What we have learned from the National Spatial Big Data Project of Korean Government

NOV 4, 2022

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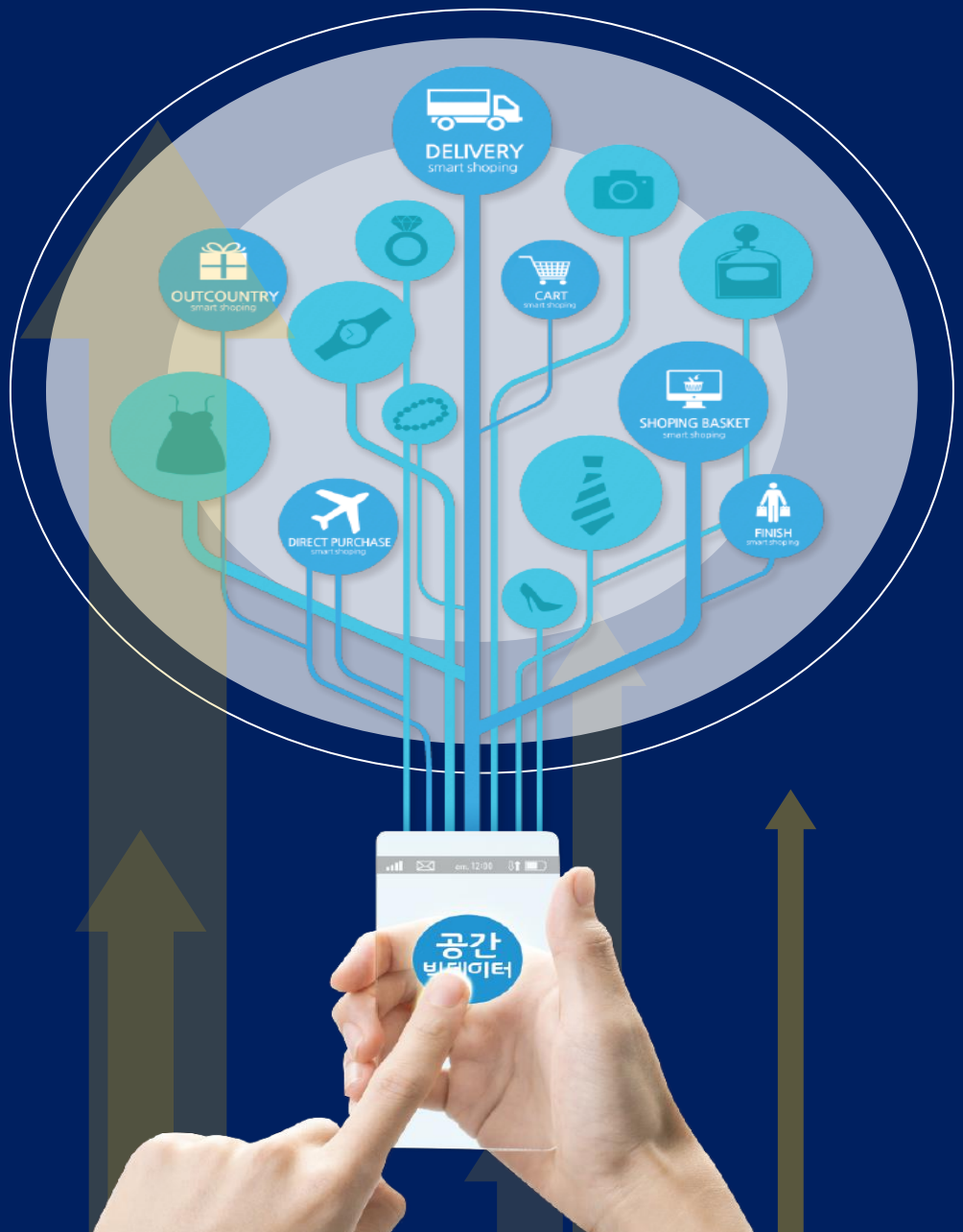

Junyoung CHOI, Ph.D.

Seoul Institute of Technology (2020 ~)
- Research fellow, 2020 ~

OSGeo (Open Source Geospatial Foundation)
- Charter member, Korean Chapter member
- FOSS4G ASIA 2023 Seoul Co-chair

*FOSS4G: Free Open Source Software for Geospatial

Korea Land and Housing Corp (2006 ~2020)
- Manager, Urban Project Office, 2018 ~ 2020
- Staff Secondment, UN-Habitat, 2018
- Manager, Spatial Information Office, 2006~2018,

PMO for Ministry of Land, Infrastructure and Transport, Republic of Korea

- Land for Housing Information System (2006~2007)
- National Housing supply Statistics (2007~2008)
- Public Housing Site Construction Information System (2009)
- GIS based Integrated Building Information (2009)
- ISP on the Unification of Real Estate Administration Information(2009)
- National Spatial Data Infrastructure Project[NSDI] (2008, 2010~2011)
- Korea Land Information System[KLIS] (2012)
- National Spatial Big Data Project (2013~2018)

Korea Local Information research Development Agency(2003~2006)
- Researcher, e-Loacl gov. policy research

CONTENTS

What we have learned from the National Spatial Big Data Project of Korean Government

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01. National Spatial Big Data - Project

- Background
- Spatial Big Data Project
- History

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1.1 Background

Support for various analysis of convergence big data

The basis of sharing and utilization of spatial big data

Administrative efficiency

- Responding to current issues and forecasting the future
- Providing customized services optimized for regions and individuals
- Understanding the needs of the people in advance

