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Geneva

**Investment, Innovation and Technology for Development:
Thailand's Experiences**

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The views expressed are those of the author and do not necessarily reflect the views of UNCTAD.

Investment, Innovation and Technology for Development: Thailand's Experiences

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National Science Technology and Innovation Policy Office, Thailand

Trade and Development Board
Investment, Enterprise and Development Commission
Fifth Session

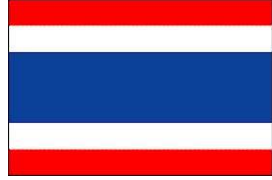
1 May 2013

United Nations Conference on Trade and Development (UNCTAD)
Geneva



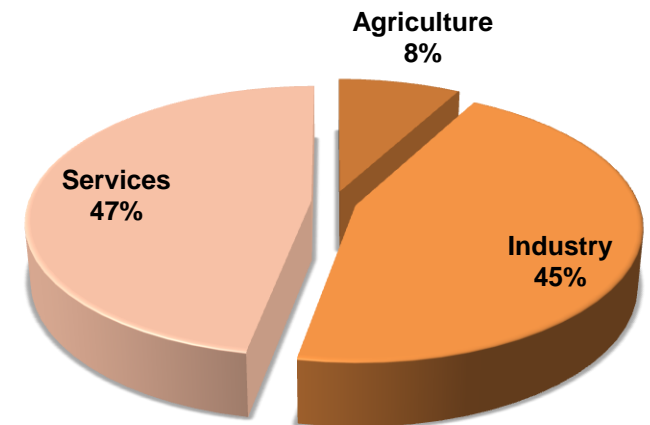
National Science Technology and Innovation Policy Office
Ministry of Science and Technology, Thailand

Thailand at a glance



- An upper middle income and 2nd largest economy in ASEAN after Indonesia
- Total population of 69.5 million in 2012
- World's Top 3 **rice** exporter
- World's Top 5 **sugar** exporter
- World's largest natural **rubber** producer and exporter
- World's top **chicken** meat exporter
- World's 2nd largest **hard-disk drive** exporter after China
- **Auto manufacturing** hub of Southeast Asia

GDP (2012): US\$ 366 billion



Competitiveness ranking:

- **18th** (from 185) in Ease of Doing Business 2013
- **38th** (from 144) in Global Competitiveness Report 2012 - 2013 by World Economic Forum
- **30th** (from 59) in IMD World Competitiveness Rankings 2012

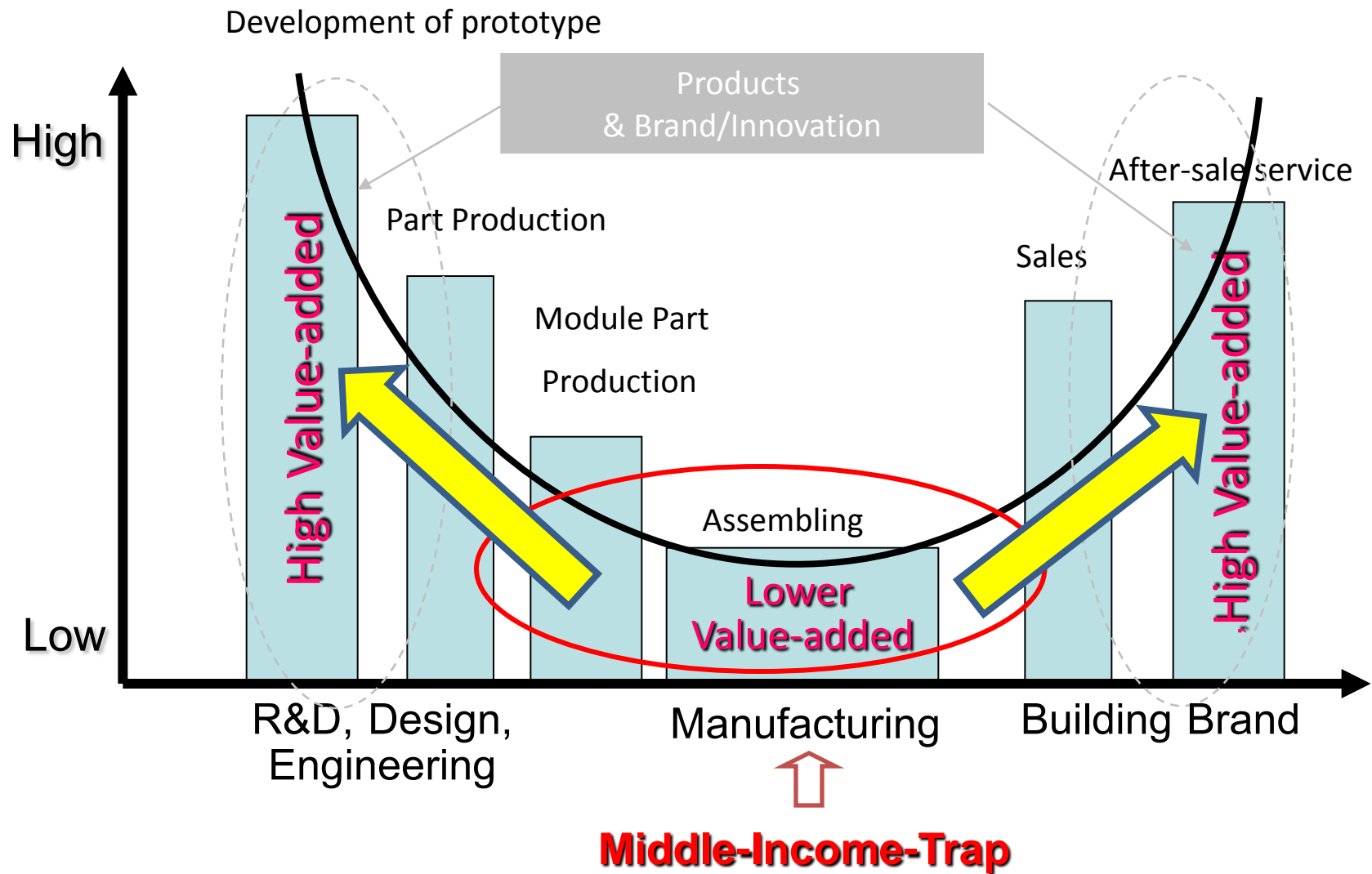
Thailand Economic Profile

	No. of Enterprises	Employment (Persons)	GDP (Million Baht)	Exports (Million Baht)
LEs	4,614 (0.06%)	2,875,495 (10.80%)		
SMEs	2,848,256 (35.83%)	9,129,747 (34.28%)	5,502,676 (55.75%)	3,432,006 (65.04%)
Agriculture	5,097,540 (64.12%)	14,629,941 (54.93%)	3,503,340 (35.50%)	1,844,433 (34.96%)
			863,482.05 (8.75%)	
Total	7,950,410	26,635,183	9,869,498	5,276,439.52

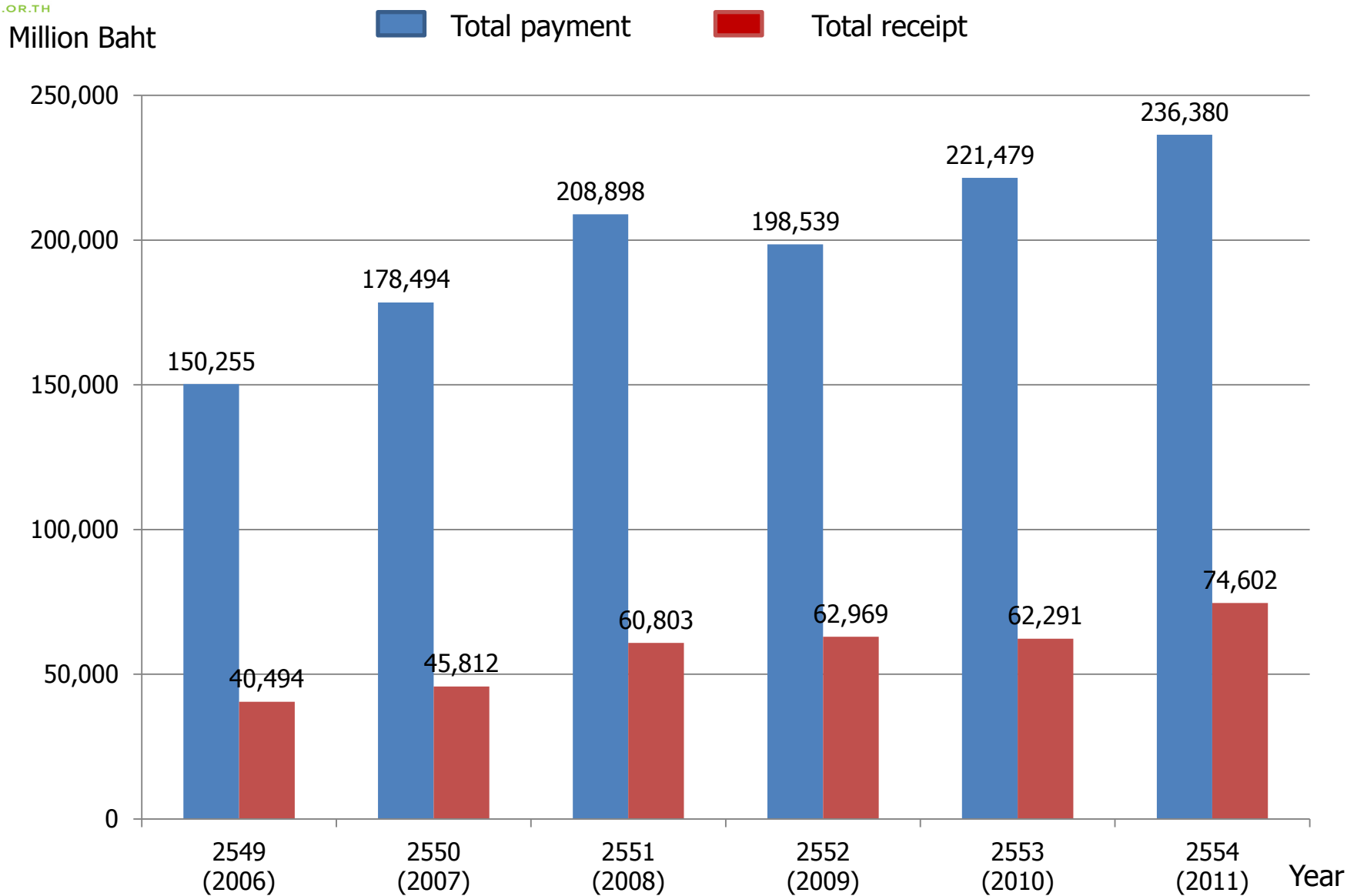
Notes : 2011 Statistics

1. There were 0.3% of the enterprises whose information on size was unavailable.
2. There were 2.2% of the export transactions whose information on the exporters' size was unavailable.
3. LEs were included their diversification enterprises (12% GDP)
4. **SMEs contribute to 99.8% of total enterprises in Thailand**

