

**APEC Workshop on
SMEs' Access to Technology
Jakarta, Indonesia, 7-9 February 2012**

Annex B

Annex B. Presentations from Speakers



Key Determinants behind the Success Stories of Technology Development in SME

Franz Gelbke
February 7th, 2012

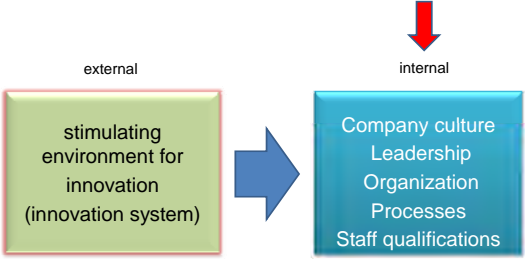


Key Determinants behind the Success Stories of Technology Development in SME

Franz Gelbke
February 7th, 2012

- Internal and external influence
- Key determinants inside SME
 - ❖ Leadership
 - ❖ People and Culture
 - ❖ TQM
 - ❖ Product and Process
 - ❖ Knowledge and Information
 - ❖ Other Factors
- Innovation System
 - ❖ The important role of policy and administration
 - ❖ The level of intervention and time
 - ❖ 30 Determinants of a National Innovation Systems
 - ❖ Promotion tools along the timeline
 - ❖ The impact after 30 years

Internal and external determinants for innovation in SMEs.



external

stimulating environment for innovation (innovation system)

internal

Company culture
Leadership
Organization
Processes
Staff qualifications

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Key determinants inside SMEs: Leadership


- Management fosters creative thinking and innovation in the company.
- Everyone in the organization is expected to come up with new ideas. Management takes new ideas very seriously.
- The organization operates a suggestion scheme.

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Key determinants inside SMEs : People and Culture

- The culture in this organization promotes change and the structure of the organization facilitates change.
- Bonuses are paid according to the organization's performance.
- Overall, employees have access to all the resources needed to get the job done.
- The organization is an enjoyable place to work.

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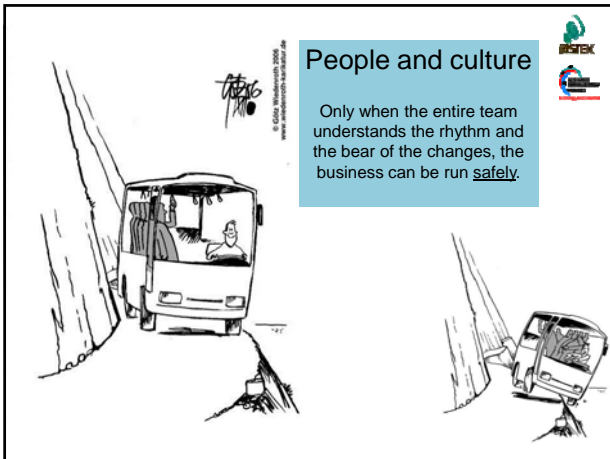


People and culture

To run a business in the global economy means to NOT only be fast, BUT the products and processes must be flexibly adaptable to global economy.

The corporate culture plays an important role in adapting process.

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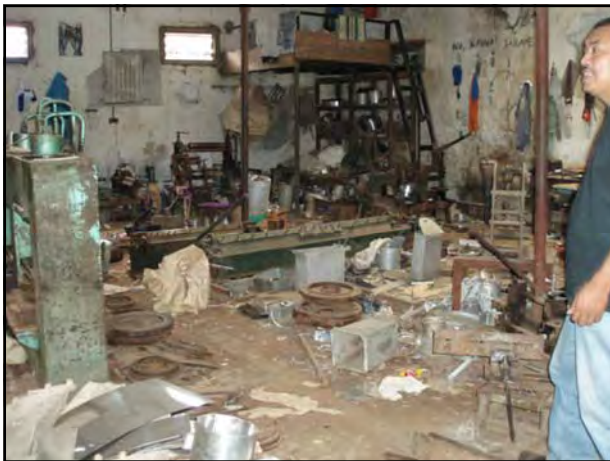


Key determinants inside SMEs :

TQM (Total Quality Management)

- Total Quality Management program and Continuous Improvement (CI) process.
- From a formal structural quality system to a quality culture.
- Therefore, people need positive role models.

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Key determinants inside SMEs : Product and process

- Management places top priority on new products and processes.
- Groups and teams are involved in developing new products and services.
- We regularly compare our products and services with those of our competitors.
- Customers are regularly involved in the development of new products and services.
- Everyone in the organization is expected to suggest ways to improve processes and procedures.
- This organization is investing to develop the capabilities it will need in the future.

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Key determinants inside SMEs : Knowledge and information

- Information/knowledge is effectively managed and used throughout the organization.
- Efforts are made to share information/knowledge across the organization.
- Information/knowledge from and about customers is effectively managed within the organization.
- Active management of information/knowledge produces a range of business benefits.

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Key determinants inside SMEs : Sources for Innovation

Source	Percentage
External Sources	
Business partners	35%
Customers	25%
Consultants	15%
Competitors	10%
Associations, trade groups, conference boards	5%
Academia	5%
Internal Sources	
Employees (general population)	45%
Sales or service units	30%
R&D (internal)	15%
Other	5%
Think tanks	5%
Internet, blogs, bulletin boards	5%

Source: IBM CEO Study 2006

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Key determinants inside SMEs : Other factors

- Collaboration with other partners – cooperation culture
- Grants for promoting innovation received - stimulation
- Links with universities to support innovation
- Links with other group to support innovation

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Internal and external determinants for innovation in SMEs.

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    graph LR
      subgraph External
        A[stimulating environment for innovation (innovation system)]
      end
      subgraph Internal
        B[Company culture  
Leadership  
Organization  
Processes  
Staff qualifications]
      end
      A --> B
  
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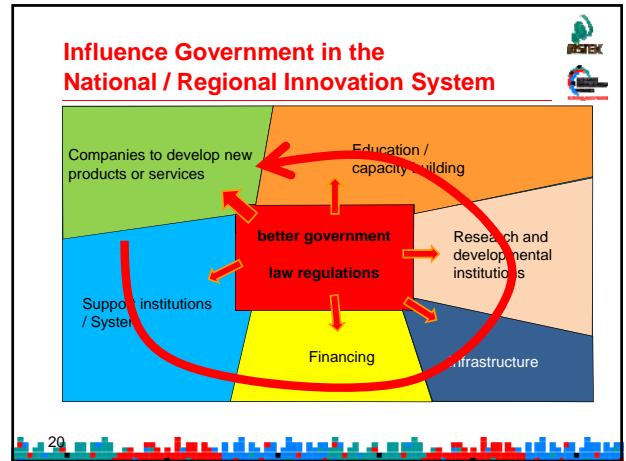
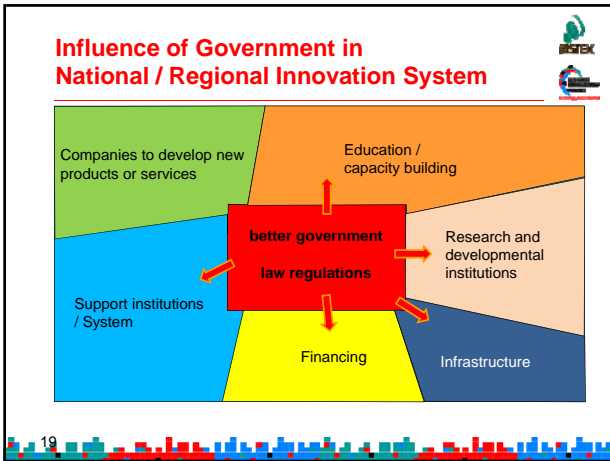
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Elements to build National / Regional Innovation System

The diagram consists of a central red box labeled "Companies to develop new products or services". Surrounding this central box are six colored segments representing different elements:

- Green: Good governance / law regulations
- Orange: Education / capacity building
- Blue: Support institutions / System
- Yellow: Financing
- Dark Blue: Infrastructure
- Light Orange: Research and developmental institutions

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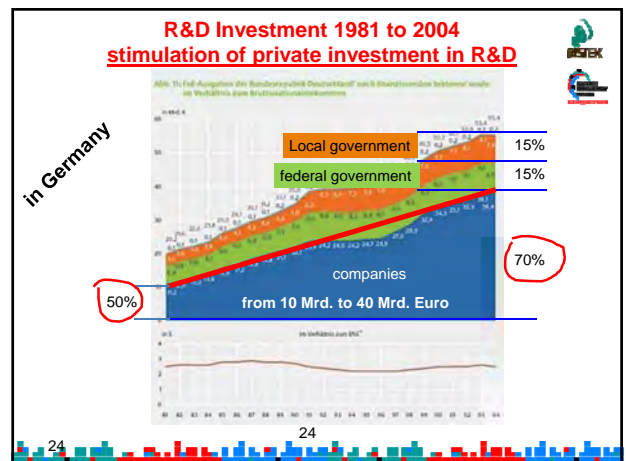
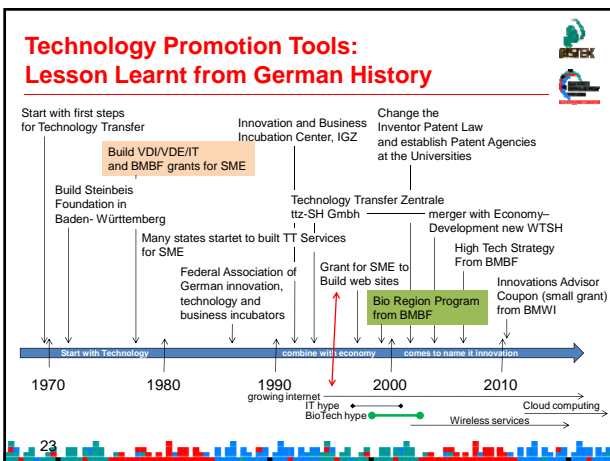
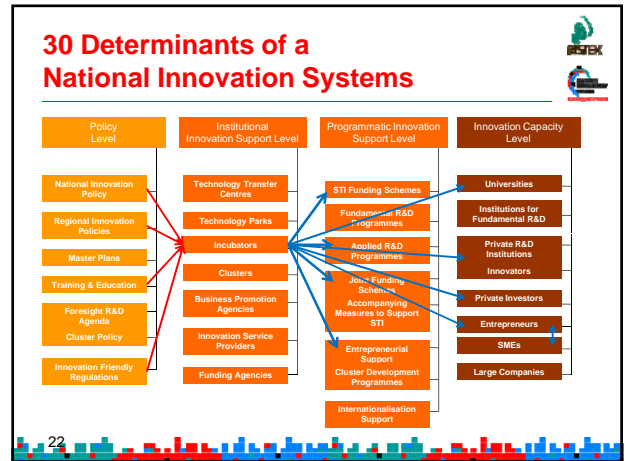


Matrix of level and type of intervention

Level of Intervention	Micro Level	Meso Level	Macro Level
Innovation Capacity	- EDUCATION - TRAINING	- PROGRAMS - INSTITUTIONS - FRAMEWORK CONDITIONS	- INNOVATION POLICY - EDUCATION POLICY
Technology	- RESEARCH AND DEVELOPMENT	- R&D PROGRAMS - R&D INSTITUTIONS	- TECHNOLOGY POLICY
Production Commercialization	- PRODUCTION - COMMERCIALIZATION - DISTRIBUTION	- MARKET INCENTIVE PROGRAMS - PROMOTING BODIES	- TRADE POLICY - SUBSIDY POLICY

Long-term (upward arrow), Short-term (downward arrow), Impact (rightward arrow)

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Terima kasih | Thank you | Danke

*Business Technology Center - Network
Ministry of Research and Technology
BPPT Building 2, 6th floor | JL. MH. Thamrin No. 08 Jakarta - 10340
Phone: +62 21 3169903 | Fax: +62 21 39839719
www.ristek.go.id/btc-network*

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by Rodney McAdam, Vol. 8, No. 1, 2008

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VDI/VDE/IT January 2012.