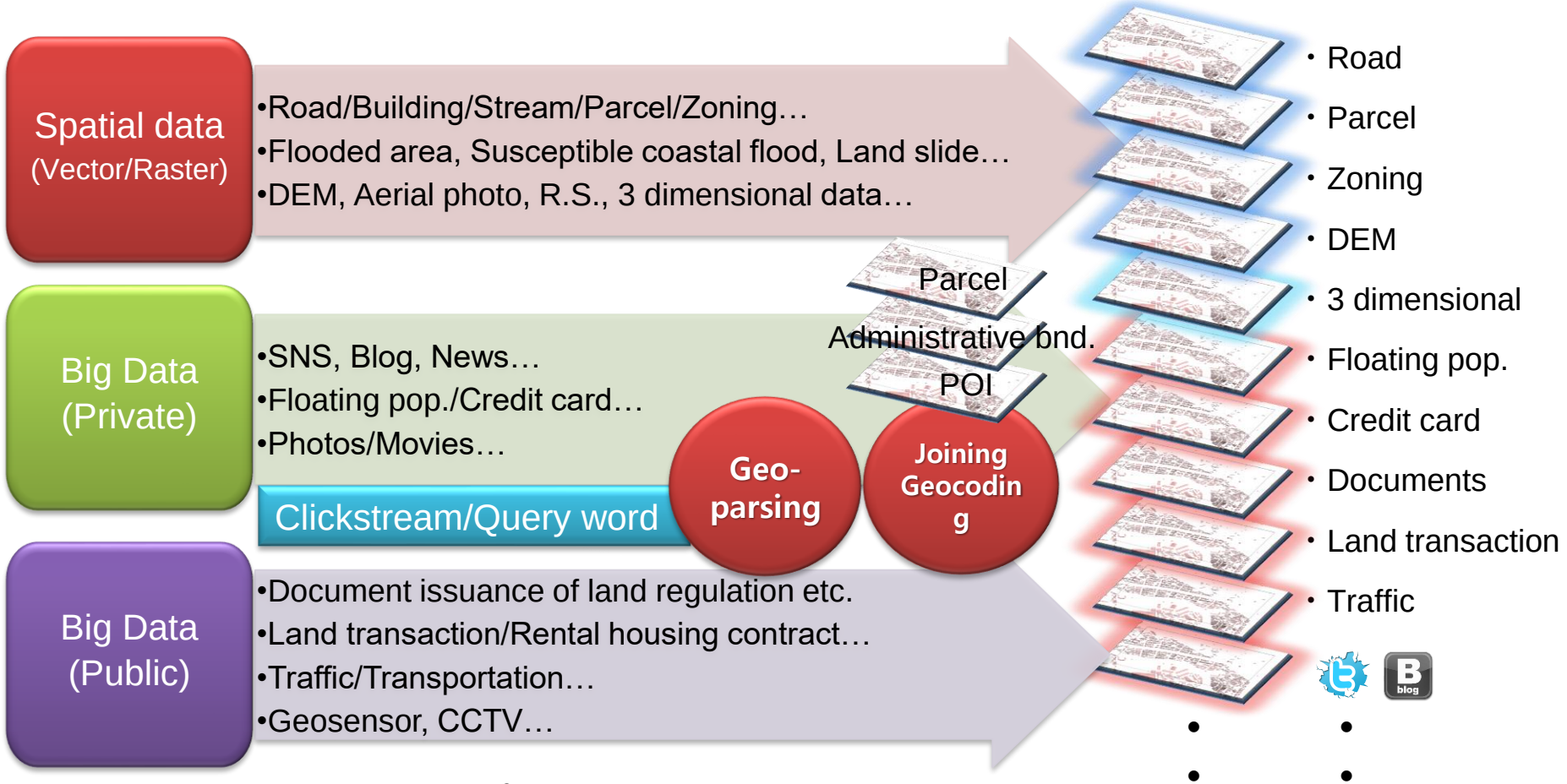
Industry creation

- Revitalization of private industry by leading spatial big data technology
- Creation of creative business opportunities based on spatial data and analysis technology

People's Convenience

- Spatial-based analysis enables rapid response to potential complaints
- Analysis of complex social phenomena

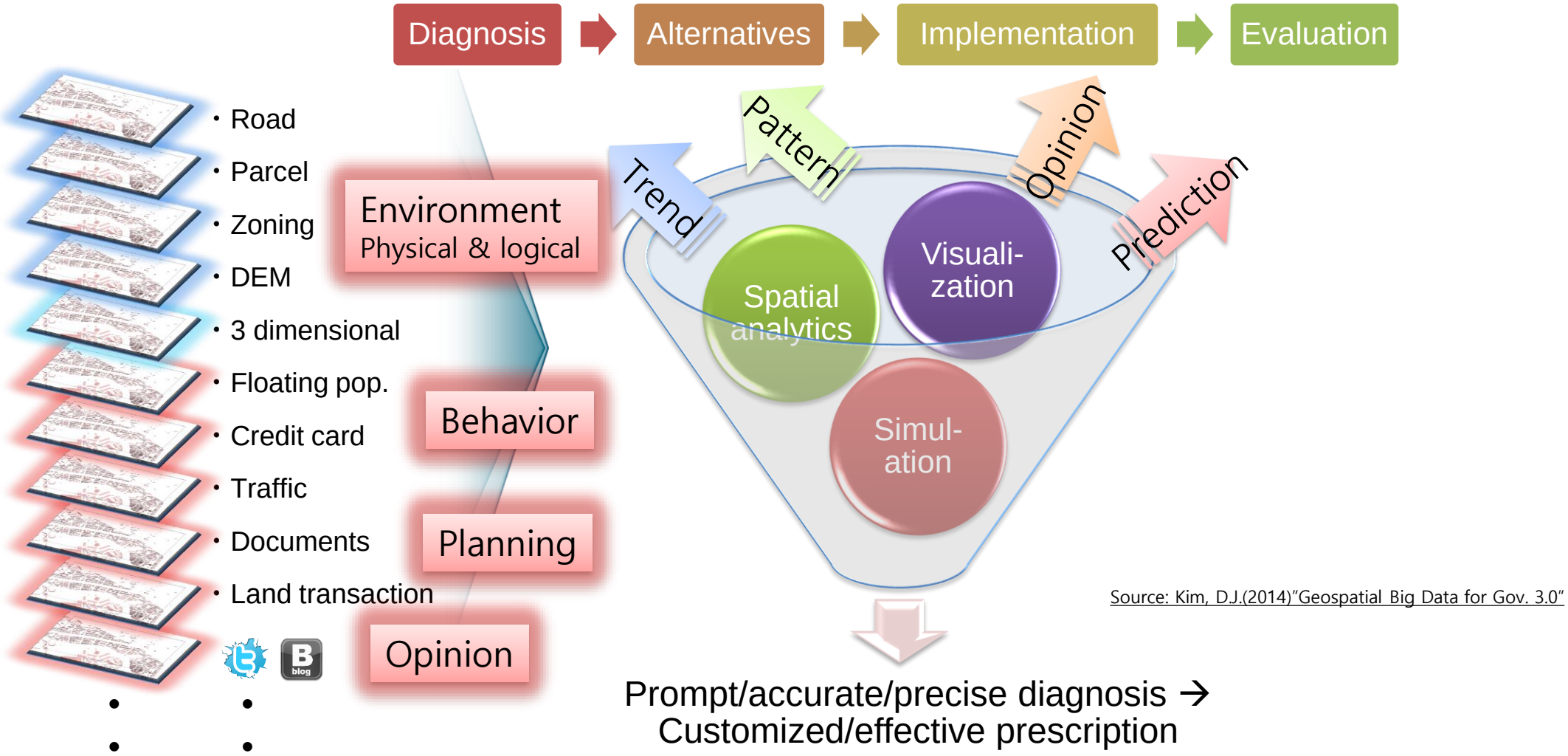
1.2 Spatial Big Data Project



Over 80% of Big Data is also geographically referenced!

