World Science Forum, Rio de Janeiro, Brazil, 25 November 2013

Prof. Jung, Sang-Chul Ph.D.
President,
Chungnam National University, Rep. of Korea
email : scjung@cnu.ac.kr

Prof. Oh, Deog-Seong Ph.D.
Secretary General, World Technopolis Association (WTA)
Vice President, Chungnam National University, Rep. of Korea
email : ds_oh@cnu.ac.kr

Universities and Regional Innovation Cluster
: R&BD and Innovation Ecosystem



copyright ⓒ 2013 by Prof. Deog-Seong, Oh

1 Introduction



"**Universities** are always a major **magnet** for talent – and the world's **most dynamic companies** always gravitate to places where they can find the **best and the brightest**"

- Michael R. Bloomberg, Mayor of New York City -

- **The "Applied Science NYC"** :
  - ✓ about **280 faculty members** and **2,500 students** in master's and doctoral programs.
  - ✓ two times of total master and doctoral students in New York City than now
  - ✓ about **60 thousand of venture companies** in new industries formed based on R&D and innovation activities of high-quality humanware.



copyright ⓒ 2013 by Prof. Deog-Seong, Oh

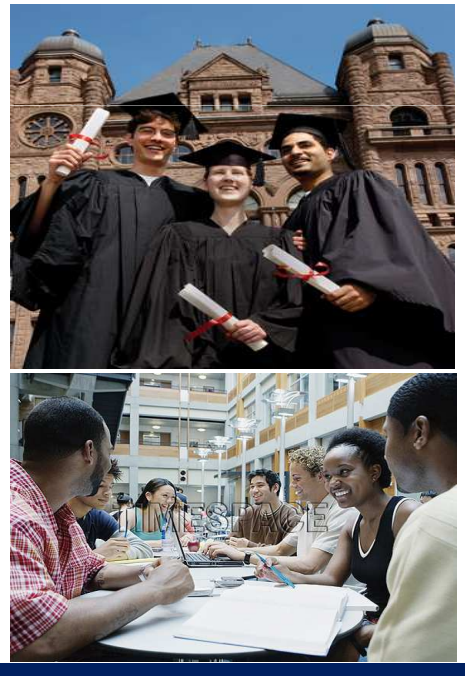
1

Sources of Innovation

Universities and research institutes *are important contributors in innovation networks.*

- ✓ Austin, Texas - Univ. of Texas etc.
- ✓ Research Triangle Park - Univ. of North Carolina, Duke Univ., North Carolina State Univ.
- ✓ Silicon Valley - Stanford Univ., UC Berkeley etc.
- ✓ Singapore - National Univ. of Singapore etc.
- ✓ Hsinchu, Taiwan - Chung Hua Univ., National Chiao Tung Univ.
- ✓ Dortmund, Germany - Dortmund University of Technology etc.
- ✓ Daedeok, Korea – KAIST, Chungnam National Univ. etc.

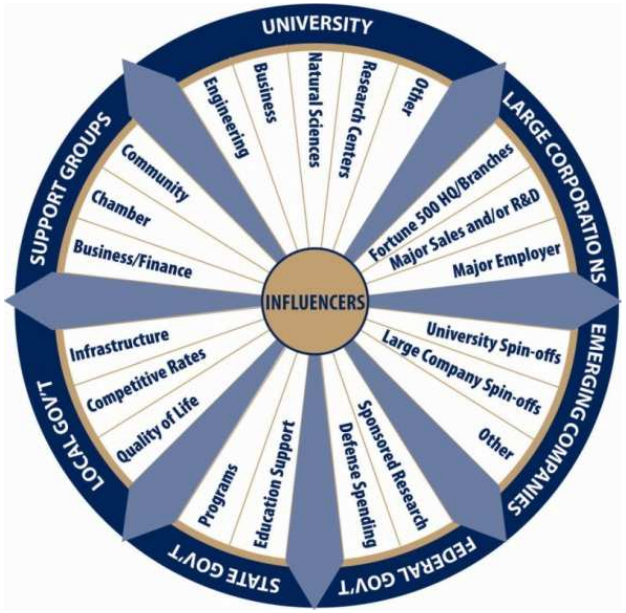
Classification / HEIs type	Role & Function				Activities	
	Education of research procedures	Providing human resources capable of research	Providing specially trained human resources	Re-training	Basic R&D	Applied R&D
University & Graduate school	●	○	●		●	●
Research oriented University & Graduate school	●	●		○	●	●
Graduate school of specific purpose		○	○	●		●
University of Technology	○		●			●



