



# Thailand Taking off to New Heights

**Kan Trakulhoon**

**Director & Chairman of the Management Advisory Committee**

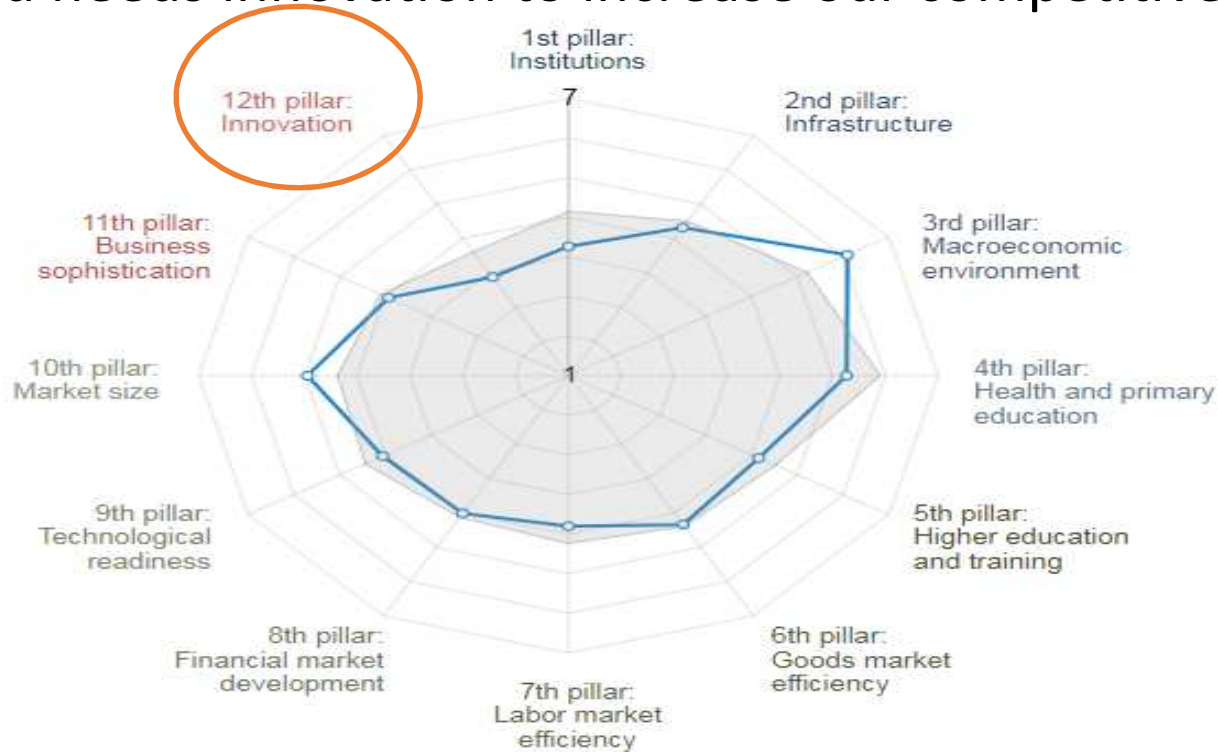
Mon., Mar. 19, 2018 at 10.00-12.00hr  
@ Royal Jubilee Ballroom, Impact Muangthongthani

@ SCG 2018



## Thailand's Performance Overview

- Thailand needs innovation to increase our competitiveness



Source: International Monetary Fund; World Economic Outlook Database (April 2017)

# National Agenda: Moving Out From Middle Income Trap

## Government view points on Thailand 1.0-4.0



**Thailand 1.0:** Focus on agricultural sector

**Thailand 2.0:** Focus on productivity enhancement in light industries

**Thailand 3.0:** Focus on labor- and heavy-machinery intensive production



**Thailand 4.0:** Focus on technology and innovation to add product & service value

We Are Caught in A Trap of...



Middle Income Country    Income Inequality    Imbalance



[www.boi.go.th/upload/content/TIR Jan 32824.pdf](http://www.boi.go.th/upload/content/TIR_Jan_32824.pdf)  
<http://www.admissionpremium.com/news/1377>

# Transformative Shift in Thailand 4.0

Traditional Farming



Traditional SMEs



Traditional Services



Unskilled Labors



Buy Technologies



Smart Farming



Startup



High Value Service



Knowledge worker/  
High Skilled Labors



Develop  
Technologies



Source: THAILAND BOARD OF INVESTMENT, [www.boi.go.th](http://www.boi.go.th)