Thai SMEs in the Global Value Chain



Dependence on Foreign Technology



Source : Bank of Thailand

Technology Payment and Income 2006-2011

Low R&D Investment

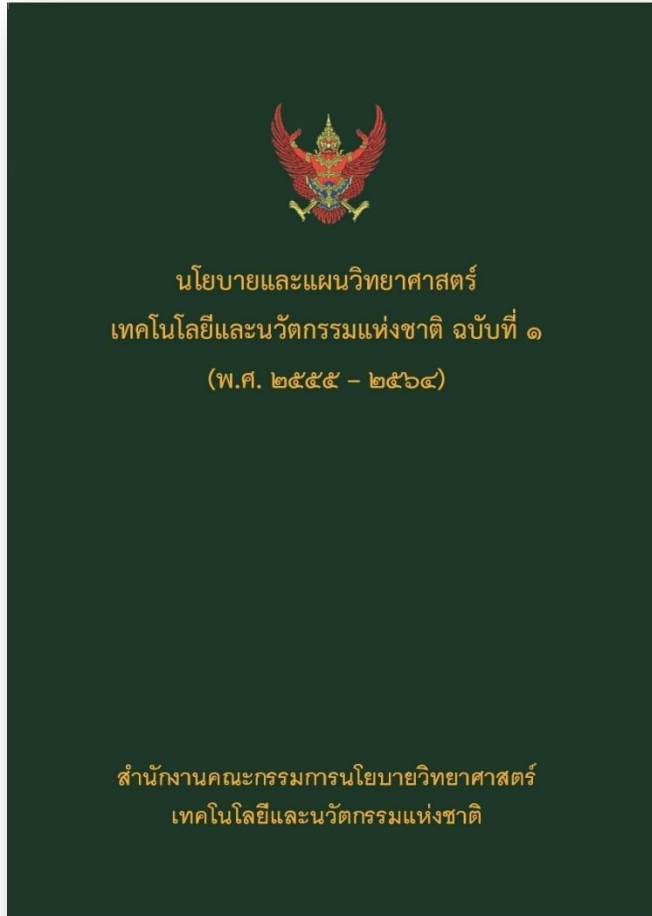
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Public R&D Investment (mil. baht)	8,202	8,138	9,571	10,548	9,988	11,550	10,015	11,887	12,737
Private R&D Investment (mil. baht)	5,284	5,164	5,928	6,023	6,679	7,998	8,210	7,278	8,174
Total R&D Investment (mil. baht)	13,486	13,302	15,499	16,571	16,667	19,548	18,225	19,165	20,911
R&D/GDP (%)	0.25	0.24	0.26	0.25	0.24	0.25	0.21	0.21	0.23
Public/Private R&D Investment	61:39	61:39	62:38	63:37	60:40	59:41	55:45	62:38	60:40

Sources: Public R&D Investments from 2001 to 2007 are collected from the national surveys on R&D expenditure and personnel by the Office of the National Research Council of Thailand

Public R&D Investments from 2008 to 2009 are collected from GFMIS, the Comptroller General's Department, Ministry of Finance

Private R&D Investments from 2001 to 2008 are collected by the national surveys on Private R&D Investment by the National Science Technology and Innovation Policy Office (STI Office)

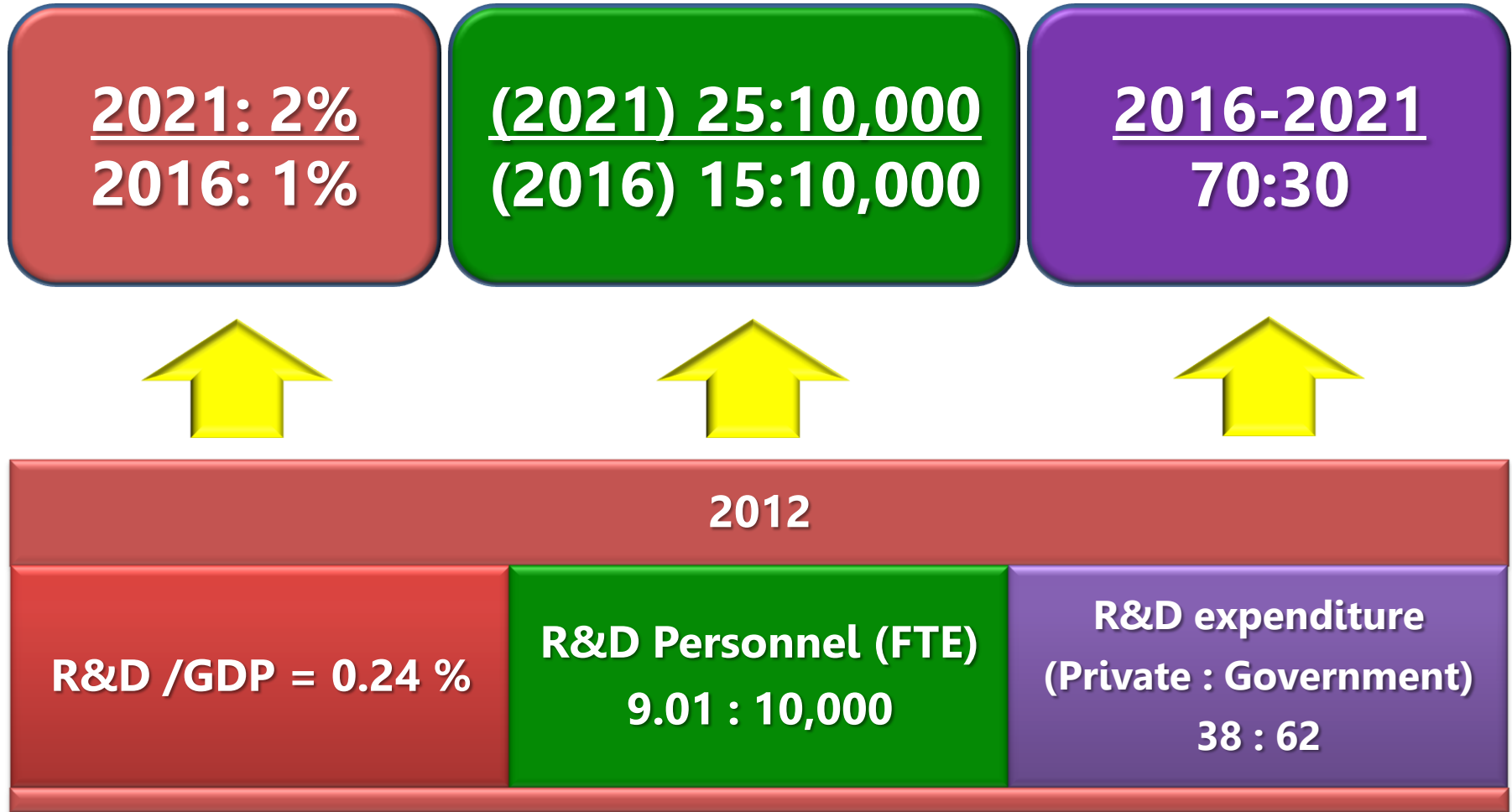
The National Science Technology and Innovation Policy and Plan 2012 - 2021



**Approved by the Cabinet
on 17 April 2012**

- **First Time “INNOVATION” is systematically introduced**
- Address STI for development and development of STI
- Provide national direction for the next 10 years with periodic adjustments
- Identify Focuses and Balance between Economic and Social Development and Context for Thailand
- Preparedness for Future Changes that will have major impacts to Thai Society
- Plan derived from Intensive and Widespread Public & Stakeholders Participatory Process with Implementation Strategies Incorporated

