The Growth of DAEDOK VALLEY and R&D Special Zone Plan

2005. 2

CDI 충남발전연구원
Chungnam Development Institute

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Ⅰ. Change of Korean Innovation Mode

1. Evolution of S&T Policy
2. Evolution of Industrial Policy
3. Evolution of Regional Policy
4. Evolution of Economy
5. Innovation Mode

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I. Change of Korean Innovation Mode

1. Evolution of S&T Policy

1960 s

- Establishment KIST 1966
- Establishment MOST 1967
- S&T Promotion Act 1967

1970s

- KAIST 1971
- Construction DSP 1974
- Establishment of many GFRIs in the field of heavy and chemical industries from mid-1970s

1980 s

- Launching 1st National R&D Program 1982
- Promotion of private firm's research institutes
- Financial and Tax incentives to stimulate private firm's R&D investment

1990 s

- Promotion of university research: ERC, SRC, etc
- New R&D program：Frontier、BK 21
- NSTC(inter-ministerial coordination body)

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I. Change of Korean Innovation Mode

2. Evolution of Industrial Policy

1960 s

- Export of **Natural Resources**

1970 s

- **Light Industries**
- Strong Technology Push
- Importing Parts & Materials, Exporting Manufactured Products
- **Imitation of Imported Technology**
- Core Industry: Textiles

1980 s

- **Heavy and Chemical Industry**
- Imitation of Advanced Technology and Development of Simple one
- Core Industry: Iron, Shipbuilding, Machinery

1990 s

- Electronics
- Development Advanced Technology
- Core Industry: Home applied Electronics, Automobile, Semiconductor

I. Change of Korean Innovation Mode

3. Evolution of Regional Policy

1960 s

- Construction of Industrial Infrastructure
- Focus on the Resource in Seoul Metropolitan Area

1970s

- Seoul Metro Area
- Development of Sea-side belt
- Industrialization

1980 s

- Regional Balance of Development
- Development of Growth Pole

1990 s

- Internal Growth of Region
- 9 Technopolis

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I. Change of Korean Innovation Mode

4. Evolution of Korean Economy

Top 5 Exports

1960

	Item	Amount (%)
1	Iron Ore	13.0
2	Tungsten	12.6
3	Raw Silk	6.7
4	Anthracite	5.8
5	Cuttle Fish	5.5

1970

	Item	Amount (%)
1	Textiles	40.8
2	Plywood	11.0
3	Wig	10.8
4	Iron Ore	5.9
5	Electronics	3.5

1980

	Item	Amount (%)
1	Textiles	28.8
2	Electronics	11.4
3	Iron & Steel Prod.	9.0
4	Footwear	5.2
5	Ship	3.5

Amount of top ten exports

I. Change of Korean Innovation Mode

4. Evolution of Korean Economy

Top 5 Exports

1990

	Item	Amount (%)
1	Electronics	27.5
2	Textiles	22.6
3	Footwear	6.6
4	Iron & Steel Prod.	6.5
5	Ship	4.3

2000

	Item	Amount (%)
1	Semiconductor	15.1
2	Computer	8.4
3	Automobile	7.7
4	Petrochemical Prod.	5.5
5	Ship	4.8

2010

	Item	Amount (%)
1	?	
2	?	
3	?	
4	?	
5	?	

Amount of top ten exports

Ⅰ. Change of Korean Innovation Mode

5. Stages of Technological Innovation

The first generation model

「Imitation」 model: Imitation of Imported Technology

Examples: Textiles and consumer electronics in the 1960s and automobile, steel, shipbuilding and machinery in the 1970s

The second generation model

「Path-defining」 model: Production based Innovation

Examples: The later generation products of automobile, shipbuilding, steel; DRAM, CDMA, TFT-LCD and DVD

The third generation model

「Path-exploring」 model: Generating New Industry

Examples: SoC, fuel cell, 4G mobile hand set, BT, NT, optics, next generation vehicles, etc.

