# Industrial Cluster Policies of the Korean Government in the 2000s: Retrospect and Prospect

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Anshan
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Dandong
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P'yŏngyang
Dalian
Tangshan
BEIJING
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Shijiazhuang
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Datong
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Yanji
Mudanjiang
Jixi
Jiamusi
Hegang
Yichun
Daqing
Songhua Hu
Nen Jiang
Sungari
Liao He
Hun He
Da Hinggan Ling
Sikhote Alin
Menangiyn Plain
Plateau
Inner Mongol
Nei Mongol
SEA OF JAPAN
YELLOW SEA
EAST CHINA SEA
PACIFIC OCEAN
Bo Hai
Gulf of Liaodong
Korea Bay

**South Korea**

Pop: 48 Million

GNP: $16,000

Land: 99,000Km$^2$

# Economic and Industrial Growth

**1945 : Liberated from Japan**

**1948 : New government**

**1950 – 1953: Korean War**

**1962 – 1996: Economic Development Plans**

**1972 – 2020: Comprehensive Land Development Plans**

# The Success

**1960s**

**1970s**

**1980s**

**1990s**

**2000s**

# Resulting Problems

**1. Widening Regional Gaps**

- **between the Capital and the Rest**
- **between the East and West**
- **between Urban and Rural**
- **between old core and new areas within cities**

**2. Widening Social and Economic Gaps**

**3. Environmental Pollution**

**4. The Lack of Social Infrastructure**

# Past Approaches to the Problems

**Rural Development: New Community Movement**

**Growth Control in Seoul**

**Construction of Industrial Estates Mainly in the South**

**Coordinated Development by Spatial Planning: CNLDPs**

**Decentralization**

# New Approaches in the 2000s

**Regional Innovation Policies**

**Industrial Cluster Strategies**

**New Administrative Capital**

**Innovative Cities and Enterprise Cities**

# RIS Programs by Ministries

| Ministry in Change | Projects | Main Actors | Beneficiaries |
|---|---|---|---|
| Ministry of Commerce Industry & Engergy | Techno-Park Project | Universities Governments | Universities Local Governments |
| | Regional Technology Innovation Center(TIC) | Universities | SMEs outside of Seoul |
| | New Technology Business Incubator Center (TBI) | Universities (29) | University Professor, Engineer, Research Staffs |
| | Growth Engine for the Next Generation | Companies, Local Governments | Companies |
| | Pilot RIS Project | Universities, Research Institutes Companies | Universities, Companies |
| | Regional Research Center (RRC) | Universities | Universities, Companies |



Source: Revised from Kwon and Hur (2000: 177).

# RIS Programs by Ministries

| Ministry in Change | Projects | Main Actors | Beneficiaries |
|---|---|---|---|
| Bureau of Small & Medium Enterprises | Business Incubator Assistance Project | Corporation of Promoting SMEs | Individuals |
| | Business Incubator Assistance Project | Corporation of Promoting SMEs Local Governments | Individuals |
| Ministry of Science & Technology | Science Research Center (SRC) | Universities(26) | University Professors and Students |
| | Engineering Research Center (ERC) | Universities (35) | University Professors and Students |
| | Center for High-Tech Commercialization | KAIST | University Professors and Students |
| | Center of New Technology Start-ups | KAIST | Individuals |

Source: Revised from Kwon and Hur (2000: 177).

