THAILAND

Science, Technology and Innovation Policy: Promotion of Entrepreneurship

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National Science Technology and Innovation Policy Office (STI)

Myanmar Business and Development Week
24 September 2013
Thailand’s position in Global Value Chain

Stan Shih’s Smiling Curve

High value

Intellectual Properties

Brand

Low value

R&D

Production

Distribution

South Korea

Singapore

China

Thailand

Thailand’s position in Global Value Chain
R&D Investment and GNI/Capita: South Korea and Thailand

Data Source: World Bank, OECD and STI
Compiled by National Science Technology and Innovation Policy Office (STI)
Thailand National Target on R&D (2016 – 2021)

- **GERD/GDP**: Present = 0.24%
  - 2021: 2%
  - 2016: 1%

- **R&D Personnel (FTE)**: Present = 9: 10,000
  - (2021) 25:10,000
  - (2016) 15:10,000

- **R&D expenditure (Private : Government)**: Present = 40 : 60
  - 2016-2021 = 70:30

**Note:**
- R&D Exp = 21,493 MB
- R&D Exp : Gov : Private = 13,318:8,175 MB
- R&D Personnel = 57,220 FTE

THE 3 NATIONAL TARGETS

<table>
<thead>
<tr>
<th>Year</th>
<th>R&amp;D/GDP (Million Baht)</th>
<th>R&amp;D Personnel (FTE) (Persons)</th>
<th>Private : Government R&amp;D expenditure (Million Baht)</th>
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<tr>
<td>2007</td>
<td>18,000</td>
<td>43,000</td>
<td>8,000 : 10,000</td>
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<td>2013*</td>
<td>29,000</td>
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<td>2016**</td>
<td>130,000</td>
<td>100,000</td>
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Note: * Preliminary figure
** Calculated based on projection of GDP growth rate at 5% per annum
Strategic Measures to Promote Competitiveness

Source: National Science Technology and Innovation Policy Office
The “Valley of Death” in Technology Commercialization

- Research (lab scale)
- Commercialization
- Law/Regulation
- Capital
- Manpower
- Infrastructure e.g. pilot plant/testing center
- Valley of Death
- Product/Service/Process
Reregulation
Policy Proposal on Intellectual Property System to Promote Country Competitiveness

IP Creation (& Utilization)
1. Incentive for IP commercialization by giving IP ownership to R&D performer organization
2. Reform of IP Registration System
3. Financial & tax incentive to promote IP Commercialization

IP Protection
4. Strengthening TT organizations and professionals

IP Utilization
Ineffectiveness of Commercialization of IP

- No clear government policy on ownership of IP made under government funding.
- At present, rules regarding IP ownership are varies among funding agencies. Government funding agencies either solely own the research results or jointly own with the grantees.
- Joint ownership resulted in inefficiency of technology transfer and commercialization
- Transfer of technologies from funding agencies to commercial sectors has been relatively limited or virtually not existed.
Applying of Bayh-Dole Act Principle

Applied Principle

• Government must provide option for funding recipient to choose whether or not to own IP.

• But grantee must prove their technology transfer capability to retain IP ownership.

• IP recipient means university, research institution, entrepreneur, SMEs, Community enterprise.

• All must be Thai Nationality.
Financial Support and Tax Incentive for R&D Commercialization
Innovation Process

Funding for incubation process

Funding for business acceleration

VC

Commercialization

Launch product

Feedback from market

Start profit making

Research

Develop

Technology transfer

Valley of death

Source: adapted from Osawa and Miyazaki (2006)
## Technology Commercialization Barrier

