Korea Land and Geospatial InformatiX Corp.

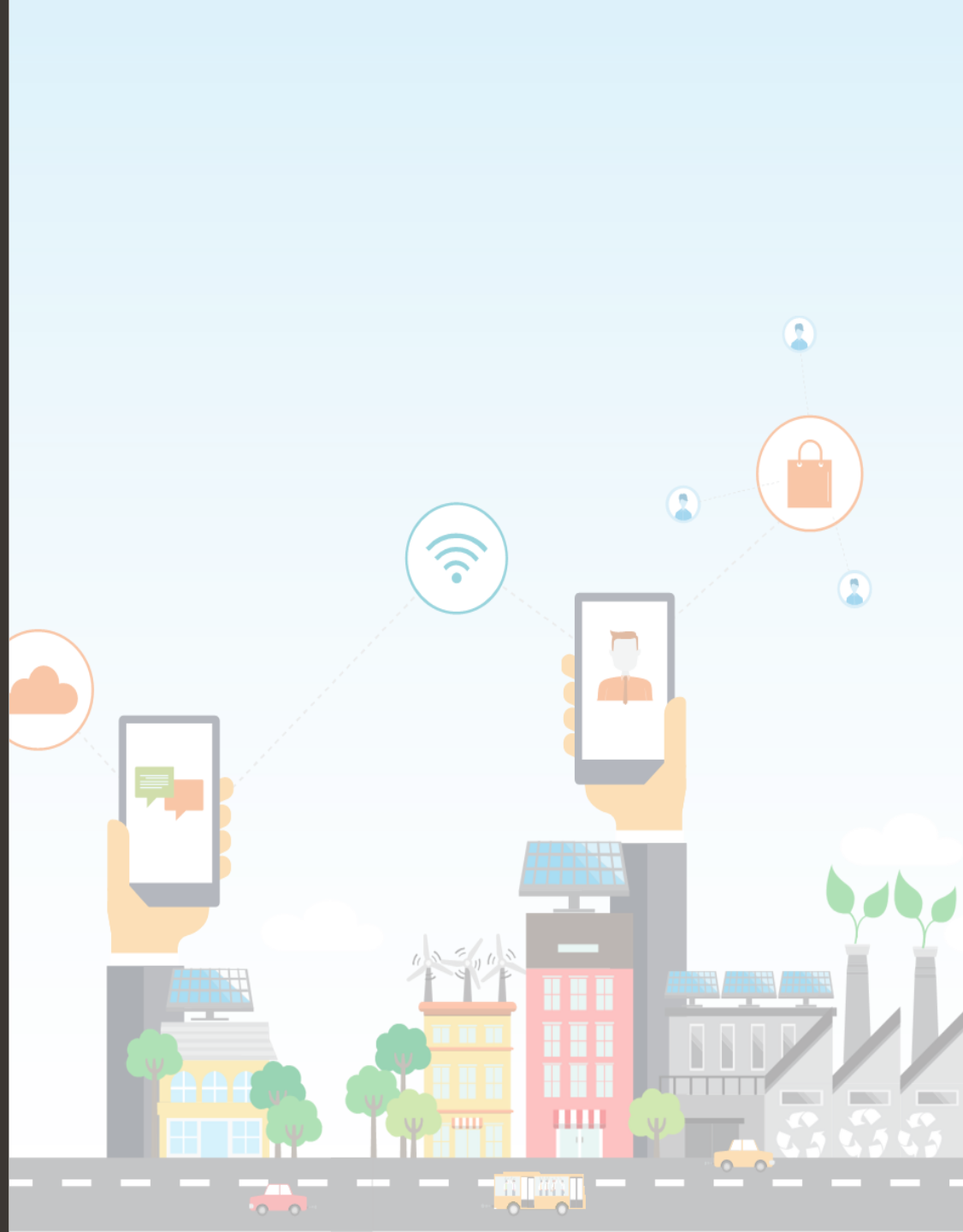# Digitalization of cadastral information in Rep. of Korea
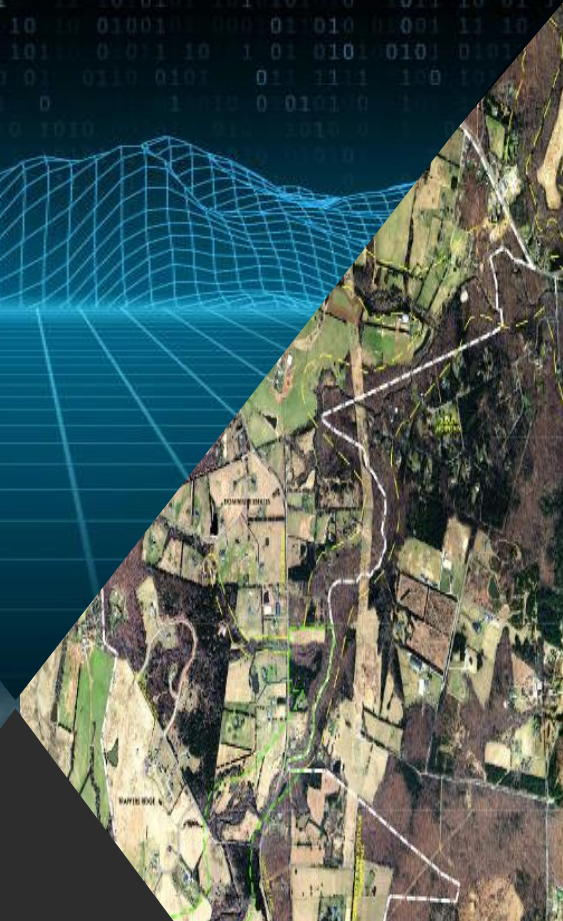
Changhyeon Ryu

(7th. Nov. 2024)

Overall - Contents

Part 1

Japanese Colonial Era

Korea War

Total Destruction

Land Survey for Land Confiscation

김해군 주천면 양덕리 과세지견취원도(1912)

More than 80% of the infrastructure and facilities were destroyed.

Civilians killed: 3,500,000

War Orphan: 100,000

Separated Families: 10,000,000
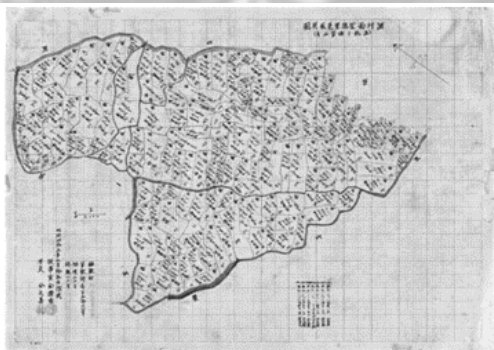
**GDP($): About USD 1.67 trillion in 2022,
Ranked 13th in the world**

(by WB)
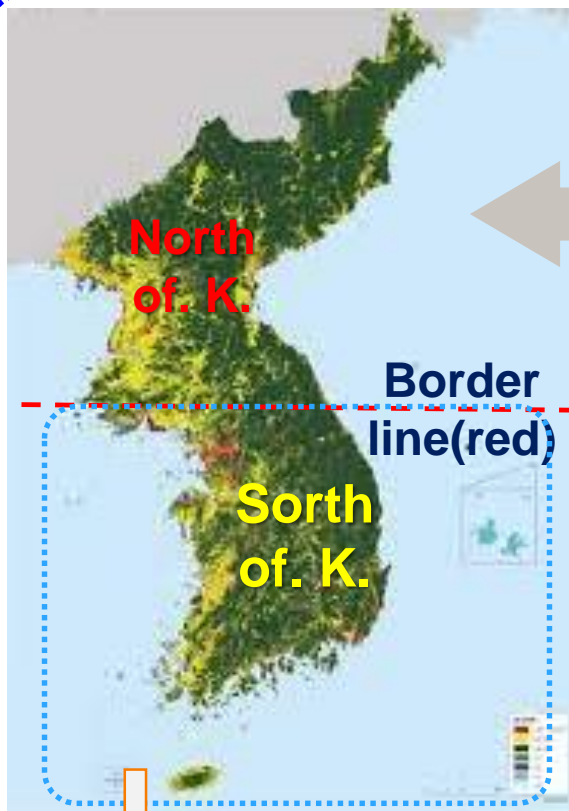
Population : 51.7 millions
(26th in the world)

Population Density: 515 / km^2
(23th in the world)

Parcels: 39,367,416
Area(only Rep. of Korea)**: 100,431 km^2**
(**109th** in the world)

North of. K.

Border line(red)

Sorth of. K.