STI Investment Targets



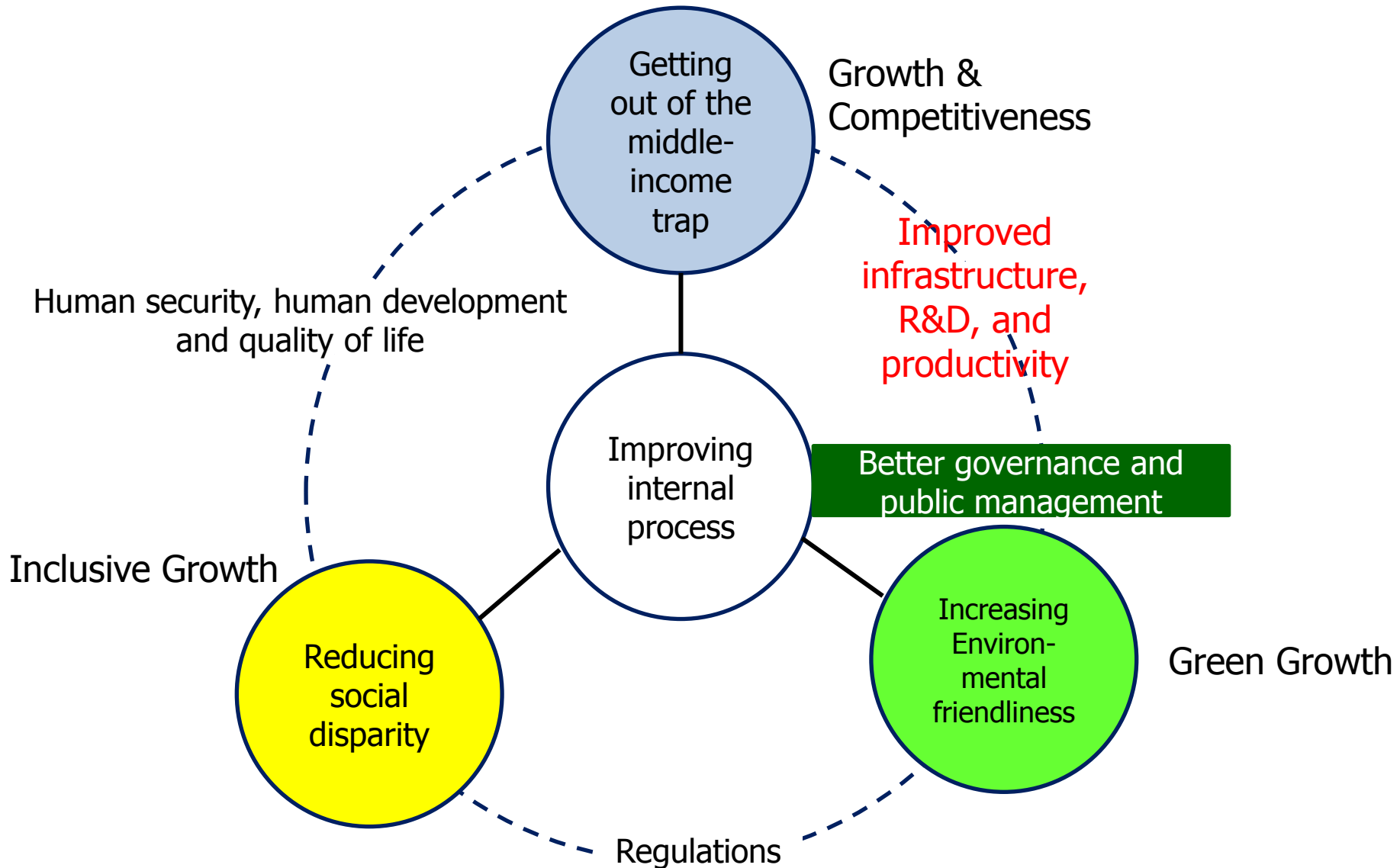
Thailand Status in 2012

- R&D Exp = 21,493 MB
- R&D Exp : Gov : Private = 13,318:8,175 MB
- R&D Personnel = 57,220 (man-year)

Source: National Science Technology and Innovation Policy Office

The Country Strategy 2014

New Growth Model



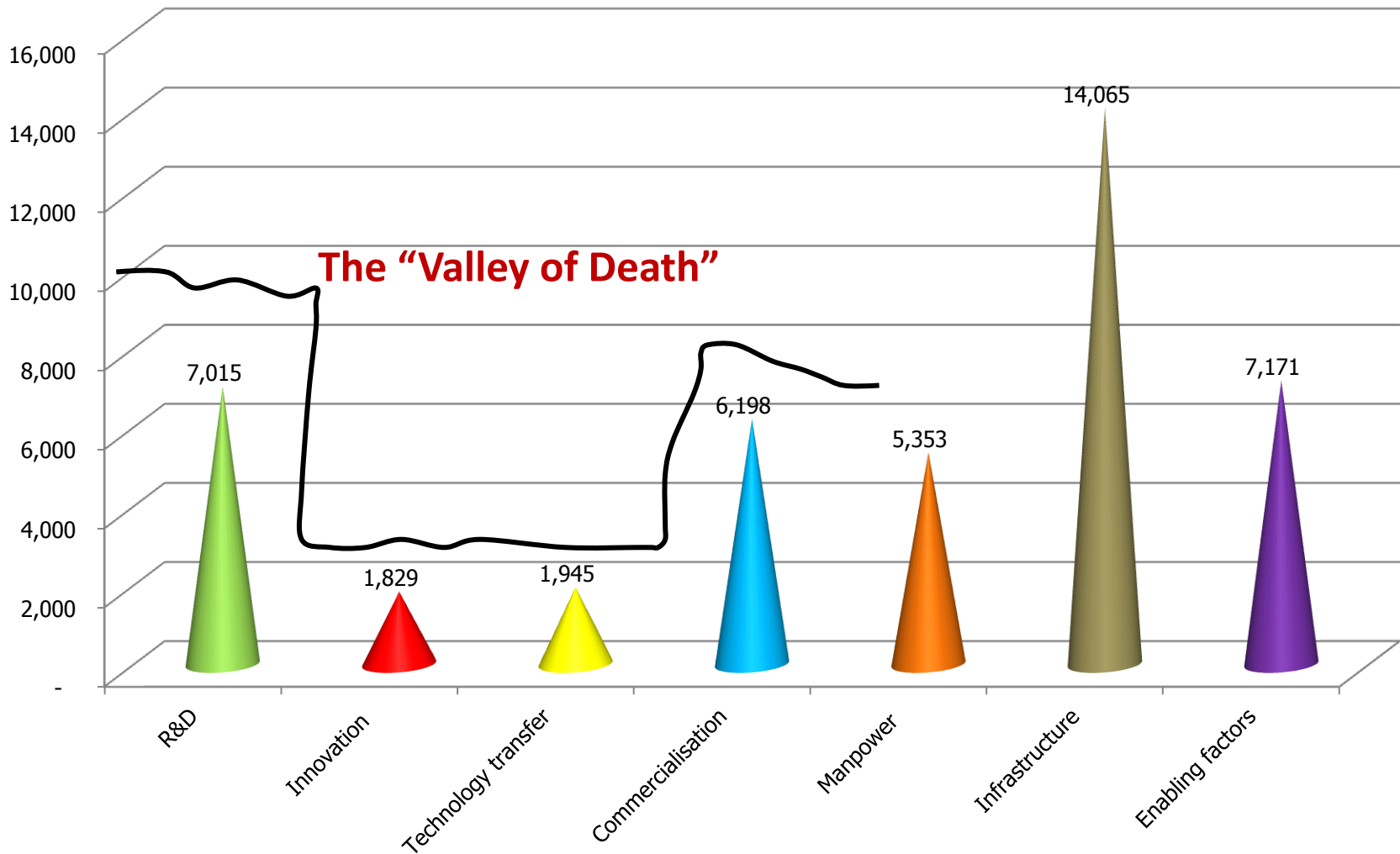
NEW GROWTH MODEL

28 strategic issues

GROWTH & COMPETITIVENESS	INCLUSIVE GROWTH	GREEN GROWTH	INTERNAL PROCESS
<ol style="list-style-type: none">1. Agriculture2. Industry3. Tourism and services4. Infrastructure5. Energy6. Regional integration7. Competitiveness8. Research & development <p>8.1 Raise R&D expenditure to 1% of GDP</p> <p>8.2 Promote talent mobility</p> <p>8.3 Development of regional science parks</p>	<ol style="list-style-type: none">1. Education2. Public health3. Social welfare for all4. Promotion of community enterprises and SMEs5. Labor protection6. Social justice7. Anti-corruption measures	<ol style="list-style-type: none">1. Eco-industry towns2. Reduction of GHG emission3. Environmental fiscal policy4. Rehabilitation of natural resources and water resource management5. Climate change adaptation and mitigation	<ol style="list-style-type: none">1. Legal reform2. Civil service restructuring3. Public-sector HRD4. Tax restructuring5. Budgeting reform6. Government asset utilization7. Peace & security in the southern border provinces8. Political reform