# Daejeon: a Science City

**Pop: 1.5 Million**

**Land: 537 $Km^2$**

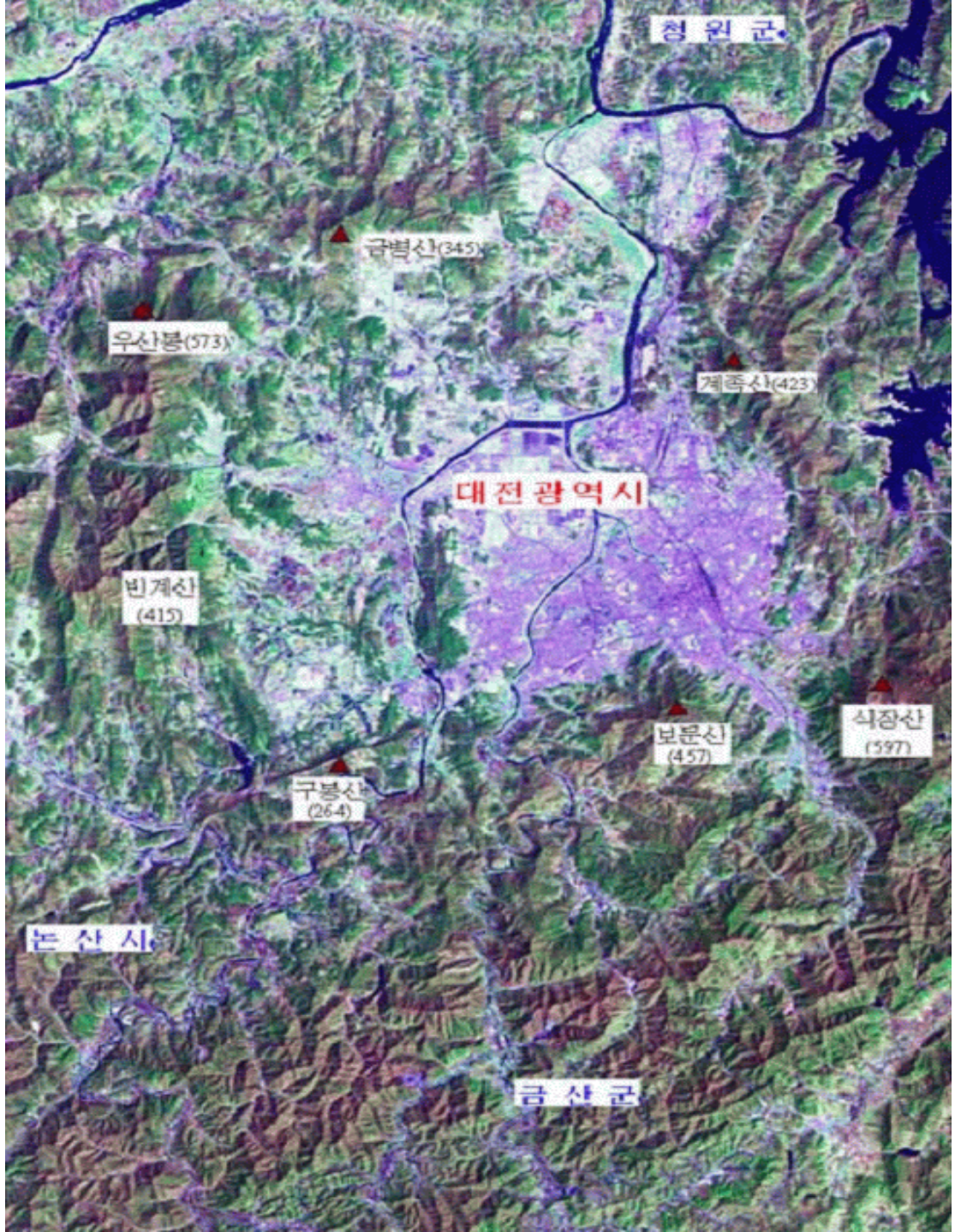
**Characteristics:**

- **Science City**
- **Transportation Hub**
- **Administrative Centre**
- **Educational Centre**
- **Regional Centre**