Skyrocketing land price

Environmental problem

High density of population

Land Use

• [83.3%] = Agricultural
  + Conservation area
  + others

• [16.7%] = Urban area

  - 15.3% = Residential area

  - 84.7% = 녹지지역 + others

Unbalanced urban planning

Land disputes

- Optimization of Land Resources
- Economic Advancement
- Industrialization

Economic Growth

Citizenship

Good Governance

- Transparency
- Resolution of Land Disputes
- Efficient and Fair for Taxation

- Secured Land Property Rights
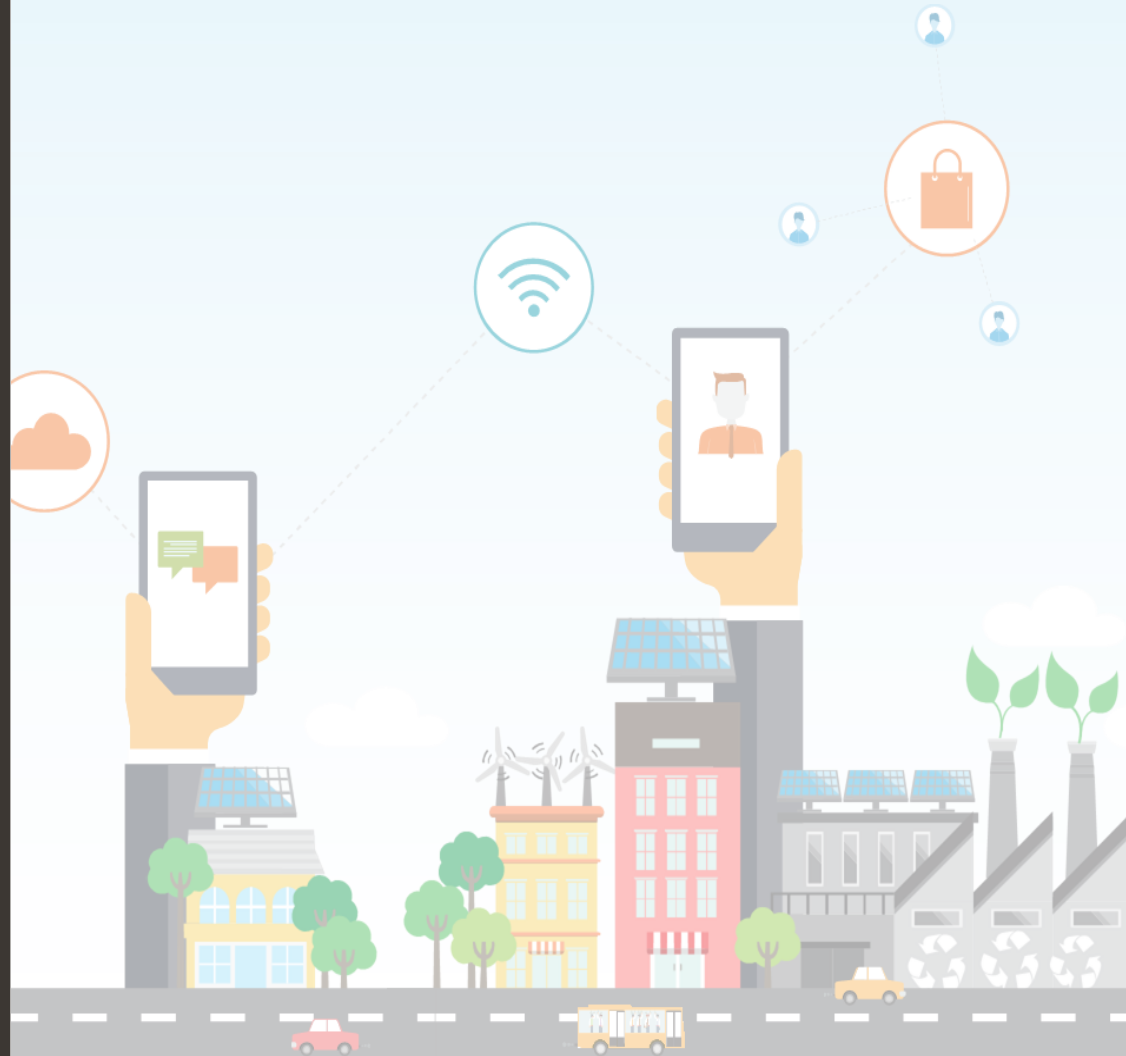- Enhancement of Land Public Services
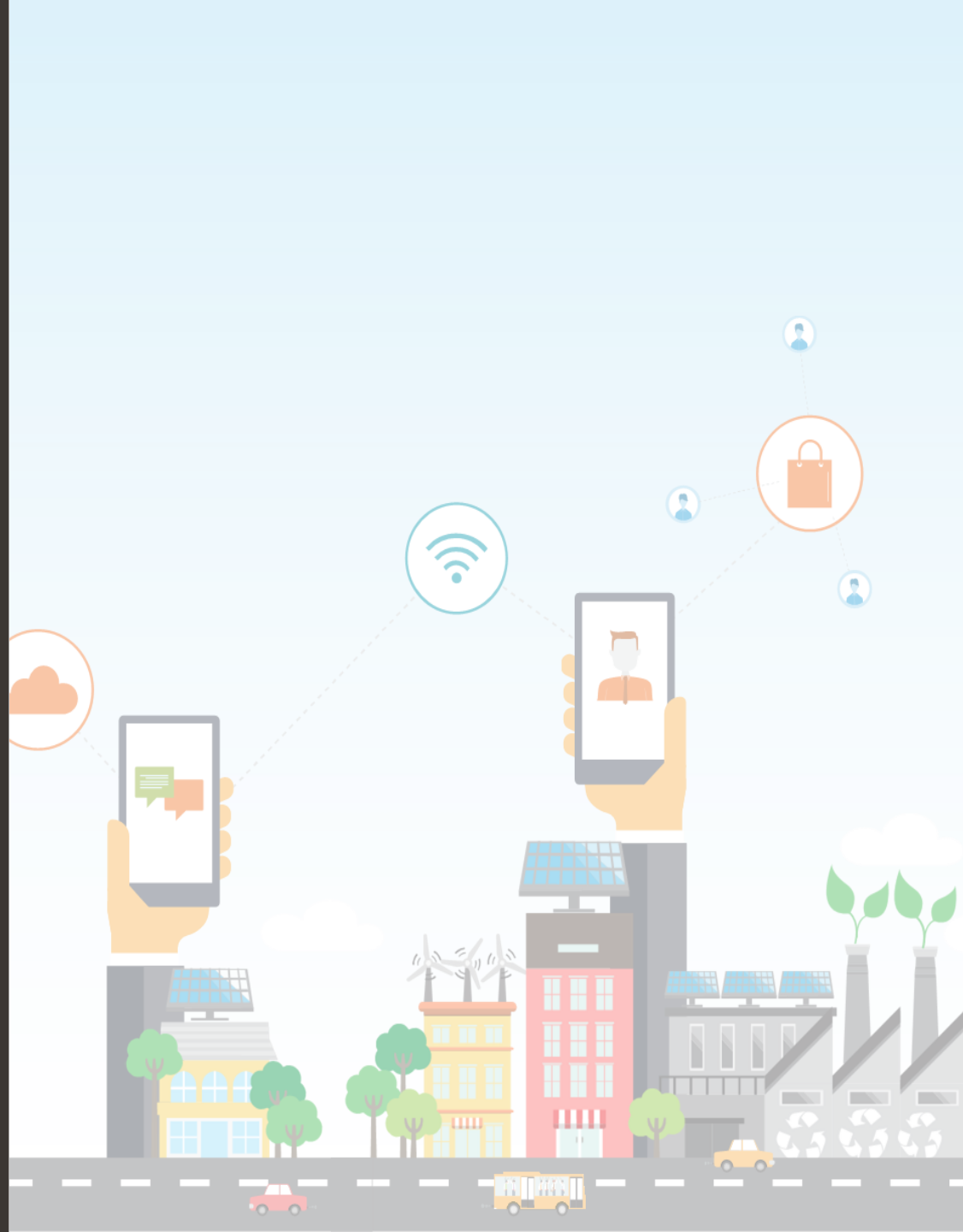- Guarantee of Equal Opportunity