copyright ⓒ 2013 by Prof. Deog-Seong, Oh

2 Concept

- Integrated approach : RIS / Technopolis development wheel



1. University

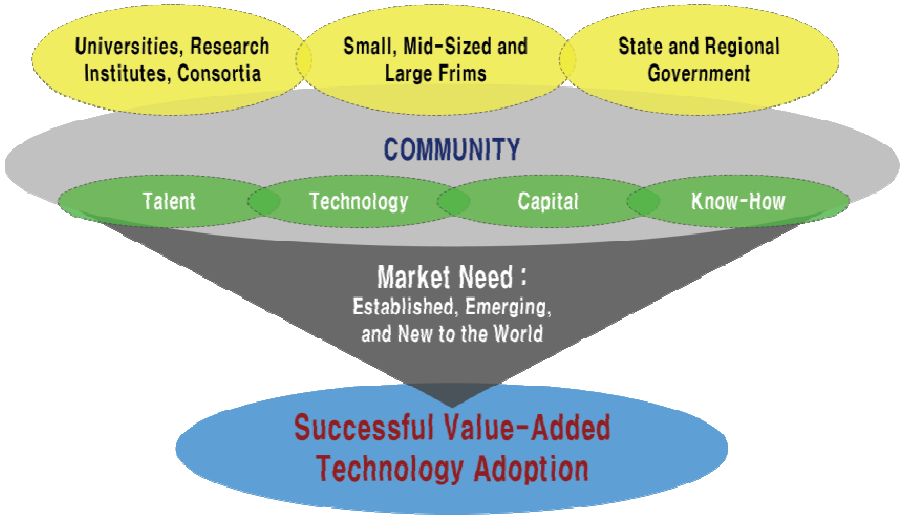
2. Large Corporations