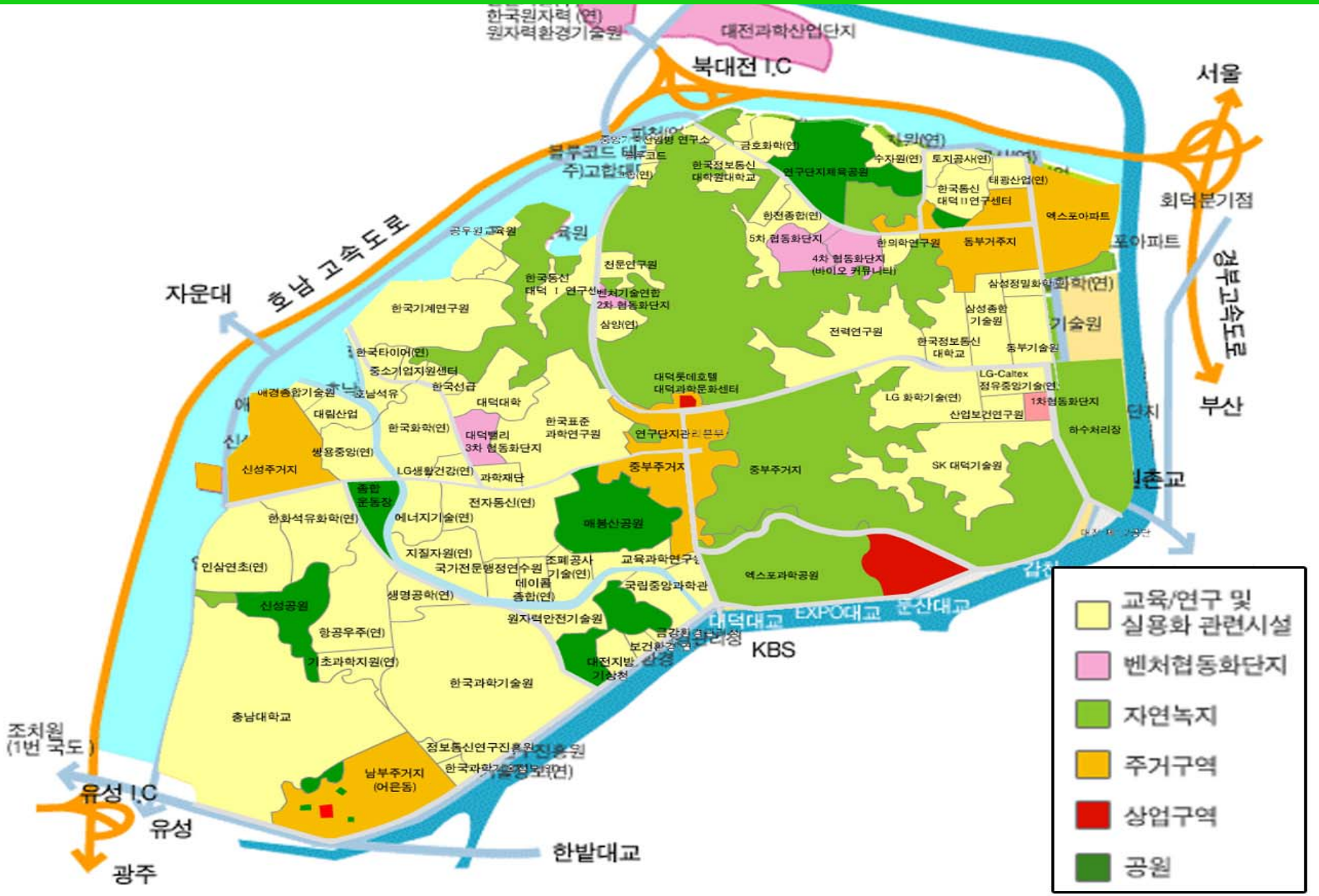
**Modern Economy: Science & Administration**

**Traditional Economy: Leather, Textiles**

**History: 1905 Railway Station**


청 원 군
금병산(345)
우산봉(573)
계족산(423)
대 전 광 역 시
빈계산
(415)
보문산
(457)
식장산
(597)
구봉산
(264)
논 산 시
금 산 군

# Daeduck Science Town



# Changes in the DST

| Time | Major Activities |
|---|---|
| 1973 | Area Designated (24.7 Km2) |
| 1974 | Master Plan (Ministry of Science & Technology) |
| 1974 | Construction Started |
| 1978 | Location of Research Institutes Began |
| 1983 | Daejeon Was Expanded to Include DST |
| 1992 | Land Development Completed |
| 2002 | Renamed as “Daeduck Valley” |
| 2004 | Renamed as “Special R&D District” |
| 2005 | Area Expanded, Governing Structure Changed |