II. DAEDOK VALLEY

The Man-made Satellite 'ARIRANG'

1. Location
2. Background
3. History
4. Present Position
5. Problems

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II. DAEDOK VALLEY

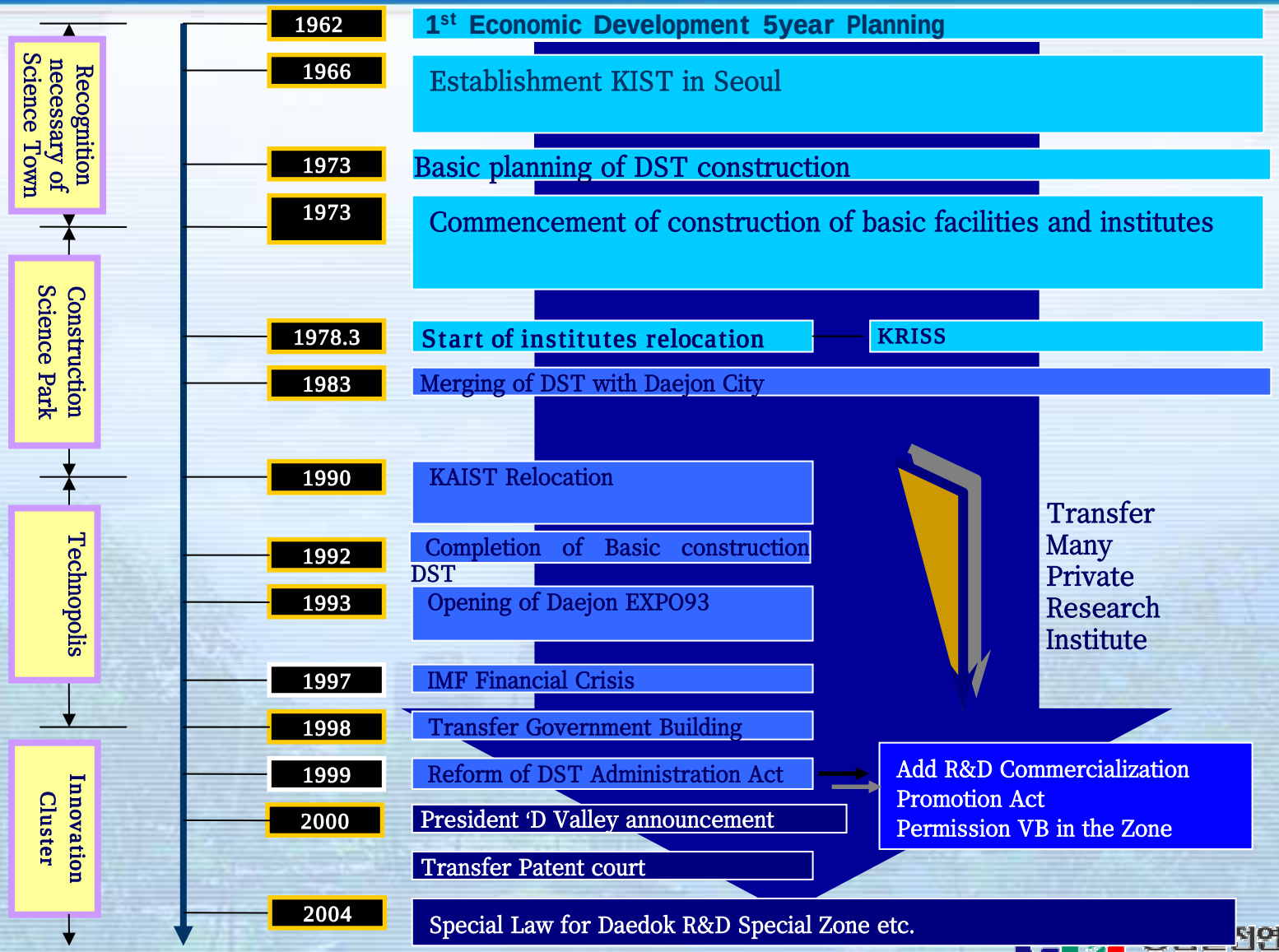
1. Location

- Located in Daejeon City
- 153km from Seoul, 283km from Busan, 178km from Kwangju
- Middle of Nation-wide
- Transportation: Railroad, Highway, KTX, AirPort