<table>
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<th>Start-up</th>
<th>Small Enterprise</th>
<th>Medium Enterprise</th>
<th>Large Enterprise</th>
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<tr>
<td><strong>Idea</strong></td>
<td>• Researchers do not consider production (at massive scale) or commercial viability when started their research project.</td>
<td>• Most of research result is still in a “know how” phase, which can’t be commercialized immediately after licensing.</td>
<td>• High licensing price</td>
</tr>
<tr>
<td></td>
<td>• No effective assessment of real needs in defining research problems</td>
<td>• IP belongs to government in the case of government sponsored research</td>
<td>• Risk of revealing business secret</td>
</tr>
<tr>
<td></td>
<td>• High cost and time consuming for testing</td>
<td>• Lack of financial and business skills</td>
<td>• Risk of revealing business secret</td>
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<tr>
<td><strong>Transfer</strong></td>
<td>• Mindset of funding agencies militating against direct financial support to private companies</td>
<td>• A delay, uncontinuity and inadequate supportive mechanism</td>
<td>• Risk of revealing business secret</td>
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<tr>
<td></td>
<td>• Lack of collateral for a loan</td>
<td>• Lack of experts on technology valuation</td>
<td>• Risk of revealing business secret</td>
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<tr>
<td></td>
<td>• Grantee mostly did not received the full amount of funding as stated in programs</td>
<td>• Lack of STI Infrastructure/difficulties to access to existing infrastructure/ firms do not know the location of infrastructure.</td>
<td>• Risk of revealing business secret</td>
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<tr>
<td></td>
<td>• High fee for using credit guarantee program</td>
<td></td>
<td>• Risk of revealing business secret</td>
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<td></td>
<td>• High cost and time consuming for testing</td>
<td></td>
<td>• Risk of revealing business secret</td>
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<td><strong>Com</strong></td>
<td></td>
<td></td>
<td>• Risk of revealing business secret</td>
</tr>
<tr>
<td></td>
<td>• Limited market for STI products</td>
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<td>• Risk of revealing business secret</td>
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</table>
Current Financial Support Mechanism

- **Grant/Matching Grant**
  - Innovation Coupon (NIA)
  - Industrial Technology Assistance Program (NSTDA)

- **Loans**
  - Company Directed Technology Development Program (CD) : NSTDA
  - Zero Interest innovation program : NIA

- **Tax incentive**
  - STI (Skills, Technology, Innovation) Investment Privilege : BOI
  - University - Industry R&D Promotion Privilege: BOI
  - R&D tax incentive 200% : Revenue Department
  - Machinery depreciation for R&D project : Revenue Department

- **Venture Capital: VC**
  - Innovation Development Fund : NIA
  - SME Fund : SME Bank (One Asset Management), SME Bank
  - KSME Venture Capital (Kaogla Fund), K-Bank
Financing R&D Commercialization

(R&D) (commercialisation of research) (Translational Research)

Government support 12,000 ml. Baht

Private R&D 8,000 ml. Baht

Government support 600 ml. Baht

Technology Commercialization Program (TCP)

“Valley of Death”
Proposal TCP Framework

Concept
20% “ring fenced” annual budget provided to RDI funding agencies in order to specifically grant for technology commercialization for start-up and SMEs

Scheme
Support 80% of the project but not more than 15 ml. baht

Technology Commercialization Program

Funding Agencies

SME/Start-up

Lab
Proof of Concept/Market
Prototyping
Pilot
Commercial
Proposal New R&D Tax Incentive Regime
The Enhancement of deduction on R&D Expenditure from 200% to 300%

- Company A has R&D expenditure = 10 MB.
- Deduction on R&D expenditure 300% = 30 MB.
- CIT = 20%
- Tax benefit = 6 MB.

Qualifying Activities:
- R&D
- IP acquisition
- IP registration
- Automation equipment
- Training
- Design

Subject to expenditure cap
10 MB for each qualifying activity

Beyond expenditure cap
**Differential in the R&D Tax deduction between tax benefit 200% and 300%**

**Example : Tax benefit 200%**
Company A has R&D expenditure 10 MB
And makes the profit at 25 MB

<table>
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<th>Tax benefit 200%</th>
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<td>R&amp;D expenditure</td>
<td>10 MB</td>
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<td>Tax deduction 200%</td>
<td>10 *200% = 20 MB</td>
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<td>Company’s profit</td>
<td>25 MB</td>
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<td>After Tax deduction</td>
<td>25-20 = 5 MB</td>
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<td>CIT 20% of 5MB</td>
<td>1 MB</td>
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<td>Tax benefit</td>
<td>2 MB</td>
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**Example : Tax benefit 300%**
Company A has R&D expenditure 10 MB
And makes the profit at 25 MB

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<tr>
<td>Company’s profit</td>
<td>25 MB</td>
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<tr>
<td>After tax deduction</td>
<td>25-30 = -5 MB</td>
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<td>CIT 20%</td>
<td>0</td>
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<td>Tax benefit</td>
<td>3 MB</td>
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Promotion for Technology Business Incubation
Regional Science Parks

- Northern Science Park
- Southern Science Park
- North Eastern Science Park
- Thailand Science Park

Specialized Science Parks
- Food Innovation Valley
- Space Krenovation Park

Private Science Parks
- Software Park Phuket
- AMATA (Industrial Estate Developer)

- Tax incentives
- Linkage of STI Infrastructure/services between universities/research institutes and private science parks
- Talent Mobility