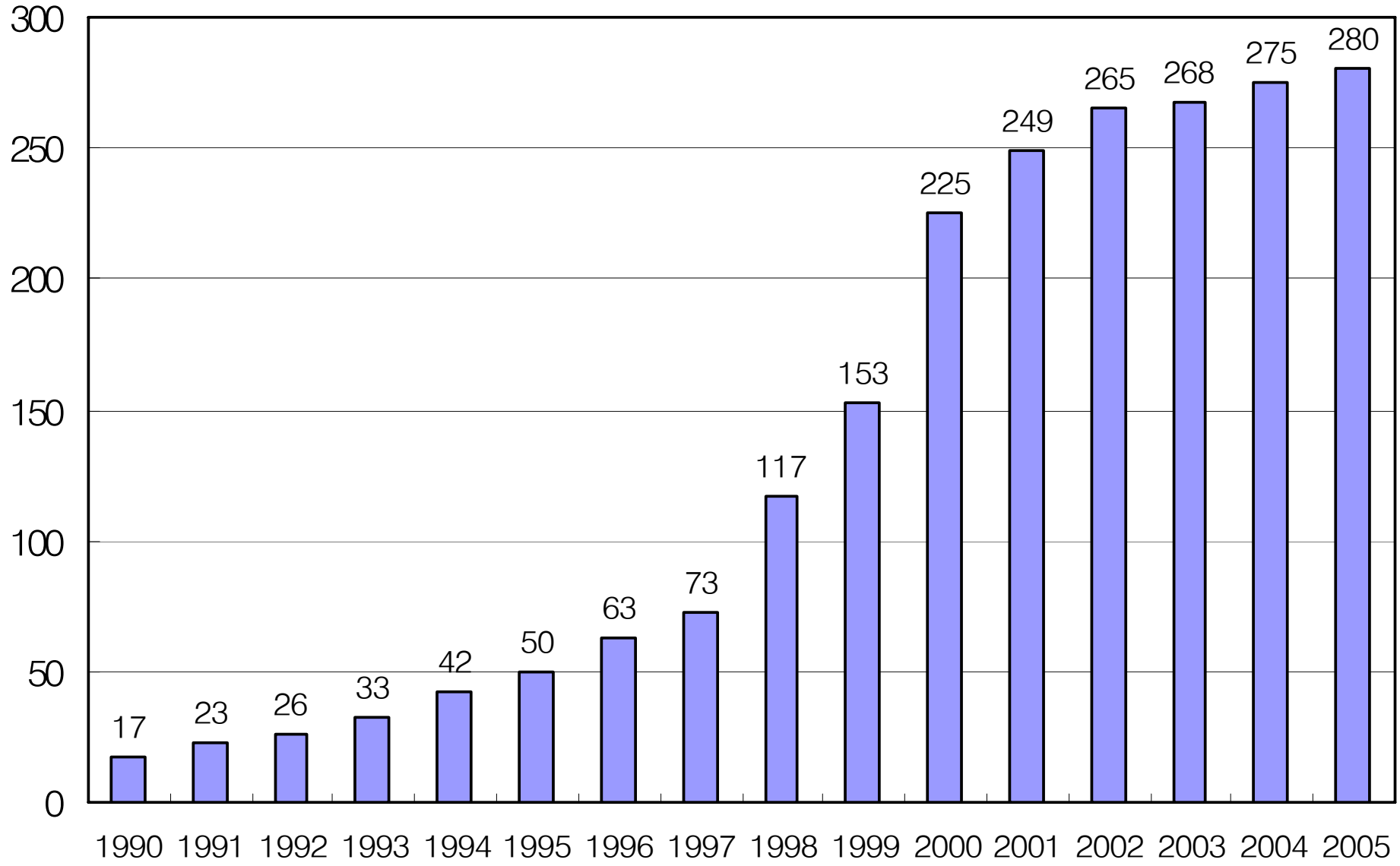
# Growth in the DST

| Year | 1979 | 1985 | 1990 | 1997 | 2002 | 2005 |
|---|---|---|---|---|---|---|
| Gvt. Institutions | 0 | 0 | 3 | 7 | 9 | 12 |
| Private Res. Ins. | 0 | 0 | 0 | 0 | 7 | 6 |
| Res. Institutions | 8 | 11 | 27 | 49 | 54 | 64 |
| - Gvt | 5 | 8 | 19 | 16 | 17 | 20 |
| - Private | 3 | 3 | 8 | 25 | 26 | 33 |
| - Semi-gvt | 0 | 0 | 0 | 8 | 11 | 11 |
| Universities | 1 | 2 | 3 | 3 | 4 | 6 |
| SMEs | 0 | 0 | na | na | 111 | 152 |
| Total | 9 | 13 | 33 | 59 | 185 | 239 |

# Growing Employees in the DSP

| Year | 1979 | 1985 | 1990 | 1997 | 2002 | 2005 |
|---|---|---|---|---|---|---|
| Gvt Institions | 0 | 0 | 244 | 420 | 426 | 726 |
| Private Comp. | 0 | 0 | 0 | 0 | 54 | 55 |
| Res. Institutions | 4,698 | 6,848 | 10,218 | 14,220 | 12,036 | 14171 |
| - Gvt | 3,879 | 6,129 | 6,920 | 7,473 | 6,277 | 7217 |
| - Private | 719 | 719 | 1,432 | 4,475 | 3,224 | 4399 |
| - Semi-gvt | 0 | 0 | 0 | 2,272 | 2,535 | 2555 |
| Universities | 1,146 | 1,257 | 2,084 | 2,423 | 2,385 | 2,707 |
| SMEs | na | na | na | na | 1,919 | 3097 |
| Total | 5744 | 8105 | 10,680 | 17,063 | 16,820 | 20756 |

# Spin-offs form the ETRI



ZEROtherm
VGA COOLER
ZX810

PACK Inc.