3. Emerging Companies

4. Federal / State / Local Government

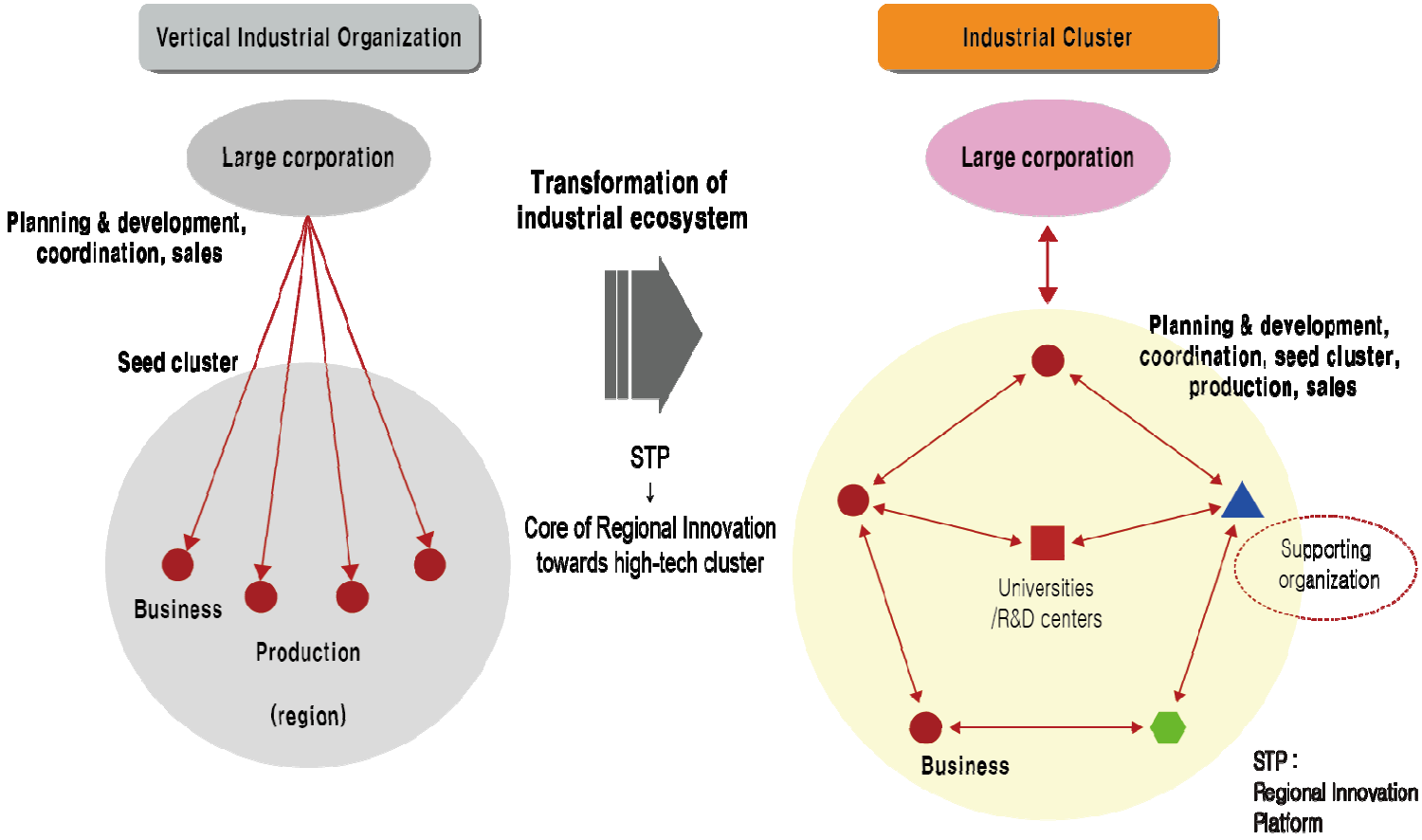
5. Support Groups

- Knowledge / technology transfer & application at the regional level