Part 2

1. Land Challenges stemming from the rapid development

2. **The essential steps to creating an integrated Land Information System**
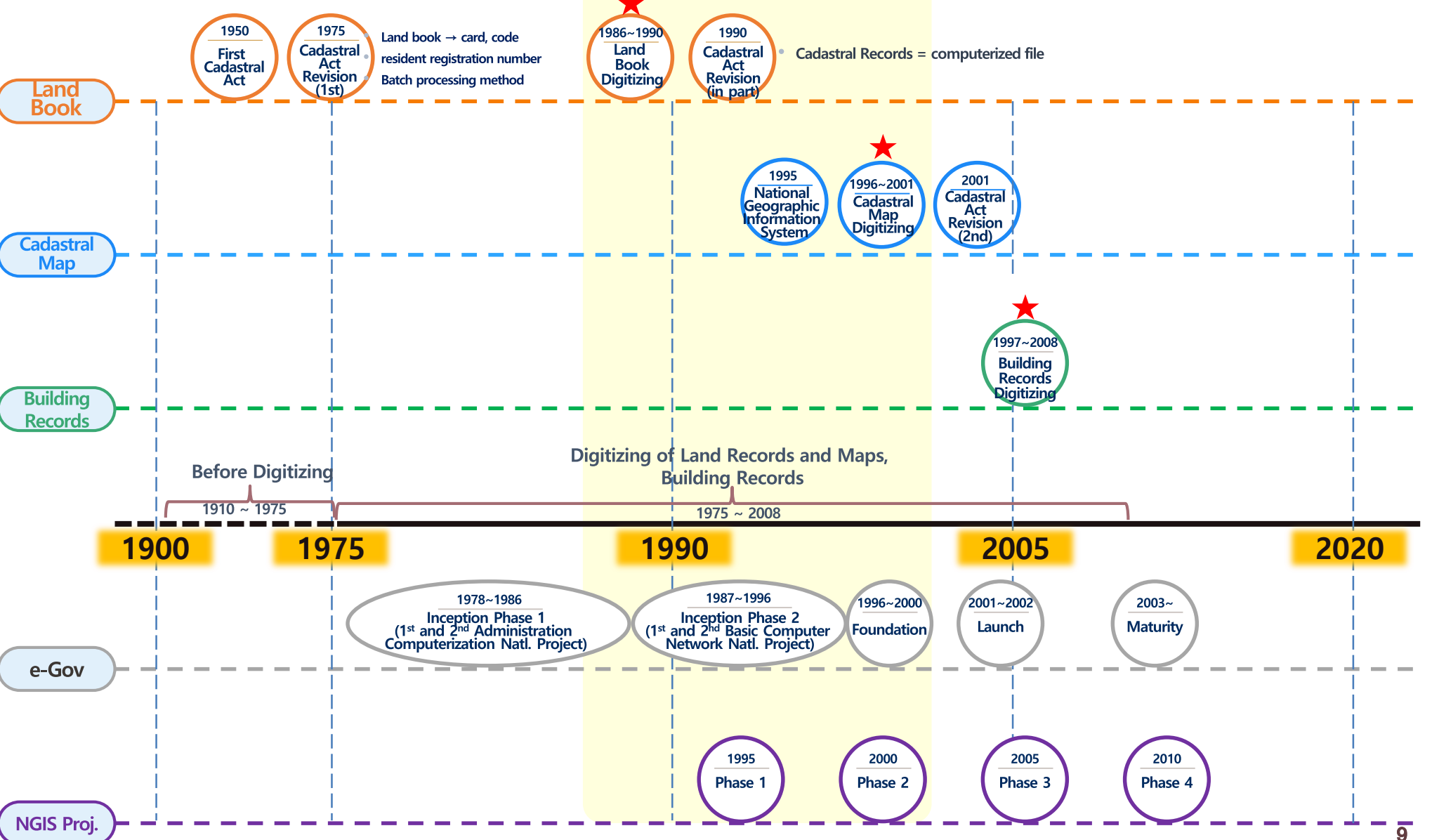
3. Solution for Land Challenges
(Korea Land Information System - KLIS)

Focused on Digitalization

Land Book

- 1950 — First Cadastral Act
- 1975 — Cadastral Act Revision (1st)
  - Land book → card, code
  - resident registration number
  - Batch processing method
- 1986~1990 — Land Book Digitizing
- 1990 — Cadastral Act Revision (in part)
  - Cadastral Records = computerized file

Cadastral Map

- 1995 — National Geographic Information System
- 1996~2001 — Cadastral Map Digitizing
- 2001 — Cadastral Act Revision (2nd)

Building Records

- 1997~2008 — Building Records Digitizing

Before Digitizing
1910 ~ 1975

Digitizing of Land Records and Maps, Building Records
1975 ~ 2008

1900　　**1975**　　**1990**　　**2005**　　**2020**

e-Gov

- 1978~1986 — Inception Phase 1 (1st and 2nd Administration Computerization Natl. Project)
- 1987~1996 — Inception Phase 2 (1st and 2nd Basic Computer Network Natl. Project)
- 1996~2000 — Foundation
- 2001~2002 — Launch
- 2003~ — Maturity

NGIS Proj.

- 1995 — Phase 1
- 2000 — Phase 2
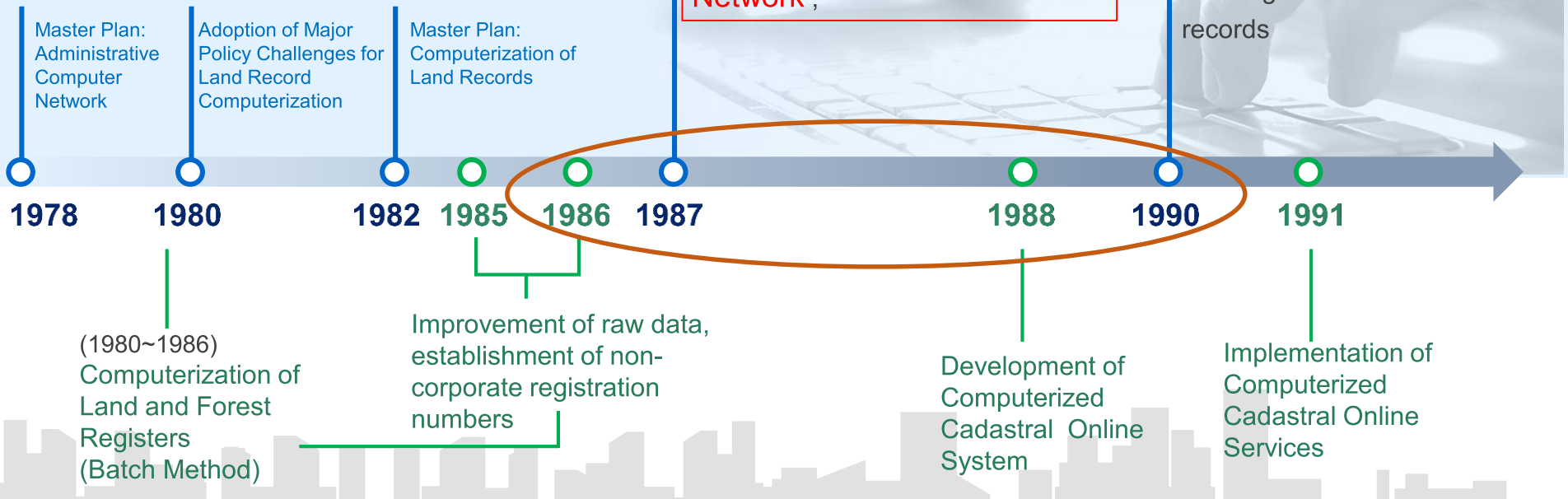- 2005 — Phase 3
- 2010 — Phase 4

9

Progress

Real estate(land) management included as part of 6 priority tasks of administrative computer network

32 million parcels of land and forest are computerized and connected nationwide online

National Computer Network Project

Establishment of plan for the 5 major national computer network project including 'Administrative Computer Network', '

Partial Revision of Cadastral Act

Protection of people's property rights and secure convenience by providing management guidelines for inputting computerized data and by allowing issuance of cadastral records

Master Plan: Administrative Computer Network

Adoption of Major Policy Challenges for Land Record Computerization

Master Plan: Computerization of Land Records

1978   **1980**   **1982 1985   1986 1987**   **1988   1990**   **1991**

(1980~1986) Computerization of Land and Forest Registers (Batch Method)

Improvement of raw data, establishment of non-corporate registration numbers

Development of Computerized Cadastral Online System

Implementation of Computerized Cadastral Online Services

(Source: MoLIT PPT)