Federal Report on Research and Innovation 2005 and 2010 / BMBF Germany

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The Role of R&D Institutes/Universities in supporting Technology Development/Innovations in SMEs

Franz Gelbke
February 7th, 2012



The Role of R&D Institutes/Universities in supporting Technology Development/Innovations in SMEs

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- Definitions
 - ❖ The understanding of R&D for SMEs
 - ❖ Types of R&D institute
- Development phases within SMEs
- Technology Transfer Process
 - ❖ Telemetry System: example
 - ❖ Supplier of Technologies.
- Reflection

Understanding of R&D for SMEs : 1


Family handicraft business

Cluster development is required.

Basic knowledge on marketing, production process, quality, design and tools building are needed.




Understanding of R&D for SMEs : 2-3



Mechanical production
LOW LEVEL

SMEs need basic knowledge on:
marketing production process
quality construction
idea for new product (start development)




Electro-mechanical development and production
MEDIUM LEVEL

SMEs need knowledge on:
optimized injection molds
develop components for microcomputer
training
training on computer simulation based

Understanding of R&D for SMEs : 4

Advanced mechanical development and application of programmable controllers

SMEs need:
optimization of backing wheel supported by "finite element analysis" using remote maintenance (develop telemetry system)



Types of R&D institute : 1

Vocational school (SMK):

Education
Training
Prototyping

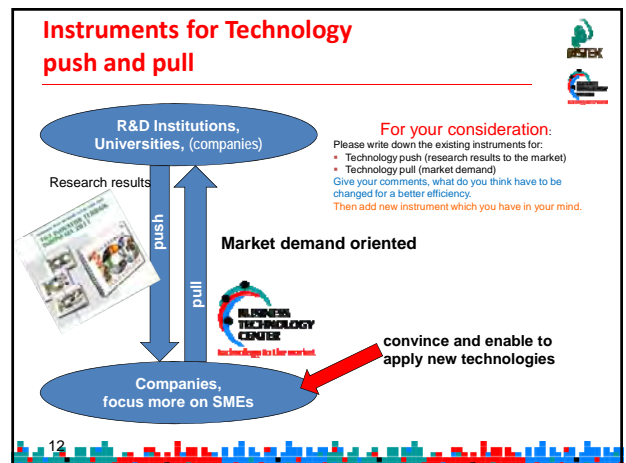
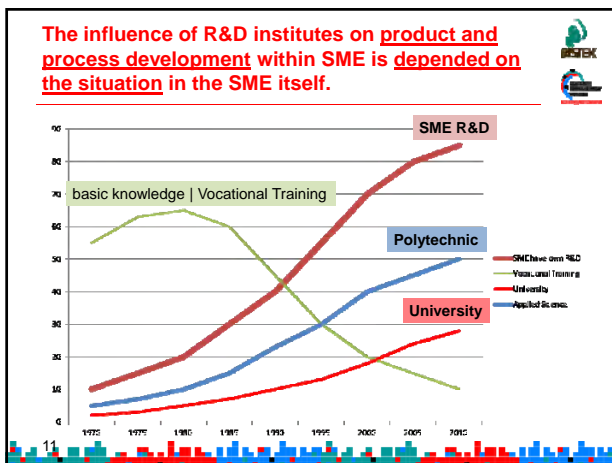
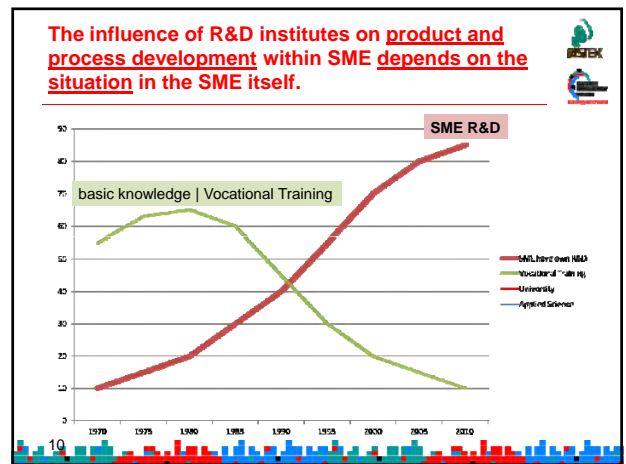
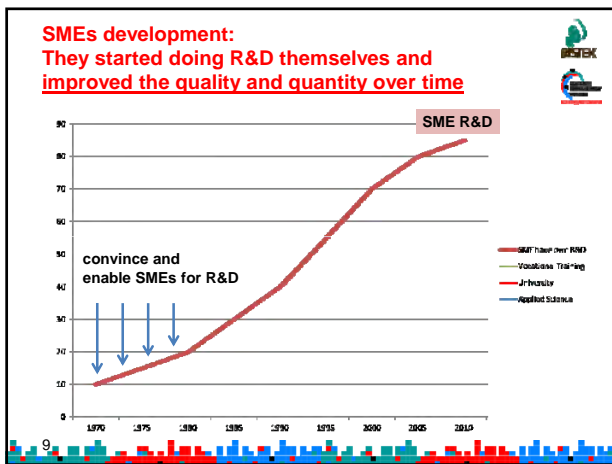


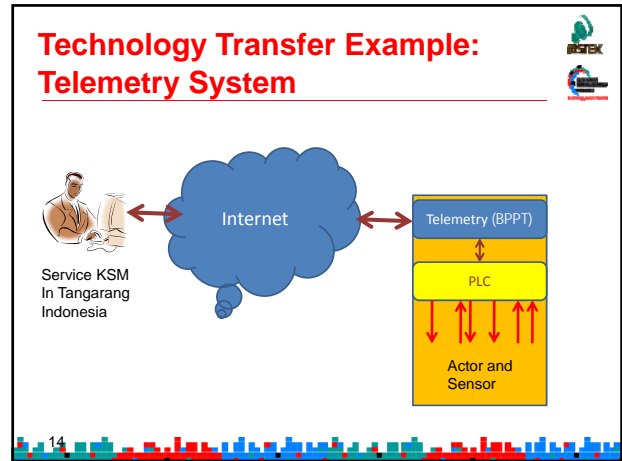
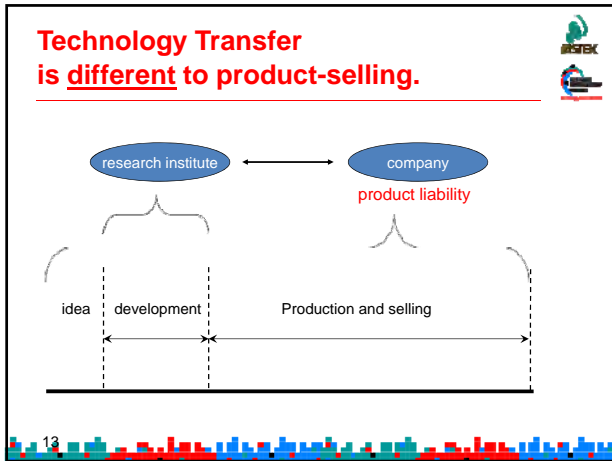
Types of R&D institute : 2

Polytechnic (University of applied science)
Higher Education
Training
Prototype Center

Types of R&D institute : 3

University
high education
process technology
simulation before prototyping
complex mathematic process optimization





Telemetry System: Project result (1)

Positive:

- The company employed one engineer for further development and for technical marketing.
- BPPT staff has gained experiences to develop telemetry system to work in the internet cloud.

Telemetry System: Project result (2)

Negative:

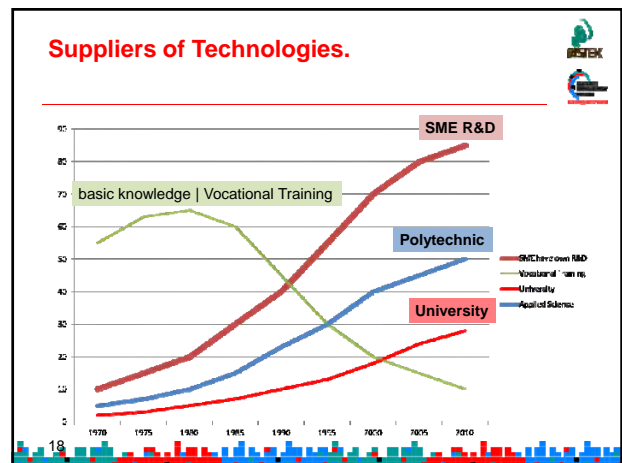
- BPPT develop a product, which unfortunately did not fit the demand from the company.
- The company does not apply that research result into their machines yet.
- From this experience, the company has not planned yet to collaborate with any public research center anytime soon.
- No economy effects up to now and in the near future.

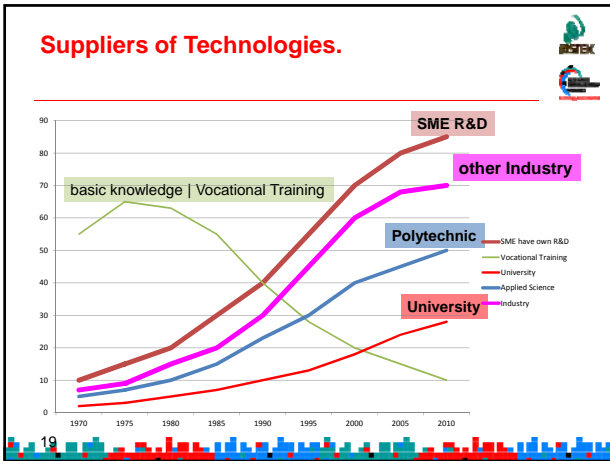
Telemetry System: Project result (3)

Challenge:

The negative result has nothing to do with the knowledge of the researcher (BPPT). They are very well educated.

- The Incentive program has to be adapted. For further collaborative project, SMEs have to get the responsibility.
- Project process at research center shall be changed.





CERAMIC CAPACITORS

SMD ceramic multilayer capacitors, type Kermet

Ceramic multilayer capacitors, type Kermet Admix C 418

product catalogs

ANALOG DEVICES

2.7 V to 5.5 V, $\pm 100 \mu A$, 8-/10-/12-Bit *nanDACs*® with I²C™-compatible Interface, Tiny 5G70 Package
AD5602/AD5612/AD5622

*component descriptions
books, webinars
and workshops*

FUNCTIONAL BLOCK DIAGRAM

PRODUCT HIGHLIGHTS

1. 100kOhm to 100MOhm impedance
2. Minimum 100 pA power consumption, single supply operation
3. 100kOhm to 100MOhm impedance, single supply operation
4. 100kOhm to 100MOhm impedance, single supply operation
5. 100kOhm to 100MOhm impedance, single supply operation
6. 100kOhm to 100MOhm impedance, single supply operation
7. 100kOhm to 100MOhm impedance, single supply operation
8. 100kOhm to 100MOhm impedance, single supply operation
9. 100kOhm to 100MOhm impedance, single supply operation
10. 100kOhm to 100MOhm impedance, single supply operation

Reflection

Depending on the level of development of SMEs, we need different institutions for R/D and we need intermediaries as door opener

We often overestimate the importance of R&D institutes in product / process development in cooperation with SMEs.