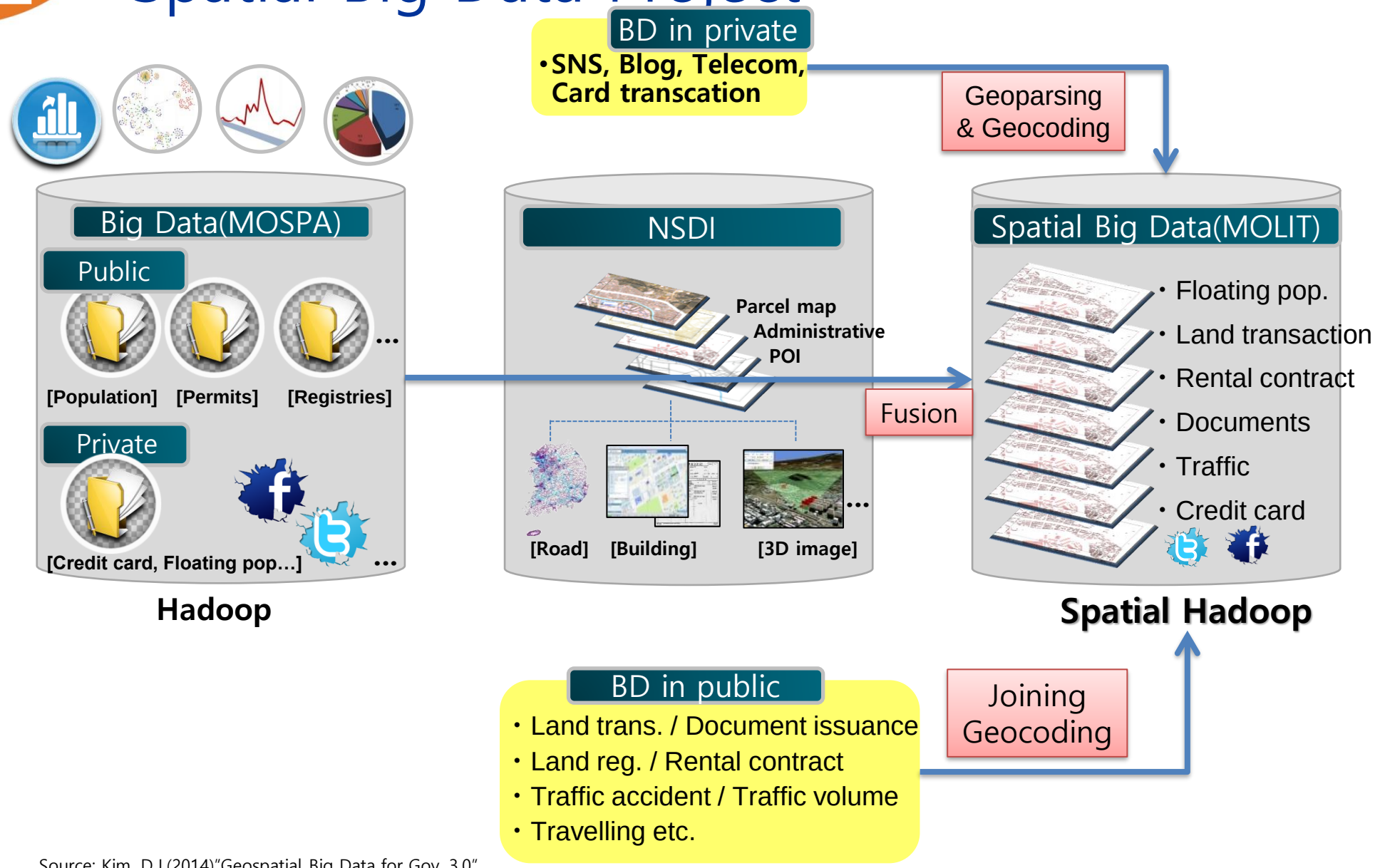
Source: Kim, D.J.(2014)"Geospatial Big Data for Gov. 3.0"

1.2 Spatial Big Data Project



Source: Kim, D.J.(2014)"Geospatial Big Data for Gov. 3.0"

1.2 Spatial Big Data Project



Source: Kim, D.J.(2014)"Geospatial Big Data for Gov. 3.0"

1.3 History

2008 ~2012
National Spatial Data Infrastructure Project

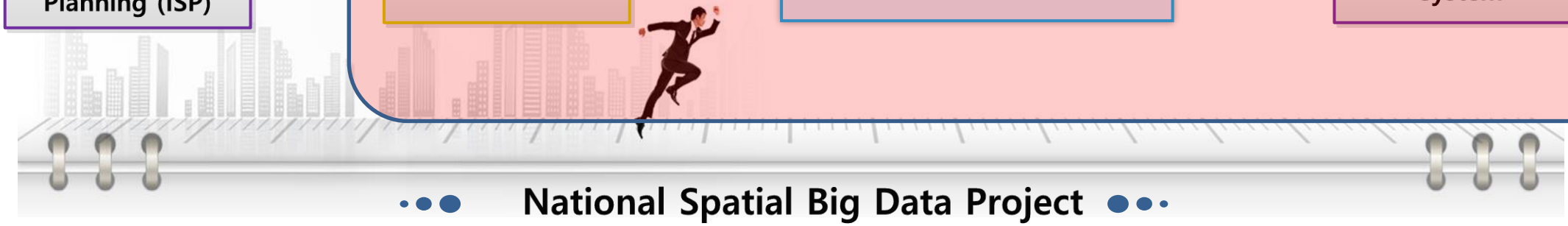
2012
NSDI Development Plan (Later Spatial Big Data Master Plan)

2013
Information Strategy Planning (ISP)

2014~2016
1st, 2nd (Building foundation)