Legend — Policy Direction
— Project Direction

📂 **Digitalization of Land(+forest) Records**

Type Writing **D.B**
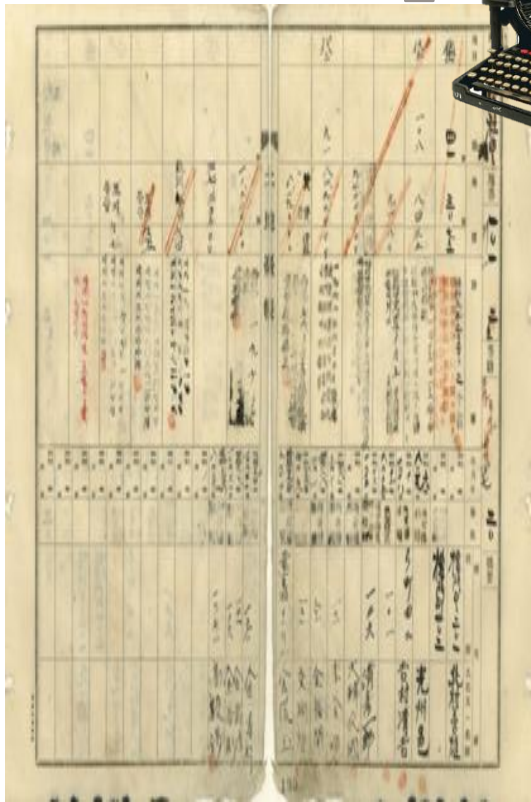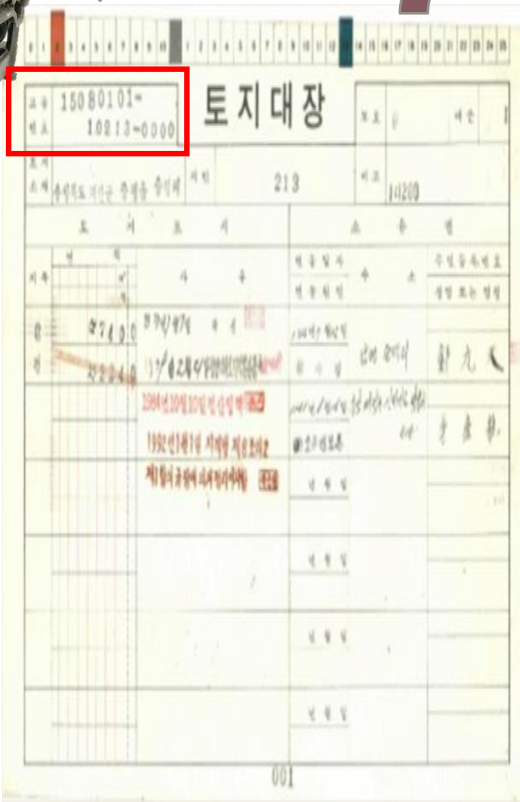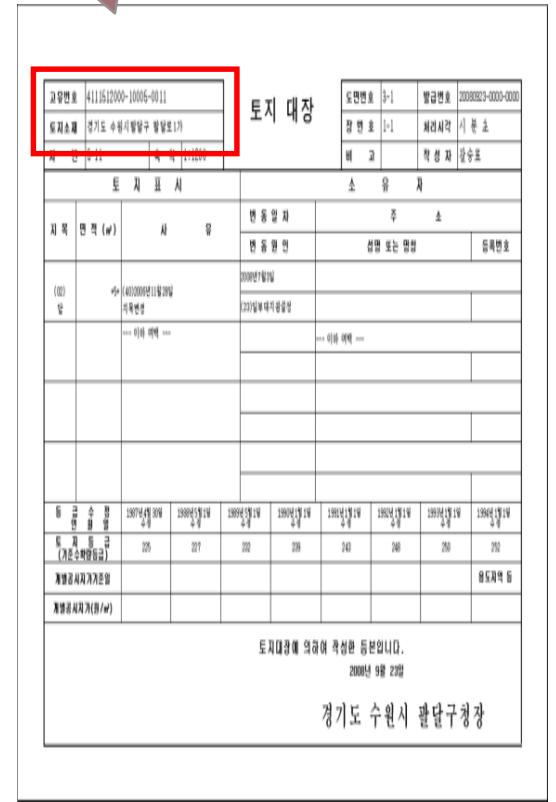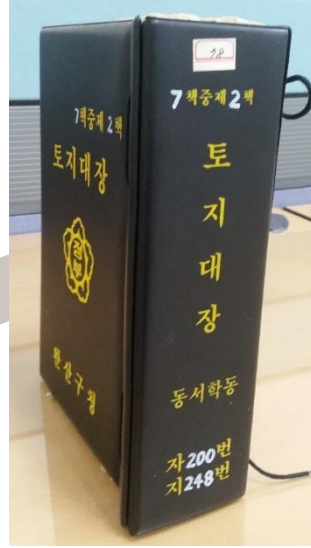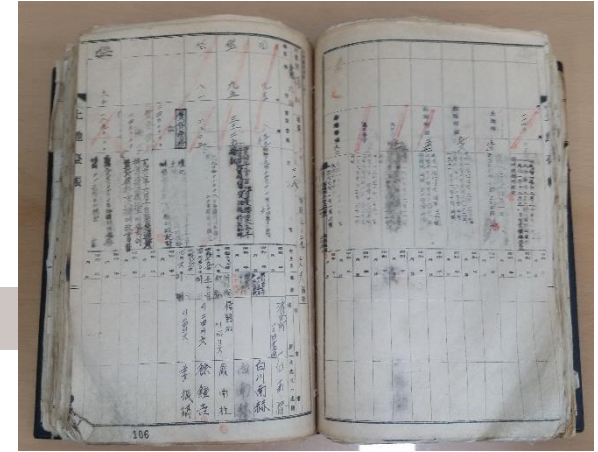