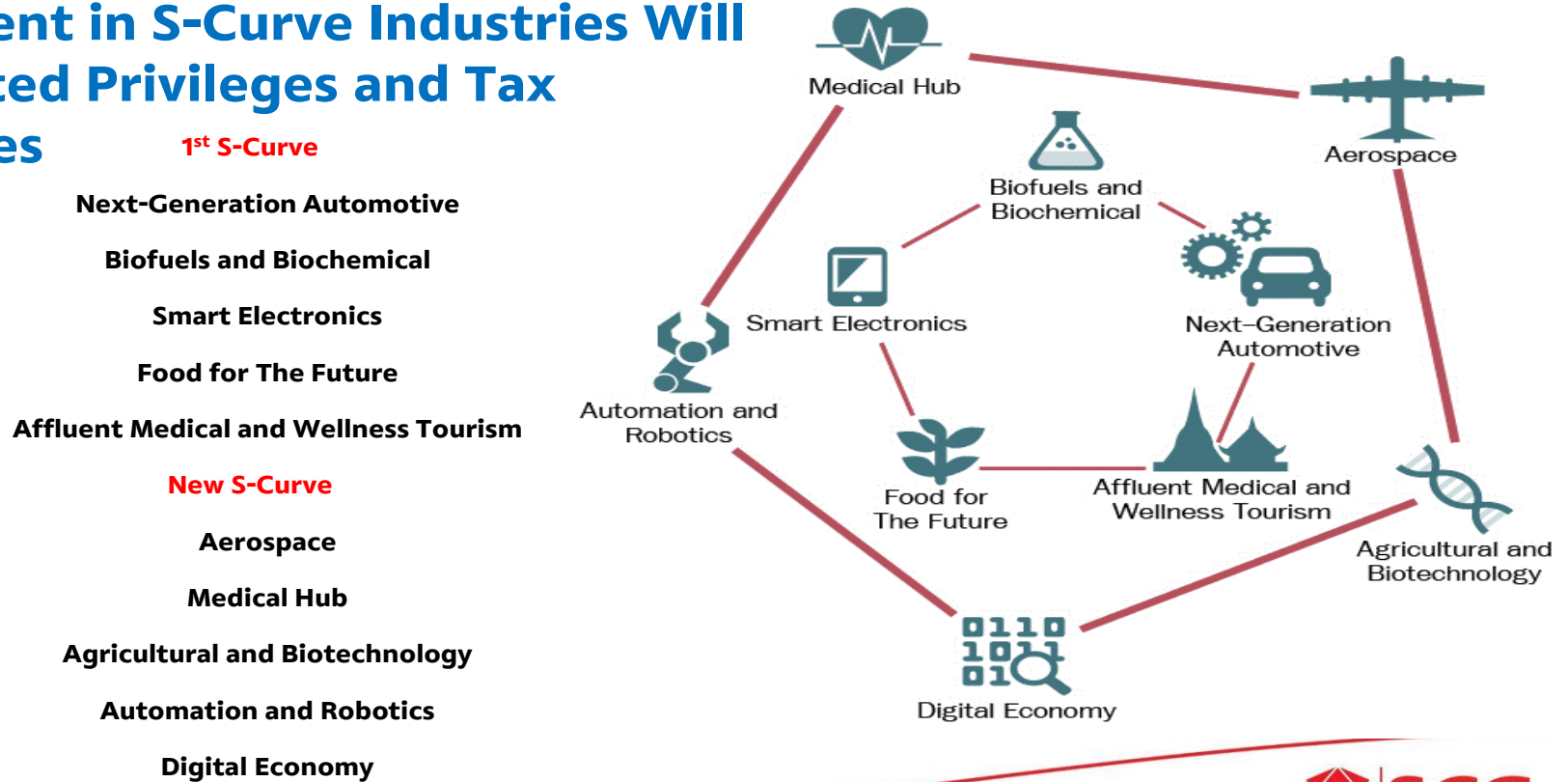
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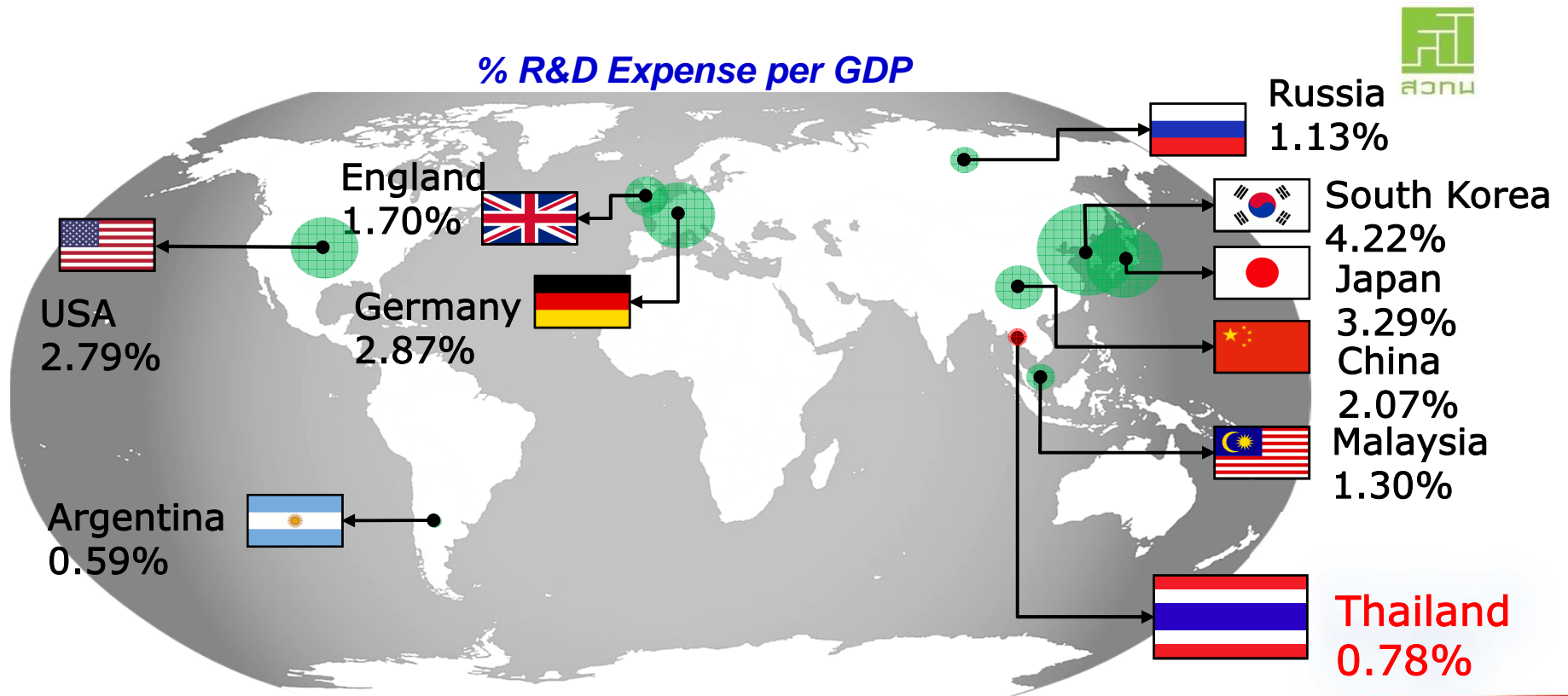
## New Growth Engine (S-Curve)