2. Background

- Construction Research Park in Seoul
- 1970s, Excessive concentration of metropolitan are a population and industrial activity
- Limited Space, Getting worse in Research Environment
- 1974.3. Developing DST

3. History


Recognition necessary of Science Town
Construction Science Park
Technopolis
Innovation Cluster
1962
1st Economic Development 5year Planning
1966
Establishment KIST in Seoul
1973
Basic planning of DST construction
1973
Commencement of construction of basic facilities and institutes
1978.3
Start of institutes relocation
KRISS
1983
Merging of DST with Daejon City
1990
KAIST Relocation
1992
Completion of Basic construction DST
1993
Opening of Daejon EXPO93
1997
IMF Financial Crisis
1998
Transfer Government Building
1999
Reform of DST Administration Act
2000
President 'D Valley announcement
Transfer Patent court
2004
Special Law for Daedok R&D Special Zone etc.
Transfer Many Private Research Institute
Add R&D Commercialization Promotion Act
Permission VB in the Zone

II. DAEDOK VALLEY

4. Present Position of Daedok Valley

R&D Resource

- R&D Investment(Daejon) 1,997.7Bil Won、 12.4% of Nation (2002)
  - Public Research Institute 59.8%, Univ 7.8%, Business 32.4%
- R&D Organization 399.
  - 5.4% of Nation-wide
- R&D Human Resource 25,929 persons
  - 25.2% of Nation-wide

R&D Expenditure

- Total R&D Expenditure 1,092.1 Bil (2001)
  - National Expenditure 59.6%
  - Regional Expenditure 0.01%
- It depends on the National Investment considerably

II. DAEDOK VALLEY

4. Present Position of Daedok Valley

The Human Resource of R&D

- Total HR of R&D 25,929 persons(9.9% of Nation)
- Public Institute7,863 (30.3%) 、Univ.10,344 (39.9%) 、Business7,722 (29.8%)
- Seoul, Kyunggi, Daejon 65% of Nation

The R&D Organization

- 399 Research Institute, Public Institute 21, Univ. 24, business 354(Daejon)
- Per Nation 5.4%. Seoul 38.0%、Kyunggi 23.9%
- DSP- 27.8km², 204 Institute(2002.12.)
- GFRI(17/6,314Person)、Business R&D Institute (29／3,778person) 、High level Educational Institute (4／2,401person) 、GRI (8／2,311person) 、Public Institute (16／510person) 、Venture (130／2,212person)
- Researcher11,668(67%) , 、Research Assistant1,696, Administer4,162

II. DAEDOK VALLEY

4. Present Position of Daedok Valley

Research Capacity

Research Papers

- In 2002, The International Article(SCI, SSCI, AHCI) at Univ about 2,300 articles.
- KAIST ranks 2 and CNU 13
- GFRI 1,300 articles(2002)
- Four GFRI including KAERI – over 200 articles every year

Intellectual Property

- Applied Patents: 3,300(2001) (4.5**%** of Nation , Rank 4th)
- 23.2patents per 10,000 peoples
- All of intellectual property Rights 4.0**%** of Nation
- GFRI - 11,017patents(1982~1999)
- ETRI - 6,780 (62.8**%**) KIST(1,699、KRICT (956) , KIMM (381) , KIER (248)
- University - 1,820 Patents(1982~1999), KAIST occupied 1,062 (58.4**%**)

II. DAEDOK VALLEY

4. Present Position of Daedok Valley

The Growth of VB

- 40 Companies(1995)– 811 Companies(2002) (Registered VB 413)
- IT VB 369 (45.5%) , BT 164 (20.2%)