SOLAPACK

HANOOL
ROBOTICS
주)한울로보틱스

KIA

InBioNET
InBioNET

Commercial Biotechnology Innovator
Business Portfolio
Animal Healthcare Products
Bioenvironmental Products
Bioagricultural Products
Biopharmaceuticals
Pharmaceuticals
Biotechnology Network

Insect Biotech

ASTEL

XL PHOTONICS
IDIS

아이티

ASTEL

# Problems of the DST

**Unclear Role Definition**

- **Public vs Private**
- **R vs D and B**

**Limited Local Economic Impacts**

- **Problems in Local Economic Structure**
- **Problems in its Governing Structure**

**Lack of Internal Linkages**

- **Poor Advanced Services in Daejeon**
- **Low Political Commitment & Poor Strategies**

**Limited Resources**

# NURI: Concept

BK21 and NURI, Created by MEHRD

NURI focuses on forming industrial clusters

Aims to supply trained graduates and applied knowledge

Improves the quality of university education

Strengthens university-industry relationships

Creates mutual support between universities and industry

Plans investing 260 million dollars annually for 5 years

Constituted of 3 types: large-, medium-, and small-scale

In 2004, 111 projects have been selected

# NURI: Evaluation

Daejeon hosts 11 NURI projects

According to the BK21-NURI Evaluation Committee

Initial success by downsizing the number of college students

- Improved ratio of teaching staffs versus students
- Increased No of intern & OJT students
- Increased No of special lectures by corporate managers at universities

No clear signs of creating new jobs and better trained people

# RIS Pilot Program: Concept

Designed by MCIE

Aims to create start-up activities,

Aims to assist the existing firms by supplying R&D activities

Using universities and other research institutions

Aims to generate jobs by commercializing existing technologies

Assists networking activities among universities and businesses

Using commercializable technology

Provides each area with 2.5 million dollars per year for 3 years

In 2004, 39 projects were selected

# RIS Pilot Program: Daejeon

**Six proposals submitted**

**DRIA, KAIST, and HNU, CNU, etc.**

**Two were selected: merged one, and another**

**Merged one: material design, tech-transfer**

**Another: logistics cluster based on chemical tests**

# RIS Pilot Program: Evaluation

**At the National Level**

**Too many programs with little diversity**

**Too much investment, leading confusion & budget waste**

**Unreasonable and rigid regulations: budget and accounting, Lack of Trusts**

**Poor coordination among agencies**

**Long communication channels**

**Delayed budget**

**Irrational selection process**

# RIS Pilot Program: Evaluation

**At the local level:**

**Lack of coordination and cooperation**

**Lack of professional ethics:**

**Lack of technological competence**

**Poor coordination among project sub-teams**

# Daedeok Valley Innovative Cluster Management Plan

**Conducted a Major Survey in the Late 2005**

**Designed the Program by DRIA Director**

**To Create Forums for Technology-intensive SMEs**

**To Share Information, Knowledge, and Technologies**

**Expected to Create Industrial Clusters**

**Constituted of 8 Clusters and 14 Mini-clusters**

**Held Meetings with Popular Supports in the early 2006**

**Not Active Any More Since then, because of Political Reason**

# Industrial Complexes in Korea

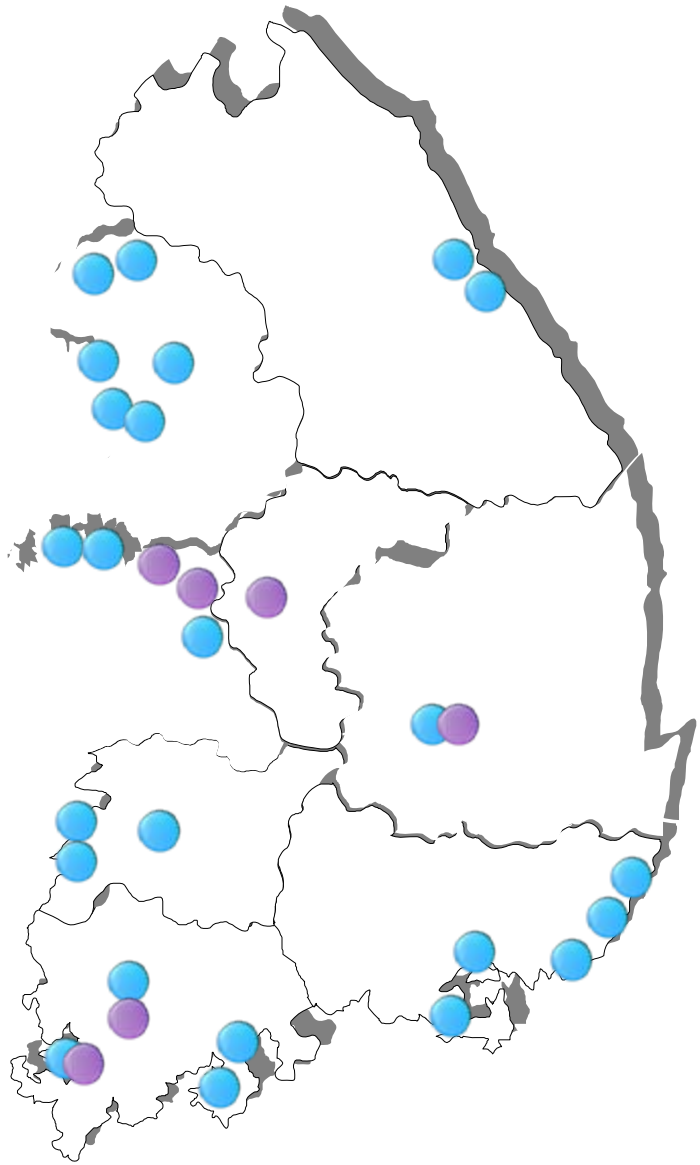
Operate 30 industrial complexes
- total size : 265,960,000 sq. meter