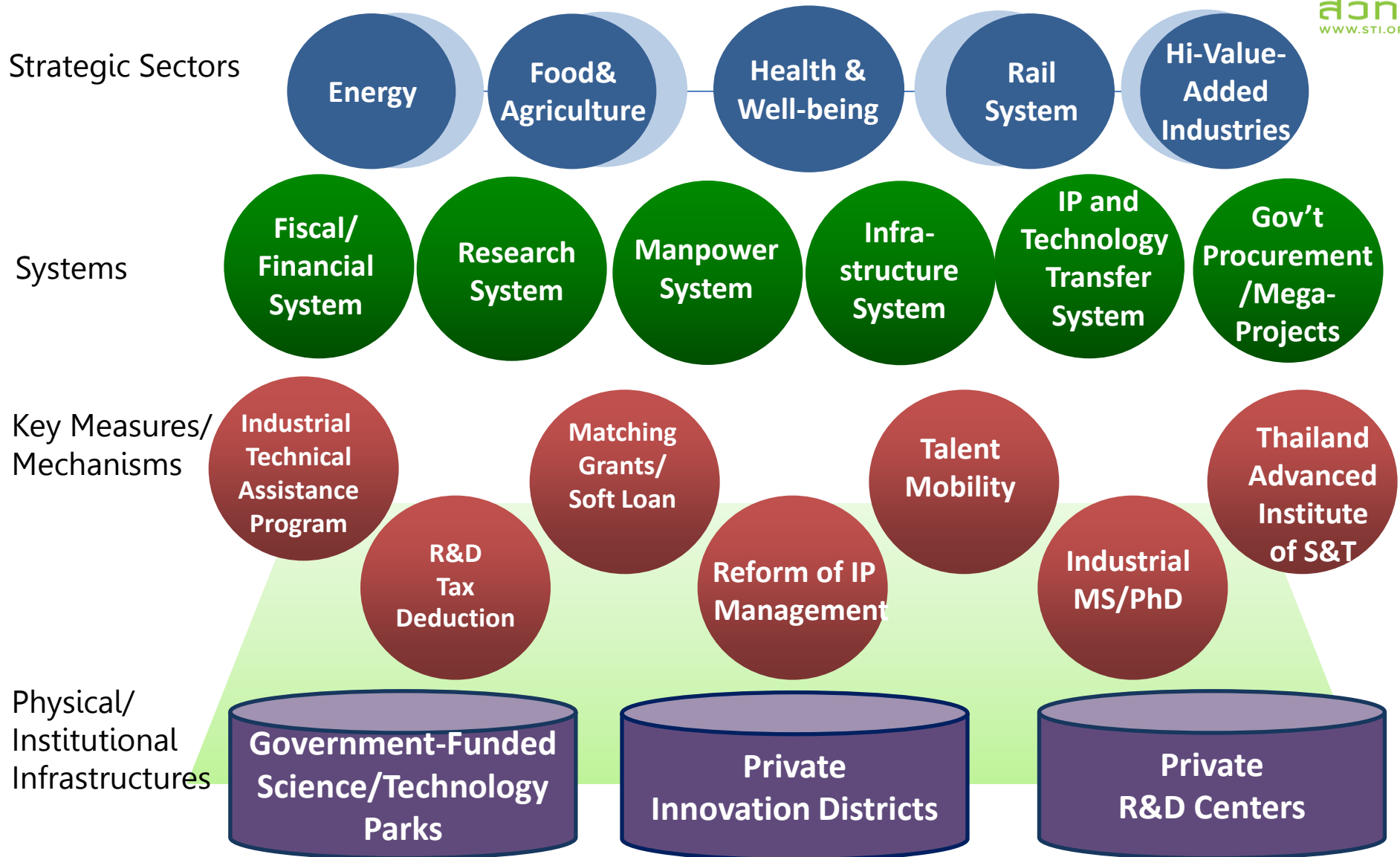
A Snapshot of Government Spending on STI System

(Fiscal Year 2012 – 852 Projects 43,575.52 million Baht)



Source: Data from 14 ministries, analyzed by STI Office

STI Framework to Enhance Innovation



Science Parks Network

5 Science Parks and 60 University-Business Incubators

Thailand Science Park

Headquarter of NSTDA and
4 National Researcher Centers

Northern Science Park:

- (1) Chiang Mai University
- (2) Maejo University
- (3) Naresuan University
- (4) Mae Fah Luang University

North Eastern Science Park:

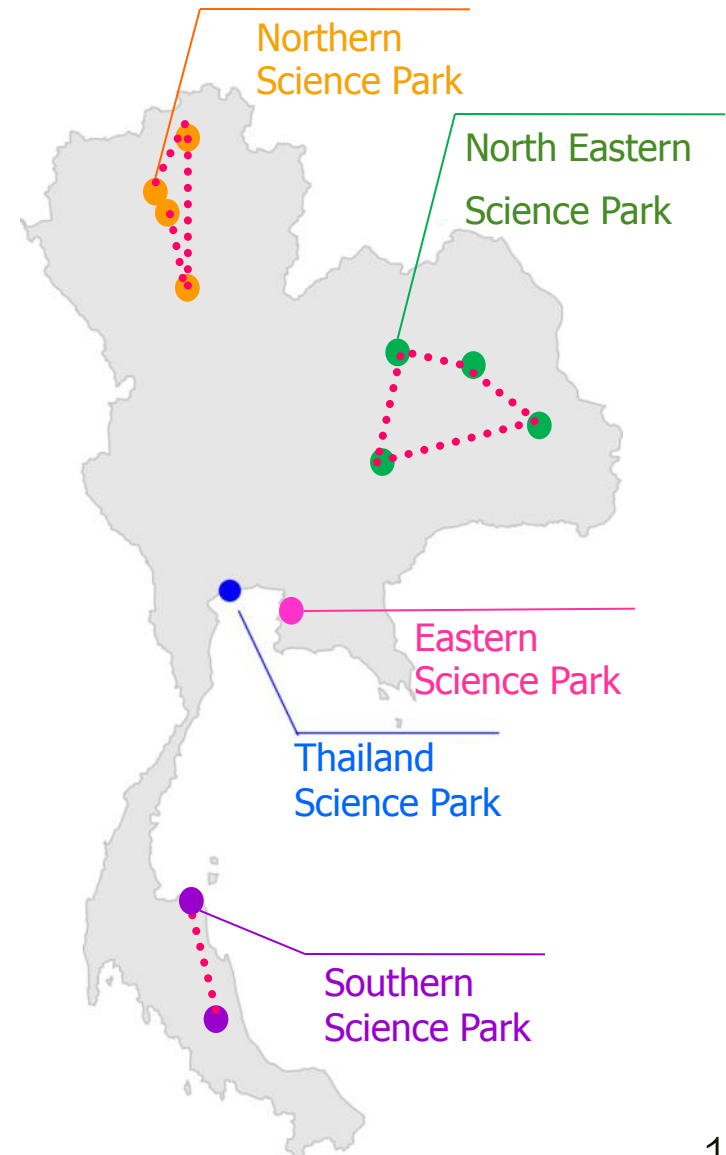
- (1) Khon Kaen University
- (2) Suranaree University of Technology
- (3) Maha Sarakham University
- (4) Ubon Ratchathani University

Southern Science Park:

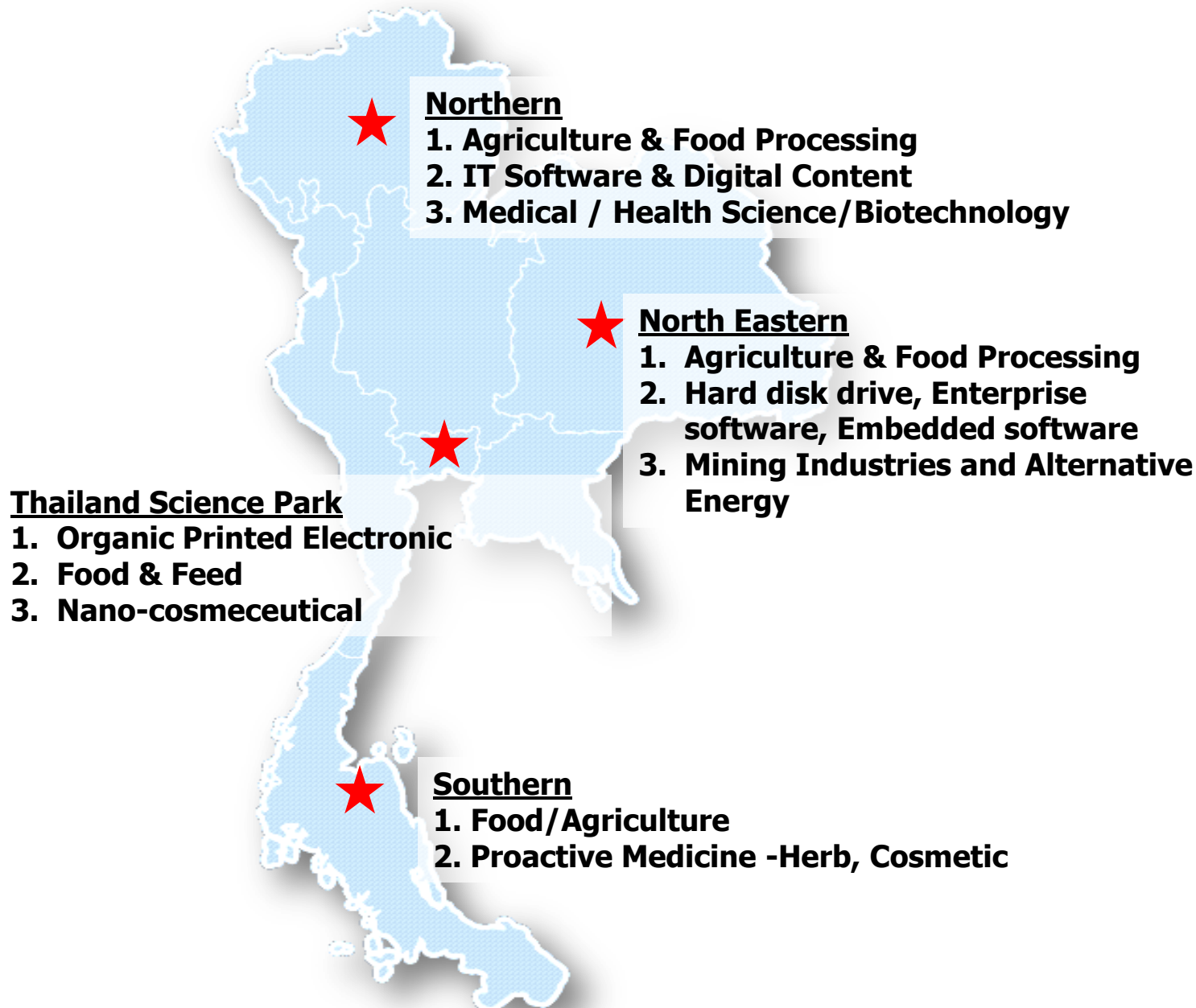
- (1) Prince of Songkla University
- (2) Walailak University