Source: STI and SPA
## Main activities in Regional Science Parks

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<th>1. Techno-Business Incubation</th>
<th>• To create technology-based entrepreneur in order to develop innovative products and service to market.</th>
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<tr>
<td>2. Intellectual Infrastructure support for manufacturing and service sector</td>
<td>• Enhance service providing capability eg: IP service, product design including lab testing/analysis service.</td>
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<tr>
<td>3. Develop R&amp;D capability of SMEs</td>
<td>• Capacity building for local business to be potential customer of science park. By means of enhancing their R&amp;D capability.</td>
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<tr>
<td>4. Stimulate co-research between university-industry</td>
<td>• Support entrepreneur in utilising resources of university for R&amp;D.</td>
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<tr>
<td>5. Develop STI Infrastructure in science parks</td>
<td>• STI infrastructure for R&amp;D and techno-business incubation eg: R&amp;D lab space/Start up / service providers / Lab tools/Specialized lab/pilot plants</td>
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</table>
Rubber latex 600,000 kg/year

Extracted protein from rubber latex (Hb Extract) 1,000 kg/year 100 MB

Biomolecules 1,200 kg/year 2,600,000 MB

Advanced biochemical Engineering technology producing biopharmaceutical agents

Bioactive comp. 1,200 kg/year 1,500 MB

Drug/ Cosmeceutical Industry (e.g. cancer therapy)

Estimated product value from pilot plant 2,200 MB/year

Rubber product design and processing technology

- Rubber heel 100 MB/year
- Hip protector 100 MB/year
- Gel pillow 120 MB/year

- Latex glue 300 MB/year
- Rubber pool tile 20 MB/year

Medical devices from rubber

Rubber products

High quality dry rubber

Liquid latex

Extraction and purification technology for Biopharmaceutical agent
Pilot plants for capsaicin extraction and high valued chili products

**Fresh chili** (the cultivar Akkaneepiroth)
Capsaicin > 500,000 SHU
1,200 ton/year
value 60 MB

Fresh chili
total product
2,000 ton/year
value 40 MB

Dry chili
200 ton

**Extraction technology for high valued biopharmaceutical agent**

Capsaicin
6.7 ton/year
670 MB

Drug industry
Cosmetic industry
Food industry

**New food product** (sample)
amount 2,000 ton
(fresh chili)

Food Innovation Technology
(Production process/product development/management)

New high valued food product
> 200 MB

Domestic / Export

**Dry chili**
Amount 400 ton

Grinding technology

**Chili powder**
amount 400 ton
value 80 MB

Production technology/food recipe

New business for SMEs

Domestic / Export

**FDB Oven (prototype)**
Capacity 4 ton/day

Advanced Drying Technology for SMEs scale production by fluidized bed Technique (FDB)

Chili powder
15 machine/year
value 15 MB

SMEs Food/ Dry chili factory

**Drug industry**
**Cosmetic industry**
**Food industry**
**Domestic / Export**
**New business for SMEs**
**Domestic / Export**
**SMEs Food/ Dry chili factory**
Talent Mobility Program
To facilitate the mobility of researchers in GRIs and HEIs to industrial sector.

Industry reimburses university*

* SMEs are exempt from reimbursement through MOST subsidy

Talent Mobility Programme

To facilitate the mobility of researchers in GRIs and HEIs to industrial sector.

Industry

University/Research Institution

Talent Mobility Committee

1. Tax incentives
   - BOI STI-tax
   - MoL 200% corp. tax
   - RD 200% corp. tax

2. Regulation reforms needed to encourage mobility
   - Continuing tenure
   - Academic promotion

3. STI Office coordinating roles:
   - Project certification
   - Promotion/support
   - Demand-Supply database keeping
   - Pushing for enabling regulations
   - Matching events

4. The Cabinet approved talent mobility to be a key performance indicator of universities and research institutions
Framework (phase I)

Enhance country’s competitiveness

Industry
- Large company
- SME
- Community enterprise

Domestic and International

University/Research Institution
- R&D
- Technical solution
- Testing Analysis and standard system
- Management

Government institutes
Model 1: Technology Advisor

**Objective:** Build technological capacity for enhancing SMEs competitiveness

- **University**
  - R&D institutes
  - Supporting for
    - reforming rules and regulations
    - expertise and enterprise matching
    - Data development

- **Enterprise (SMEs)**
  - Co-funding
  - Monitoring and evaluation

**Problem analysis and consultation**
- R&D
- Technical solution
- Testing Analysis and standard system
- Management

**Talent Mobility Program**
Model 2: Technologist-to-Hometown

**Objective:** promoting S&T manpower working in the city to go back to their hometown to be technology-based entrepreneur. In order to support local business.