# 10 Targeted Industries: Mechanism to Drive Economy for the Future

Investment in S-Curve Industries Will Be Granted Privileges and Tax Incentives



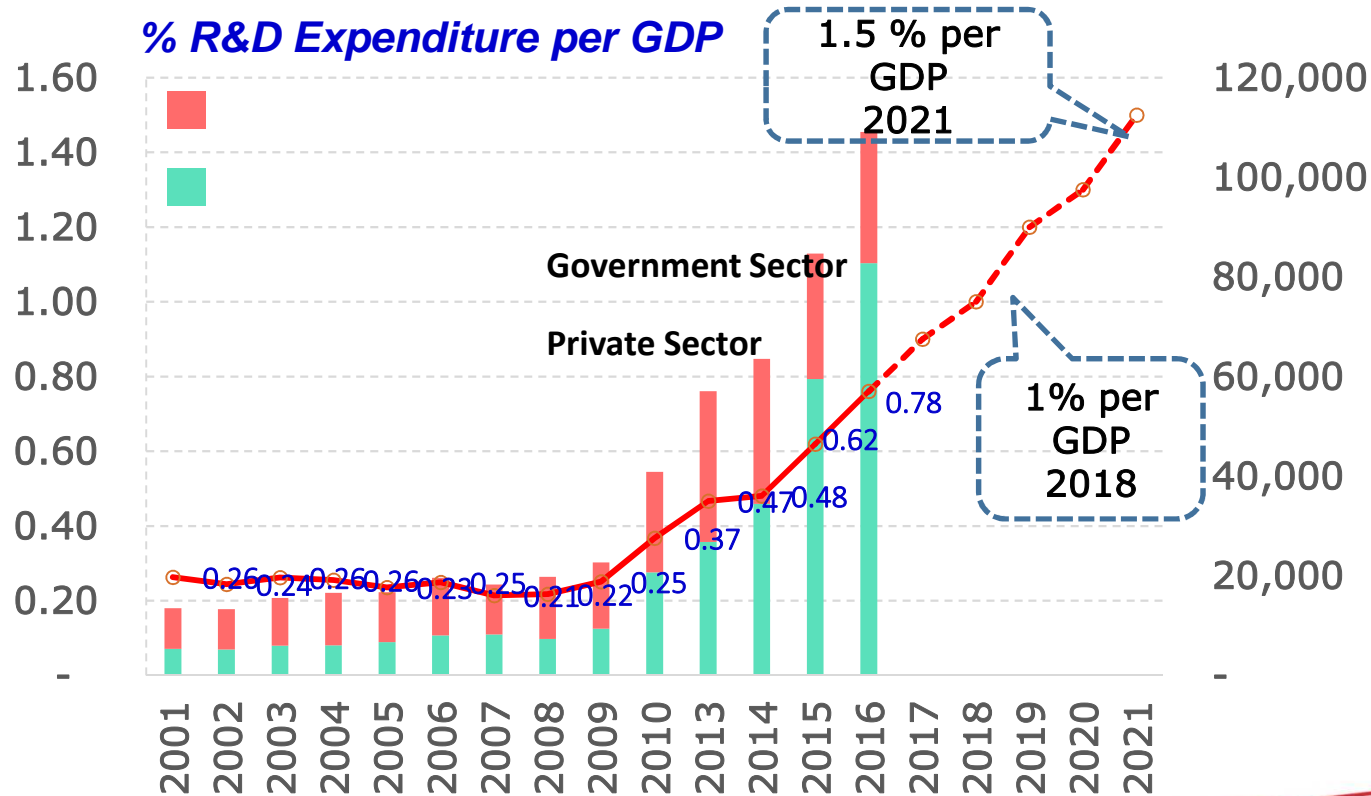
## Research and Development Expenditure (% of GDP)



Source: IMD 2017 and STI, 2018. Note: International data as of 2015 and Thailand data as of 2016.

