand Science Park

Thailand Science Park (TSP)

Area: 80 Acres

Current Space: 140,000 sq.m. (300,000 sq.m. for whole project)

National Research Centers : BIOTEC, MTEC, NECTEC, NANOTEC

Space for private sector: Incubator units,
Multi-tenant buildings
Long term leased land

At present: 60 companies (70% Thai, 30% international)

Projection in 3 years (after 2011) :

Additional 40,000 sq.m. available for private sector (>200 companies, 4,000 knowledge workers)

Facilities Available at Thailand Science Park

National Centers

Pilot Plants

Convention Center

Multi-tenant Incubator Building

Greenhouse

Thailand Science Park: phase 2

- 4 integrated towers
- Gross area of around 126,900 sq.m., Net area of 72,000 sq.m.
- 40,000 sq.m. allocated for private companies
- Clean rooms, sensitive labs, heavy equipment area available

Proximity promotes Collaborations between Tenants & NSTDA

Examples of Joint R&D:

- BIOTEC and Shiseido
  Thai herbs for cosmetics
- BIOTEC and Betagro Science Center
  Production of enzyme phytase that can tolerate high temperature, from Thai microorganisms.
- MTEC and Shimadzu Bara Technical Center
  PBX-RF Analysis for prohibited compounds in export products
- MTEC and Thai Plastic and Chemical
  Simulation Software for PVC
- NECTEC and Western Digital
  R&D on hard disk drive
- NECTEC and NICT Asia Research Center
  Natural language processing

Incentives

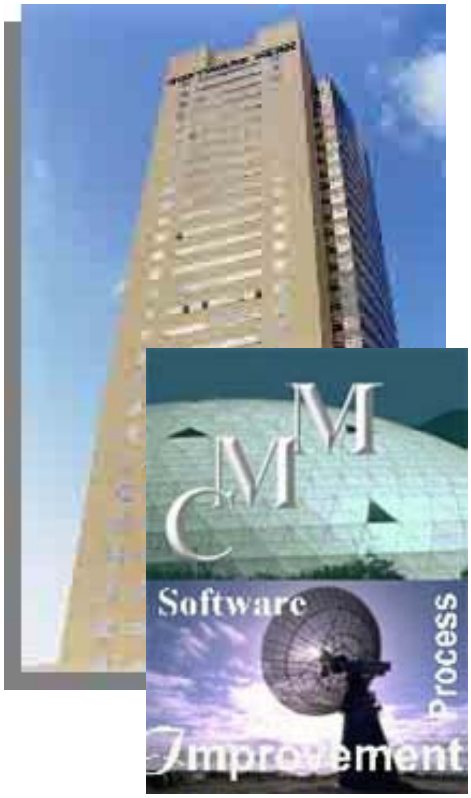
BOI

- **Exemption of corporate income tax for 8 years**
- **Import Tax exemption for machines, equipment and materials for R&D**
- **Accelerated depreciation of machinery and equipment**
- **Work permit and visa for foreign researchers and experts**
- **Allowance for foreign ownership**

Revenue Department

- **200% deduction of research expenses**

Software Park Thailand



Build up collaboration between government agency and private sector

- **56 companies, 17 companies with international businesses**
- **560 workers employed generating about $ 10 million per year**
- **Collaborate with IBM, SUN, HP, Oracle and universities in training and sharing facilities**
- **Raise software standard by providing consultancy on Capability Maturity Model (CMM) from Carnegie-Mellon University, U.S.A.**
- **Incubate 30 entrepreneurs per year**

Incubator's role in PP Collaboration

Accumulated No of TSP incubatees: 35

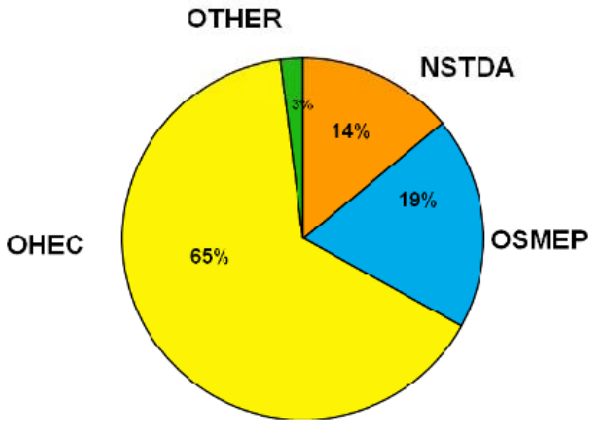
Examples of NSTDA-Incubatees Collaboration

- T-Net.. *licensed IT Security from NECTEC*
- Innov(Thailand)..*licensed blood test technology from BIOTEC*
- Hi-grimm Environmental and Research.. *collaborative research with BIOTEC on production of oil-degrading bacteria*

also….

- *KTBI @ Thailand Science Park since March2010 (Korean Technology Business Incubator)*

Business Incubators in Thailand



Total 86 incubators in 2008

OSMEP: Ministry of Industry
NSTDA: Ministry of Science
OHEC: Ministry of Education

Thai BISPA

Thai Business Incubator and Science Park Association

Founded 16 January 2009

through the collaboration of the

Ministry of Industry, Ministry of Science, Ministry of Education

•Inspire •Integrate •Innovate

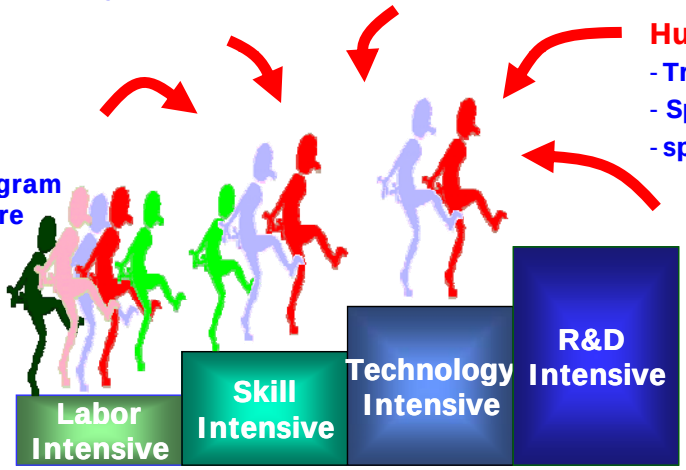
NSTDA Strategies for PP collaboration:

Technology
- -Contract / Joint research
- - Industrial Consultancy
- - Technology acquisition
- - Testing and analytical services

Infrastructure
- - Thailand Science Park
- - Software Park Thailand
- - Technology Business incubator

Financial
- - Research Grant
- - Soft loan
- - Joint investment
- - Tax incentive program for R&D expenditure

Human Resource
- - Training
- - Specialist database
- - specialist recruitment



Business and IP
- -IP management
- -IP commercialization

How to move companies up the technology ladder and promote innovation through *IP creation*

BIOTEC a member of NSTDA
NSTDA
TMC a member of NSTDA
MTEC a member of NSTDA
NECTEC a member of NSTDA
NANOTEC a member of NSTDA