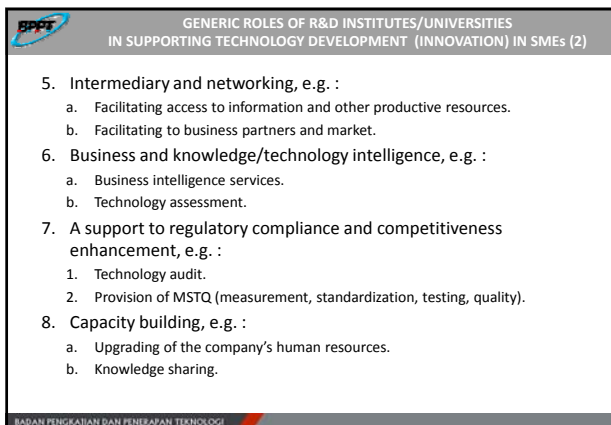
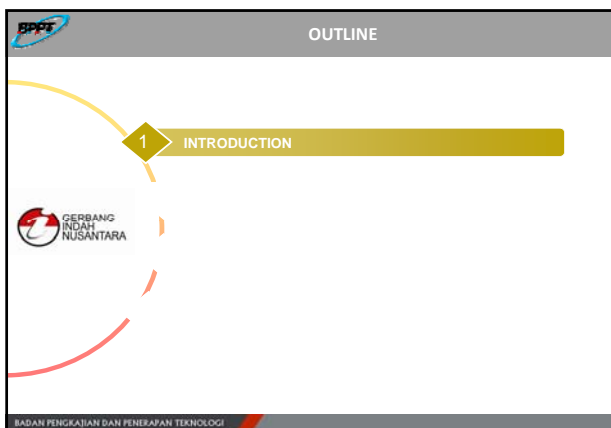
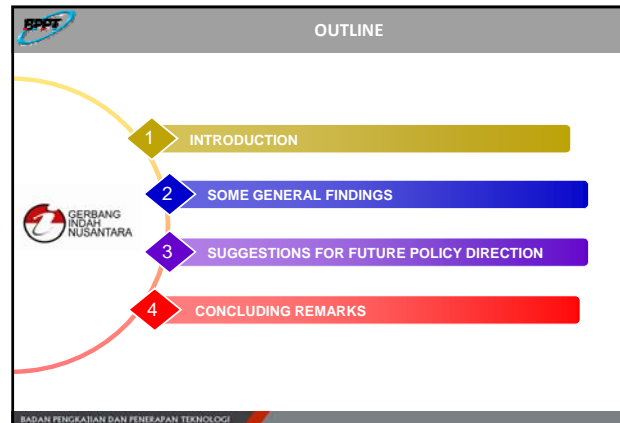
In fact, it is $\leq 5\%$ that SMEs collaborate with R&D institute/university.

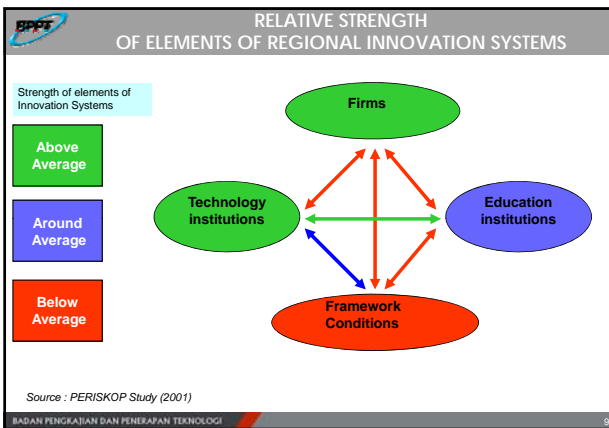
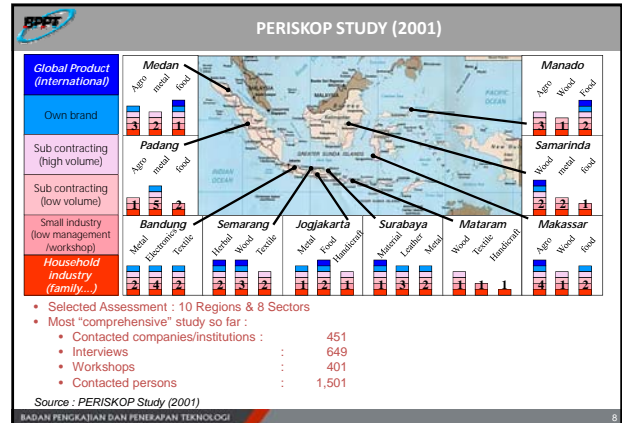
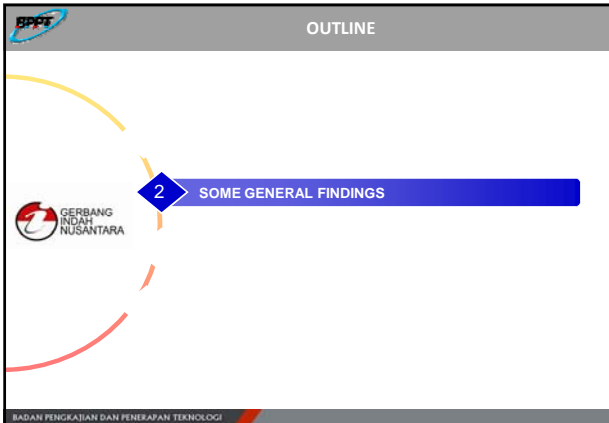
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Franz Gelbke
Business Technology Center – Network
Ministry of Research and Technology
BPPT Building 2, 6th floor | JL. MH. Thamrin No. 08 Jakarta – 10340
Phone: +62 21 3169903 | Fax: +62 21 39839719
gelbke@btc-network.com

Small and medium-sized enterprises (SMEs) SME Definition in Europe

Enterprise category	Headcount	Turnover
medium-sized	< 250	$\leq \text{€ } 50$ million
small	< 50	$\leq \text{€ } 10$ million
micro	< 10	$\leq \text{€ } 2$ million





BPPT **TECHNOLOGY SUPPLY SIDE**

- Public R&D institutes and some large universities provide technology supports to SMEs, but the activity outreach is generally still limited
- Most common & a relative easily accessed service : capacity building of SMEs (trainings, knowledge/ information sharing)

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT **TECHNOLOGY SUPPLY SIDE**

- Among limited roles are :
 - As a talent pool (especially for new/start-up companies)
 - Provision business & knowledge/technology intelligence
 - Supports to regulatory compliance (technology assessment/audit)
 - Provision of proven technology & technology-based services (with adequate technology readiness levels required, a prompt service response, a clear & satisfying IPR arrangements, an affordable business model)
 - Effective intermediary, e.g. as innovation centers for technopreneurship development (incubators & business development service providers)

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT **TECHNOLOGY DEMAND SIDE (SMEs)**

- Mostly based on natural resource abundance, low knowledge content (low value added/ productivity)
- Limited economies of scale for service providing organizations
- Limited 'formal educational background' & absorptive capacity
- Lack of motivation toward continuous improvement

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT TECHNOLOGY/INNOVATION RELATED LINKAGES

1. Institutional gaps & cultural gaps (between R&D institutes/universities and SMEs)
2. Policy supports :
 - a. Individual – fragmented government policy measures
 - b. Limited adequacy of scope of government intervention
 - c. “Rigid” government mechanisms/procedures (e.g., government procurement, funding for innovation initiatives)
 - d. Institutional support-related issues, e.g., risk financing (lack of risk capital development)

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT OUTLINE

3 SUGGESTIONS FOR FUTURE POLICY DIRECTION

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT GENERAL SUGGESTIONS

- Innovation system approach to strengthen SME competitiveness (through national flagship programs)
- Needs more holistic & synergetic policy measures
- Collaborative supports from key stakeholders
- National policy agenda with regional & industrial “flavors” (customization) to support local specific potential strenghts.

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT OUTLINE

4 CONCLUDING REMARKS

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT CLOSING

- R&D institutes/universities need to develop more effective roles in supporting SMEs (serving existing SMEs, and initiating new/start-up companies as well)
- Systemic approach to strengthen innovation, technology transfer & diffusion, and learning process (that is innovation system approach) needs to be the national and regional consensus & movement
- More focus on local specific strengths
- Developing effective intermediary and networking role is among the most important agenda to provide significant leverage for Indonesian SME competitiveness.

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

BPPT GERBANG INDAH NUSANTARA

Gerakan Membangun Sistem Inovasi, Daya Saing dan Kohesi Sosial di seluruh Wilayah Nusantara
(National movement to develop Innovation system, competitiveness, and social cohesion through out the Country)

... in harmony we progress ...

Thank You

Dr. Tatang A. Taufik
Deputy Chairman of BPPT for Technology Policy Assessment
Agency for the Assessment and Application of Technology
Badan Pengkajian dan Penerapan Teknologi (BPPT)
Gedung BPPT II, Lt. 13
Jl. MH. Thamrin 8, Jakarta 10340 INDONESIA
Telp. (+62 21)-316 9441 / 9442
Fax. (+62 21)-319 24127
E-mail: tatang.taufik@bppt.go.id

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

DEVELOPMENT OF MSMEs, THEIR CONSTRAINTS AND MAIN SOURCES OF TECHNOLOGY: THE INDONESIAN STORY

Tulus T.H.Tambunan
 Center for Industry, SME and Business
 Competition Studies, Trisakti University
 © 2012

- MAIN CHARACTERISTICS
- PERFORMANCE
- CURRENT CONSTRAINTS
- COMPETITIVENESS
- MAIN SOURCES OF TECHNOLOGY

Aspect	MIEs	SEs	MEs
Formality	operate in informal sector, unregistered & pays no taxes	some operate in formal sector, registered & pay taxes	all operate in formal sector, registered & pay taxes
Location	Majority in rural areas/ villages	Many in urban areas/cities	Mostly in urban areas/cities
Organization & management	- run by the owner - no internal labor division -no formal management & accounting system (bookkeeping)	- run by the owner - no labor division (majority), -no formal management and accounting system (bookkeeping)(majority)	-many hire professional managers, -many have labor division, formal organizational structure & formal account-ting system (bookkeeping)

Aspect	MIEs	SEs	MEs
Nature of employment	majority use unpaid family members	some hired wage laborers	-all hired wage laborers -some have formal recruitment system
Nature of production process	- degree of mechanization very low/mostly manual - level of technology very low	some use up-to-date machines	many have high degree of mechanization/access to modern technology
Market orientation	majority sell to local market and for low-income consumers	-many sell to national market and export -many serve also middle to high-income group	-all sell to national market and many also export - all serve middle and high-income consumers

Aspect	MIEs	SEs	MEs
Social & economic profiles of owners	- low or uneducated - from poor households - main motivation: survival	- some have good education, and from non-poor households - many have business/profit motivation	- majority have good education - many are from wealthy families - main motivation: profit
Sources of inputs	- majority use local raw materials and use own money	- some import raw materials -some have access to bank and other formal credit institutions	- many use imported raw materials - majority have access to formal credit sources
External networks	- majority have no access to government programs and no business linkages with LEs	- many have good relations with government and have business linkages (such as subcontracting) with LEs (including MNCs/FDD).	- majority have good access to government programs - many have business linkages with LEs (including MNCs/FDI)
Women entrepreneurs	ratio of female to male as entrepreneurs is high	ratio of female to male as entrepreneurs is high	ratio of female to male as entrepreneurs is low

Total enterprises by size category in all economic sectors in Indonesia, 2000-2009 (000 units)