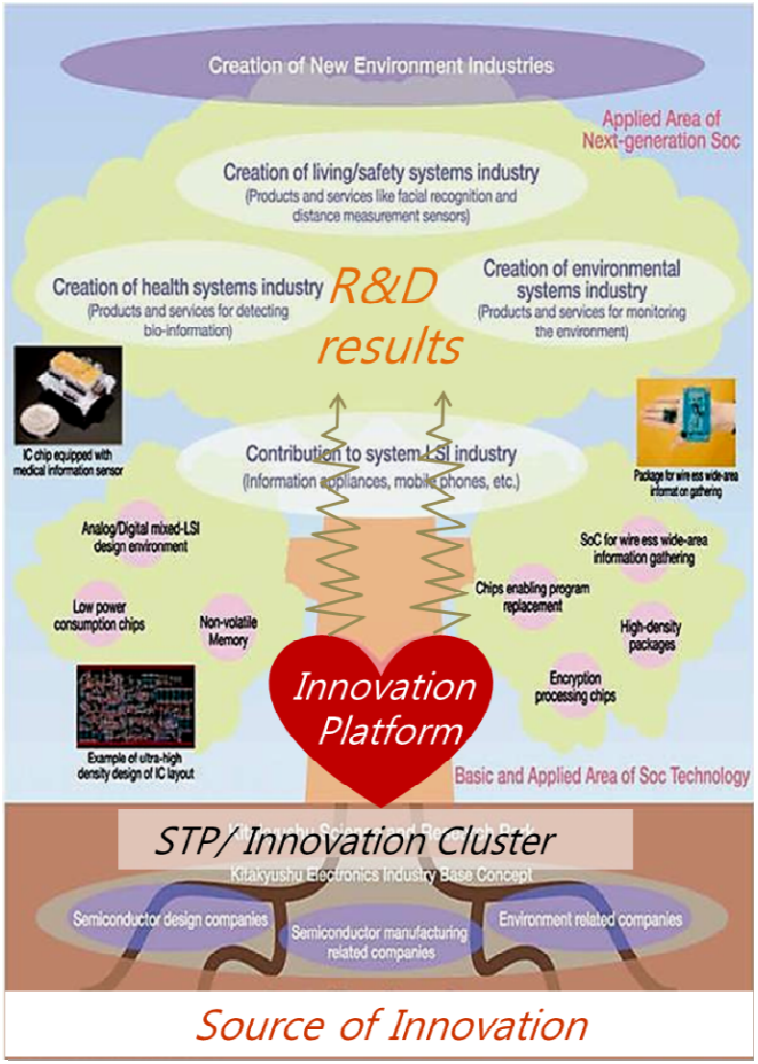


copyright © 2013 by Prof. Deog-Seong, Oh

Innovation Ecosystem



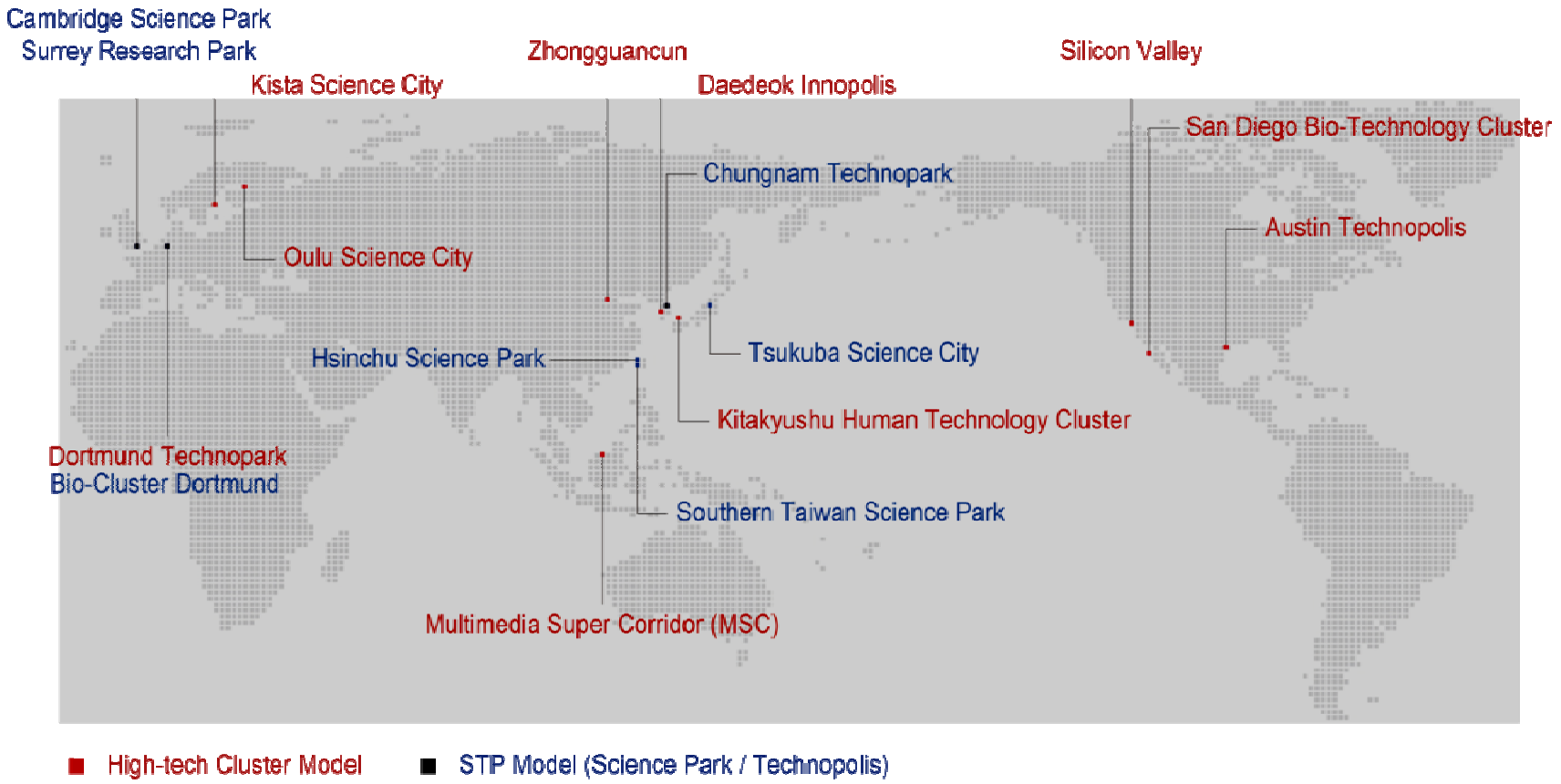
copyright ⓒ 2013 by Prof. Deog-Seong, Oh