Host 26,768 companies

Employ 679,335 workers

Produce 280 billion dollars per year

Export 120 billion dollars per year



# Innovative Cluster Strategy of KICOX

**Strategy**

| | Industrial Complex | Innovative Cluster |
|---|---|---|
| Main Body | Company | Company+Univ+Re. Institute |
| Relationship | Vertical | Horizontal |
| Inducement | Physical Location | Using network |
| Competitiveness | Mass Production Eco | Technology Innovation |

# The Process

**Jan. 2004: The Strategy was Designed**

**June 2004: Selected 7 pilot areas**

**Jan. 2005: Approved by MOCIE**

**Apr. 2005: Launched 7 Cluster Development Agency**

**(Budget US$ 30M)**

**Apr. 2006: Evaluated the 1st year's ('05.4~'06.3) performance**

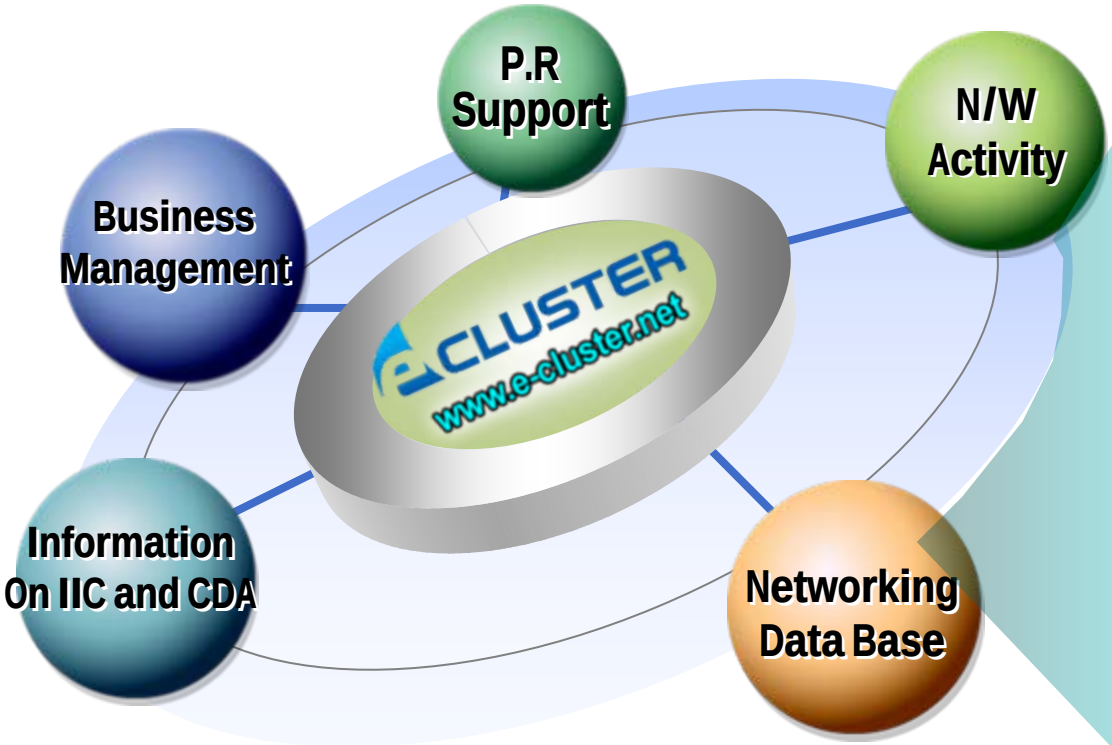
**& Start the 2nd year project (Budget US$ 46M)**