Eastern Science Park (in the-set-up)

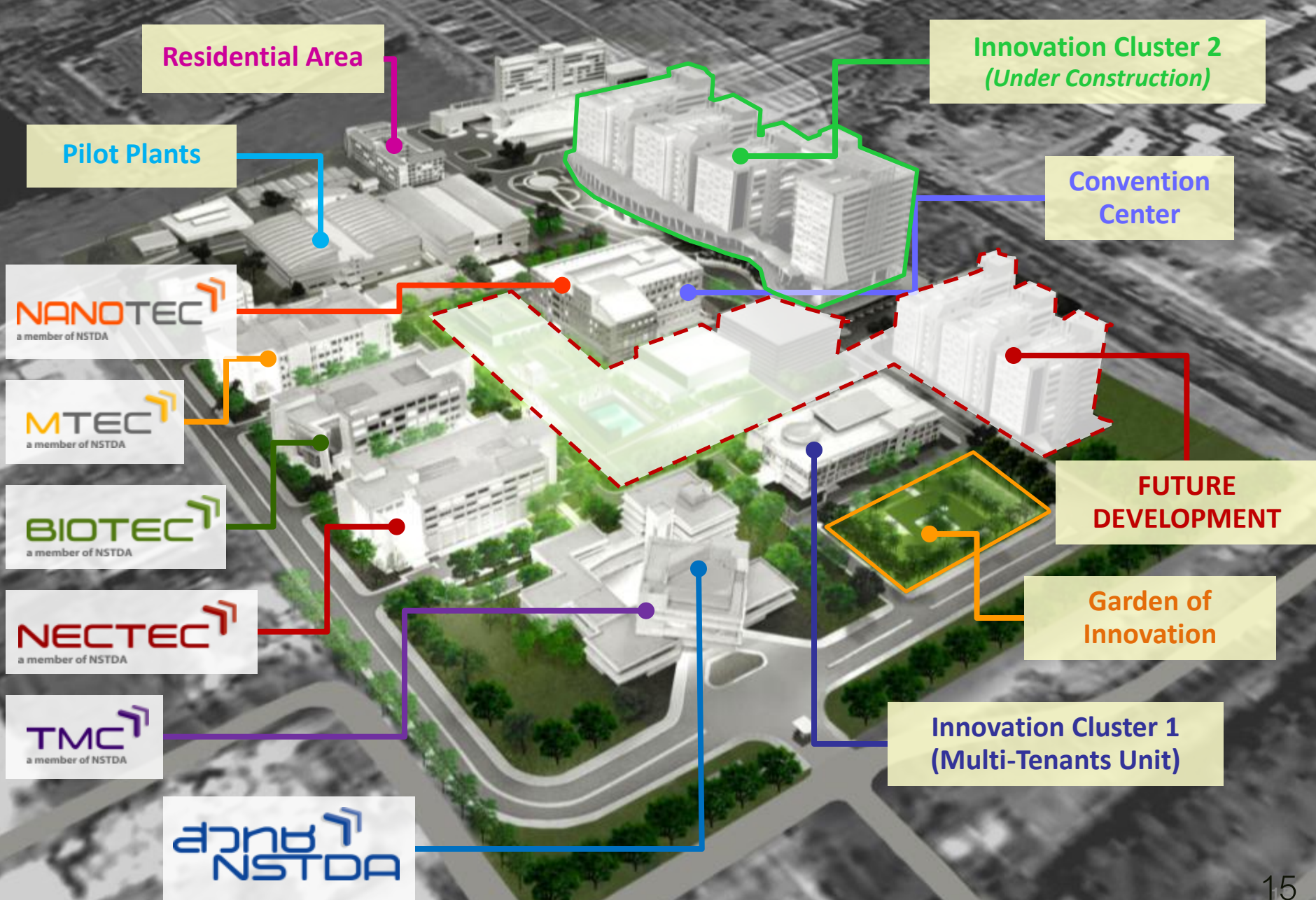
- (1) GISDA
- (2) Burapha University



Strategic Sectors of Science Parks



STI Community in Thailand Science Park



Facilities available at Thailand Science Park



Laboratory



Pilot Plant



Long-term Leasehold Land



National Research Center

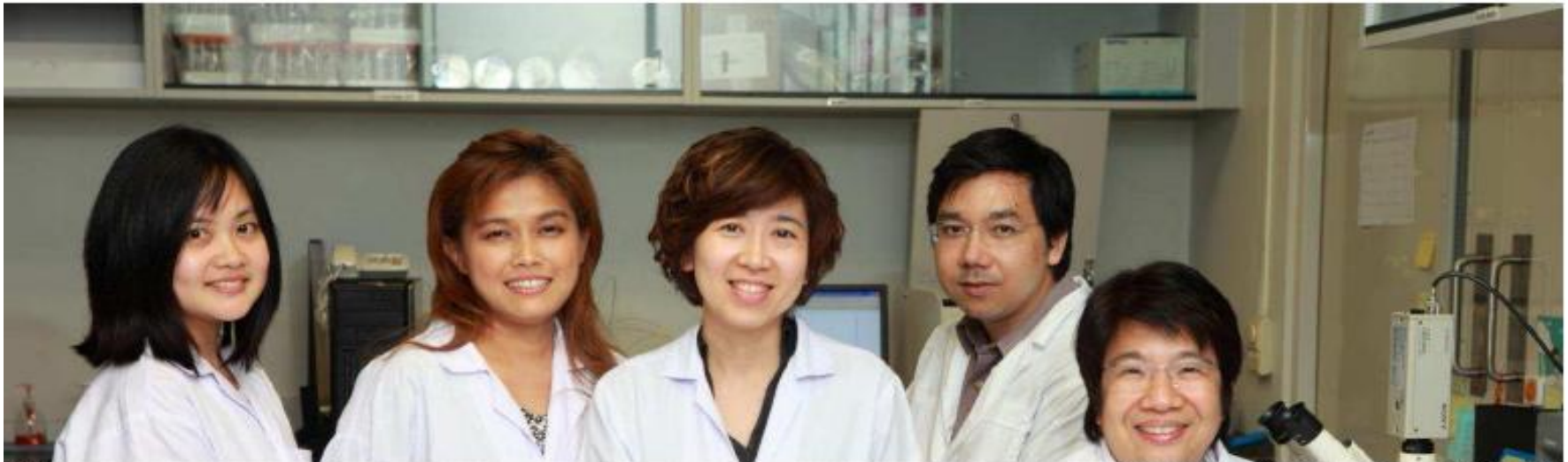


Information Service for R&D



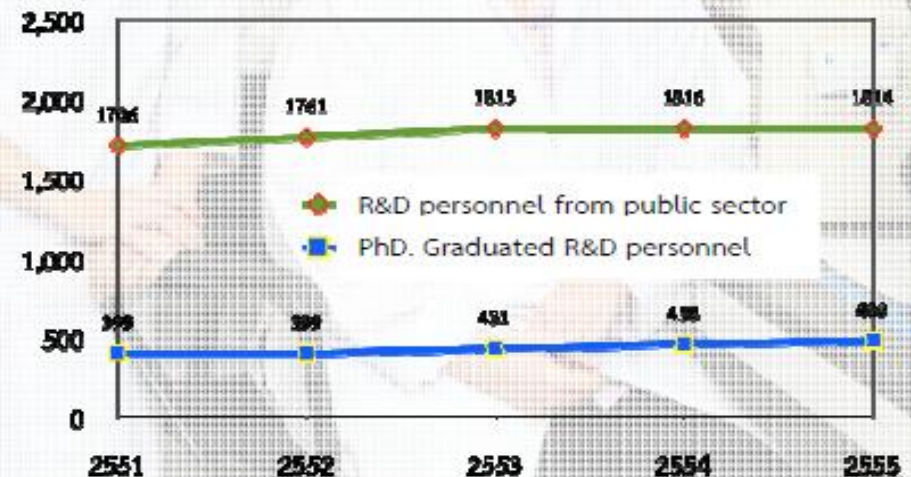
Convention Center

High-Quality Research Personnel



Hub of High-Quality Research Personnel

Thailand Science Park is hub of highly-skilled R&D personnel from public sector with more than 1,800 researchers of which around 480 are PhD.s.