- Government institutes and universities
  - Regulatory reform
  - Matching on expertise and enterprise

- Intellectual property licensing
- Technology Transfer
- Technological and management consultation
- Consultation for Fund raising

To hometown -> New entrepreneurs

- Co-funding
- Monitoring and Evaluation

Talent Mobility Program
Model 3: Researcher Spinoff

**Objective**: To promote Techno-Sci based business by providing opportunities to scientist, technologist and researcher who has commercial ready research result to be entrepreneurs

- University
  - R&D institutes
- Talent Mobility Program
  - Regulatory reform
- Techno/Sci-based business
  - Co-funding
  - Monitoring and evaluation
Target: 15,000 enterprise within 5 years

Pilot: May 2556, 25 companies

Target: number of firms and budget

<table>
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<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
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<td>600</td>
<td>5,400</td>
<td>9,000</td>
<td>15,000</td>
<td>15,000</td>
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<td>Phase II</td>
<td>400</td>
<td>3,600</td>
<td>6,000</td>
<td>10,000</td>
<td>10,000</td>
<td>30,000</td>
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<td>Phase III</td>
<td>200</td>
<td>1,800</td>
<td>3,000</td>
<td>5,000</td>
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<td>Budget (MB)</td>
<td>100</td>
<td>900</td>
<td>1,500</td>
<td>2,500</td>
<td>2,500</td>
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</table>
Process of Talent Mobility support
(financial support is specifically for Thai SMEs)

1. SME and experts agree on co-project
2. Submit Project proposal
3. SME advance for expert cost
4. Reimbursement at 50-70% but not over 400,000 baht
Supporting Measures for Entrepreneurs
Joint Partnership
STI
IMBA, TU
STVP

STVP Approach

Teaching
Develop Curriculum
Teach Courses
Mentor Students

Research
Scholarly Research
Publications
Ph.D. Students

Outreach
Web Sites
Conferences
Trade & Text Books
Entrepreneurial Skills Complement Technical Skills

Breadth of Knowledge about Business and Leadership

Depth of Knowledge in a Technical Discipline
Metamorphosis Program through Regional Science Park Incubators
• metamorphosis program is about adjusting ideas and behavior for New Entrepreneur in Entrepreneurship curriculum.

• explorer, experiment and execute process.

• by finding answers/solution and searching information from media as a guideline for business development.

• Then conduct market testing and use the acquired information for business model improvement and propose to investor.
# Business Model & Opportunity Canvas

**Business Model & Opportunity Canvas**

### 1. Customer Segments
- Customer segments: 3 types
- Customer needs: How are these needs met?
- Customer pain points: How do you address these needs?

### 2. Value Proposition
- Value proposition: What makes your offer unique?
- Value proposition: How do you deliver value?

### 3. Channels
- Channels: How do you reach your customers?

### 4. Customer Relationships
- Customer relationships: How do you engage with your customers?

### 5. Revenue Streams
- Revenue streams: How do you make money?

### 6. Key Resources
- Key resources: What assets do you need to build your business?

### 7. Key Activities
- Key activities: What do you need to do to create your product or service?

### 8. Key Partnerships
- Key partnerships: Who do you need to work with to succeed?

### 9. Cost Structure
- Cost structure: How much does it cost to create and deliver your product or service?

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### Example Application

**Example:**

- **Customer Segments:**
  - Customer needs: Looking for a language learning app.
  - Customer pain points: Finding time to practice language.

- **Value Proposition:**
  - Value proposition: Daily language practice sessions.
  - Value proposition: Personalized learning plans.

- **Channels:**
  - Channels: Mobile app, website.

- **Customer Relationships:**
  - Customer relationships: Social media groups, online forums.

- **Revenue Streams:**
  - Revenue streams: Subscription model, language exchange program.

- **Key Resources:**
  - Key resources: Language experts, learning content.

- **Key Activities:**
  - Key activities: Developing app, content creation.

- **Key Partnerships:**
  - Key partnerships: Language teachers, content providers.

- **Cost Structure:**
  - Cost structure: Development costs, language expert fees.

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### References

- [Business Model Canvas](https://www.businessmodelgeneration.com/)
- [Opportunity Canvas](https://www.imba.com/)

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### Notes

- Additional notes and considerations.

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**Authors:**

- [Name 1]
- [Name 2]

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**Contact:**

- [Email]
- [Phone number]
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**รายรับ**

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**รายจ่าย**

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</tbody>
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Support and Development Program for New Entrepreneurs
Thank you!!