# Seven Pilot Project Areas

**7 Complexes**

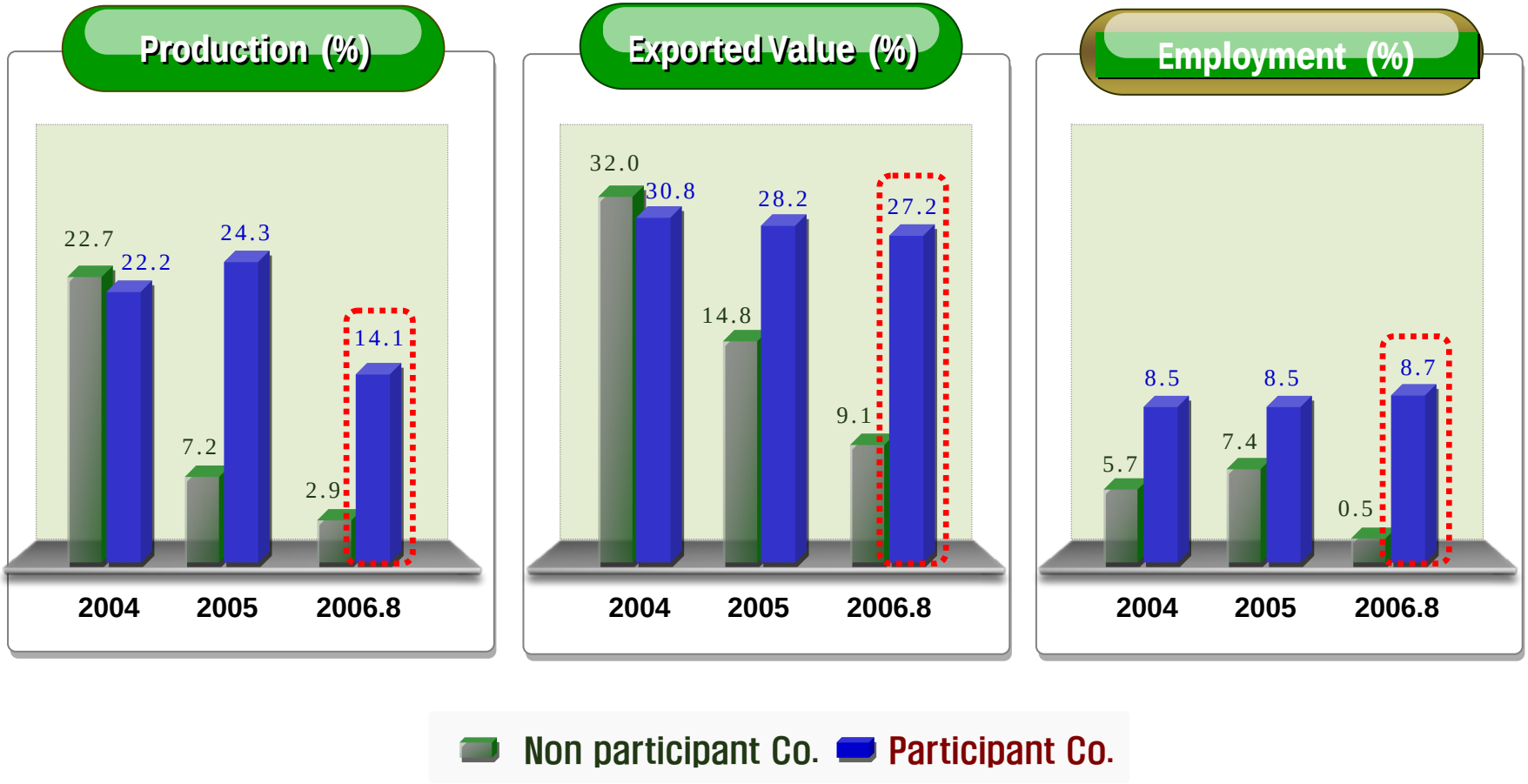
| Complex Name | Strategic Industry | Development Vision |
|---|---|---|
| Changwon | Machinery | Advanced Machinery Global Cluster (strong presence of heavy industry already) |
| Gumi | Electronics | Advanced Digital & Electronic Cluster |
| Ulsan | Automobile | Global base of Advanced Automotive Component Supply |
| Banwal Sihwa | Components & Material | Global base of Advanced components & Material Supply |
| Gwangju | Optical Electronics | Global Cluster of Photonics Industry |
| Wonju | Medical device | The Core of Advanced Medical Device Industry |
| Gunsan | Automobile Machinery | Global Cluster of Auto & Machine parts Industry |