HEI's & Innovation

copyright ⓒ 2013 by Prof. Deog-Seong, Oh

Innovation Policies and HEI's



copyright © 2013 by Prof. Deog-Seong, Oh

3

Evaluation

Critical Elements	Functional Components	Regional Innovation Cluster (Science Park / Technopolis)				
		a	b	c	d	e
R&D	HEI	●	●	○	○	○
	Public R&D / Private R&D	●	●	○	●	○
	Collaboration	●	●	○	○	○
Business Development	Technology Transfer	●	●	○	○	○
	Technology Commercialization	●	○	○	○	●
	Business Incubation	●	●	○	○	○
Innovation Ecosystem	Entrepreneurship Development	●	●	○	○	●
	Networking	●	●	●	●	●
	Support Activities : Capacity Building / Financial Aid	○	○	●	●	●

Note - Very Positive : ●, Positive : ○

a : Dortmund Technology Park(Germany)

b : Surrey Research Park(UK)

c : Chungnam Technopark(Korea)

d : Southern Tiwan Science Park (Taiwan)

e : Kitakyushu Human Technology Park(Japan)

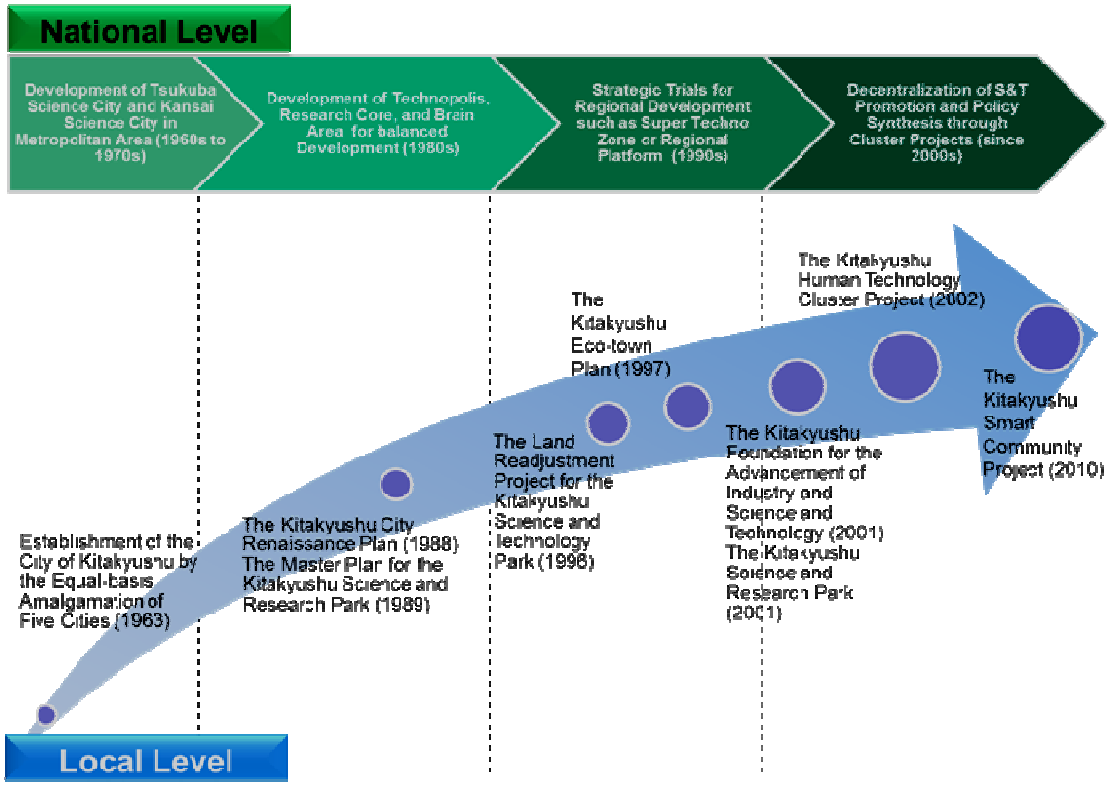
copyright ⓒ 2013 by Prof. Deog-Seong, Oh