# Thailand needs Much More Investment in R&D

## Targeted future R&D investments in the private and government sectors



- **BOI Privileges** for R&D and Innovation Investment
- **Competitiveness Fund**
- **Startup Ecosystem**
- **Economic Zone for Innovation**
  - Food Innopolis
  - Science Park
  - EECi
- **300% Tax Exempt** of R&D and Innovation Cost
- **Spearhead Innovate Thailand**
- **Ease of Doing Innovation Business**
  - Talent Mobility
  - Smart Visa

Note: Figures since 2560 are forecasted. Source: IMD 2017 and STI, 2018.

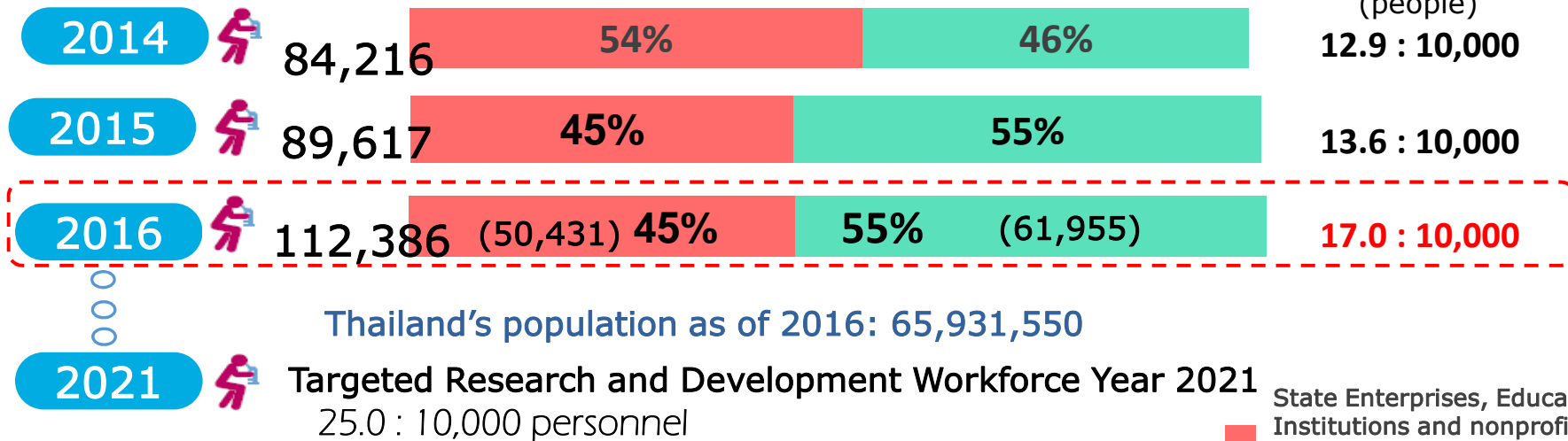


# Thailand needs More Researchers

## Increase in Research and Development Workforce



Number of  
Research and Development  
(FTE) personnel per capita  
(people)



State Enterprises, Educational Institutions and nonprofit organizations  
Private Sector











Source: STI, 2018.

Number of research and development personnel in the private sector provided by STI. Number of research and development personnel in government sector, higher education, state enterprises, non-profit organizations provided by the National Research Council of Thailand. Population of Thailand as of 2016 from Department of Provincial Administration Ministry of Interior





## Goal: Increasing Researchers to serve S-Curve Industries

Target Industries	Personnel requirements Science and Technology ( person per 5 years)			First S-Curve	New S-Curve
	Bachelor	Master	Ph.D.		
<b>1. Automotive</b>	<b>10,339</b>	<b>809</b>	<b>85</b>	Automobile for the future 	Robotics & Automation 
1.1 Automobile and Transport equipment manufacturing	9,770	770	85		
1.2 Automobile for the future	569	39	-	Smart electronics 	Aviation & Logistics 
<b>2. Electronics</b>	<b>13,047</b>	<b>2,002</b>	<b>485</b>		
2.1 Computer, Electrical and Electronic Manufacturing	9,845	980	415	High value tourism & services 	Digital 
2.2 Smart electronic	3,202	1,022	70		
<b>3. High value truism &amp; service</b>	<b>5,962</b>	<b>513</b>	<b>202</b>	Agro & Bio Tech Industry 	Bio-based Energy & Chemicals 
4. Agroindustry	12,114	424	138		
4.1 Agriculture, Forestry and Fisheries	8,970	275	30	Food for the Future 	Medical & Health Industry 
4.2 Agro & Biotechnology	3,144	147	108		
<b>5. Food</b>	<b>14,945</b>	<b>1,085</b>	<b>112</b>		
5.1 Food & beverage manufacturing	8,660	455	50		
5.2 Food for the future	6,285	630	62		
<b>Total</b>	<b>56,407</b>	<b>4,833</b>	<b>1,022</b>		

ที่มา: TDRI (๒๕๕๙) รายงานฉบับสมบูรณ์ โครงการการประมาณการและปฏิรูปกลไกการบริหารจัดการกำลังคนในสาขาวิทยาศาสตร์ เทคโนโลยี และนวัตกรรมของประเทศไทย เสนอ สวทช.