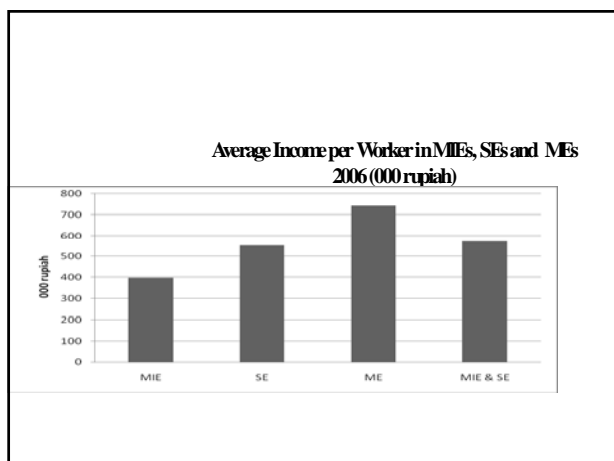
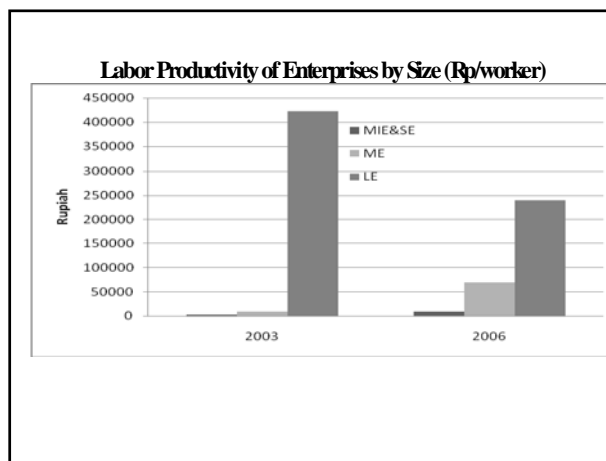
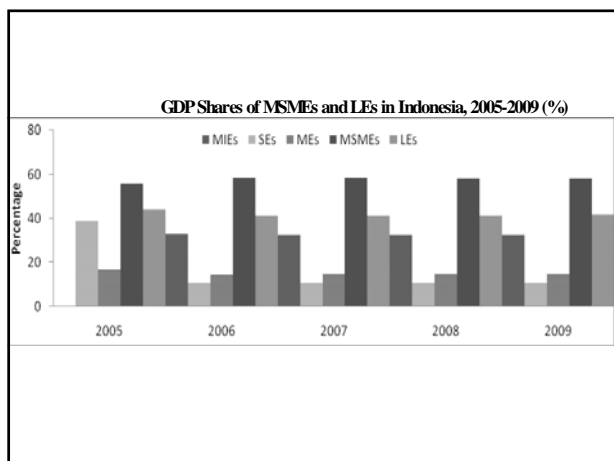
Size category	2000	2004	2006	2009
MIEs & SEs	39,705	44,684.4	48,822.9	52,723.5
MEs	78.8	93.04	106.7	41.1
LEs	5.7	6.7	7.2	4.7
Total	39,789.7	44,784.1	48,936.8	52,769.3

Total Employment by Size Category and Sector in Indonesia, 2008 (workers)

	MIEs	SEs	MEs	LEs	Total
Agriculture	41,749,303	66,780	643,981	229,571	42,689,635
Mining	591,120	28,762	21,581	78,847	720,310
Manufacture	7,853,435	1,145,066	1,464,915	1,898,674	12,362,090
Elect. gas & water supply	51,583	19,917	31,036	54,233	156,769
Construction	576,783	137,555	51,757	31,016	797,111
Trade, hotel & restaurant	22,168,835	1,672,351	472,876	179,895	24,493,957
Transport & communication.	3,496,493	145,336	111,854	98,191	3,851,874
Finance, rent & service	2,063,747	313,921	279,877	156,064	2,813,609
Services	5,096,412	462,683	178,311	49,723	5,787,129
Total	83,647,711	3,992,371	3,256,188	2,776,214	93,672,484

Structure of Enterprises by Size Category and Sector in Indonesia, 2008 (units)*

	MIEs	SEs	MEs	LEs	Total
Agriculture	26,398,113 (52.07)	1,079 (0.21)	1,677 (4.23)	242 (5.54)	26,401,111 (51.50)
Mining	258,974 (0.5)	2,107 (0.41)	260 (0.66)	80 (1.83)	261,421 (0.51)
Manufacture	3,176,471 (6.27)	53,458 (10.28)	8,182 (20.63)	1,309 (29.94)	3,239,420 (6.32)
Elect. gas & water supply	10,756 (0.02)	51 (0.11)	315 (0.79)	125 (2.86)	11,747 (0.02)
Construction	159,883 (0.32)	12,622 (2.43)	1,854 (4.68)	245 (5.60)	174,604 (0.34)
Trade, hotel & restaurant	14,387,690 (28.38)	382,084 (73.45)	20,176 (50.88)	1,256 (28.73)	14,791,206 (28.85)
Transport & communication.	3,186,181 (6.29)	17,420 (3.35)	1,424 (3.59)	319 (7.30)	3,205,344 (6.25)
Finance, rent & service	970,163 (1.91)	23,375 (4.49)	3,973 (10.02)	599 (13.70)	998,110 (1.95)
Services	2,149,428 (4.24)	27,525 (5.29)	1,796 (4.53)	197 (4.51)	2,178,946 (4.25)
Total	50,697,659	520,221	39,657	4,372	51,261,909
(percentage)	(100.00)	(100.00)	(100.00)	(100.00)	



Number of SEs and MIEs in the manufacturing industry by main obstacles, 2005

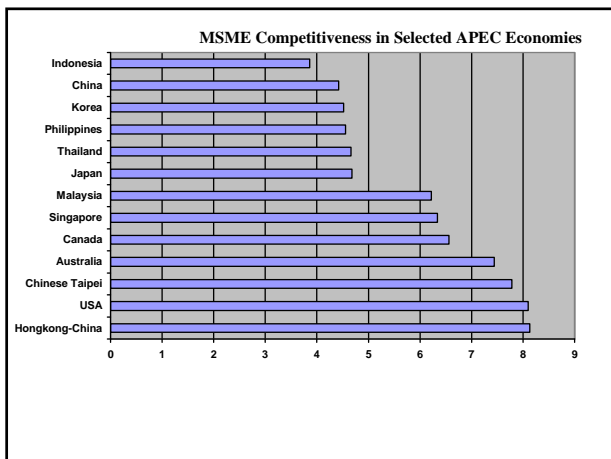
	SEs	MIEs	Total
Have no serious obstacles	46,485	627,650	674,135
Have serious obstacles:	192,097	1,862,468	2,054,565
-Lack or high prices of raw materials	20,362	400,915	421,277
-Marketing difficulties	77,175	552,231	629,406
-Lack of capital	71,001	643,628	714,629
-Transportation / distribution obstacles	5,027	49,918	54,945
-High price or short supply of energy	4,605	50,815	55,420
-High labor cost	2,335	14,315	16,650
-Other main constraints	11,592	150,646	162,238
Total	238,582	2,490,118	2,728,700

Sources of Capital of MIEs and SEs in the Manufacturing Industry, 2005 (% of total sampled enterprises)

Source of capital	MIEs	SEs
Own Money	82.41	68.85
Borrow	2.86	1.75
Own money and borrow	14.73	29.40
Total	100.00	100.00

Education of the Owners of MSMEs in the Manufacturing Industry, 2006(%)

Level of Education	Scale		
	MIE & SE	ME	MSME
Not completed primary education	12.20	7.97	16.09
Completed primary education	28.87	21.29	31.30
Completed first level secondary education	23.04	19.58	22.10
Completed second level secondary education	30.42	37.54	26.87
Completed Academic level education (D/II/III)	1.96	3.53	1.44
University diploma	3.51	10.09	2.20
Total	100.00	100.00	100.00



MAIN SOURCES OF TECHNOLOGY

- LEs
- Government
- University and R&D institutes

LEs

- Subcontracting activities between MSMEs and LEs are weak
- Japan is the leading players in subcontracting with local MSMEs (automotive; Toyota)
- No evidence showing strong cooperations in other forms in R&D between MSMEs and LEs
- The main constraint facing potential local subcontractors: lack of basic technology/knowhow
- Indonesian government has been trying to promote subcontracting, but still unsatisfied

Main Constraints in Starting and Conducting subcontracting

- Hard to get trust or confidence
- Company must be a legal entity
- Lack of skilled human resource
- Organization must be well developed with clear structure within the company
- Many costs during the tryout
- Lack of information
- Location of potential partner is far away
- Must have minimum technical capability
- Requirements (e.g. ISO 9001) are hard to be met
- Heavy competition from other potential subcontractors
- Difficulties in administrative procedures
- Difficulties in reaching an agreement that secure "win-win Solution"

Necessary Steps to become a Subcontractor

- Your company must be known through e.g. aggressive promotion of your products
- You must be able to show your business capability
- First, you must be able to produce efficiently or with cost competitiveness
- You must have minimum required facilities in place, including production space with necessary production tools.
- You must first improve first your human resource, business organization and management and technology capability

Government

- Existing government sponsored programs focus more on financing
- Transfer of technology to or Technology development in MSMEs not clear/not explicitly stated in National policy on MSMEs; neither in National policy on Technology
- Problems of coordination between government technical departments
- Lack of official staffs and uneven distributed by region dealing explicitly with technology development in MSMEs

Number of Institutions and Assistance Programs to Strengthen MSMEs, 1997-2003

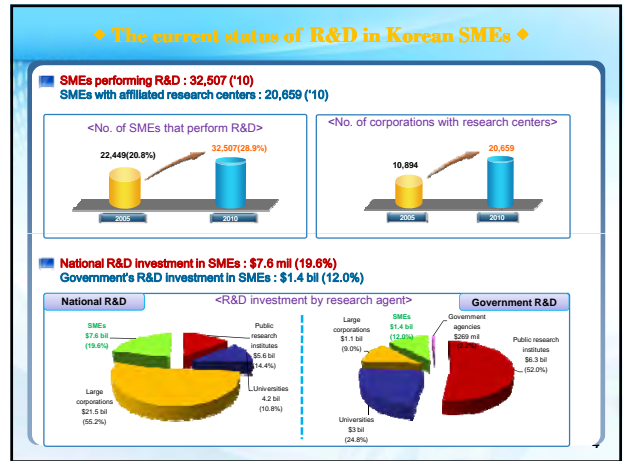
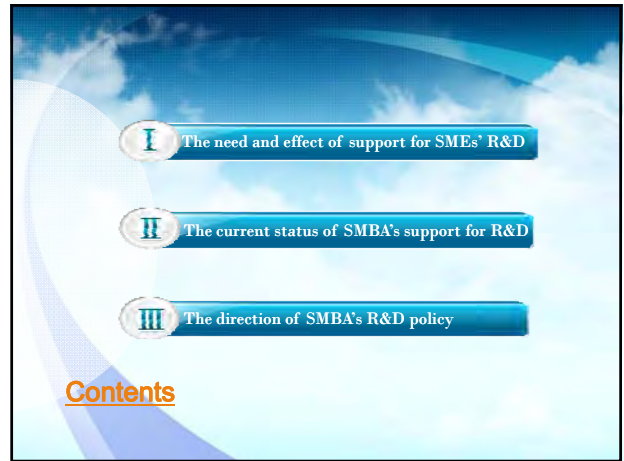
Institutions	Number of institutions	Number of assistance programs		
		Total	Still continuing	
			Total	%
Government institutions	13	388	127	32.7
Banking institutions	7	31	25	80.7
Private companies	10	12	12	100.0
Donor agencies	8	46	15	32.6
NGOs	20	109	79	72.5
Others	6	8	8	100.0
Total	64	594	266	44.8

The Proportion of Assistance Programs to Strengthen MIEs and SEs based upon the Type of Activities and the Executing Institutions (%), 1997-2003