Tenants in Thailand Science Park

- 61 companies with 500 skilled workforce (60% RDE personnel)

MBS ASIA

SHISEIDO

Alltech
...naturally

Access to your success
SHIMADZU

Polyplastics

BETAGRO
LET'S MAKE LIFE BETTER

TOKYO TECH
Pursuing Excellence

TÜV SÜD PSB
PSB Thailand

SCG
SIAM CEMENT GROUP

AIR PRODUCTS

Western Digital®

ECOLAB

INNOPHENE
GRAPHENE PRINTED ELECTRONICS

CORNING

Pfizer



Support for STI Activities

Business & IP

- Technology Business Incubation
- IP Management
- IP Commercialization

Infrastructure / Facilities

- Thailand Science Park
- Software Park Thailand

R&D / Technology

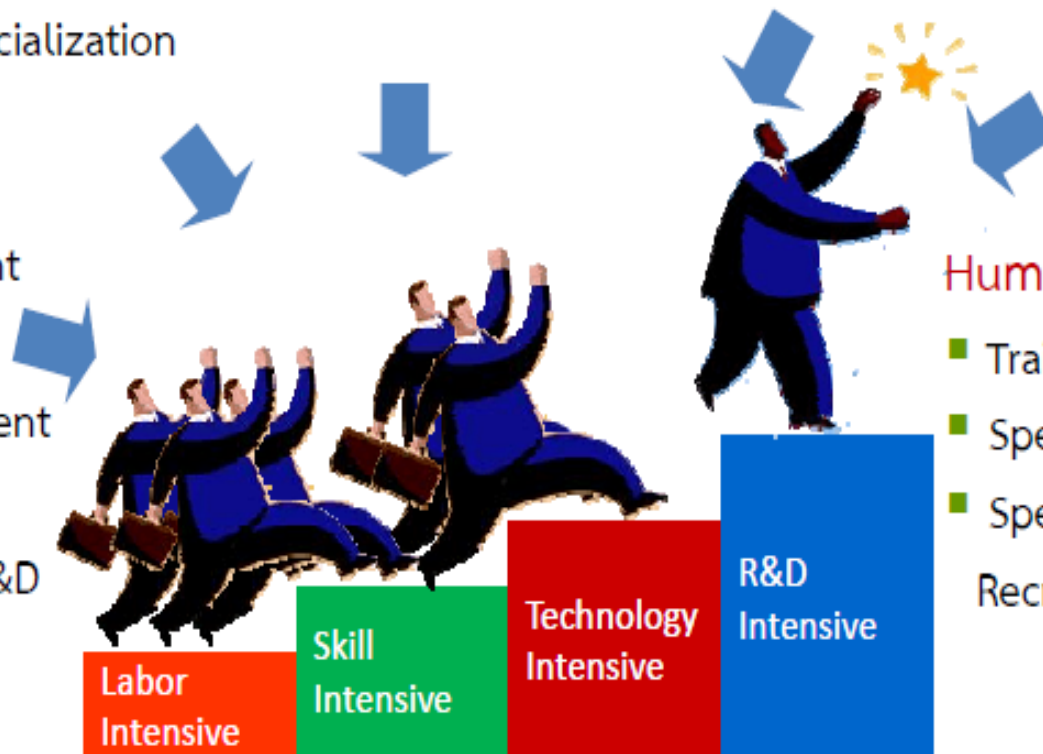
- Contract / Joint Research
- Industrial Consultancy
- Testing & Analytical Services
- Information & Technology Acquisition

Financial

- Research Grant
- Soft Loan
- Joint Investment
- Tax Incentive Program for R&D Expenditure

Human Resources

- Training
- Specialist Database
- Specialist Recruitment



Privileges & Incentives

Revenue Dept. Incentives

- Accelerated Depreciation Rate for R&D Machineries and Equipments
- 200% Deduction for R&D Expense

BOI Privileges

- Import Tax Exemption for Machineries
- Corporate Income Tax Exemption for 8 Years
- 50% Corp. Income Tax Reduction for 5 more Years after Tax Exemption Period Ends
- Work Permit and Visa Facilitation for Foreign Specialists and Researchers

Success Story at Thailand Science Park



Flexoresearch Group

- 1 of 8 Start-Ups Featured by World Bank's Publication: "The Climate Technology Innovator Success Stories," Jan. 2010.
- Recognized as WEF Technology Pioneer 2011, Sep. 2010.
- 1 of Time Magazine "10 Start-Ups That Will Change Your Life," Sep. 2010.
- Special Scoop in CNN, April 2012.

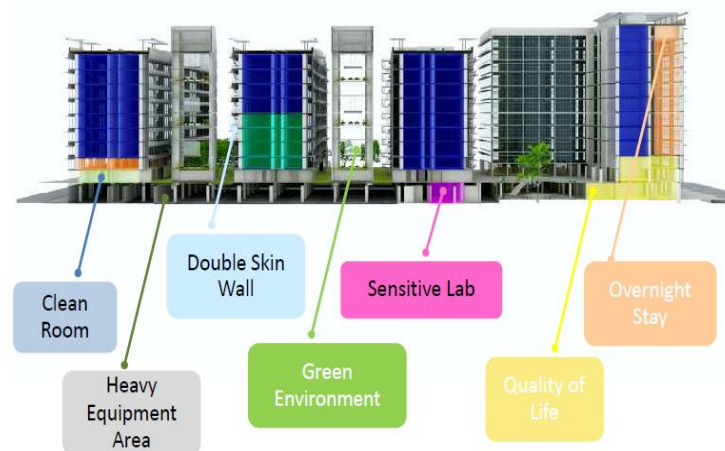
Phase II of Thailand Science Park

Innovation Cluster2 (INC2)



- 4 Integrated Towers
- Gross area = 124,000 m²
- > 30 Meeting Rooms
- 30,000 m² allocated for private companies.
- Support ~200 tenants and ~2,500 Professional in addition to current Phase
- Completed by 2013

Specially Design for R&D Activities



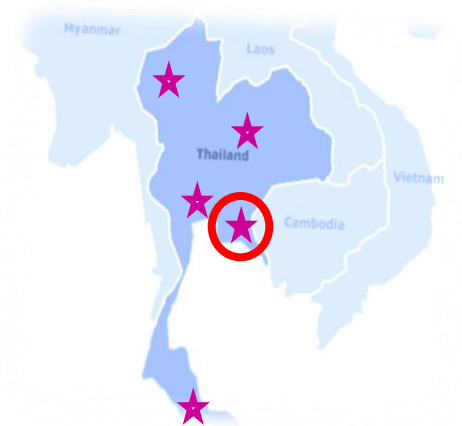
Quality of Life

Green Environment



Private SP Developer : AMATA Science City Project

- A public-private partnership project initiated by AMATA Corporation.
- Objectives:
 - ✓ Upgrading standard of living in Thailand
 - ✓ Creating value-added to products
 - ✓ Shifting activities that driven Thailand's economy from production-based to **R&I-based**.
 - ✓ Becoming **Regional Innovation Hub**.
 - ✓ Attracting Overseas Thai talent and foreign talent to come to work in Thailand



Examples of MNCs Establishing R&D Centers in Thailand



Examples of Thai-owned Large Firms Significantly Expanding R&D Investment



STI Support for SMEs: Grant and Joint Venture

Supporting Scheme	Organization	R&D and Lab Testing	Proof of Concept	Prototype	Pilot Production	Commercial Production
Grant	Agricultural Research Development Agency		✓	✓	✓	
	National Innovation Agency – Soft Loan		✓	✓	✓	
	Thailand Research Fund	✓	✓	✓	✓	
	SME Promotion Agency – R&D Grant	✓				
	SMEs Bank			✓	✓	✓
	NSTDA - CD Programme	✓	✓	✓	✓	✓
	SME Promotion Agency - Machine Fund				✓	✓
Joint Venture	NSTDA - NIC		✓	✓	✓	✓

STI Support for SMEs:

Tax Incentive, Angel Fund/VC and Credit Insurance

Supporting Scheme	Organization	R&D and Lab Testing	Proof of Concept	Prototype	Pilot Production	Commercial Production
Tax Incentive	Department of Revenue - 200% Tax Deduction	✓				
	BOI - STI Programme	✓	✓	✓	✓	
Angel Fund/VC	SME VC					✓
	Competitiveness Fund					✓
	Mai Matching Fund					✓
	Energy Fund					✓
Credit Insurance	Thai Credit Guarantee Corporation					✓

STI Support for SMEs:

Consulting Service, Pilot Plant and Market Research

Supporting Scheme	Organization	R&D and Lab Testing	Proof of Concept	Prototype	Pilot Production	Commercial Production
Consulting Services	NSTDA – iTAP	✓	✓	✓	✓	✓
	NIA – Innovation Coupon		✓	✓	✓	✓
	SME Promotion Agency - Consultancy Fund					✓
Pilot Plant	KMUTT				✓	
	NSTDA - Pilot Plant				✓	
Market Research	SME Promotion Agency- Internationalization Fund					✓

Industrial Technology Assistance Program (ITAP)

Investigate technological problem

Matching supply of & demand for technology

Technological consultancy service
Joint R&D

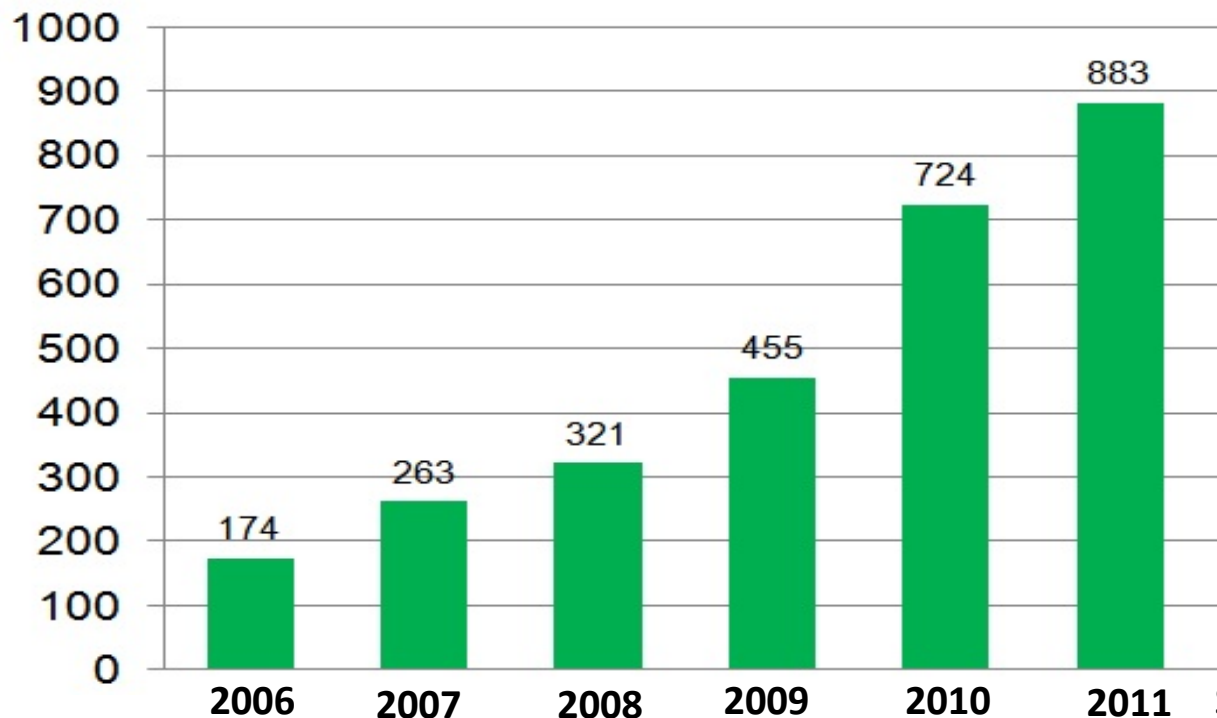
Funding subsidies
50:50

S&T Acquisition Program
(Local & Overseas)