Venture Support System

- 23 Business Incubation Center
- 13 Venture Town & Building
- 6 Venture Complex
- Venture Town: designate the former downtown office building to Venture Town and Supporting 50% of rent to the resident VB
- Daedok Angel Mart, 4.3 Bil Investment
- Venture Capital Investment, 39 Companies - 18.6 Bil Won
- Marketing, Sales Support
  - TJ Mart
  - WTA techno mart, Venture National Defense Mart, Finding New Abroad Market

II. DAEDOK VALLEY

4. Present Position of Daedok Valley

performance of VB

- Sales of VB, IPO Company:
  - Over 30 Bil 3 Companies(2003), Over 10 Bil 5 Companies, IPO 8Companies

III. Daedok R&D Special Zone Plan

R&D Special Zone Plan

Background

- Existing development strategy of generating power for the continuous growth by increase of factor input came to limit.
- Contribution of increased factor input to the growth reduced to 2%, caused stagnation of per Capita GNP at $10,000 level for 9 years.
- Technical competitiveness and innovation become imperative factor for the economic development.
- Developing Daedok R&D Special Zone as core for the transformation of innovation led economy.

III. Daedok R&D Special Zone Plan

R&D Special Zone Plan

Process

Mar.10. 04 Government policy for the development of Daedok R&D Special Zone was decided
- Designating Daedok R&D Special Zone and enactment of ensuing Special Law.
- Establishment of Integrated supporting organization for the Daedok R&D Special Zone in the form of public corporation.

Mar.10.04 Commission for the implementation of Daedok R&D Special Zone Project was launched.

Apr.10.04 Working level supporting team for the Daedok R&D Special Zone was organized

June.04 Tentative integrated program for the development of Daedok R&D Special Zone was worked out.

Dec.28.04 National Assembly passed Law for the establishment of Daedok R&D Special Zone.

III. Daedok R&D Special Zone Plan

R&D Special Zone Plan

Vision and Central Issues

Vision

Creation of world class innovation cluster by integrating research and Production functions

Central issues

1. Laying basis for the commercialization of R&D
2. Promotion of business creation and business activity.
3. Maximization of R&D capabilities.
4. Fostering specialized cluster in each important field.
5. Creation of basis for international R&D activity.
6. Establishment of integrated supporting system for the innovation of Special Zone.

III. Daedok R&D Special Zone Plan

1. Creation of basis for R&D commercialization

Establishment of integrated supporting organization

- establishing and operating technology commercialization center under the Daedok R&D special zone HQ integrated special zone development organization
- total support for the commercialization of research achievements of the resident organizations.
- Providing services to assist commercialization like appraisal and transfer of technology, marketing of technology, operating commercialization fund, management consulting and legal and accounting advise. Etc.
- Assisting manufacturing of test products utilizing commercialization technique appraisal of test products
- Commercialization center will be placed under the Daedok R&D Special Zone HQ. However it will be given a certain level of self-rule in management in view of its profit pursuing trait.

III. Daedok R&D Special Zone Plan

1. Creation of basis for R&D commercialization

Creation of basis for the commercialization of public research center

- Allowing establishment of affiliated company (research business) of GFRI and activating investment/ participation by technology.
- Selecting 1-2 organizations that have capabilities in management fund and commercializable technology, carry out test using part of the income from technological commission.
- Activating creation of hi-tech and venture business by providing investment and technology(patented technology)
- Establishing and operating a team specializing in technological transfer(TLO) of universities and government funded research centers.
- Strengthening cooperation with technology trade center to assist commercialization like establishing patent right on possessing technology, providing technical information, business moving, support to business creation, etc.

III. Daedok R&D Special Zone Plan

1. Creation of basis for R&D commercialization

Creation of basis for the commercialization of public research center

- Giving priority to the Special Zone Organizations in patenting Process. Considering patent application made by the Special Zone organizations be included in the category of Patent Law article 61, Implementation Order clause 9 that stipulates patent application made by defense industry, venture business and patent application directly related to export promotion be given priority in examination.
- Creation of network of technology exchange market for the transfer and commercialization of technology owned by universities and research centers. DB of commercializable technology, survey of business's technological obstacles, mutual matching service, after service, etc. .
- Introducing award for technology commercialization

  - Giving award to the successful business creation and commercialization of new technology to the Special Zone university research center & business

III. Daedok R&D Special Zone Plan

2. Promotion of business creation

Support to the professional education for the hi-Tech venture business creation.