# 20 year Research and Innovation Strategy

## Spearhead Research & Innovation Program (2017-2036)

### Research and Innovation Budget Plan 20 year Research and Innovation Strategy

Strategy 1

Research and  
Innovation for  
Economic Stability

Strategy 2

Research and  
Innovation for Social  
and Environmental  
Development

Strategy 3

Research and Innovation  
for the Creation of Basic  
Knowledge

Strategy 4

Development of  
Research and Innovation  
Eco-system

Integration of Strategic Program for the Promotion of  
Research and Innovation

Spearhead Research and Innovation

# Innovation Index 2018

## Bloomberg 2018 Innovation Index

2018 rank	2017 rank	YoY change	Economy	Total score	R&D intensity	Manufacturing value-added	Productivity	High-tech density	Tertiary efficiency	Researcher concentration	Patent activity
1	1	0	S. Korea	<b>89.28</b>	2	2	21	4	3	4	1
2	2	0	Sweden	<b>84.70</b>	4	11	5	7	18	5	8
3	6	+3	Singapore	<b>83.05</b>	15	5	12	21	1	7	12
4	3	-1	Germany	<b>82.53</b>	9	4	17	3	28	19	7
5	4	-1	Switzerland	<b>82.34</b>	7	7	8	9	11	17	17
6	7	+1	Japan	<b>81.91</b>	3	6	24	8	34	10	3
7	5	-2	Finland	<b>81.46</b>	8	16	10	13	19	6	4
8	8	0	Denmark	<b>81.28</b>	6	15	11	15	26	2	10
9	11	+2	France	<b>80.75</b>	12	35	14	2	10	21	9
10	10	0	Israel	<b>80.64</b>	1	27	9	5	41	1	19
11	9	-2	U.S.	<b>80.42</b>	10	23	6	1	42	20	2
12	12	0	Austria	<b>79.12</b>	5	8	15	26	12	12	5
13	16	+3	Ireland	<b>77.87</b>	22	1	1	18	20	14	33
14	13	-1	Belgium	<b>77.12</b>	11	22	13	10	37	13	21
15	14	-1	Norway	<b>76.76</b>	19	37	19	11	23	8	14
16	15	-1	Netherlands	<b>75.09</b>	17	26	20	6	47	15	18
17	17	0	U.K.	<b>74.54</b>	20	40	23	14	8	18	15
18	18	0	Australia	<b>74.35</b>	14	46	16	17	17	3	20

Source: <https://www.bloomberg.com/news/articles/2018-01-22/south-korea-tops-global-innovation-ranking-again-as-u-s-falls>



## Innovation Index 2018

2018 rank	2017 rank	YoY change	Economy	Total score	R&D intensity	Manufacturing value-added	High-tech Productivity	Tertiary density	Researcher efficiency	Patent concentration	activity
19	21	+2	China	73.36	16	19	40	12	4	42	6
20	24	+4	Italy	68.88	25	20	22	20	32	36	23
21	22	+1	Poland	68.74	35	13	37	16	14	34	24
22	20	-2	Canada	67.98	21	32	26	23	45	16	22
23	19	-4	New Zealand	67.40	31	36	18	25	43	22	11
24	25	+1	Iceland	67.11	13	28	2	-	27	9	26
25	26	+1	Russia	66.61	32	33	44	22	5	28	16
26	23	-3	Malaysia	64.79	26	17	36	24	36	33	34
27	27	0	Hungary	64.37	24	10	42	18	48	32	35
28	28	0	Czech Rep.	63.47	18	3	25	-	33	24	28
29	29	0	Spain	63.06	29	25	27	36	6	31	31
30	31	+1	Portugal	61.38	28	31	32	42	7	23	37
31	30	-1	Greece	61.37	36	45	34	28	15	26	39
32	34	+2	Luxembourg	60.65	27	38	3	-	50	11	13
33	37	+4	Turkey	60.26	34	21	30	34	13	43	30
34	32	-2	Lithuania	59.04	33	14	33	-	9	29	43
35	38	+3	Romania	58.94	48	12	31	27	24	47	38
36	33	-3	Estonia	58.76	23	24	29	-	22	27	42
37	35	-2	Hong Kong	57.05	41	50	4	29	31	25	29
38	36	-2	Slovakia	56.88	30	8	35	-	39	30	45
39	40	+1	Malta	54.27	40	43	7	37	29	38	47
40	39	-1	Latvia	53.65	46	39	28	40	30	39	32
41	NR	-	Bulgaria	51.54	37	34	41	39	38	37	48