Training/
Workshop

Attach local expert to overseas expert, help technology transfer to firms and universities

Number of projects

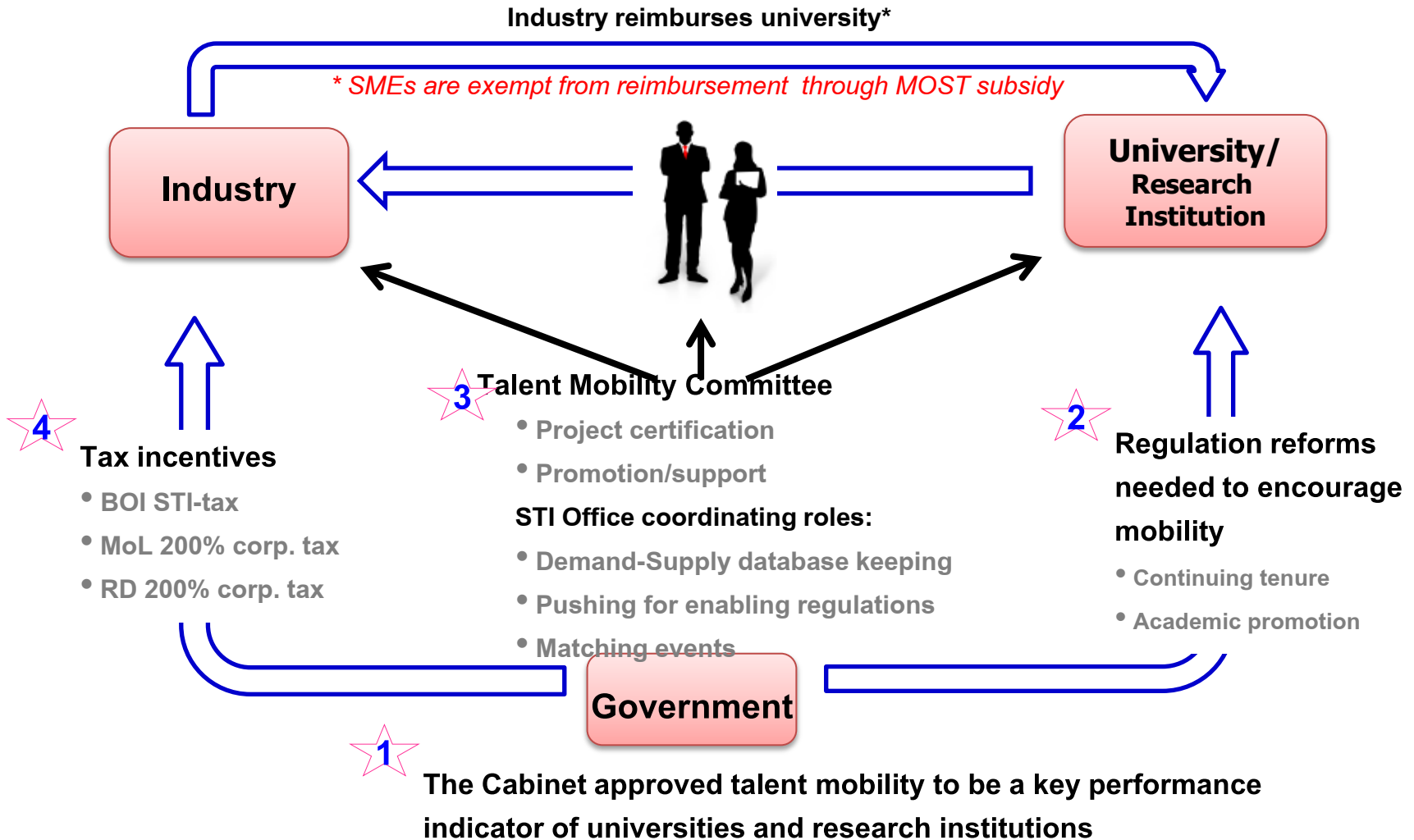


- 2,820 technology Development & innovation projects
- 10 regional nodes linking with local universities and science parks with 50 project managers
- Total investment 55.4 Million USD

Source: ITAP, NSTDA

Talent Mobility Programme

To facilitate the mobility of researchers in governmental agencies and higher education institutions to industrial sector.





Establishment of Network on HRD in **Rail Technology**

- **ENSIAME University (France)**
- **Korean Railroad Research Institute (Korea)**
- **Aachen University (Germany)**
- **Railway Technology Research Institute (Japan)**
- **JR East Company (Japan)**
- **etc.**



- Partner in education e.g. training and course and curriculum development
- Exchange of researchers

Thailand Advanced Institute of Science and Technology (THAIST)



- **KMUTT**
- **KMUTNB**
- **CU**
- **SUT**
- **etc.**

- Education e.g. training and course and curriculum development
- Exchange of researchers

- Promote/support/facilitate HRD, joint R&D, tech. collaboration between university & industry and Thailand and overseas

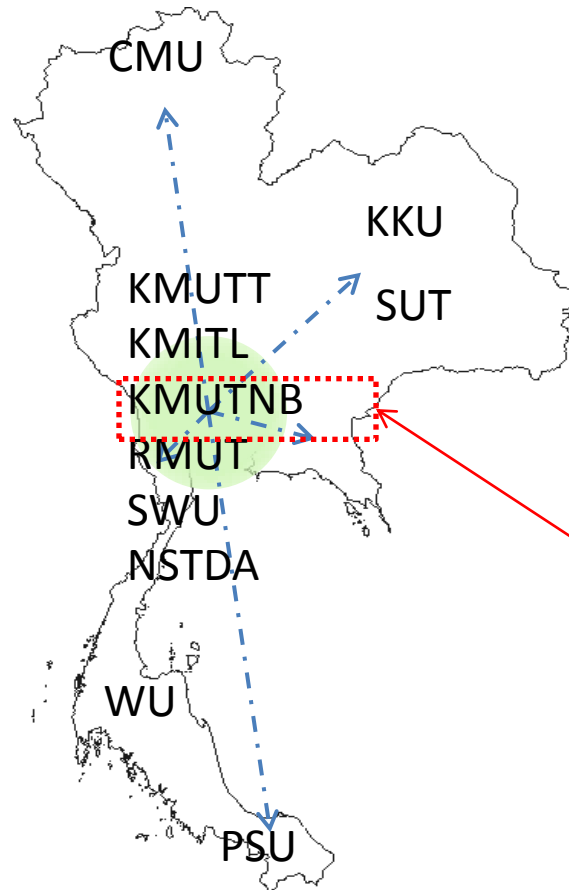


- **SRT**
- **MRTA**
- **BTS**
- **BMCL**
- **Airport Link**
- **Siemens**
- **Alstom**
- **Bombardier**

- Partner in education e.g. training and course and curriculum development, internship, joint R&D and technology development
- Support scholarship

Establishment of Network on HRD in **Design for Manufacturing**

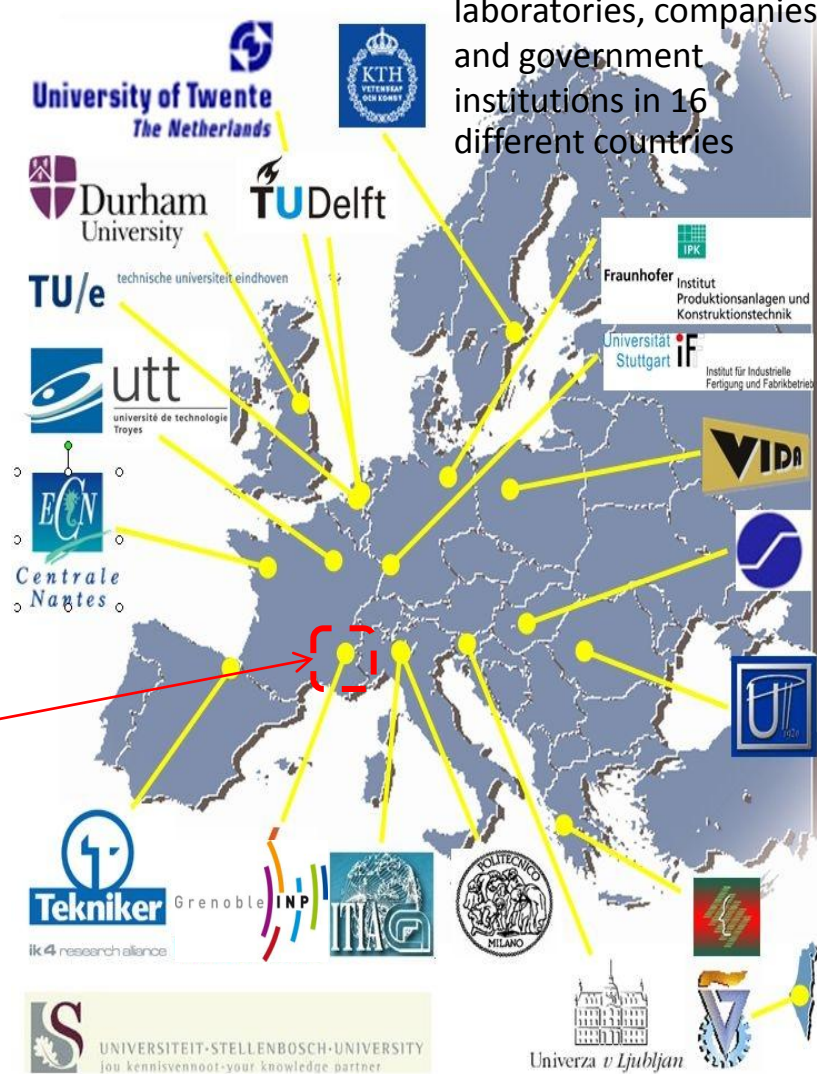
THAIST Affiliated Institutes (Design for Manufacturing)