3

RIC

HEI & Sustainable growth

- **Universities** – pioneers
- **Public sector** – early partners: Government, public R&D
- **Private sector** – slow followers: firms, private R&D

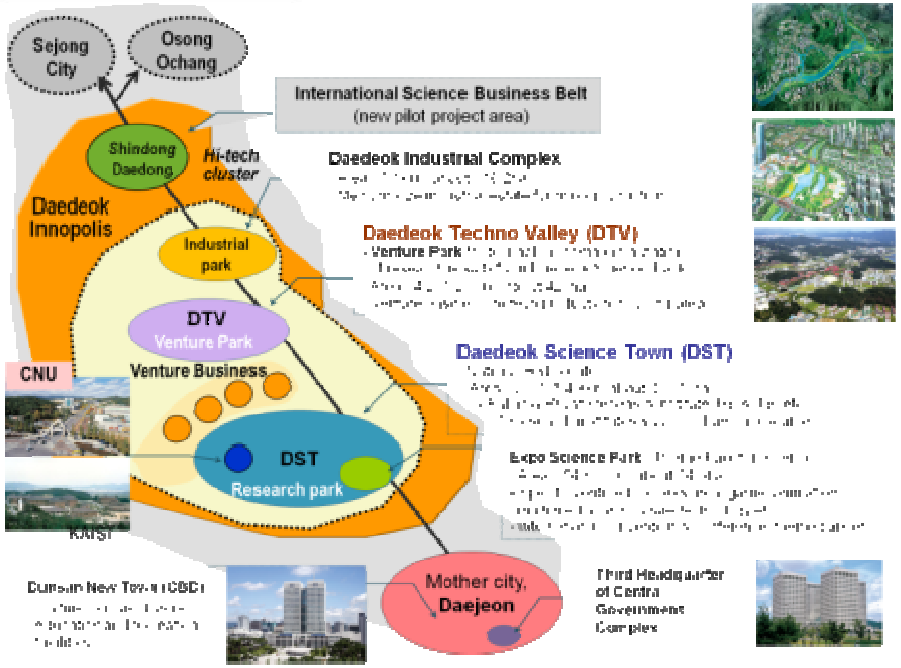


copyright ⓒ 2013 by Prof. Deog-Seong, Oh

4 Daedeok Innopolis(+KAIST, CNU), Korea

- Daedeok Innopolis in Daejeon Metropolitan City
  - ✓ Sustainable development from STP to Innovation Cluster
    - Agglomeration of hi-tech industries, HEIs and R&D centers
    - Stakeholders in the regional innovation system promoting their clustering and networked entrepreneurship.
  - ✓ Venture Ecosystem
    - a magnet for innovative businesses including hi-tech, green business and technology convergence.
  - ✓ Global leader in National & Regional innovation
    - Successful RIS/ NIS building
    - integrated support system for domestic and global businesses
    - Capacity building programs in the global context (WTA & UNESCO)
  - ✓ Soft infrastructure to guarantee the Quality of life