Paper Book ▶▶ **Paper Card** ▶▶ **Digital Data(present)**

📂 Land register conservation management

Period of use: 1910~1975
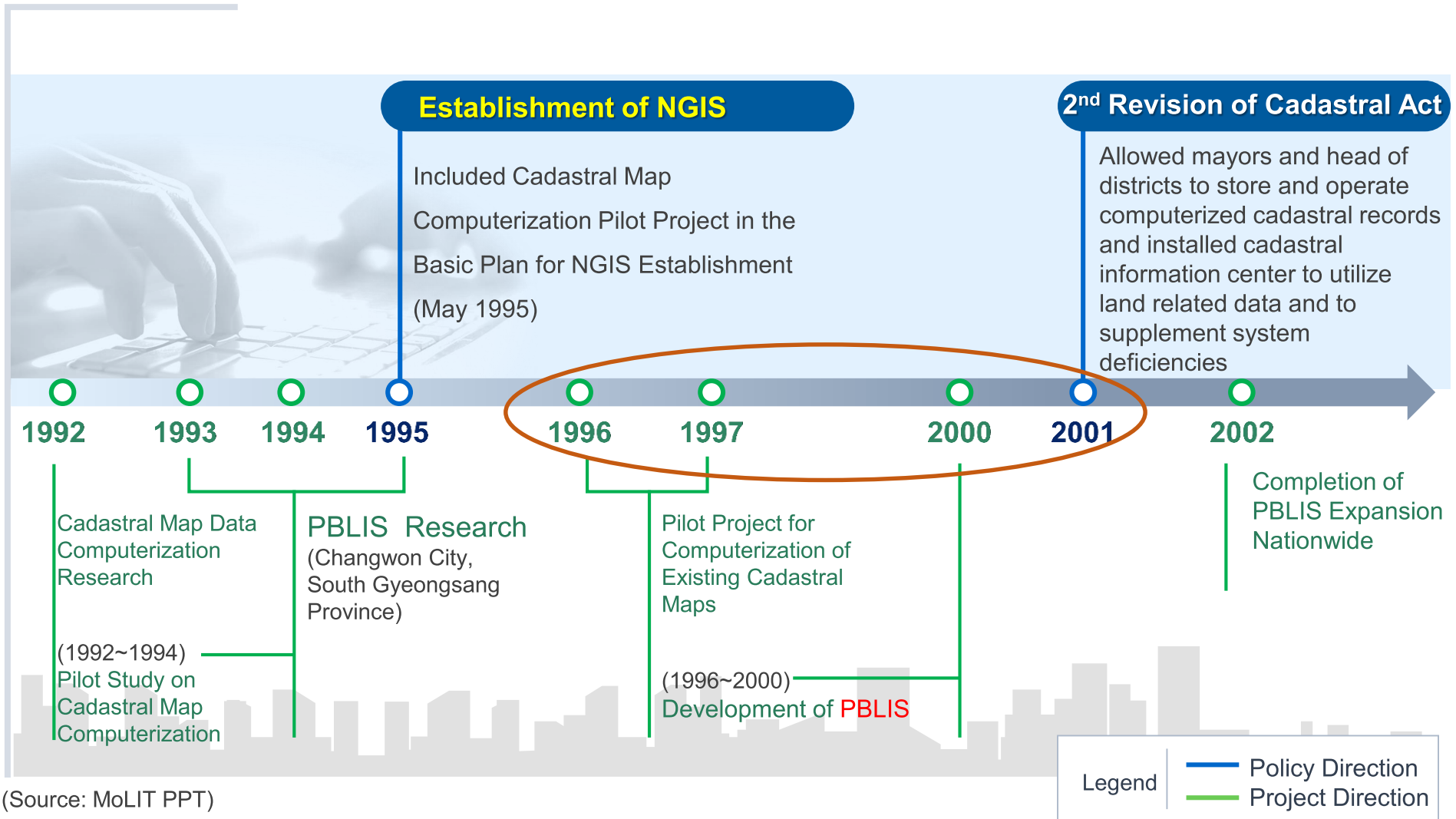
Paper Book

Period of use: 1975~1990
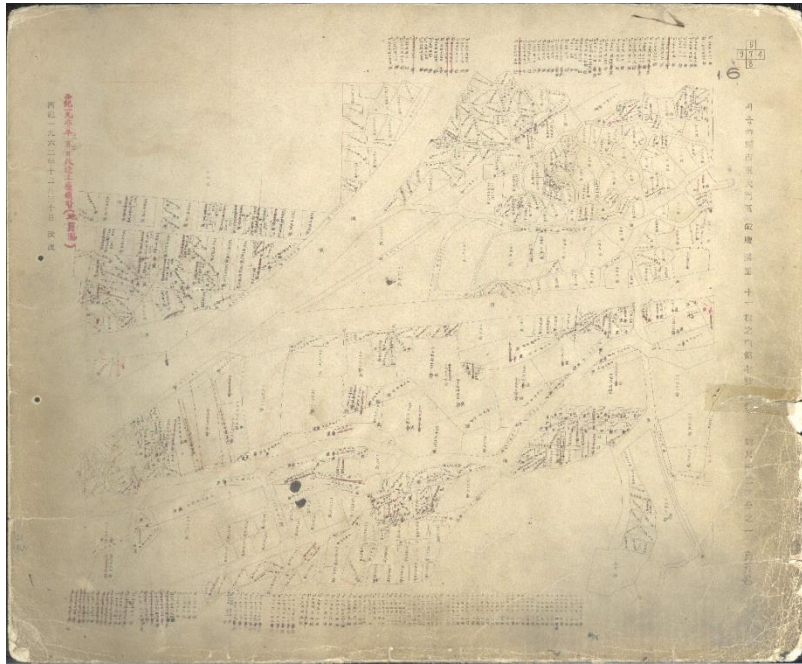
Paper Card

Progress | Development of foundation for Parcel-Based Land Information System (PBLIS) through computerization projects to jointly utilize existing cadastral map information and support public service

Establishment of NGIS

Included Cadastral Map Computerization Pilot Project in the Basic Plan for NGIS Establishment (May 1995)

2nd Revision of Cadastral Act

Allowed mayors and head of districts to store and operate computerized cadastral records and installed cadastral information center to utilize land related data and to supplement system deficiencies

| 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 2000 | 2001 | 2002 |

Cadastral Map Data Computerization Research

(1992~1994)
Pilot Study on Cadastral Map Computerization

PBLIS Research
(Changwon City, South Gyeongsang Province)

Pilot Project for Computerization of Existing Cadastral Maps

(1996~2000)
Development of PBLIS

Completion of PBLIS Expansion Nationwide

Legend | —— Policy Direction
—— Project Direction

(Source: MoLIT PPT)

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- **Vectorizing**
- **Digitizing**

**Paper Cadastral Maps
(Scale: 1/1200)**

**Digital Cadastral Maps
(Scale: 1/1200)**

Applying GIS Technology to Cadastral Map Computerization

레이어 번호	데이터 명	타 입	비 고
1	필지경계선	LINE	
10	지 번	TEXT	Point 값으로 필지 내에 위치
11	지 목	TEXT	Point 값으로 필지 내에 위치
30	문자정보	TEXT	색인도, 제명, 행정구역선, 행정구역명칭, 작업자표시, 각종 문자 등
60	도 곽 선	LINE	

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• **Vectorizing**: For well-preserved cadastral maps

Determination of work type

Vacuum compression

Scanning

Creation of image(TIF) file

Editing digitized files
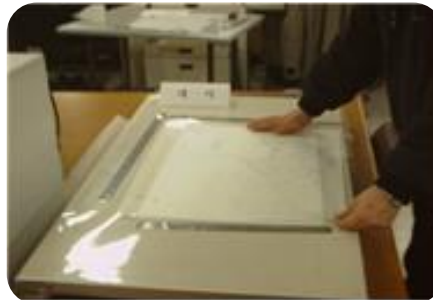
Check between original map and digitized map

Print out of vectorized files

Vectorization of vertex

Submission of final files

• **Digitizing**: **For damaged cadastral maps**

Determination of work type
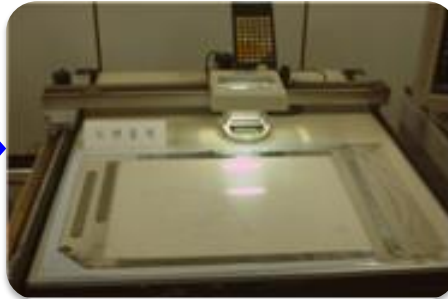
Vacuum Compression

Digitizing: Acquiring curved parcel point coordinate

File creation by digitizing

Submission of Final files

Editing digitized files

Check between original map and digitized map

Print out of digitized file

16

📂 **Cadastral map conservation management**
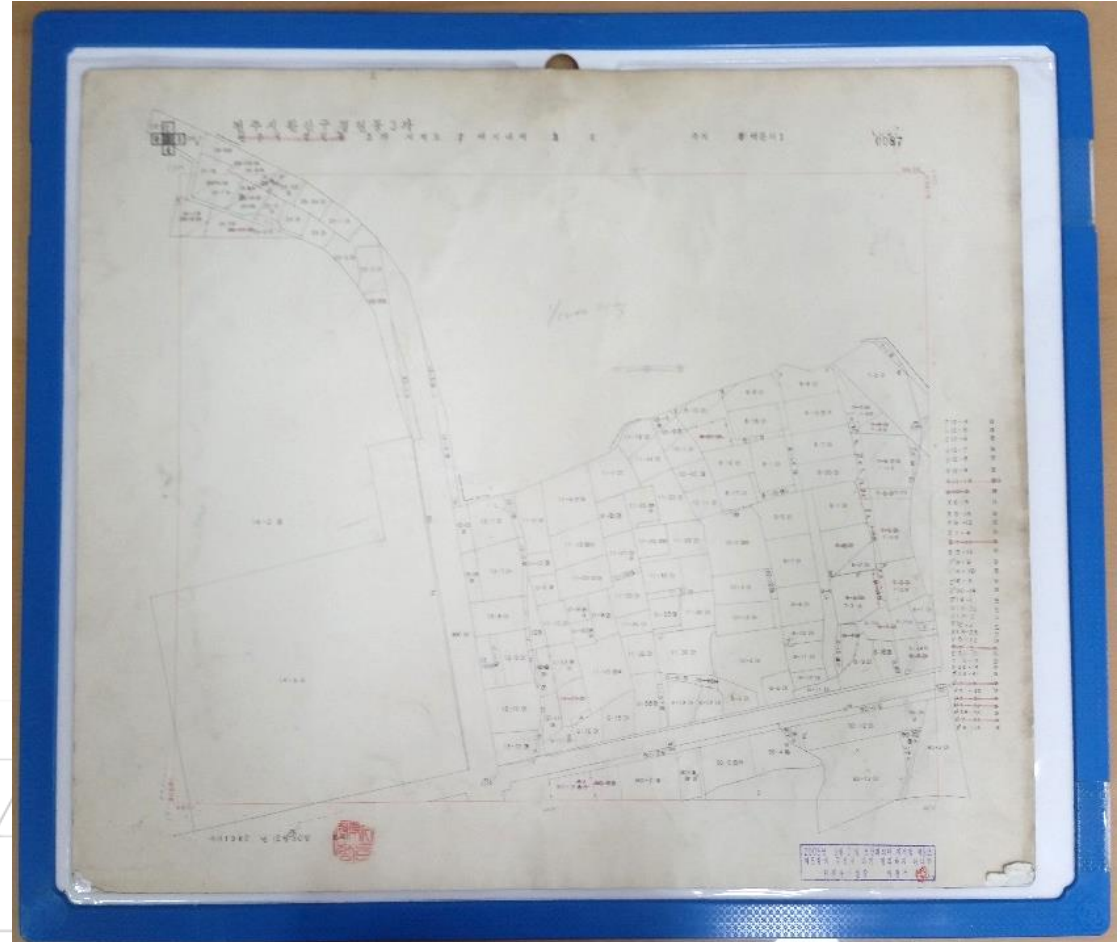
Period of use : 1910 ~ 2005(year)