Source: <https://www.bloomberg.com/news/articles/2018-01-22/south-korea-tops-global-innovation-ranking-again-as-u-s-falls>



## Innovation Index 2018

2018 rank	2017 rank	YoY change	Economy	Total score	R&D intensity	Manufacturing value-added	Productivity	High-tech density	Tertiary efficiency	Researcher concentration	Patent activity
42	41	-1	Croatia	51.24	39	30	39	44	35	41	41
43	45	+2	Tunisia	49.83	44	41	46	41	16	40	44
44	43	-1	Serbia	48.93	38	29	47	43	44	35	46
45	44	-1	Thailand	47.83	45	18	45	31	25	48	-
46	42	-4	Ukraine	47.28	47	48	50	32	21	46	27
47	47	0	Cyprus	47.01	49	49	38	30	40	45	40
48	-	-	S. Africa	46.98	42	47	43	35	49	50	25
49	-	-	Iran	46.09	50	42	49	38	2	49	36
50	50	0	Morocco	44.84	43	44	48	33	46	44	49

Source: <https://www.bloomberg.com/news/articles/2018-01-22/south-korea-tops-global-innovation-ranking-again-as-u-s-falls>



# Innovation Ecosystems for the Future

create innovation with speed, quality and affordability



Eastern Economic Corridor  
Innovation (EECI)  
New growth hubs to drive innovation

Open Innovation

Gateway to connect & innovate

R&D Consortium

Select right target for driving RD to commercialization

Technology Startup

Support and encourage startup growth ecosystem

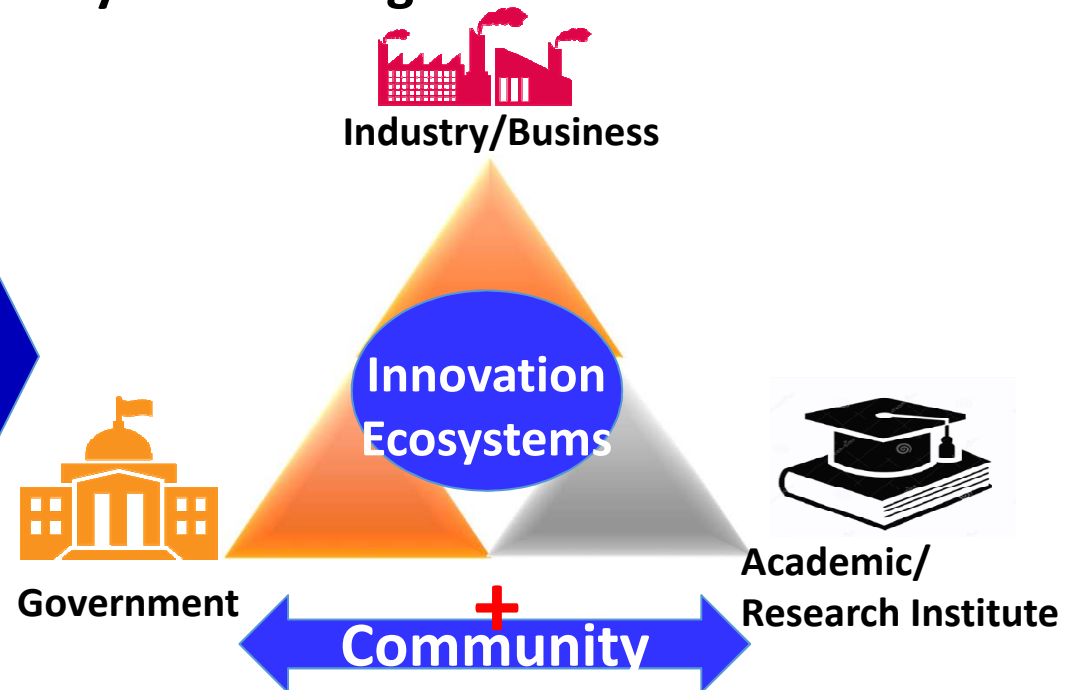
# Eastern Economic Corridor Innovation(EECI)

A comprehensive innovation ecosystem through research and innovation

## Eastern Economic Corridor Area



*The government is developing **new growth hubs** by starting with the **Eastern Economic Corridor (EEC)***



Source: Ministry of Science and Technology, Ministry of Industry

# Open Innovation

Create ecosystem to speed up the innovation



- ### Benefit
- Access to know-how & new ideas
  - Becoming 'the partner of choice'
  - Faster time to market
  - Increase revenues