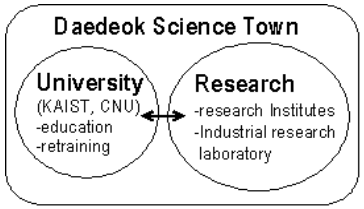
copyright ⓒ 2013 by Prof. Deog-Seong, Oh

Stages of Development (Daedeok Innopolis)

- **1st stage** : 1972 – 1999

  Science Town(Public R&D and HEI's)

  - ✓ Daedeok Science Town (1972 ~1999)
  - ✓ Daejeon Industrial Park (1971~1999)

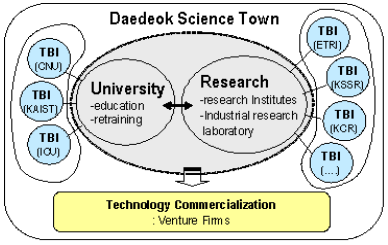


DST (1973-1992)

- **2nd stage** : 2000 – 2005

  Expansion of the SP& promote hi-tech industries

  - ✓ Daedeok Valley (National R&D Special Zone, 2000~2005)
  - ✓ Daedeok Techno Valley (Hi-tech Industrial Park, 2005)
  - ✓ Daejeon Techno Park (2002)



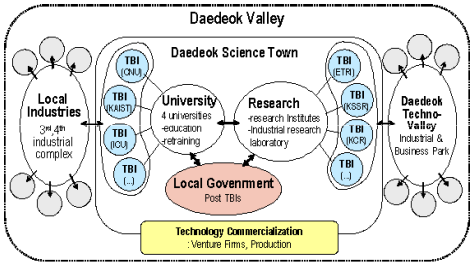
Expansion of DST (1993-1999)

- **3rd stage** : 2006 –

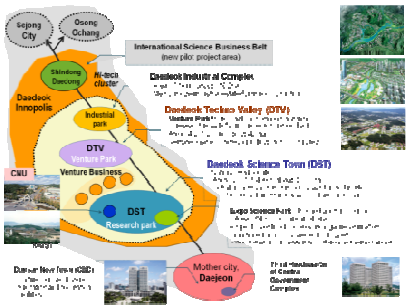
  (High-tech innovation cluster)

  Promoting R&BD(Technology Converence) in the creative economy

  - ✓ Daedeok Innopolis (Hi-tech Cluster; IT,BT,NT etc., 2006~)
  - ✓ International Science Business belt project (2012~)
  - ✓ Business Park for Academia-Industry collaboration (Daedong, planned)
  - ✓ Urban conurbation(Daedeok+Sejong City+Osong City)



Daedeok Valley (2000-2004)



Daedeok Innopolis (2006-)

copyright ⓒ 2013 by Prof. Deog-Seong, Oh

4

Analysis of R&BD Activities in accordance with development stage

Main Function	Components	Stage of Development		
		Initial Stage	Development Stage	Mature Stage
R&D	HEI	○	●	●
	Public R&D / Private R&D	○	●	●
	Collaboration	-	○	●
Business Development	Technology Transfer	○	○	●
	Technology Commercialization	-	○	●
	Business Incubation	○	●	●
Innovation Ecosystem	Entrepreneurship Development	-	○	●
	Networking	-	○	●
	Support Activities : Capacity Building / Financial Aid	-	○	●