2017 ~2018
System foundation

2018~2019
Upgrading the system



National Spatial Big Data Project

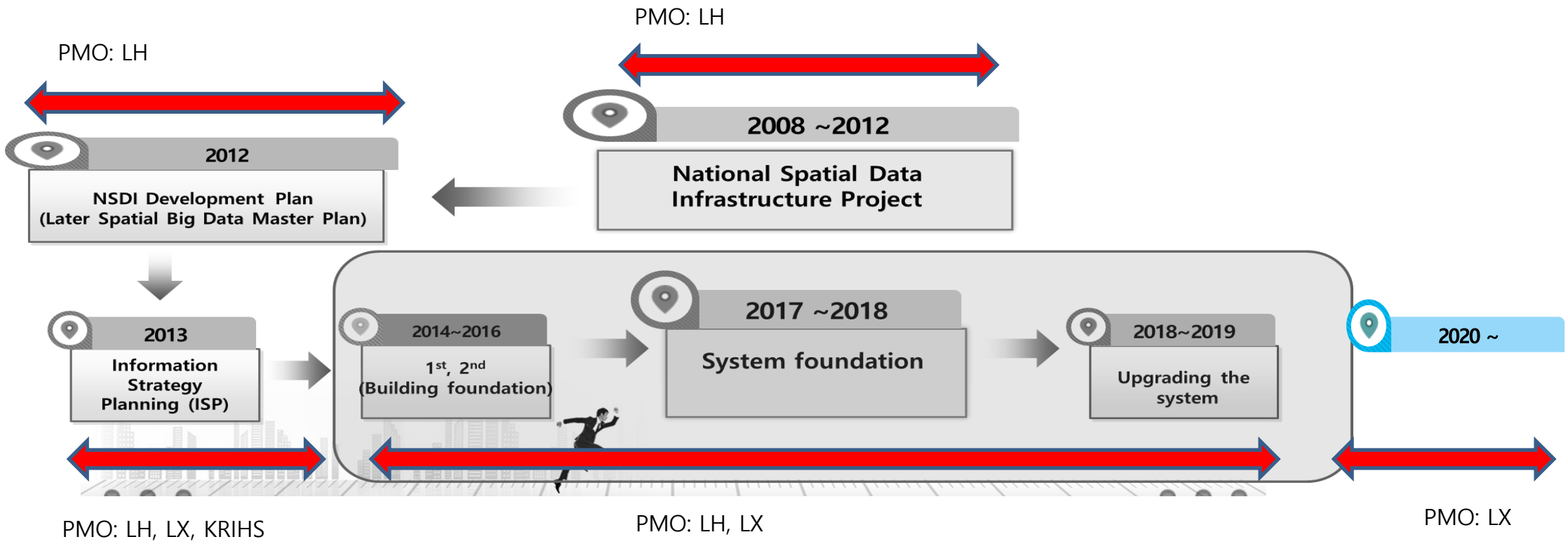
Basic DB
Converged DB

Analysis Platform

Utilization Service

Analysis support

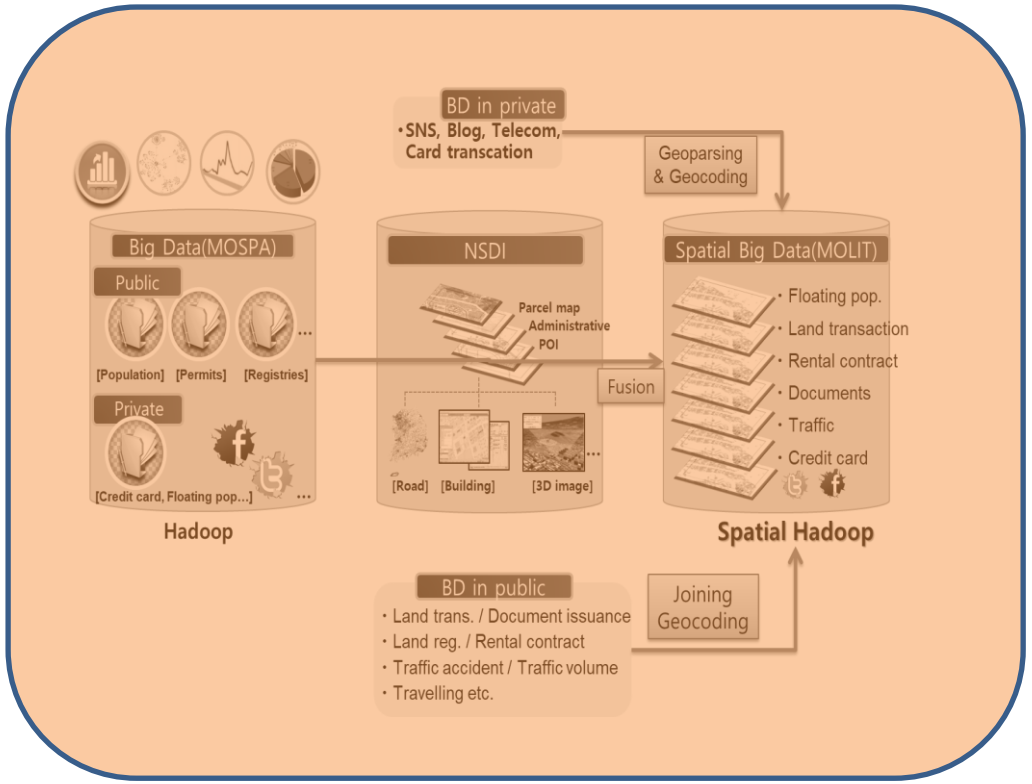
1.3 History: Who manage the project



PMO: Program Management Office
LH: Korea Land and Housing corp.
LX: Korea Land and Geospatial Informatix corp.
KRIHS: Korea Research Institute for Human Settlement

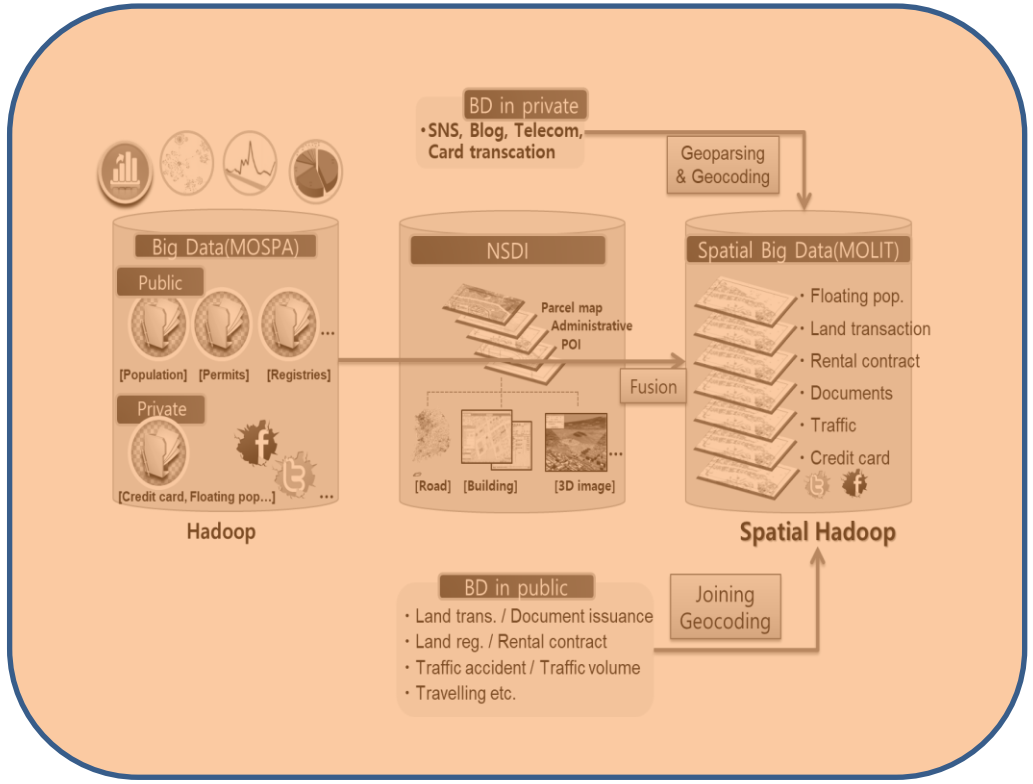
1.3 History: Financial vs R&D program

National Spatial Big Data Project
(Finance program, 2014~)



Parallel
Process

National Spatial Big Data R&D
(National R&D program, 2014 ~ 2018)



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02. National Spatial Big Data - Spatial Big Data Analysis