	Government institutions	Banking institutions	Private companies	Donor agencies	NGOs	Others	Total
Capital assistance	5.3	52.9	25.0	21.0	29.6	28.6	17.3
Training	21.1	13.7	22.2	19.0	29.0	21.4	22.9
Facilitation	11.3	9.8	19.4	7.6	28.7	0.0	16.1
Information	1.9	7.8	2.8	3.8	1.6	21.4	2.6
Facilities	16.2	2.0	5.6	8.6	1.0	0.0	9.7
Promotion	3.0	3.9	13.9	6.7	1.0	7.1	3.3
Dissemination/introduction of new technology	27.9	0.0	0.0	6.7	1.3	0.0	15.2
Guidelines	4.3	0.0	0.0	0.0	0.7	0.0	2.4
Others	9.0	9.8	11.1	26.7	7.2	21.4	10.5
Total activities	531	51	36	105	307	14	1044

Universities and R&D Institutions

- very few universities engaged actively in supporting technology development in MSMEs
- No coordination among universities
- National policy on MSMEs does not mention specifically about the need of strong coordination in technology development between universities and MSMEs
- cooperation between universities and business community is not an Indonesian culture like in Japan, US, and Korea



I. The need and effect of support for SMEs' R&D

1. The necessity of support for SMEs' R&D

- **SME : Primary agent for technological innovation & Core of the national economy**
- **Agent for technological innovation** : ● Progressive, ● Flexible, ● Fast adaptation to environmental changes
- **Core of economy** : 99.9% of Enterprises, 87.7% of Jobs
- **Government's support : Compensating market failure and inducing private investment in R&D**
- **Market failure** : Avoiding the risk of R&D
Shortage of investment in R&D
- **Inducing private investment in R&D**
: Increasing productivity and inducing private investment in R&D

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I. The need and effect of support for SMEs' R&D

2. The effect on technological innovation in SMEs

- **Product innovation** is positively related to the rate of increase in the sales and number of employees of a corporation. (Roper, Freel)
- SMEs increase sales through **technological innovation**, while large corporations do so by expanding their **production scale**. (Dr. Zoltan J. Acs)
- **Innovation in manufacturing process, marketing and R&D** is positively related to the growth of an SME. (Heunks)
- **The value of patents a corporation holds** is positively related to the value of the corporation. (Schencker and Swanson, Hall et al)

<Outcomes of SMBA's support for R&D>

- **(Commercial outcome)** 601 mil Won (KRW) in sales were generated.
- **(Technological outcome)** 0.5 cases of registration and certification of Intellectual property were generated.
- **(Job creation outcome)** 0.216 jobs were created.

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II. The current status of SMBA's support for R&D

1. Outline of support projects
2. Budget
3. Outcomes
4. Problems



II. The current status of SMBA's support for R&D

1. Outline of support projects

Improving the technological competitiveness of SMEs

Types of projects

Developmental stages of corporations
(Startup - Innovation - Global)

Types of research performance
(Independent - Industry-Academy - Industry-Research)

Developmental stages of technology
(Planning - R&D - Commercialization)

Areas of technology
(Product - Manufacturing process)

Scale of support

- ≈ \$560 mil in total
- ≈ From \$21,000 to \$0.7 mil

Condition of support

- ≈ Government funding
- ≈ Up to 75% of total cost

Period of development

- ≈ 1-3 years

Royalty

- ≈ 20% of funding in case of success

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II. The current status of SMBA's support for R&D

2. Budget

SMBA's budget for R&D : ('09) \$433 mil → ('10) \$499 mil → ('11) \$560 mil
 * 2011 government budget for R&D : \$13.2 bil (SMBA : 4.2%)

Technology development	Scale	No. of projects	Industry-academy-research institute cooperation	Scale	No. of projects
▪ Innovation of technology	2,091	959	▪ Joint development technology	817	1,401
▪ Development of startup / growth technology	950	598	▪ Support for establishing affiliated research centers	380	403
▪ R&D in service	100	81	▪ Technology development for application of research equipment	200	114
▪ Purchase-conditional development of new product	530	310	▪ Support for sharing research equipment	151	123
▪ Technology development connected to overseas demand	70	23	▪ Development of transferred technology	100	43
▪ Technology development with private-public joint investment	200	85	▪ Development of technological convergence and combination	234	111
▪ Innovation of R&D planning	50	220	▪ Development of green manufacturing technology	400	172
▪ Development of manufacturing, IT convergence technology	15	10			
Total (8 subprojects)	4,006	2,286	Total (7 subprojects)	2,282	2,367

II. The current status of SMBA's support for R&D

3. Outcomes

Strengthening competitiveness of SMEs

Per 100 mil won (KRW) of government funding.

- **(Commercial outcome)** 601 mil won (KRW) in sales
- **(Technological outcome)** 0.5 cases of registration and certification of intellectual property
- **(Job creation outcome)** 0.216 jobs

Expanding base of technological innovation in SMEs

- Supporting 15,000 SMEs for R&D
→ Increasing SMEs with R&D activities by 9% (from 2006 to 2010)
- Increasing total amount of R&D investments of SMEs by 13.9% (from 2006 to 2010)

Fostering multiple major SMEs with new technology

- R&D funding from SMBA : Stepping stone for KOSDAQ registration

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II. The current status of SMBA's support for R&D

4. Problems

- **Technological level of Korean SMEs : 75% of the best in the world**
- **Weakness in investment efficiency and commercialization capability : Low ratio of R&D commercialization**
- **SMEs' productivity : 1/3 of big corporations**

Technology level (compared with advanced nations)

Growth ratio between big companies and SMEs

Success rate of R&D Commercialization

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II. The current status of SMBA's support for R&D

4. Problem

Korean SMEs' R&D investment
: Lower than the investment of advanced nations

* Scale of R&D : 1/10.5 of the U.S., 1/2.2 of Japan,
 * R&D spending per capita : 1/3 of big corporations, 30% Shortage of technical workforce

R&D cooperation in SMEs

Research centers

Difficulties in self-development of technology

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Direction of SMBA's R&D policy

1. R&D expansion
2. Strategic support for R&D
3. Strengthening cooperative R&D
4. Shared prosperity & Protection of SMEs' technology
5. R&D Commercialization
6. Advanced system of R&D management

III. Direction of SMBA's R&D policy

1. R&D expansion

- Support for SMEs' R&D : Effectiveness of KOSBIR
- Expansion of funding for SMEs' R&D : Ratio of funding for SME's R&D (up to 6% by 2015)

Ratio of exclusive funding for SMEs' R&D

Year	Government budget (10 billion won)	Ratio of budget for SMEs' R&D (B/A)
'09	1,234	12.9%
'10	1,364	12.9%
'11	1,487	12.9%
'13	-	5.5%
'15	-	6.0%

III. Direction of SMBA's R&D policy

2. Strategic support for R&D

Supporting promising projects

- Revising & supplementing the existing roadmap
→ Presenting core technology appropriate for SMEs
- Finding promising RFPs by roadmap and project-finding committee

Technological convergence and combination in SMEs

- Increased 2012 budget for 'Convergent, Combined Technology Development Project
- Approval Program for convergence projects
- 'SME Support Center for Convergence and Combination'
: (2011) 7 centers → (2012) 11 centers

III. Direction of SMBA's R&D policy

2. Strategic support for R&D

R&D Support system based on developmental stages

- Differentiated targets and goals of support projects

Fostering SMEs in promising areas

- Fostering growth of SMEs in 17 promising areas
• (17 areas) solar energy, wind energy, applied robotics, IT convergence, SW & contents, industrial foundation, etc
- Supporting overseas expansion of green SMEs

III. Direction of SMBA's R&D policy

2. Strategic support for R&D

Health care program for R&D

- Providing quick evaluation and support based on R&D prescriptions
 - Dividing projects into short-term projects and general
 - Short-term Project : up to 9 months, and up to \$44,500 of government funding
 - General Project : up to 1 year, and up to \$89,000 of government funding

❖ **Health care program**: a program to promote and maintain sound growth of a corporation by preventing a possible business crisis and solving business problems in general.

III. Direction of SMBA's R&D policy

3. Strengthening cooperative R&D

Expanding R&D cooperation

- Industry-research institute cooperation
: Joint R&D with government-funded research institutions
- Industry-academy cooperation
: Support for technology development tailored to size and experience

Creating foundation of innovation

- Operating 'Platform for Technological Connection'
- Creation of departments dedicated to SMEs in research Institutes
- Establishing 'SME-affiliated Research Center Complex' in universities

III. Direction of SMBA's R&D policy

4. Shared prosperity, and Protection of SMEs' technology

R&D between big corporations and SMEs

- Private-public R&D cooperation fund to support development of new technology products
- Participation of big corporations and public institutions in projects for purchase-conditional development of new products

Protecting core technology and workforce

- 'Measures to protect and foster technological workforce of SMEs' (11.8)
- 'Technology Protection Center for Smes' (11.3)

III. Direction of SMBA's R&D policy

5. R&D Commercialization

Incentives to SMEs good at commercialization

- Strengthening SMEs' capabilities for R&D planning
- Incentives to SMEs with good outcomes for future projects

R&D funding for commercialization

- 'Financial Support Program for Stimulation of Commercialization' for successful R&D projects
- Private investment and guarantee-based financial support for R&D

III. Direction of SMBA's R&D policy

6. Advanced system of R&D management

Increasing user convenience

- Unifying management systems for SMEs' R&D
- Providing 'online learning program' on projects for SMEs' R&D

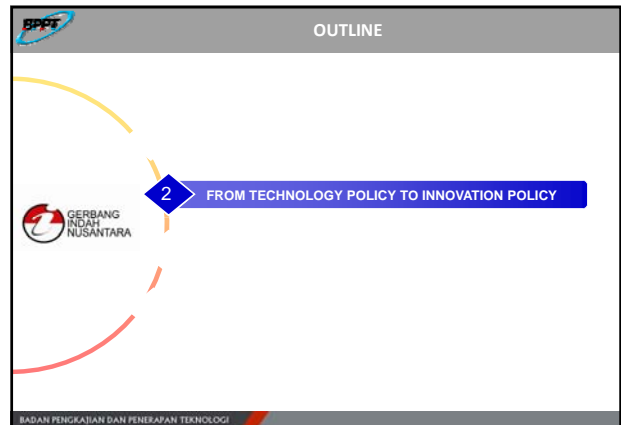
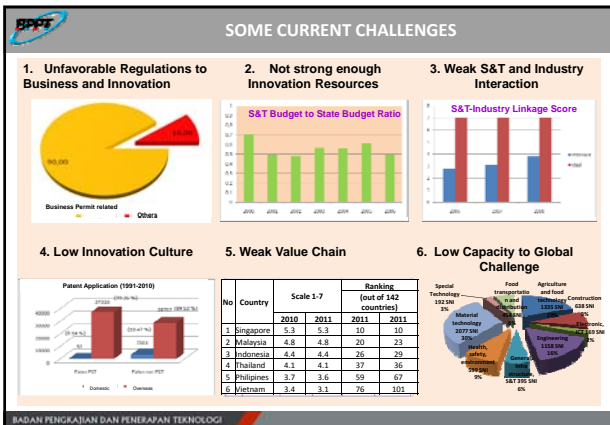
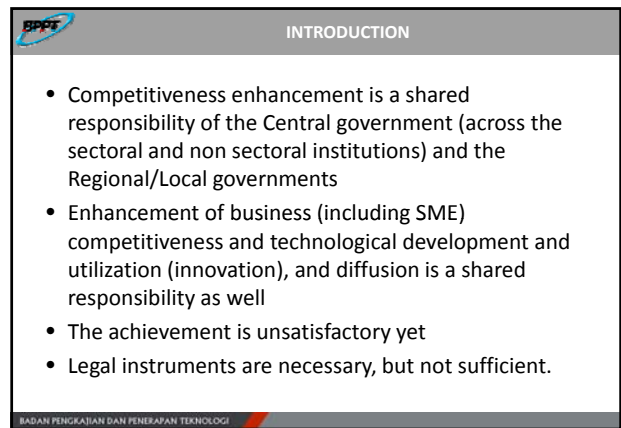
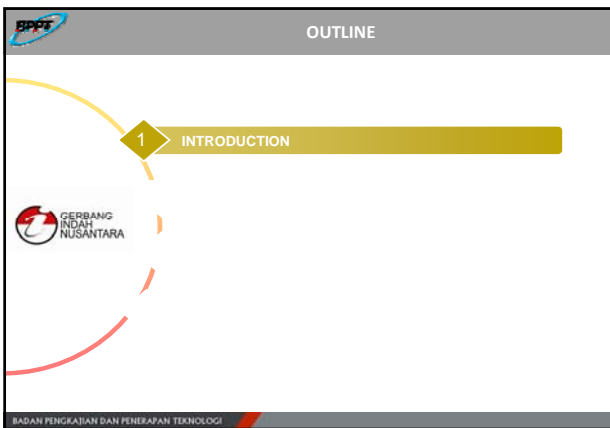
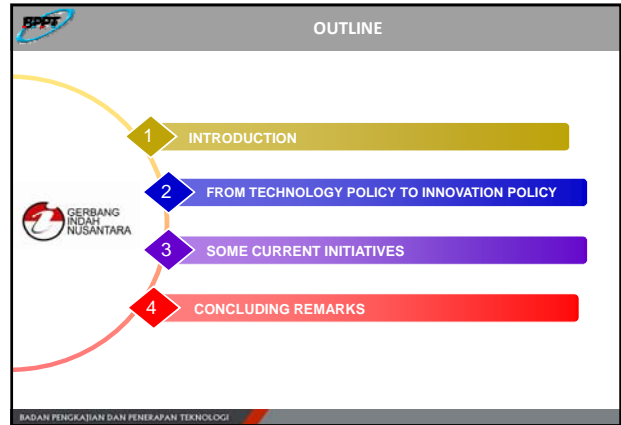
Professionalism in evaluation of R&D projects