# SCG Open Innovation Center: Gateway to Connect and Innovate



Open since July  
2017



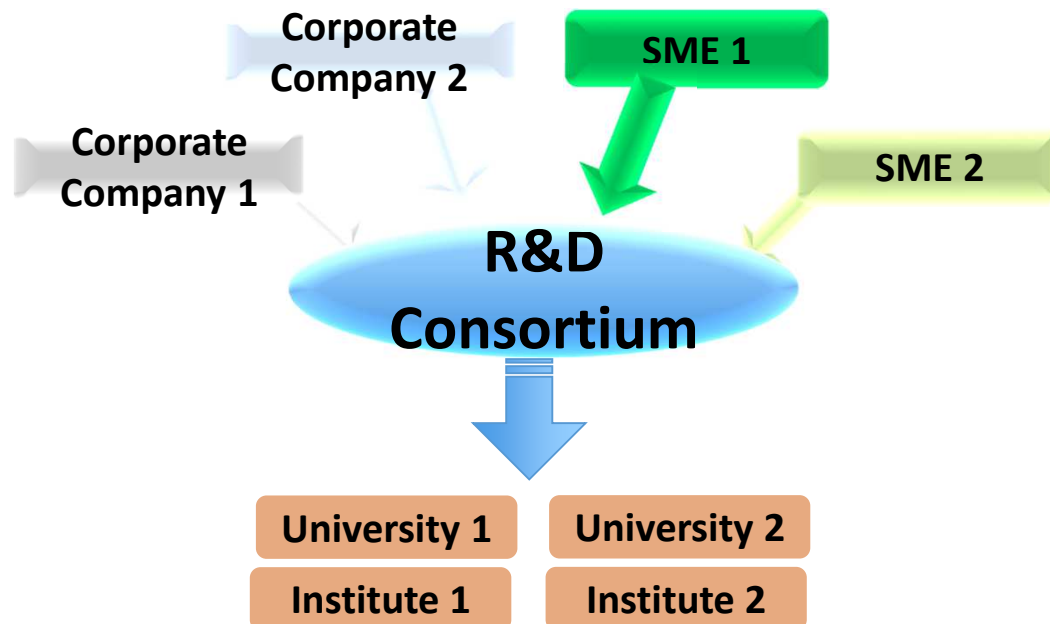
- **Exhibition area** to inspire partners (Example of 50 innovative projects)
- **Lab facilities** for ideas demonstration
- **Meeting facilities** to connect the world
- **Technology Bridging Platform** to exchange idea and technology

Contact: [openinnovation@scg.com](mailto:openinnovation@scg.com)

Thailand Science Park, INC 2, Tower D,  
FL 9

## R&D Consortium

will lift up the whole value chain competitiveness



### Objectives:

- Industrial collaboration to initiate new research from actual demands
- Universities and Research Institutes deliver solutions

### Benefits:

- Rapid access to new technologies
- R & D commercialization
- Uplift of whole value chain

Source: Public-Private Collaborative Committee on Innovation and Digitalization (D1)

## Example of R&D Consortium: Food Innopolis

### Global food innovation hub focusing on innovation for food industry



**Food production**      **Agriculture & livestock**

- Seed
- Breeding technology
- Precision farming
- Organic farming
- LCA/carbon/water footprint

- Non-thermal process
- Robotic & automation
- IoT
- Food structure modification
- Sensory evaluation
- Packaging & preservation

**Food quality & manufacturing**



**Food ingredient & additive**

- Production of ingredient
- Nutrition
- Health claim
- Encapsulation & delivery system

**Food chain management**

- Logistics
- Standard compliance
- Inventory mgt.
- Big data analytics
- IoT

**Food safety**

- Testing & diagnostic
- Sensors
- Traceability
- Toxicology
- Regulation & international standard



Source: <http://foodinnopolis.or.th/en/home/>  
National Science Technology and Innovation Policy Office





# Startup Thailand

A national startup promotion platform to support and encourage **startup growth ecosystem**