Part 3

1. **Land Challenges stemming from the rapid development**

2. **The essential steps to creating an integrated Land Information System**

3. **Solution for Land Challenges**

   (Korea Land Information System - KLIS)

Duplication of works

Time-consuming public service

Conflicts of interests

KLIS

Enhance public service

Increase transparency
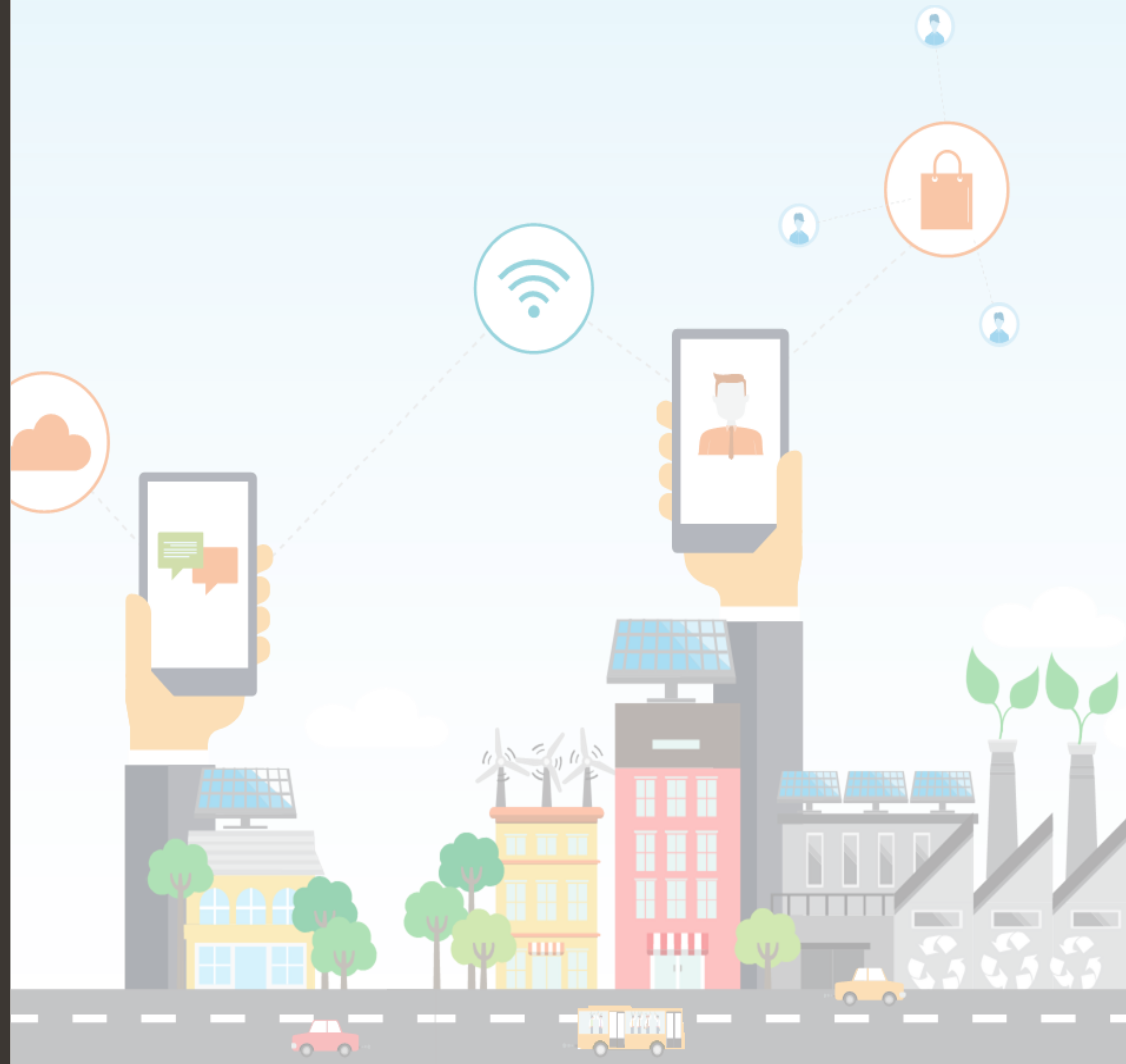
Promote transactions
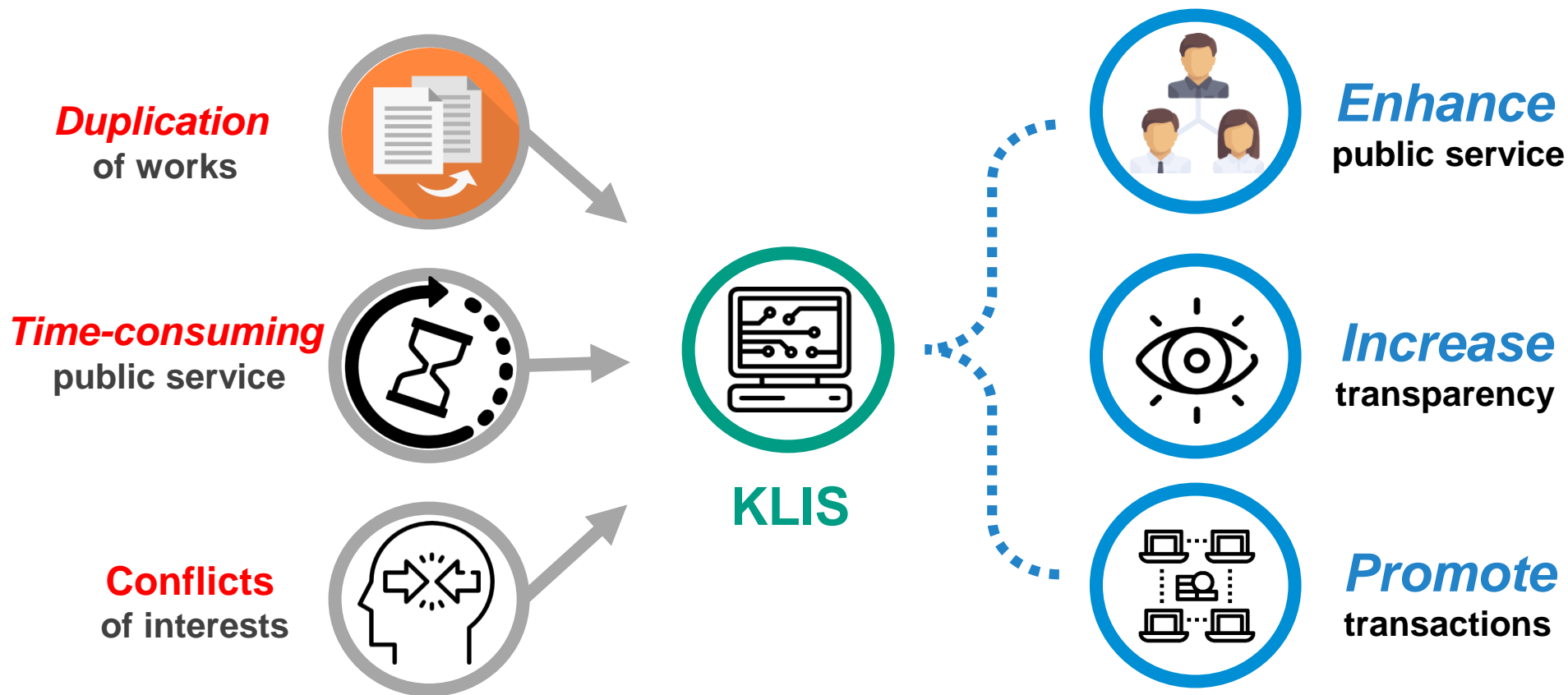
Systematic **Land Administration** & *Innovate* **Civil Services**

Land Information System

Government at Federal and Local levels

Decision Making Dept.

Spatial Planning Dept.

Land Admin Dept.
Civil Engineering Dept.
Civil Appeal Dept.
Cadastral Dept.