France



22 leading research laboratories, companies and government institutions in 16 different countries

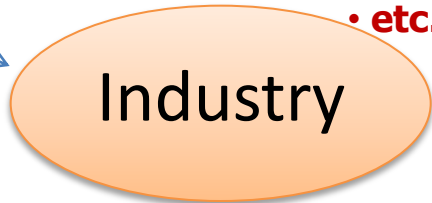




Establishment of Network on HRD in **Rubber Processing**

• **J.J. Murphy Research Centre, Rubber Park India**

- **KMUTNB**
- **Mahidol U**
- **NSTDA**
- **PSU**
- **KU**
- **etc.**



- Partner in education e.g. training and course and curriculum development
- Exchange of researchers

- Promote/support/ facilitate HRD, joint R&D, tech. collaboration between university & industry and Thailand and overseas

- **Federal of Thai industries**
- **etc.**

- Partner in education e.g. training and course and curriculum development, internship, joint R&D and technology development
- Support scholarship

- Education e.g. training and course and curriculum development
- Exchange of researchers

SCIENCE-BASED TECHNOLOGY SCHOOL : SBTS

Concept

SBTS is national vocational schools for gifted and talented students who have developed skills in invention and technology. The Teaching and Learning of this project use Project-Based approach. The aim of this project is to develop these students to become the technologist or innovator in the future.

- The cabinet approved this project on December 18th, 2007.
- The Ministry of Education and the Ministry of Science and Technology decided to launch the pilot SBTS program. (2008-2012)
- The first SBTS school is located in Science Based Technology Vocational College (Chonburi).

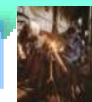
Lamphun College of Agriculture and Technology, (Agricultural Biotechnology)



Suranaree Technical College, (Science Based Industrial Technology)



Singburi Vocational College, (Food Technology)



Science Based Technology Vocational College (Chonburi), (Science Based Industrial Technology)



Phang-nga Technical College, (Innovation in Tourism)

Technical HRD of Vocational Diploma Level – Collaboration with Michelin Siam Co., Ltd.



- Co-develop curriculum and select students to the programme
- Arrange classes
- Administration work

**Austria-Thai
Technical
College**

- VEC: formulate policy/select college
- STI: focal point and drive the project until success

- Co-develop curriculum and select students to the program
- Provide 2-year financial support
- Allow 10-month placement for students
- Provide salary/payment
- Offer job position to the graduates (must meet requirements)

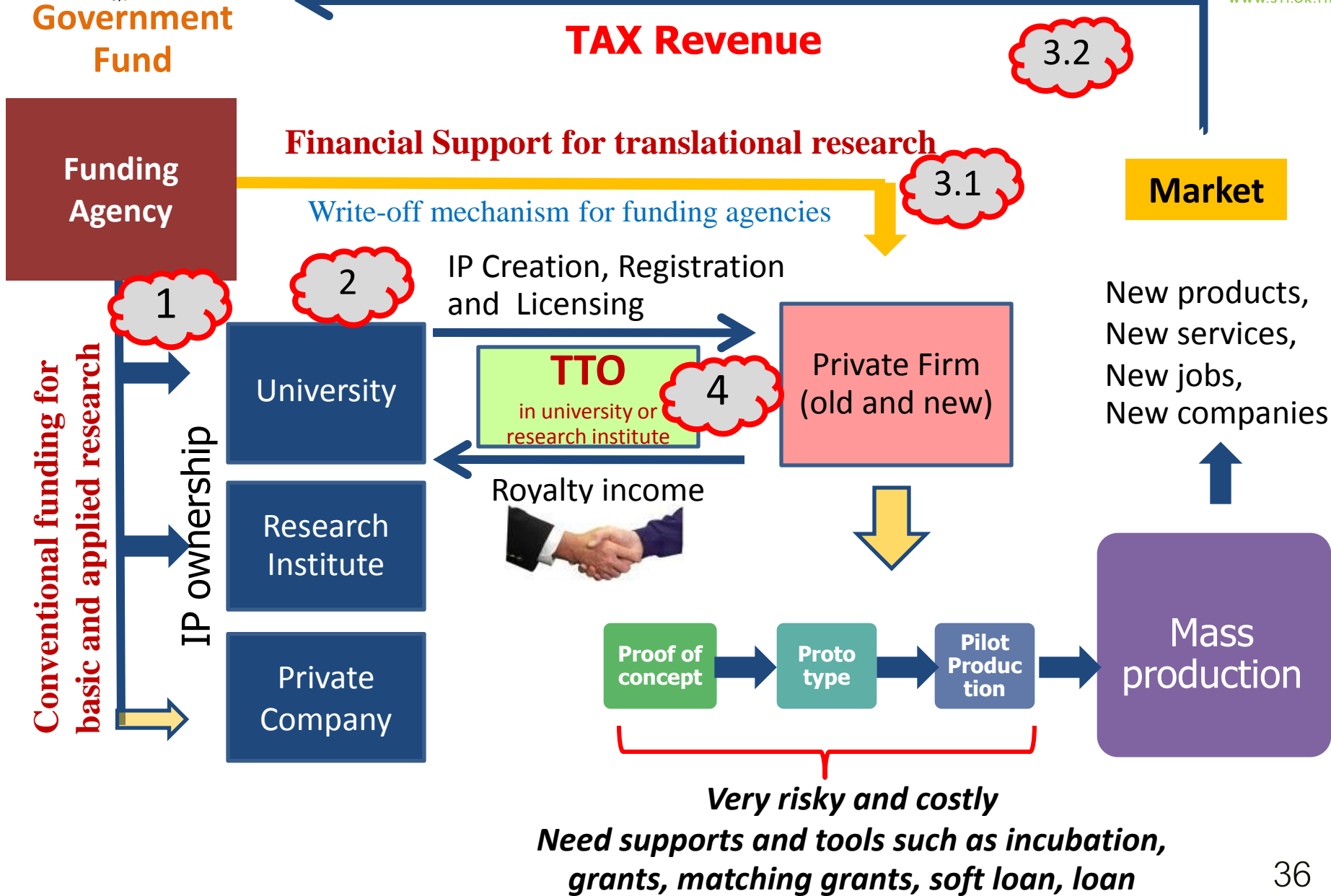
Michelin



**VEC
STI**



Development of Innovation System through IP Management



Development of Innovation System through IP Management

Policy	Measure
1. Clear Policy on Gov. funded IP Ownership	<ul style="list-style-type: none"> Funding recipient, who proves to have TT capability, is entitled to retain IP ownership of the government sponsored research results .
2. Reform of IP Registration System	<ul style="list-style-type: none"> Department of Intellectual Property (DIP) is entitled to retain IP registration fees as well as to have greater management flexibilities to overcome its backlogs and improve the overall registration system
3. Financial and tax incentive to promote IP Commercialization	<p>3.1 Financial support for SMEs in the form of grant or matching funds for scaling up of R&D commercialization (From Lab → market)</p> <p>3.2 Tax benefit for the company's expense on royalty fees paid for University's IP licenses.</p>
4. Strengthening TT organizations and professionals	<ul style="list-style-type: none"> Setting up a TTO Consortium and giving them enough resources to build technology transfer capabilities for TTO personnel

Policy recommendations for Innovation Promotion

- In developing countries, innovation intermediary should be established as a catalyst of technology transfer and innovation development
 - ❑ Bridging knowledge providers, support agency and SMEs (mapping & matching supply and demand), stimulating technology transfer
 - ❑ Strengthening linkages and creating knowledge sharing between knowledge producing agents, industry (mainly SMEs), and government policy and support organizations
 - ❑ Provision of management and support for R&D, innovation and technology transfer
 - ❑ Financial support for R&D, innovation and technology transfer

Policy recommendations for Innovation Promotion

- Strengthen universities and research agencies to provide effective services of technology transfer to SMEs
- Improve S&T infrastructure to support private sector investment in research and technological capability development
 - ❑ Physical infrastructure (e.g. science park, software park)
 - ❑ Non-physical infrastructure (e.g. legal system, tax incentives, financial support)

Policy recommendations for Innovation Promotion

- Talent Management
 - Special scheme for talent
 - Talent mobility
- STI Awareness
 - Promote importance of R&D among executives
 - Create experts in technology and production commercialization
 - Increase STI contents through public media
 - Create STI hero
 - Promote S&T career path



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