- Basic Configuration
- Spatial Analysis

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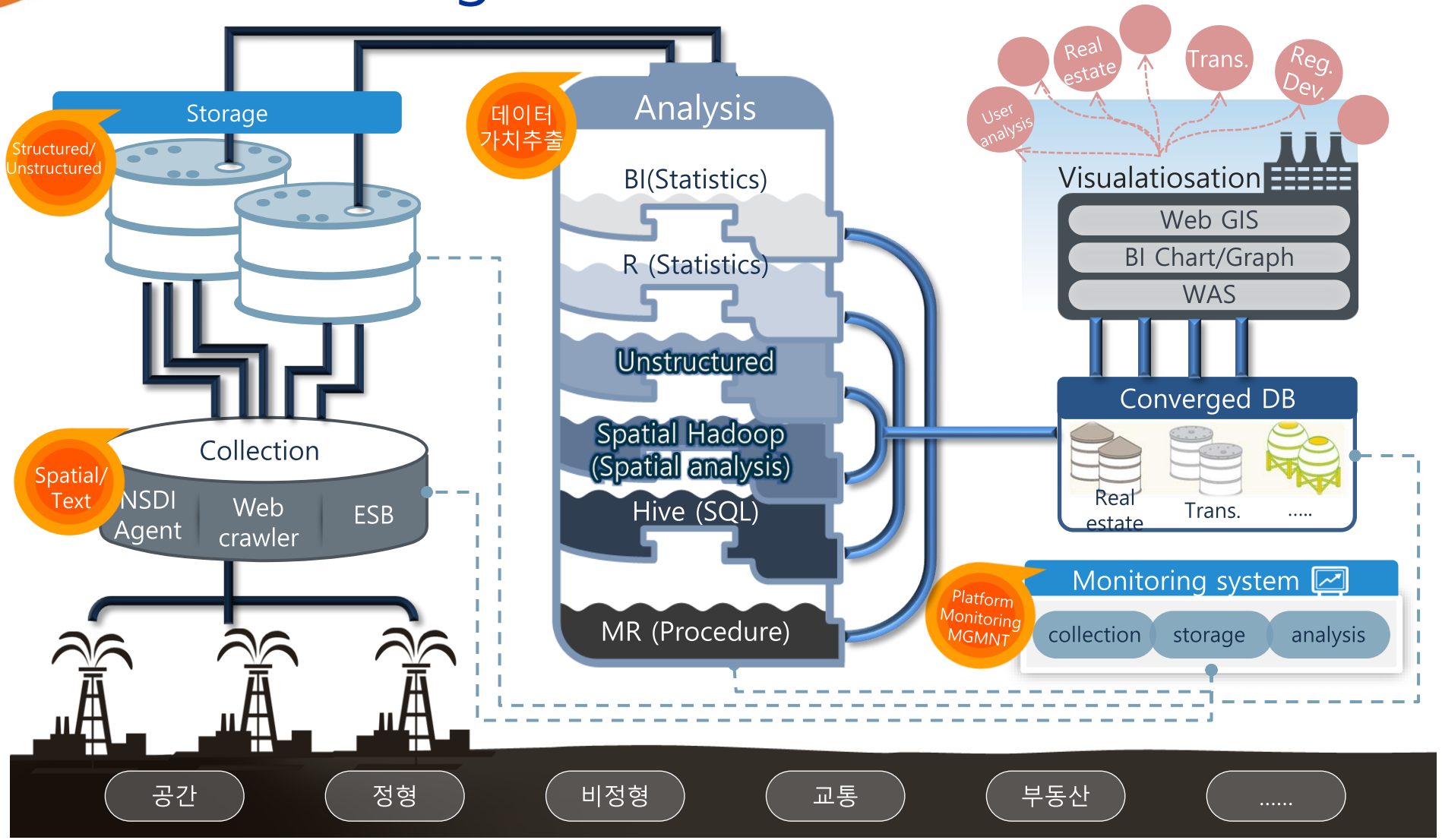
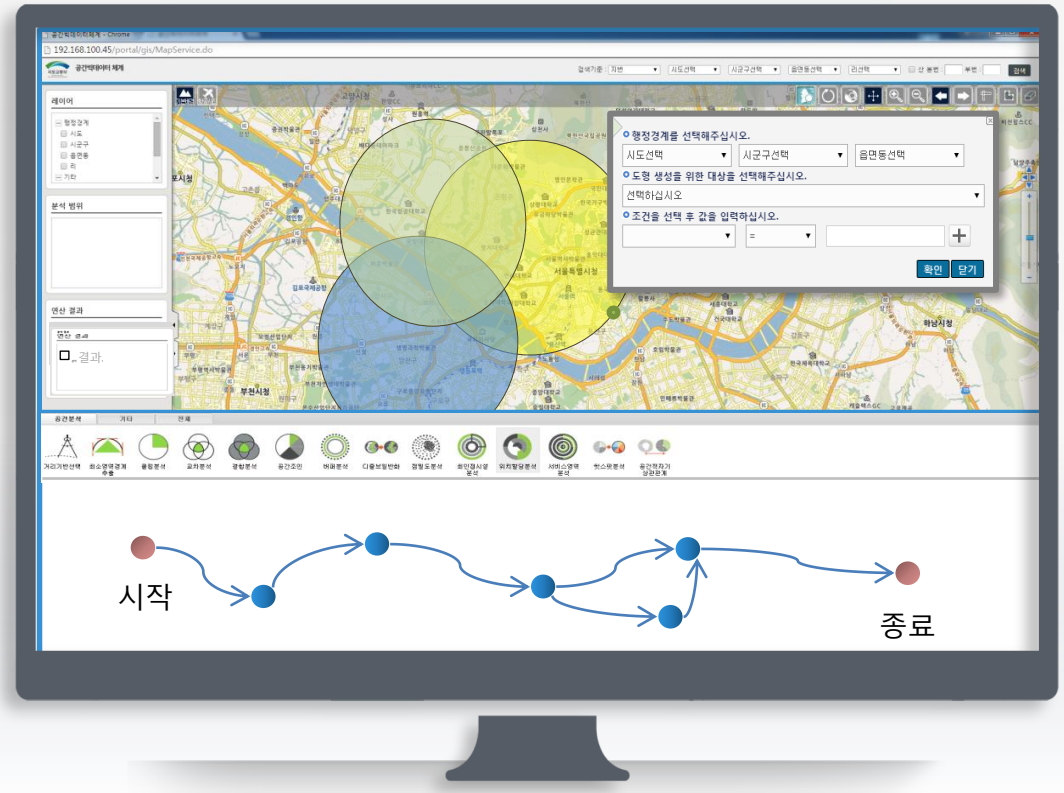
2.1 Basic configuration



2.1 Basic configuration

Agile management based on the Scientific data driven decision support according to Increasing analysis service needs

Interactive spatial analysis



Converged DB & Analsysis

Distance

기준피처로부터
거리
포함
찾거
산출

예) 지

ServiceArea

네트
주변
영역
에서
내에
거리
예)