- Raising fairness and professionalism of evaluation by an automatic recommendation system

Increasing transparency in project operation

- Monitoring by 'Point system and online management system'
- 'Online purchase system' for transparent management of R&D funding

Thank you.



BPPT INNOVATION & INNOVATION SYSTEM : A PERSPECTIVE

- The views change on innovation :
 - From "linear-sequential" perspectives (of "technology push" and "demand pull" models) → "market-driven" models : a **system perspective/approach of a dynamic and interactive-recursive models**.
 - From 'technical' views → **multidimension views** (technical, business/economic, socio-cultural, etc.)
- Among some recent important trends, more attentions have been given on:
 - Interactions and roles of actors (e.g., the *triple helix model*);
 - Local/regional dimensions, where social learning and social capital, and other local specificities play as more and more determining factors (e.g., *regional/local innovation systems* and *industrial clusters*).

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BPPT INNOVATION SYSTEM : POLICY IMPLICATIONS

- From 'market failure' arguments → + **government failures & systemic failures**
- From a **partial-fragmented policy** setting → a more **holistic-innovation policy** framework
- From a shortsighted & single side policy measure design → a more **longer term & comprehensive policy measure** design
- From a **top-down** approach → a more **participatory** approach
- From **individual actions** → **collaborative actions**
- Among policy implications, a more balanced attention on **national and regional contexts/dimensions** of the innovation policy has been increasingly acknowledged.

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BPPT DEFINITIONS

Innovation : a renewal, resulted from social and creative processes, which generate new socio-economic values.

Innovation System : a set (group) of actor (institutions or productive activities) interacting systematically that affect development and pace of innovation, its diffusion (technology and good practices) and the associated learning process (Taufik, 2008).

Keywords : **INNOVATION** , **DIFFUSION** dan **LEARNING PROCESS**

*References : Freeman (1987, "institutional network . . ."; Lundvall (1992, *interacting and interconnected amongst elements .. social system*); Nelson dan Rosenberg (1983, *group of actors . . .*); Metcalfe (1995, *system that bring different institutions together . . .*); OECD (1999, *group of institutions . . .*)

Innovation Policy : a set of coherent policies that give rise to strengthening of the innovation system.

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BPPT AN INNOVATION POLICY FRAMEWORK

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BPPT MARKET FAILURES AND SME INNOVATION

Type of Failure	Nature of Failure	Potential local policy actions
Information failure	Barriers to flow of information on innovation opps. Lead to missing markets & constraints for SMEs in obtaining finance, partners, etc.	Promotion of networks & partnerships. Public support to SME research projects
Public goods	Undersupply of non rival goods & non excludable goods that contribute to SME innovation – e.g. university research	Public policy of basic innovation infrastructure locally
Externalities	Undersupply of activities that benefit others in addition to producers – e.g. training of highly skilled labour; reduced incentives to SME innovation	Direct public support for SME research projects for training of highly skilled labour in local specialisms
Monopolies	Incumbent firms restrict entry through branding & other behaviour, constraining ability of innovative, new & small firms to enter market & compete	"Second best" policies supporting SMEs in order to "level the playing field". Support of new firm entry in local sector specialisms.
Indivisibilities	Indivisible cost in creating knowledge. If marginal cost pricing is used fixed cost is irrecoverable, constraining production of knowledge by SMEs & others	Public funding of public & private research projects with Potential spin offs for SMEs

Source: OECD (2005)

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BPPT SYSTEM FAILURES & SME INNOVATION (1)

Type of Failure	Nature of Failure	Potential Local policy action
Infrastructure Provision	Underinvestment in local infrastructure with which firms interact – e.g. communications infrastructure	Incentives for private or public communications & knowledge transfer infrastructures
Transition & lock in failures	Firms & localities are highly capable in their own technological areas but in related ones. Unable to switch from existing technologies	Incentives for technological activities that broaden firm & organisational capabilities & nurturing of emerging systems
Institutional failures	Institutional & regulatory context has unexpected negative impact	Monitoring & adjusting local institutions & regulations
Learning failures	Firms may not be able to learn rapidly & effectively	Developing firm capabilities through human capital programmes, support for R&D & technology dissemination policies. Opening channels to knowledge sources

Source: OECD (2005), Lundvall & Borras (1997).

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BPPT SYSTEM FAILURES & SME INNOVATION (2)

Type of Failure	Nature of Failure	Potential Local policy action
Suboptimal balance bet. exploitation & exploration	Local innovation concentrations may work too much on exploitation & not enough on exploration (or vice versa)	Using public procurement & funding to support exploration, introducing diversity in industry by supporting new & small firms; supporting variety through dissemination of codified information
Suboptimal balance bet. selection & variety	Local innovation concentrations may have too rapid selection whereby underperforming firms close, & too little variety, in terms of firms & activities carrying potentially promising technologies	Strengthening competition policies & use industrial & technological policies to support new firms carrying potentially promising technologies (or weaken competition policies & limit use of industrial & technological policies supporting firms that are likely to fail)
Appropriability traps	Too stringent appropriability may limit spread of knowledge within innovation system	Encouraging local knowledge transfers
Complementarities failures	The appropriate complementarities may not be present in local innovation system	Formation of R&D networks; industry university interfaces & bridging systems

Source: OECD (2005), Lundvall & Borras (1997).

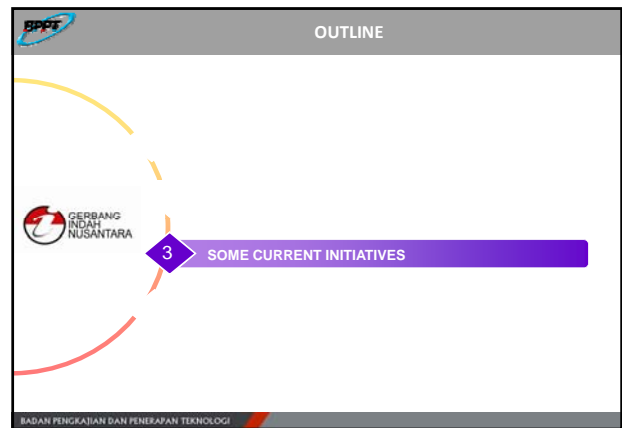
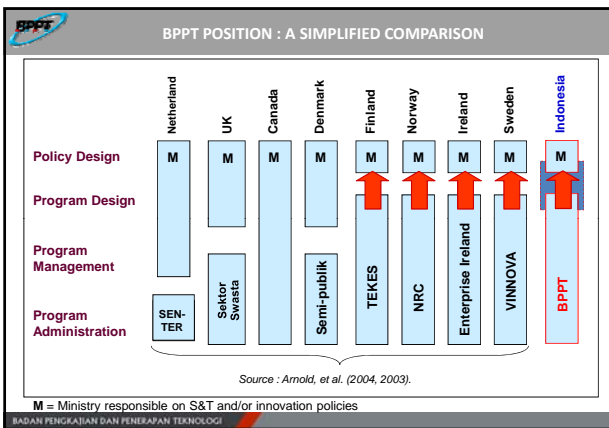
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BPPT CHALLENGES FOR PARADIGM SHIFTS IN INDONESIA

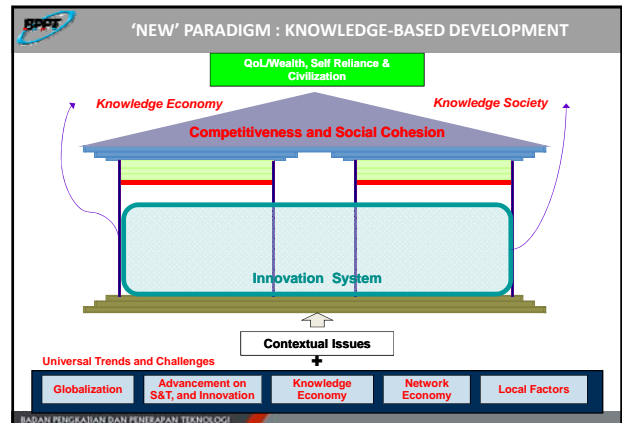
- Mostly based on natural resource abundance, low knowledge content **vs. More knowledge-based, innovation, entrepreneurial activities**
- Conventional, "business as usual" **vs. Breakthrough**
- Sectoral – partial **vs. Systemic - holistics**
- Individual – fragmented government policy measures **vs. Integrated – Coherent**
- etc... **Need a collaborative framework as a common platform to develop/strengthen coherent and synergetic policies and design their implementable actions and measurable targets/achievements.**