Note : Development

● : active

○ : weak

- : none

copyright ⓒ 2013 by Prof. Deog-Seong, Oh

4

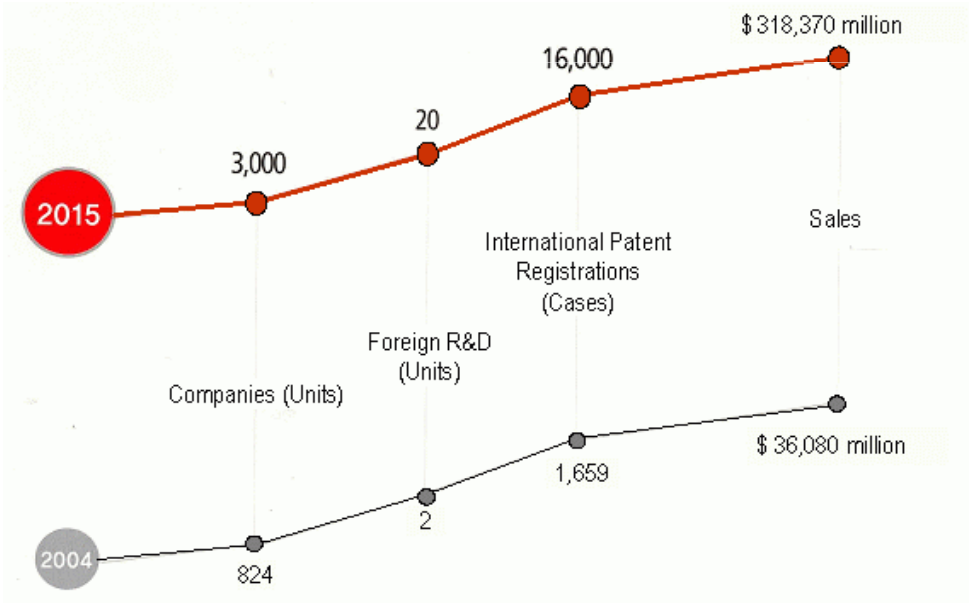
Analysis: R&BD 3.0 Structure in Daedeok Innopolis

Function	Main Features	Key Role
R&D	• Active Collaborative research programs among industries, HEIs, and research institutes • Enhancing local R&BD support capacity(Driving force: public R&D centers, KAIST).	Collaboration among firms, HEIs, and research institutes Strong support of public sector
Business Development	• Business incubation were promoted by with technology commercialization and sound entrepreneurship. • Sustainable growth of high-tech venture firm are supported by local governments.	Various business incubation centers established by HEI's, R&D center ets. (Pre-BI to Past-BI)
Innovation Ecosystem	• The collaborative network among HEIs, research institutes and industries is enhanced for creative development for creative development of high-tech business. • Integrated programs to dupport R&BD professionals	Soft business infrastructure

copyright ⓒ 2013 by Prof. Deog-Seong, Oh

Regional Economic growth

- Economic impacts rapidly growing venture business.
  - ✓ From the late 1990s, active spin-offs and start-ups had spread into whole of Daejeon area, and currently **1,306 companies** are under operations(Dec.2011) → spin out from HEI's / R&D centers
- Over the last 10 years, venture firms have made outstanding growth.
  - ✓ business growth from 250 (1999) to 1,006 firms (2009) -> 1,306(2011)



copyright © 2013 by Prof. Deog-Seong, Oh

5 Conclusion

- The creative model of Regional Innovation Cluster(STP/ Technopolis) should be integrated with R&D capabilities based on local HEI's and research institutes.
- The main issue on the sustainable growth of RIC is how to develop the innovation ecosystem consisted of R&D, business and networked entrepreneurship.
- The main activities of R&BD in Regional Innovation Cluster include 3 major functions :
  - ✓ **HEI's and R&D** : the research projects by HEIs, public and private research institutes individually
  - ✓ **Business development** : technology transfer and commercialization with business incubation
  - ✓ **Innovation ecosystem** : networking between HEIs, research institutes and industries, development of entrepreneurship and support activities of capacity building.
- **Three development phases**(HEI & Regional Innovation) **are identified in a global context.**
  - ✓ **Science & Technology Park** at initial stage
  - ✓ **Technoplis** at middle stage
  - ✓ **Regional Innovation Cluster** at mature stage
- The collaboration network among HEIs, research institutes and industries could enhance the regional innovation capability in the sustainable context.

copyright ⓒ 2013 by Prof. Deog-Seong, Oh

Thank you.

copyright © 2013 by Prof. Deog-Seong, Oh