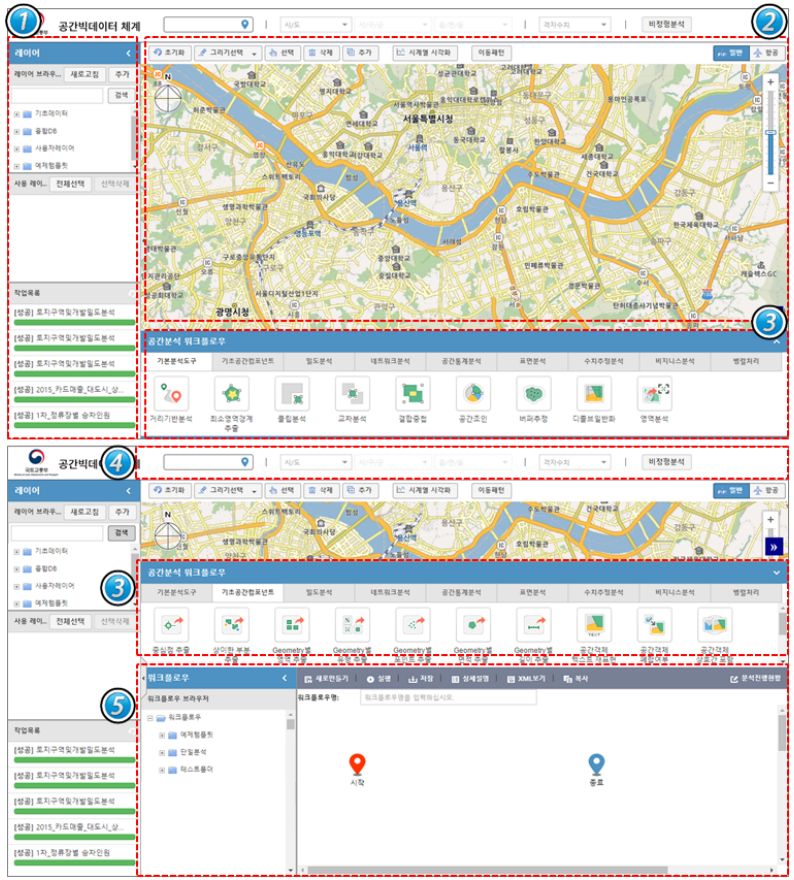
HotSpot Analysis

범죄 및 교통사
고 데이터와 소
매점포의 총매출
과 같은 값이 있는 피처를 분석하여
높은값(핫스팟)과 낮은 값(콜드팟)의
통계적으로 특별한 지점
예) 우범지역, 전세대란 지역 분석

※34 spatial analytical functions
such as Hotspot and zonal analysis (2015)