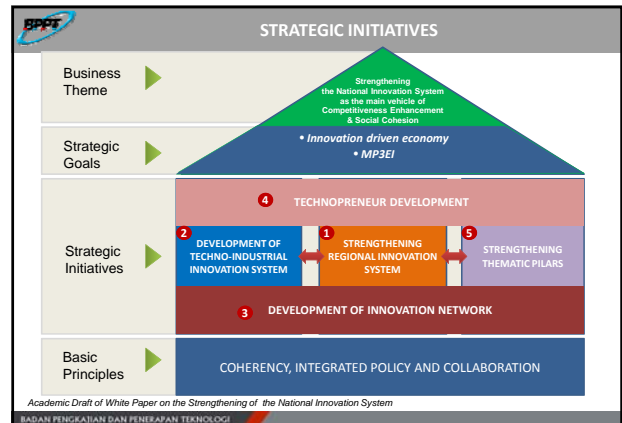
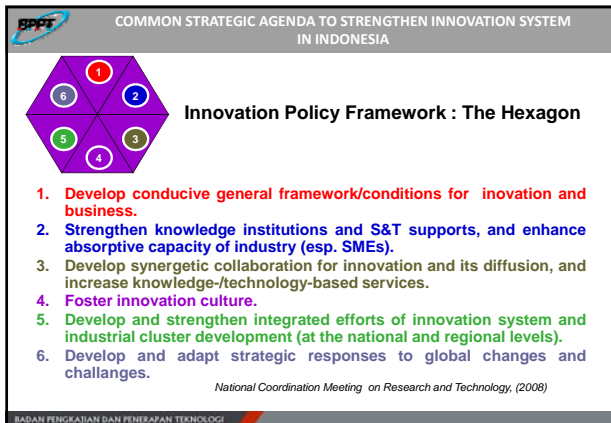
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- BPPT** INNOVATION SYSTEM AS NATIONAL COMMITMENT
- PERISKOP study - 2001, BMBF – MRT
 - BPPT study since 2004
 - Long Term Development Plan 2005 – 2025 (includes strengthening the National Innovation System/NIS to support knowledge-based economy development)
 - National Coordination Meeting on Research and Technology, 2008
 - Medium Term Development Plan, 2009-2014
 - National Innovation Committee, along with National Economic Committee, 2010
 - Master Plan for the Acceleration and Extension of the Indonesian Economic Development (MP3EI), 2011.
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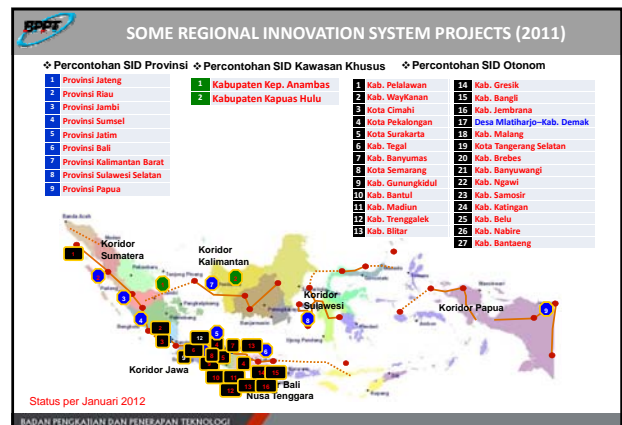


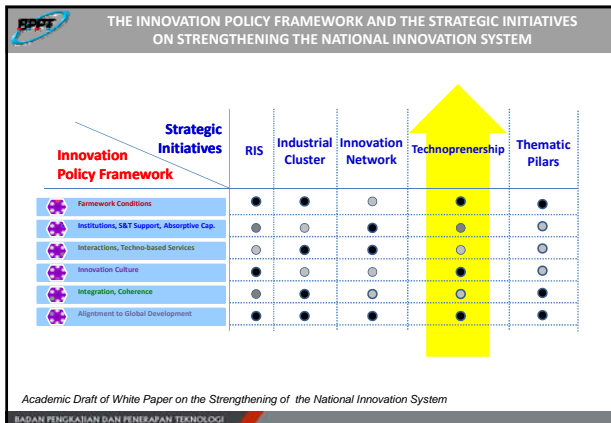
THE INNOVATION POLICY FRAMEWORK AND THE STRATEGIC INITIATIVES ON STRENGTHENING THE NATIONAL INNOVATION SYSTEM

Innovation Policy Framework	Strategic Initiatives					
	RIS	Industrial Cluster	Innovation Network	Technopreneurship	Thematic Pillars	
Framework Conditions	●	●	●	●	●	
Institutions, S&T Support, Absorptive Cap.	●	●	●	●	●	
Interactions, Techno-based Services	●	●	●	●	●	
Innovation Culture	●	●	●	●	●	
Integration, Coherence	●	●	●	●	●	
Alignment to Global Development	●	●	●	●	●	

Academic Draft of White Paper on the Strengthening of the National Innovation System

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- GENERAL ISSUES (RELATED TO SMEs)**
- The silent majority of business actors (SMEs) ~ Limited 'technological capacity' of existing SMEs
 - Low innovative entrepreneurial activities (number of entrepreneurs = 0.26%)
 - Limited role of intermediaries (e.g., estimated business incubators = 50; members of Indonesian Business Incubator Association/AIBI = 24)
 - Lack of effective government supports (consistency).
- BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

- TECHNOLOGY SUPPLY SIDE**
- Public R&D institutes and some large universities provide technology supports to SMEs, but the activity outreach is generally still limited
 - Most common & a relative easily accessed service : capacity building of SMEs (trainings, knowledge/ information sharing)
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- TECHNOLOGY SUPPLY SIDE**
- Among limited roles are :
 1. As a talent pool (especially for new/start-up companies)
 2. Provision business & knowledge/technology intelligence
 3. Supports to regulatory compliance (technology assessment/audit)
 4. Provision of proven technology & technology-based services (with adequate technology readiness levels required, a prompt service response, a clear & satisfying IPR arrangements, an affordable business model)
 5. Effective intermediary, e.g. As innovation centers for technopreneurship development (incubators & business development service providers)
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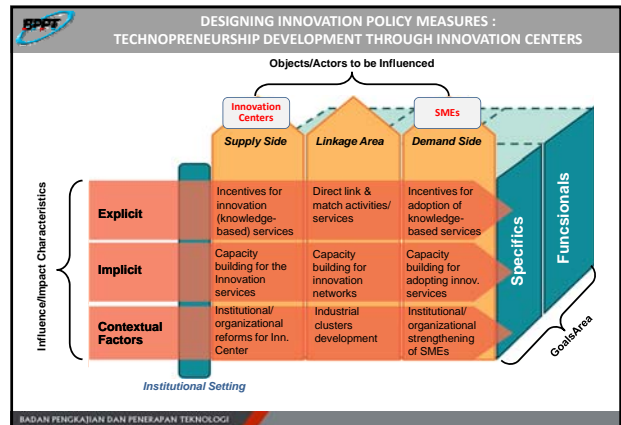
- TECHNOLOGY DEMAND SIDE (SMEs)**
- Mostly based on natural resource abundance, low knowledge content (low value added/ productivity)
 - Limited economies of scale for service providing organizations
 - Limited 'formal educational background' & absorptive capacity
 - Lack of motivation toward continuous improvement
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- TECHNOLOGY/INNOVATION RELATED LINKAGES**
1. Institutional gaps & cultural gaps (between R&D institutes/universities and SMEs)
 2. Policy supports :
 - a. Individual – fragmented government policy measures
 - b. Limited adequacy of scope of government intervention
 - c. "Rigid" government mechanisms/procedures (e.g., government procurement, funding for innovation initiatives)
 - d. Institutional support-related issues, e.g., risk financing (lack of risk capital development)
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BPPT GENERAL SUGGESTIONS

- Innovation system approach to strengthen SME competitiveness (through national flagship programs)
- Needs more holistic & synergetic policy measures
- Collaborative supports from key stakeholders
- National policy agenda with regional & industrial "flavors" (customization) to support local specific potential strenghts.

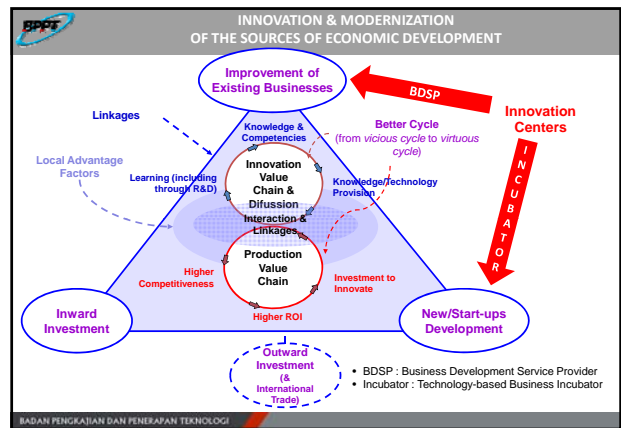
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BPPT TECHNOPRENEURSHIP DEVELOPMENT PROGRAM

- Is an "innovation system approach" flagship program as the main vehicle to foster innovative businesses (especially by providing techno-based supports to existing SMEs and developing new/startup innovative SMEs).
- Components :
 - Policy/technical assistance
 - Organizational/institutional strengthening
 - Innovation & entrepreneurial culture development
 - Financial supports
 - Incentives & Government regulatory reforms
 - Business intelligent services
 - Talent scouting (Technopreneurship camps)
 - Knowledge/technology based services

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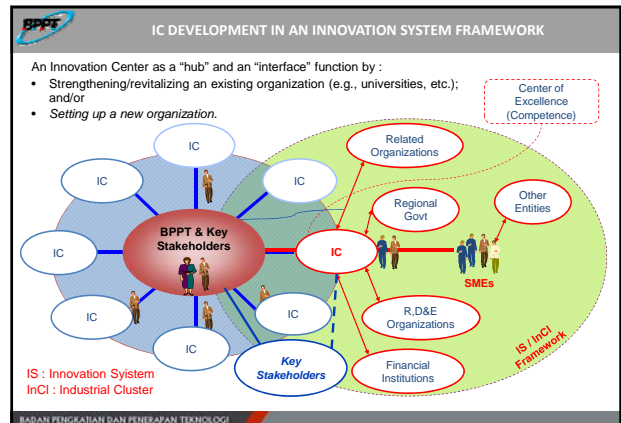
BPPT "MINIMUM" SERVICES BY AN INNOVATION CENTER

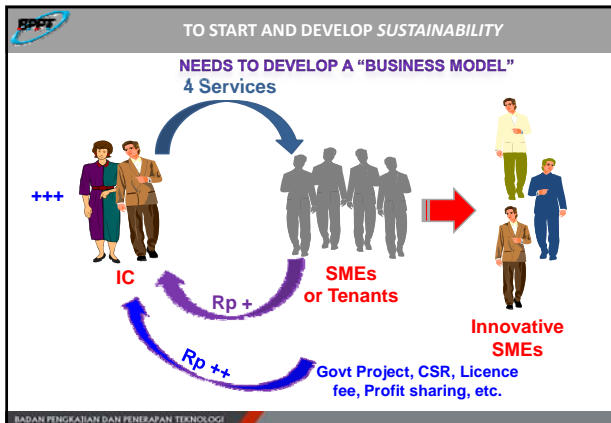
An Innovation Center needs to provide a minimum *integrated services*, at least in :

1. Technology-based services (e.g., design, prototyping, testing, technology-based business incubation, etc.)
2. Human resource development of businesses (SMEs).
3. Business networking.
4. Facilitating financing (funding) access.