# Networking Scheme



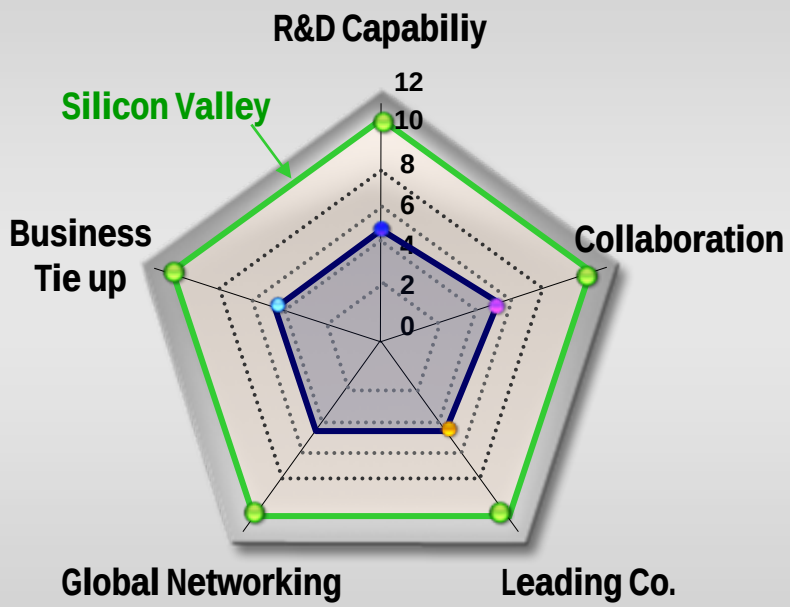

| Networking DB | |
|---|---|
| No. Company | 126,000 |
| Product | 43,000 |
| University | 384 |
| Research Institute | 488 |
| Supporting Agency | 361 |
| Experts | 13,000 |
| Equipment | 12,000 |
| Patent, Papers | 11,000 |
| Technology | 5,300 |

# Outcomes of the Strategy

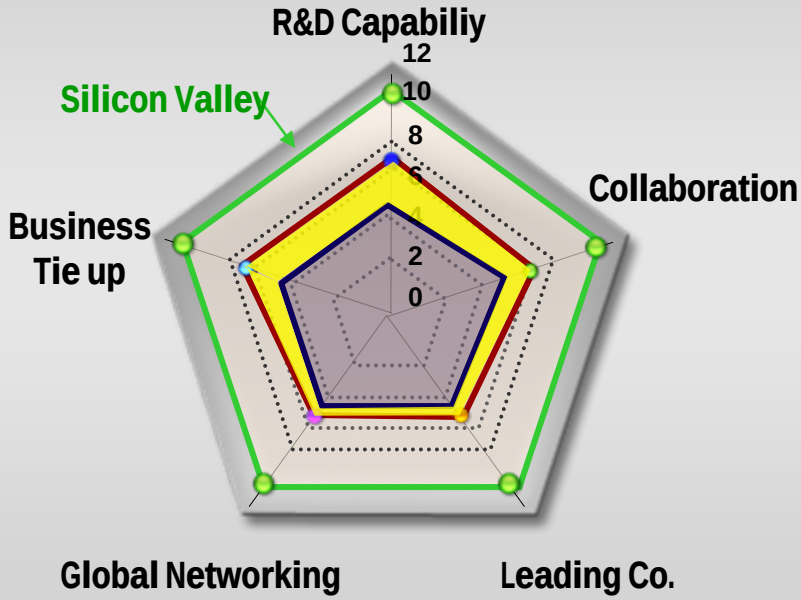


# Changes in Innovative Capacity

## Innovation Capability ('04.3)




## Innovation Capability ('06.9)



# Changes in Firm Relationships

**Exchange information on policies and networking**

**Exchange know-how in technology commercialization**

**Cooperate with technology, commercial trade and inward investment**

**Participate and run entrepreneurship programs**

**Participation in related conferences and seminars**

# Conclusion:
# The Industrial Cluster Strategy

**Positive Side**

- **Right choice to tackle the problems**
- **Succeeded in orienting concerns to applied R&D**

**Negative Side**

- **Too much focus on high-tech & manufacturing, i.e., BT, IT**
- **Considerable expenses for learning effects**

**Alternative**

- **Creative industry: culture and technology**
- **Need flexibility and diversity to create jobs**
- **Use local resources: cultural, material, and technological**
- **Focus on services as well**