Opening a “business creation MBA course”, in the Special Zone for the successful business creation of researchers and professors with insufficient business creation know how.

Expansion of financial support to the business creation

- Introducing an example of technology appraisal and guarantee system for Special Zone hi-tech business of Special Zone
- Creation of venture fund for the Special Zone.
- Mandate fund management to professional civilian company of public investment corporation specializing in investment to the venture business.

III. Daedok R&D Special Zone Plan

2. Promotion of business creation

step by step technology development support program

- Introduction of experimental package program like business feasibility study
  - Support to the technology development-commercialization.
- Small business innovation research program
  - Support to the business implementation of high risk, high feasible project among R&D projects proposed by hi-tech venture business.
- Research and business development program
  - Selecting and supporting projects that need additional technology development in pursuing technology commercialization

III. Daedok R&D Special Zone Plan

2. Promotion of business creation

Expansion of space and facilities for business creation

- Expanding the capacity of fostering room of business creation
  Target: Increase to 500 by 90 from present 321
- Increase construction portion and capacity of green belts in the research complex
- Gradual development in consideration of Special Zone business site demand and adjustment of green belt inside the research complex.

III. Daedok R&D Special Zone Plan

2. Promotion of business creation

Introduction of tax incentives for hi-tech business

- Assistance by tax exemption or reduction to the hi-tech business that fulfills a certain conditions stipulated by Special Law;
- Company tax and income tax: exemption for 3 years and 50% reduction for 2years.
- Acquisition Tax, registration tax, property tax, land tax: exemption for 3 years and 50% reduction for 2 years
- Same level support given to foreign businesses in the Special Zone

III. Daedok R&D Special Zone Plan

3. Maximization of R&D capabilities

Strengthening GFRI's innovation capabilities

- Support to the strengthening of innovation capabilities of government funded research center
  - Organizing research cell in each respective field that is responsive to the future demand.
  - Increasing mobility of man-power among the research centers, building a system for the researcher's study and reeducation
  - Introduction of new wage system that reflects achievements of the researchers.

III. Daedok R&D Special Zone Plan

3. Maximization of R&D capabilities

Creation of demand oriented man power

- Opening multi-majoring and integrated science courses in KAIST, CNU for professional research and commercialization of newly born integrated science.
  - Production of technical man power for industry and research
  - Producing man power for professional management and R&D support.
- Support to secure high quality R&D man power for hi-tech industry.
- Special treatment in military service duty for professional researchers

III. Daedok R&D Special Zone Plan

4. Creation of specialized cluster in each respective core field

IT Cluster

- Research centers like KAIST, ICU, CNU, ETRI, etc and more than 200 IT businesses.
- In addition to the existing Daedok Valley Software Town, Radiation Part Supplying Center(19.8BilWon), Intelligent Robot commercialization center(41.9 bil. Won) will be built

BT Cluster

- Genetic engineering research center, KAIST, CNU, more than 80 venture businesses
- Building Bio venture town(41.9 bil. Won)

III. Daedok R&D Special Zone Plan

4. Creation of specialized cluster in each respective core field

NT Cluster

- Standard research Center, KAIST, Nano Fab, more than 20 businesses.

RT (Radiation Technology) Cluster

- Atomic Valley was built by businesses utilizing radiation materials produced by Atomic research center(7 businesses)

ET Cluster

- Strengthening cooperation among Energy technology research center, Chemistry research center, Mechanics research center, LG Chemistry research center., SK research center, etc and 15 environment related businesses.