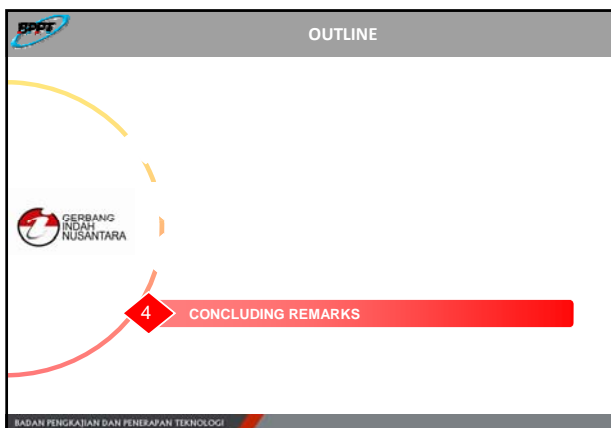
Notes :
1 & 2 : technology/knowledge services as the "core competences" of the Innovation Center
3 & 4 : intermediary roles

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- BPPT** SOME CURRENT PROGRESS & NEXT INITIATIVES
- 2009 – 2010 : 35 ICs
 - 2011 :
 1. Economic/industrial assessments, policy recommendation & policy briefs
 2. 10 related guide books
 3. 6 new regional techno-based business incubators
 4. 1 university techno-based business incubator
 - 2012 :
 1. Organizational development (including Indonesian Business Incubator Association)
 2. Continuing regional & university based Innovation Center development
 3. Network of Innovating Indonesia volunteers (including Young Volunteers of Innovating Indonesia).
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- BPPT** CLOSING
1. Partial approaches are not effective, do not provide significant leverage. Enhancement of innovation for SMEs needs a system approach (i.e., innovation system); and collaborative efforts from all key stakeholders.
 2. **Area(s) of collaboration**
 - a. An intergovernmental (& interorganizational) co-operation on policy learning on innovation and business/ technopreneurship development.
 - b. Specific collaborative pilot projects (e.g., innovation center development).
 - c. Capacity building : S&T organization, Human resource development (HR exchange, including for policy makers).
 - d. Join knowledge management ~ "cloud" innovation system network.
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- BPPT** CLOSING
3. **Develop success stories in 1 – 3 years :**
1. Starts from 'well-defined collaborative activities' critical to the strengthening of innovation system to support SME competitiveness enhancement
 2. Grow as we go
 3. Create excellent achievement
 4. Build community of practice.
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BPPT GERBANG INDAH NUSANTARA

Gerakan Membangun Sistem Inovasi, Daya Saing dan Kohesi Sosial di seluruh Wilayah Nusantara
(National movement to develop innovation system, competitiveness, and social cohesion through out the Country)

... in harmony we progress ...

Thank You

Dr. Tatang A. Taufik
Deputy Chairman of BPPT for Technology Policy Assessment
Agency for the Assessment and Application of Technology
Badan Pengkajian dan Penerapan Teknologi (BPPT)
Gedung BPPT II, Lt. 13
Jl. MH. Thamrin 8, Jakarta 10340 INDONESIA
Telp. (+62 21)-316 9441 / 9442
Fax. (+62 21)-319 24127
E-mail: tatang.taufik@bppt.go.id

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BPPT EXAMPLES OF LEGAL BASES / REGULATIONS

- Constitution 1945 – Fourth Amendment: Clause 28c and Clause 31 - Verse 5, and Clause 33 :**
 - Right to obtain the benefit from S&T and to self advancement
 - Government advances S&T.
 - National Economy and social welfare (regulated by Laws).
- Act No. 18/2002 :**
 - Goals of S&T National System Development : **to strengthen S&T capacity to accelerate the realization of state's ultimate goals; to enhance competitiveness; to enhance self reliance**
 - Chapter IV Clauses 18 – 23 : Functions and Roles of Central and Regional Governments**
- Act No. 25/2004 on The National Development Planning System**
 - The Regional Long Term Development Planning (RPJPD) should refer to the National Long Term Development Planning (RPJPN)

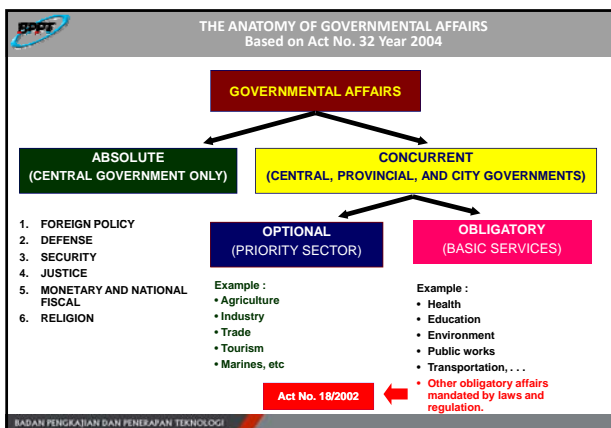
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BPPT EXAMPLES OF LEGAL BASES / REGULATIONS

- Act No. 17/2007 :**
 - IV DIRECTION, STAGES, AND PRIORITY OF LONG TERM DEVELOPMENT 2005 - 2025 (IV.1 LONG TERM DEVELOPMENT DIRECTION 2005 – 2025 : IV.1.2 TO ACCOMPLISH AS A COMPETITIVE NATION, Point C Mastering, Developing, and Utilizing S&T) : innovation system strengthening to drive knowledge based economic development.**
- Act No. 32/2004 :**
 - Goal of regional autonomy is **to enhance public welfare, public services, and regional competitiveness** (Clause 2, Verse 3); and
 - Regional Executive and Vice Executive have obligation to: advance and develop regional competitiveness (Clause 27, Verse 1, point g).

See also : Government's Regulation No. 6/2008 on The Guidelines for Evaluating Regional Government Performance

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BPPT EXAMPLES OF LEGAL BASES / REGULATIONS

- President's Instruction No. 6/2007 on Riil Sector Acceleration and SME Empowerment** (Increasing SME's access to funding sources; Development of Entrepreneur and Human Resources; Enhancing market niche for SME's products; Regulatory reform)
- Decree Letter of the Coordinating Minister on Economy No : Kep-47/M.Ekon/07/ 2008 on The Innovation Center for SME (PI-UMKM), dated July 31, 2008**
- President's Regulation No. 5/2010 on The National Medium Term Development Plan (RPJMN) 2010 - 2014 :**
 - Period of enhancing the human resource quality including the development of S&T skills as well as economic competitiveness strengthening.
 - Book I : National priorities (11) ~ culture, creativity, and technological innovation.
 - Book II Chapter IV : National innovation system strengthening.
- Joint Agreement of 3 Ministries on March 2010 (on the Technology and Business Incubator Development National Action to Generate Innovative Entrepreneur)**
- President's Regulation No. 32/2011 on MP3EI**
- Etc.**

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BPPT INTERNAL LEGAL BASES IN BPPT ~ Transitional

- Decree of the Chairman of BPPT No. 064/2011 on Special Assignment to the Deputy of Technology Policy Assessment (PKT) to Implement the National and Regional Innovation Systems Programs and Activities :**
 - To support the implementation of national development program in accordance with the national development direction stated in the National Long Term Development Plan (RPJPN) 2005 – 2025 and the National Medium Term Development Plan (RPJPMN) 2010 – 2014.
- Decree of the Deputy Chairman of BPPT for Technology Policy Assessment, No. 04/2011 on Special Assignment to all Echelons under the Deputy of Technology Policy Assessment to Implement the National and Regional Innovation Systems Programs and Activities :**
 - Techno-industry Innovation System Development**
 - Innovation Network Development**
 - Regional Innovation System Strengthening**
 - Technology Audit**
 - Technopreneurship Development**, including technology-based business incubator.

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BPPT National Budget 2011
Presidential Remarks, 16 August 2010

- BUDGET**
 - Rp.1,086.4 Trillion (120.67 Bio US \$ at 9000/USD)
 - Loan interests, domestic Rp.80.4, foreign Rp.36 T (10.7%)
 - Central government Rp.401.4 Trillion (37%)
 - Regional government total Rp.409.4 trillions (37.7%)
 - Disbursed to 524 autonomous regions; 33 provinces, 398 Districts, 93 Municipalities. —Rp. 378.4 Trillion
 - Special autonomy regions- Papua and Aceh- Rp. 10.3 T
 - Shared revenue to regions- tax, natural resources, Rp. 82 T
 - Adjustment for school grant/BOS and civil servant Rp. 39 T
- 10 STRATEGIC OBJECTIVES**
 - Higher economic growth
 - Fewer unemployment and better job
 - Reduced poverty
 - Increased income/capita
 - Maintained economic stability
 - More significant domestic financing
 - Improved food and water security
 - Improved energy security
 - Higher economic competitiveness
 - Greener development

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CURRENT GOVERNMENT DEVELOPMENT POLICY (2010-2014)

11 National priorities

1. Bureaucracy Reform and Governance
2. Education
3. Health
4. Poverty reduction
5. Food security
6. Infrastructure
7. Investment and business climate
8. Energy
9. Environment and disaster management
10. Marginal areas, outer islands/regions, post-conflict ridden areas

11. Culture, creativity and technology innovation

15 President's specific priorities

1. Eradication of court law's "mafia"
2. Revitalization of defense industry
3. Terrorism prevention
4. Nation-wide electricity availability
5. Increased food production and strengthened food security
6. Revitalization of fertilizer and sugar factories
7. Regulatory improvement in land-use and regional planning
8. Infrastructure development
9. Financial/credit support for SMEs amounted to ~US\$ 200 Mio/year
10. Financing and investment scheme
11. Reformulation of Indonesia's contribution to climate change and environmental challenges
12. Public health reform
13. Harmonization between education and employment
14. Disaster mitigation and management
15. Central and provincial/district governments synergy.

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GLOBAL COMPETITIVENESS INDEX - WEF

Country	2009	Country	2010	Country	2011
Switzerland	1	Switzerland	1	Switzerland	1
United States	2	Sweden	2	Singapore	2
Singapore	3	Singapore	3	Sweden	3
Sweden	4	United States	4	Finland	4
Denmark	5	Germany	5	United States	5
Malaysia	24	Malaysia	26	Malaysia	21
Brunei	32	Brunei	28	Brunei	28
Thailand	36	Thailand	38	Thailand	39
Indonesia	54	Indonesia	44	Indonesia	46
Burundi	133	Chad	139	Chad	142

Source: WEF, 2011

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INDONESIA'S COMPETITIVENESS PROFILE IN 2010 AND 2011 (WEF)

2010

- 44 • National Competitiveness
- 36 • Innovation
- 30 • Capacity for Innovation

2011

- 46 • National Competitiveness
- 36 • Innovation
- 30 • Capacity for Innovation

Source: WEF, 2011

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INDONESIA'S GCI (2011 VS 2010)

Global Competitiveness Index	Rank (out of 142)	Score (1-7)
GCI 2011-2012	46	4.4
GCI 2010-2011 (out of 133)	44	4.4
GCI 2009-2010 (out of 133)	54	4.3
GCI 2008-2009 (out of 136)	55	4.3

Global Competitiveness Index	Rank (out of 142)	Score (1-7)
Basic requirements (40.0%)	53	4.7
1st pillar: Institutions	71	3.8
2nd pillar: Infrastructure	76	3.8
3rd pillar: Macroeconomic environment	73	3.7
4th pillar: Health and primary education	64	3.9
5th pillar: Higher education and training	69	4.2
6th pillar: Goods market efficiency	67	4.2
7th pillar: Labor market efficiency	94	4.1
8th pillar: Financial market development	68	4.1
9th pillar: Technological readiness	94	3.3
10th pillar: Market size	15	5.2
Innovation and sophistication factors (10.0%)	41	3.9
11th pillar: Business sophistication	45	4.2
12th pillar: Innovation	36	3.6

Source: WEF, 2011

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TECHNOLOGICAL READINESS & INNOVATION INDEXES (2011)

9th pillar: Technological readiness

9.01 Availability of latest technologies	4.9	74
9.02 Firm-level technology absorption	5.0	54
9.03 FDI and technology transfer	4.7	64
9.04 Internet users/100 pop.*	9.1	117
9.05 Broadband Internet subscriptions/100 pop.*	0.8	103
9.06 Internet bandwidth, kb/s/capita*	0.3	108

12th pillar: Innovation

12.01 Capacity for innovation	3.8	30
12.02 Quality of scientific research institutions	3.9	55
12.03 Company spending on R&D	3.7	31
12.04 University-industry collaboration in R&D	4.1	41
12.05 Gov't procurement of advanced tech products	4.1	34
12.06 Availability of scientists and engineers	4.4	45
12.07 Utility patents granted/million pop.*	0.0	86

Source: WEF, 2011

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