2.2 Spatial Analysis

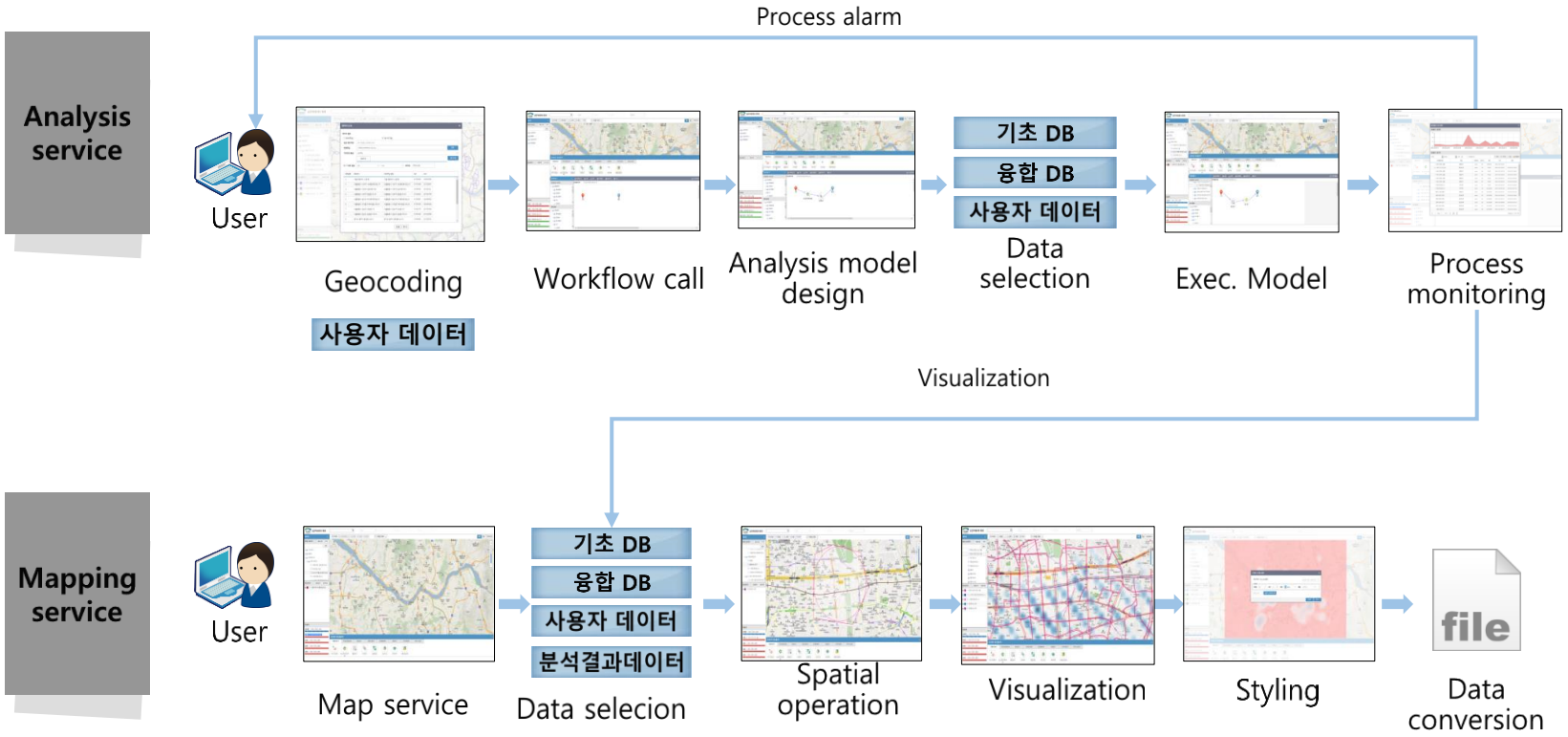
Utilize map & spatial analysis tool



No	기능		설명
①	레이어 도구	레이어 브라우저	활용 가능한 기초데이터, 융합데이터, 사용자데이터리스트 보기
		사용자 레이어	지도화면에 시각화 되어지는 데이터 리스트
		작업목록	직접실행 및 모델생성 후 실행(작업) 리스트
②	지도 화면 도구	초기화	지도 초기화면으로 돌아오기
		그리기선택	지도 위에 사용자가 원하는 형태로 면 그리기
		선택	지도 위에 그려진 면 선택
		삭제	지도 위에 그려진 면 삭제
		추가	지도 위에 사용자가 원하는 면 형태 추가
		시계열 시각화	시계열 형태로 시각화 가능한 데이터 설정
		이동패턴	이동형태를 시각화 가능한 데이터 설정
		일반/항공	일반 지도, 항공사진 지도 선택
		인덱스 맵	작은 축척의 지도 화면을 우측 하단에 표출
③	분석 라이브러리 도구	기본분석도구	사용자 기본 분석을 위한 9가지 라이브러리
		기초공간컴포넌트	사용자가 원하는 데이터 추출, 검증을 위한 15가지 공간 컴포넌트
		밀도분석	사용자 밀도 분석을 위한 3가지 라이브러리
		네트워크분석	사용자 네트워크 분석을 위한 5가지 라이브러리
		공간통계분석	사용자 공간통계 분석을 위한 7가지 라이브러리
		표면분석	사용자 표면 분석을 위한 3가지 라이브러리
		수치추정분석	사용자 수치추정 분석을 위한 3가지 라이브러리
		비지니스분석	사용자 비지니스 분석을 위한 5가지 라이브러리
		병렬처리	병렬 분석을 위한 2가지 처리 라이브러리
④	검색 도구	지역통합검색	지역 검색 기능
		지역선택검색	시도/시군구/읍면동 선택 후 검색 기능
		격자내검색	격자내 검색 기능
		비정형분석	비정형분석 기능 – 감성분석, 트랜드분석 등
⑤	워크플로우 도구	워크플로우브라우저	사용자 생성 워크플로우(모델) 및 예제템플릿 모델 리스트 보기
		새로만들기	워크플로우(모델) 캔버스 초기화
		실행	생성된 워크플로우(모델) 실행
		저장	생성된 워크플로우(모델) 저장
		상세설명	생성된 워크플로우(모델) 상세설명
		XML보기	생성된 워크플로우(모델) XML 보기
		복사	생성된 워크플로우(모델) 복사
		워크플로우명	사용자가 생성한 워크플로우(모델) 명 입력
		분석진행현황	실행되고 있는 사용자 워크플로우(모델) 분석진행현황 보기
		캔버스	사용자 워크플로우(모델) 생성을 위한 캔버스

2.2 Spatial Analysis

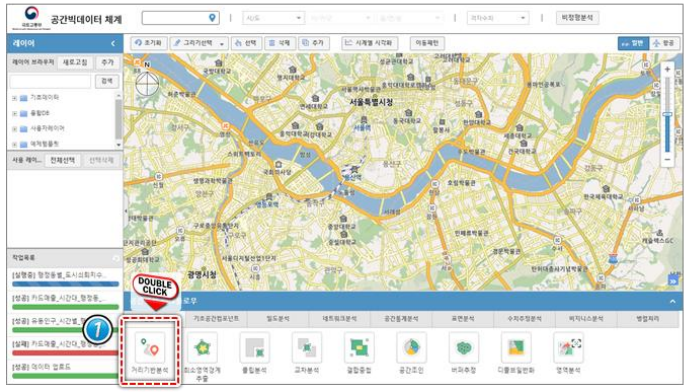
Procee based management using map and analytical functions



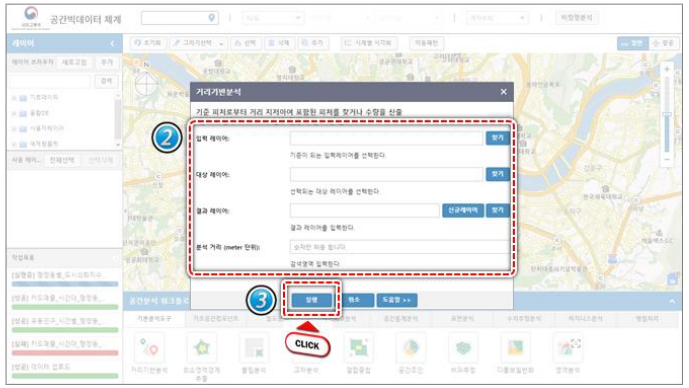
2.2 Spatial Analysis

Direct execution of mapping and spatial analysis

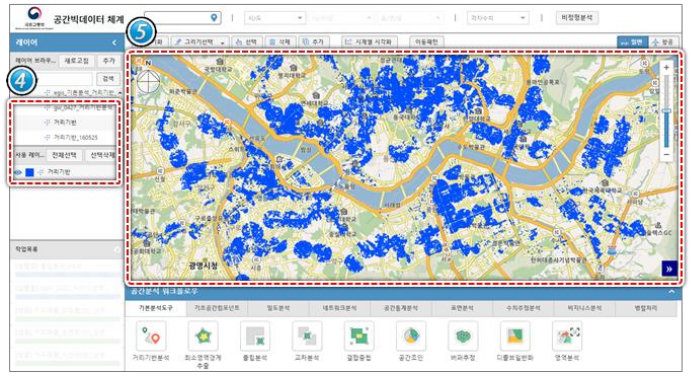
▪ 1. 단일 공간 분석 - 공간라이브러리 직접 실행



▪ 2. 입력 파라미터 설정 및 실행



▪ 3. 분석결과 지도 시각화



사용방법

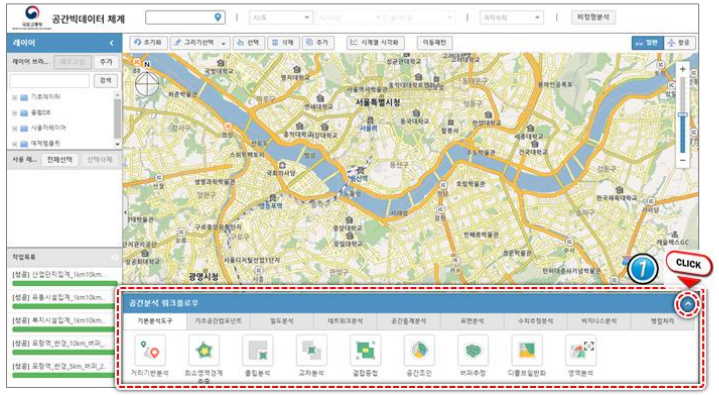
공간빅데이터체계 사이트 로그인 후 지도&공간분석 서비스 메뉴 클릭 후 사용

1. 사용자가 원하는 공간분석 라이브러리(아이콘) 더블클릭
2. 사용자 공간분석을 위한 파라미터 입력창 팝업 및 분석을 위한 파라미터 값 입력
3. 실행 버튼 클릭 – 분석 수행 (단, 사용자 분석모델 생성은 하지 않음. 분석결과만 있음)
4. 사용자 공간분석 실행 후 레이어 브라우저에 등록되어진 사용자 분석결과 레이어 더블클릭
5. 사용자 레이어 브라우저에 사용자 공간분석 결과 이동 및 지도 시각화