Center

Land Spatial DB — National Land Policy DB

Supports Land Policy

Supports Space Based Policy

Region

Land Spatial DB — Urban Land Policy DB

Internet Land Information Service

Public Service Processing

Supports Land Management

Local

Land Spatial DB — Local land Admin DB

Supports Land Administration

Cadastral Register Management

Land Space Data Management

Public Service Processing

Mobile Site Support

Cadastral Surveying Results Management

- Cadastral Map
- Topological Map
- Zoning Map
- Thematic Map
:

DBMS | **GIS Engine**

Middleware

Citizen Services

External Link(94 Systems)

- Urban Planning
- Facility Management
- Construction Admin.
- Etc…

Digitalized Data

Survey Data

Documents

Map Data

KLIS

DB

Land Administration support
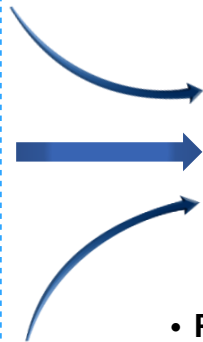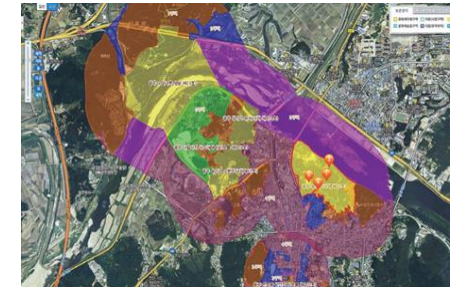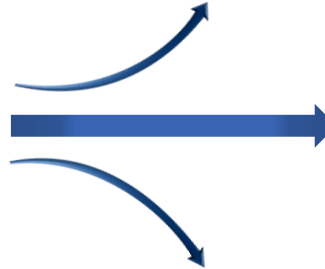
Spatial Data management Sys.

- Real Estate & Transaction
- Urban Planning
- Price & Value
- Taxation
- Land Boundary
- Real Estate Registration
- Property

Internet reading & issuing

Web-based Parcel Docu. Sys.

Serial Cadastral map

Cadastral map

Land Use zoning Map

Land Administration Information

property   agricultural land   forest   development plan   land value

Overseas business
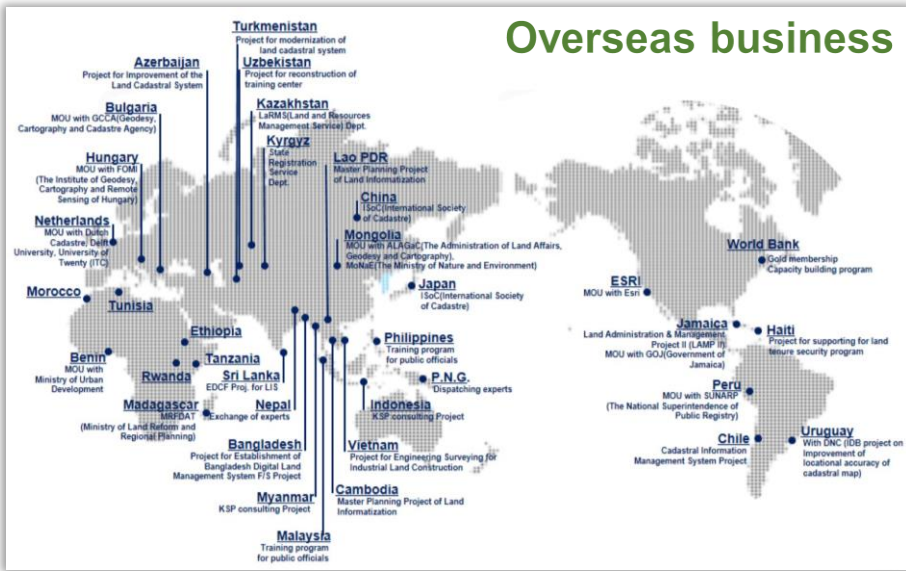
Public Enterprise

Under the MOLIT

* MOLIT : Ministry of Land, Infrastructure and Transport

Established in	Num. of Employees	Organization
1977	*4,566*	*156* regional offices (nationwide)

Main business areas

1 Cadastral Survey	**2** GIS & DB management	**3** Research & System	**4** Consultation & Capacity Building
• Up to date Land Information Service • Resurvey nationwide	• Build GIS data • Land information public service • Advanced integrated information system	• NSDI • Spatial information standardization • Developing new technologies • System Development	• Land administration • Implementation of new GIS technologies • Capacity Building for LA

- Land Survey
- GIS & Data
- Research
- System Development
- Consultation & Training

System Operation

Total Station

- Installation
- Orientation
- Measurement

Bluetooth

Electronic plane table

- Display
- Drawing-based interactive Consulting
- Result

Customer
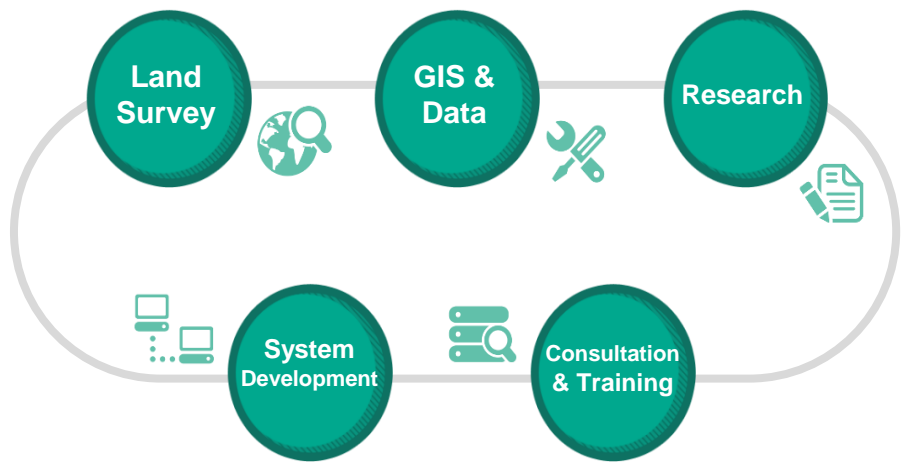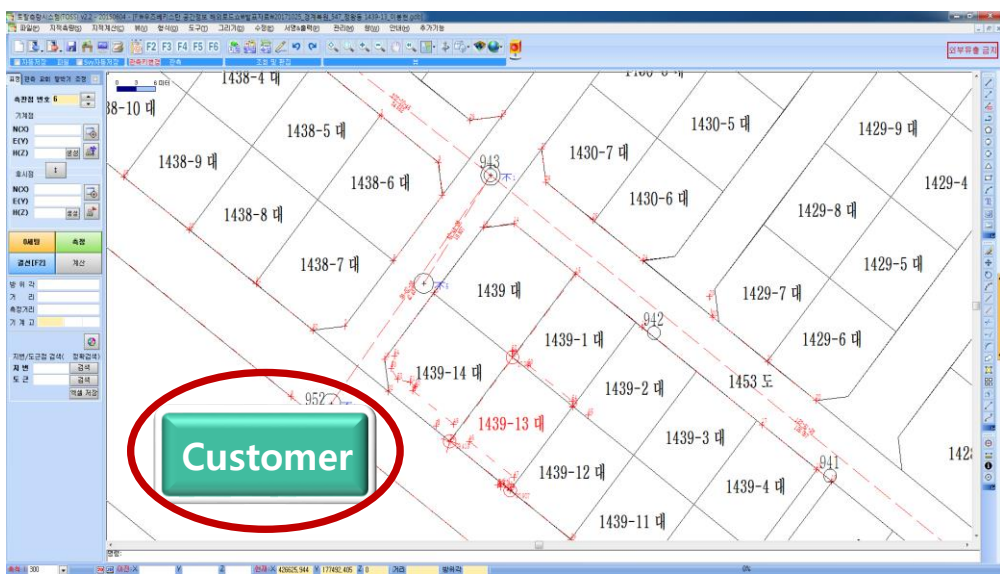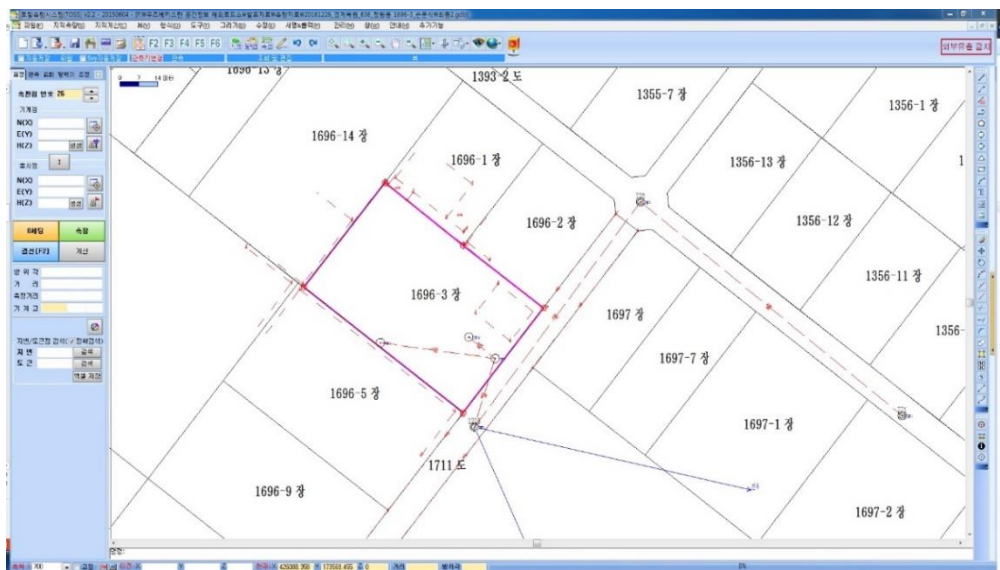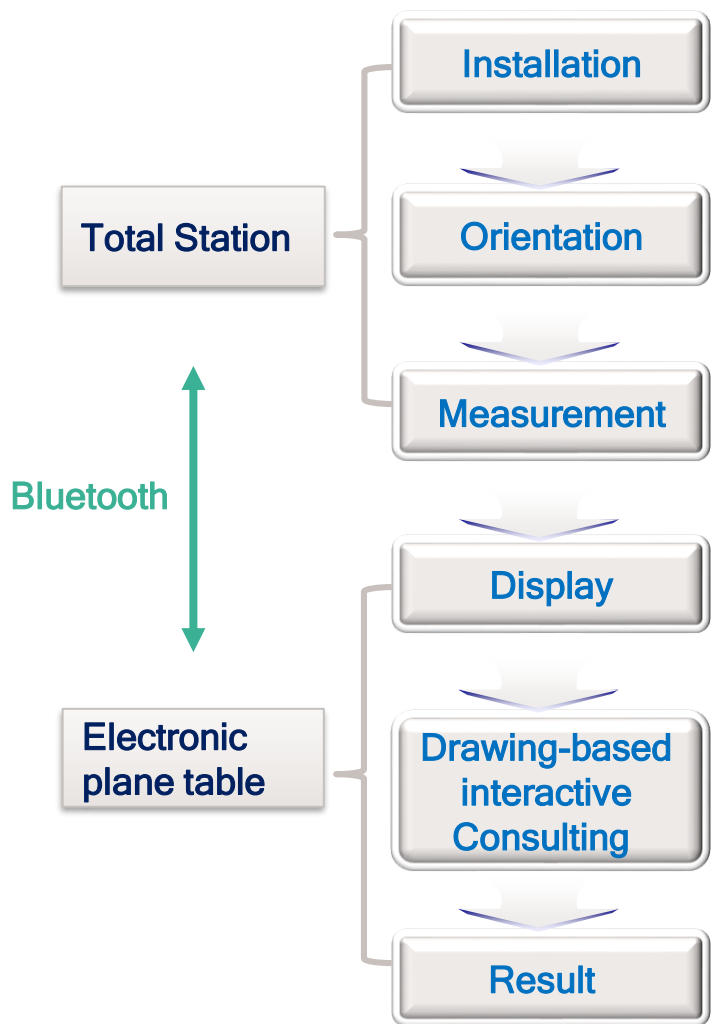
Work Procedure of Land information Alteration