## Awareness



## Networking

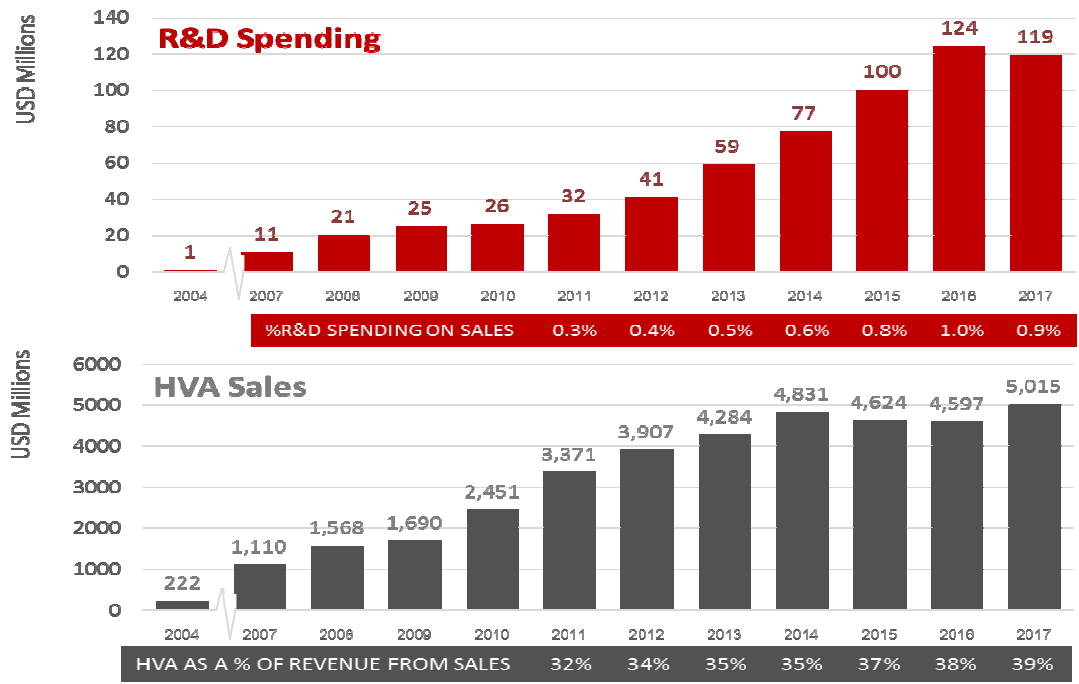


## Startup Thailand's 9 Startup Sectors

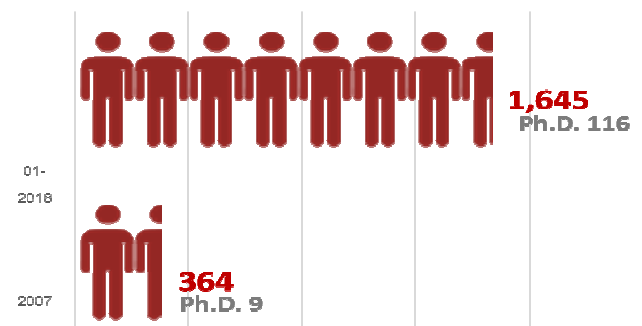


Source: [startupthailand.org/wp-content/uploads/2017/04/BOOKLET01.pdf](http://startupthailand.org/wp-content/uploads/2017/04/BOOKLET01.pdf)

# SCG Focuses R&D And HVA Products/Services



## R&D and Product Design Team



\*Includes recent acquisition of Norner Group (Norway): 50 R&D staffs (10 Ph.D.)

# SCG Collaborative Network for Innovation



**Collaborative Project: 589**  
 (18% of total projects, 44% of total expenses)

**Domestic partner: 390**  
**International partner: 199**

- Calera Corporation
- Econotech
- Envergent Technologies LLC
- Exxon
- GATECH
- IPST
- Miliken
- National Inst. of standard & tech.
- Paper Consultants International
- NJIT
- PSU
- Stony Brook U.
- The Florida State U.
- U. Of California, Berkeley
- U. of Waterloo
- Western Michigan U.

**DATACHEM**  
 Fibria Celulose

- Arkema
- Certech
- Dini Engineering
- EMPA, Swiss Federal Laboratories for Materials Science and Technology
- Federico II University of Naples
- Humburg Innovation GmbH
- Imperial College
- Inventia AB
- Martin Luther U.
- More research
- Norner Inno.
- OXFORD
- Plaxica Limited
- Polymer Insitute Brno,
- Technique University of DAMSTADT
- Technical University of Munich
- University of Leeds

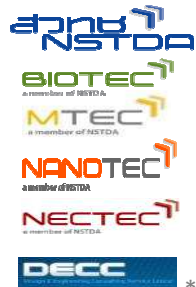
- Beijing University of Chemical Tech.
- MCN Material Technologies
- Tianjin U.
- Zhejiang U.

- HiBot
- JAIST
- Kyoto U.
- Osaka U.
- Tohoku U.
- Tokyo Tech.

**Forest Prod. R&D**  
 Institute, Department of Science & Tech.

**A\*star**

**Monash U.**



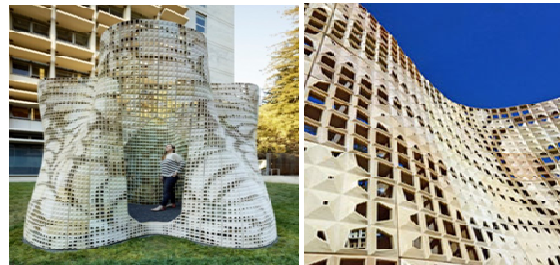
\*Data from R&D report 2012-2016

## Collaborative Research with Leading Universities

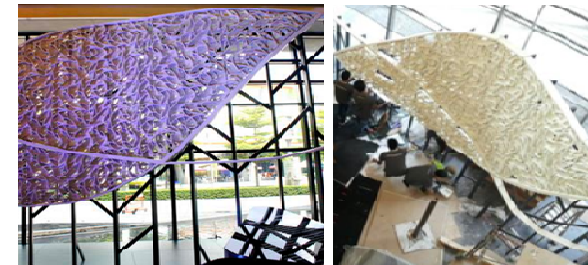


3-D printing  
technology using  
cement polymer

### **BLOOM** *The room for living*



### **COROLLA** 3D Breathable Facade



### SCG-University of Oxford Centre of Excellence

**24** patents  
Nano Materials  
& Catalysis

**12%** of all  
Oxford's IP  
was originated

**40** publications  
in leading  
international  
journals





# Thank You