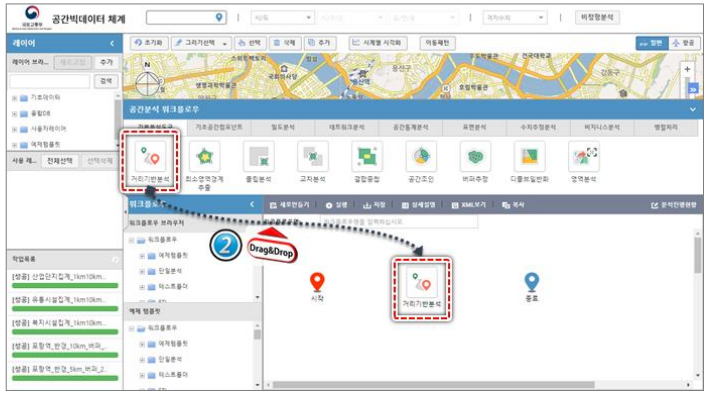
2.2 Spatial Analysis

Work flow of mapping and spatial analysis

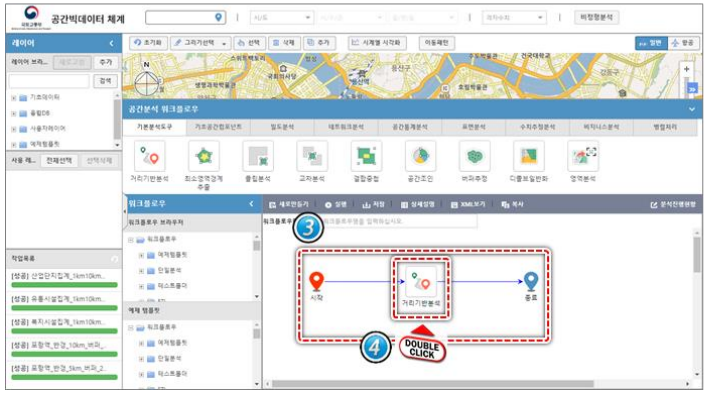
▪ 1. 공간분석 워크플로우 캔버스 활성화



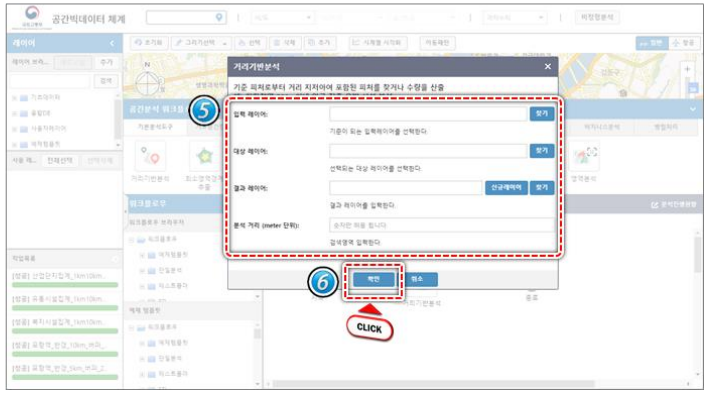
▪ 2. 사용자 워크플로우 만들기 – 단일 분석 모델 만들기



▪ 3. 입력 파라미터 설정 및 실행



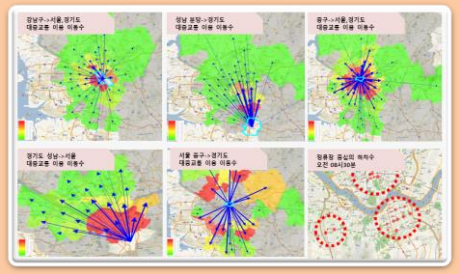
▪ 4. 공간라이브러리 파라미터 입력



2.2 Spatial Analysis cases

Pilot analysis

Mass transportation



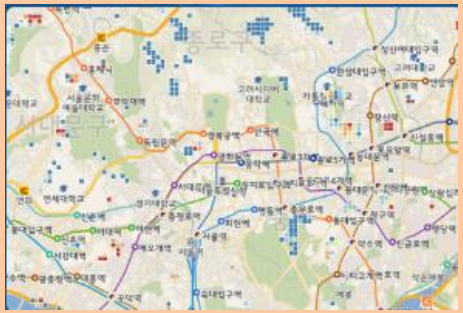
Traffic accident

Regional development

Safe city with CCTV install

Standard analysis model

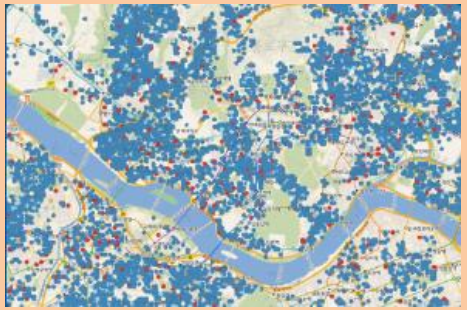
Bus stop blind area analysis



Analysis of garbage dumping area

Smart bus stop location analysis

Medical usage analysis map



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03. What we have learned from the project

- Relationship with NSDI
- Management system
- Planning and design of system
- Human resources

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3.1 Relationship with NSDI

- NSDI vs Spatial Big Data Project
  - NSDI project is the precondition of the National Spatial Big Data project
  - Linked with major e-government projects that can provide the attributes of spatial data along with spatial big data
  - Rather than providing complex analysis functions, shift towards providing common use modules and examples
- Do we need custom integrated data?
  - Low utilization compared to investment
  - If it is the integrated data required for a highly useful analysis model, it can be effective.
  - The key is to operate and manage integrated data with the latest data rather than building it.

3.2 Management of the project

- Management structure
  - Establishment of a professional support group or **Project Management Office(PMO)** for business planning and management in state owned enterprise or public institute (LH, LX, KRIHS etc.)
  - PMO members need experts in the field of system management and spatial analysis, and it is necessary to share roles between the government and PMO.
- Relationship with other project
  - Research in advance is effective for system planning, but it is difficult for all of the R&D results to be utilized in financial projects.
  - Periodic and mutual relationship formation between NSDI and e-Government projects is necessary.

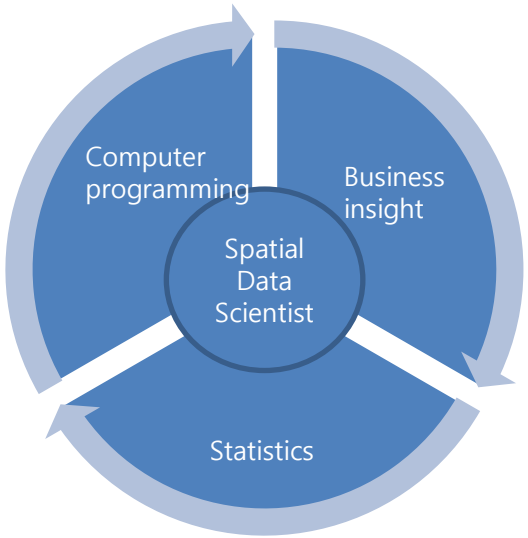
3.3 Planning and design of the project

- Planning and design of the System
  - The national system is designed to be flexible in consideration of future technology and demand changes.
  - To faithfully provide data with only basic functions as a minimum infrastructure(recognized as over investment if under utilized).
  - To create an environment for sharing analysis cases in which various cases analyzed through the system can be shared and new analyzes can be made based on already analyzed cases.

3.4 Human resources

Human resources

- It is difficult for public officials to become experts, and it is important to train data scientists inside and outside the organization.
- It is cost-effective to hold data analysis contests to stimulate data use and nurture talent data analyst.



•Spatial Big Data Analysis Contest

[Interview with the 2015 Contest winner]

[Interview with the 2015 Contest winner]

Thank you

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