Survey Agent

LX

1 **Basic and Detailed Survey**

2 **Create Survey Result File**

KLIS
For
City & District
Level
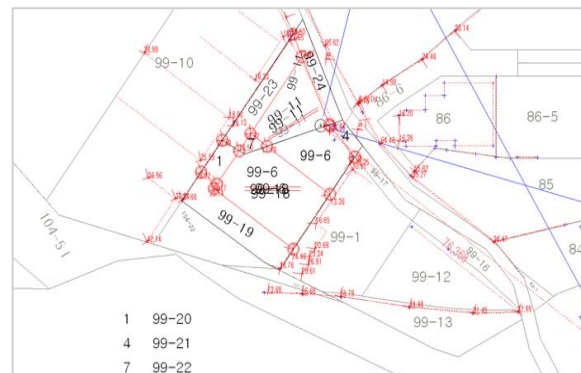
4 **Land Alteration Arrangement**
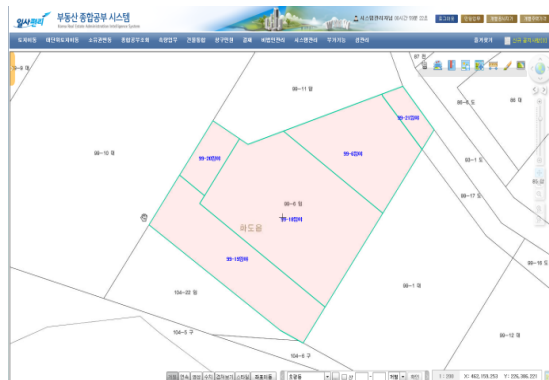
3 **Survey Result Inspection**

토지대장
Cadaster

지적도 등본
Official copy of Cadastral Map

경계점 좌표 등록부
Register of Boundary Coordinate

Certificate of land use planning
토지이용계획 확인서

일반 건축물 대장

Building Register

Certificate of Officially assessed individual land price
개별 공시지가 확인서

Anytime! Anywhere!

KIOSK Service

Online Land Information Service

Certificate of Real Property

Community Center

Bank

Market

Main Function of Mobile Land Information Service

- Evacuation Route
- Land Info. Service
- Navigation
- Area Search
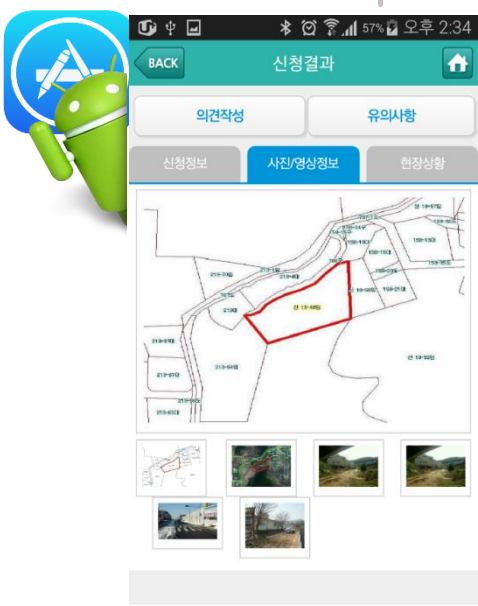
Digitization of railroad construction map and related land parcel book

https://land.kr.or.kr

■ Background

- Increasing utilization value in private and public sector of real estate information
- **Necessity of integration of scattered cadaster, building and ownership information**
- Necessity of improvement in information caused by separated management and discrepancies of information
    - ⇒ Difficulties in integrated construction caused by information discrepancies

■ Purpose

- Construction of **unified real estate administration** based on geospatial information

- Quality improvement of real estate information: Cadaster reinvestigation, information maintenance of real estate

Comprehensive certificate of real estate

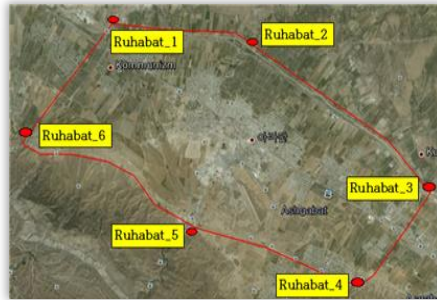## Digitalization → Acquisition → Integration → Utilization

Analog cadaster book and map

Digitalization of cadaster book and map

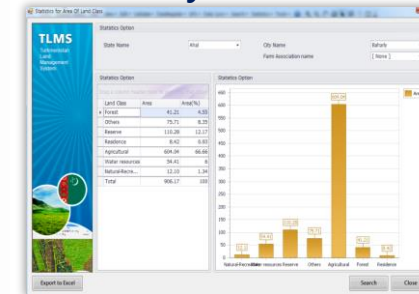**Generate digital cadastral data**

Confirmation of pilot project area
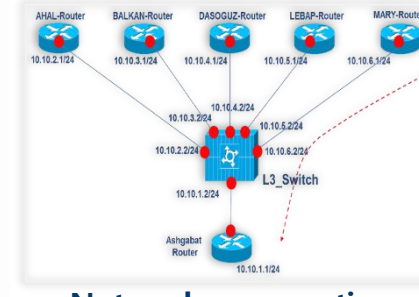

GNSS and field survey

Registration of land parcel

Spatial(Land) info. mgmt. system
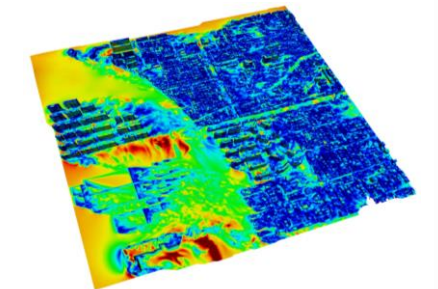

Geospatial statistical data

Networks connection to major city

3D modeling of business area

Building digital twin data

Digital twin utilization service

Well Timed - Law & Policy

THANK YOU !