III. Daedok R&D Special Zone Plan

5. Laying groundwork for international R&D activity

Support to the foreign investment

- tax incentives
  - Income tax, business tax exemption for 3 year and 50% reduction for 2 year. 2 year tariff exemption for R&D materials and capital goods import. Acquisition tax, registration tax, property tax, land tax exemption for 3 years and 50% reduction for 2 year.
  - Conditions for the support

    -R&D facilities $3mil.and up more than 5 researchers

    -Manufacturing $10mil.and up, more than 100 employees
- Reduction of rental fee for government and public properties.
- Allowing use, profit taking, leasing and sales by arbitrary contract
- Providing foreign R&D centers and hi-tech industries with remodeled part of expo science park at a minimum charge.
- Support to the foreign investment business in training and reeducating technical man power.

III. Daedok R&D Special Zone Plan

5. Laying groundwork for international R&D activity

Improvement of foreigner's living conditions

- Creating residential complexes inside Daedok Techno Valley and providing rental houses for the foreigners.
- Constructing hospitals for foreigners use and introducing medical service system for foreigners.
- Building education facilities for foreigners by foreign education foundation.
- Financial support for the facilities for foreigners convenience, like medical care, education and residence.
- Operating ombudsman office for the solution of foreign business difficulties.
- Building child care facilities available only to foreigners.

III. Daedok R&D Special Zone Plan

5. Laying groundwork for international R&D activity

Expansion of infrastructures for international exchanges and cooperation

- Building international convention facilities, press center, exhibition hall, etc.(hall of scientific and technological creation completion in 06)

Establishment of globalization team

- Establishment of globalization center under the Daedok R&D special zone HQ for the inducement of foreign research center and business.
- Appointing professional who has overseas network and give incentive of rewarding in accordance with achievements.

III. Daedok R&D Special Zone Plan

5. Laying groundwork for international R&D activity

Support to the overseas activity of hi-tech and venture businesses

- Assist overseas market survey and search for buyers necessary for export promotion by taking advantage of brand value of KAIST and ETRI

Creation of world class new technology test bed

- Using as international test bed for business feasibility study of new technology and market survey of new products or services.
- Utilizing expo science park for the test and advertisement of research achievements and new technology products of special zone.

III. Daedok R&D Special Zone Plan

6. Creation of total supporting system

Organizing Daedok R&D Special Zone Committee

- Function providing Daedok Special Zone with basic policy and supporting system, making program for special zone development, coordination between the authorities concerned, etc
- Composition
  - chairman minister of science and technology
  - deputy chairman Chairman of balance committee
  - Members ministers concerned and selected civilians (less than 20)

III. Daedok R&D Special Zone Plan

6. Creation of total supporting system

Establishment of DAEDOK R&D Special Zone HQ

- Legal character: public corporation established by special law
- Function: providing integrated services to the organizations in the special zone
- Composition

-Head of organization

: selecting renowned professional through open worldwide recruitment.

-Organization 4 centers

: Management supporting center, R&D supporting center,

: technology commercialization center, globalization supporting center.

: Employees around 100 Compound of special zone and its composition

III. Daedok R&D Special Zone Plan

Composition of Special Zone

Daedok Research complex(84BIL. tubo)

- Existing research complex: general R&D function
- Part of expo scientific park (80000 tubo): remodeling for hi-tech, high value added business area.
- Development of green belts(3.6bil tubo) will be considered later when necessary.

Daedok Techno Valley(12.9bil tubo)

- Industrial site(4.2bil tubo) : Hi-tech production facilities
- Unsold land (2.3bil tubo)
  - Part of residential area(2bil tubo): Building foreigners residential complex.
  - Public land(4.9bil tubo): Construction of foreign school

III. Daedok R&D Special Zone Plan

Composition of Special Zone

Daejeon 3rd, 4th site (9.5bil tubo)

- Industrial site(6.6bil tubo): venture business creation complex
  - Encouraging concentration of hi-tech business through remodeling.
- Residential site(10000 tubo)
- Public land(50000 tubo)

Development limited area

- Development limited area between Daedok research complex and Daedok techno valley(6.7bil tubo)
  - Utilization will be studied in consideration of future development.

Reserve land(4.7bil tubo)

Western side of CNU(4.7bil tubo)
North western site of 3rd and 4th site(1 mil tubo)