



Ministry of Public Safety and Security
National Disaster Management
Research Institute

Open Public Data Service

Raising Awareness of Disaster Reduction in Korea using ICT and Geo-Big Data

Disaster Information Research Division
Deputy Scientific Director / Ph.D.

Kyungsoo Pyo

2016.9.27

Extremely Dangerous Society

Global Environment Changes

Climate changes,
Depletion of natural resources



Unpredictable Social Threats

Difficulty of terror sensing

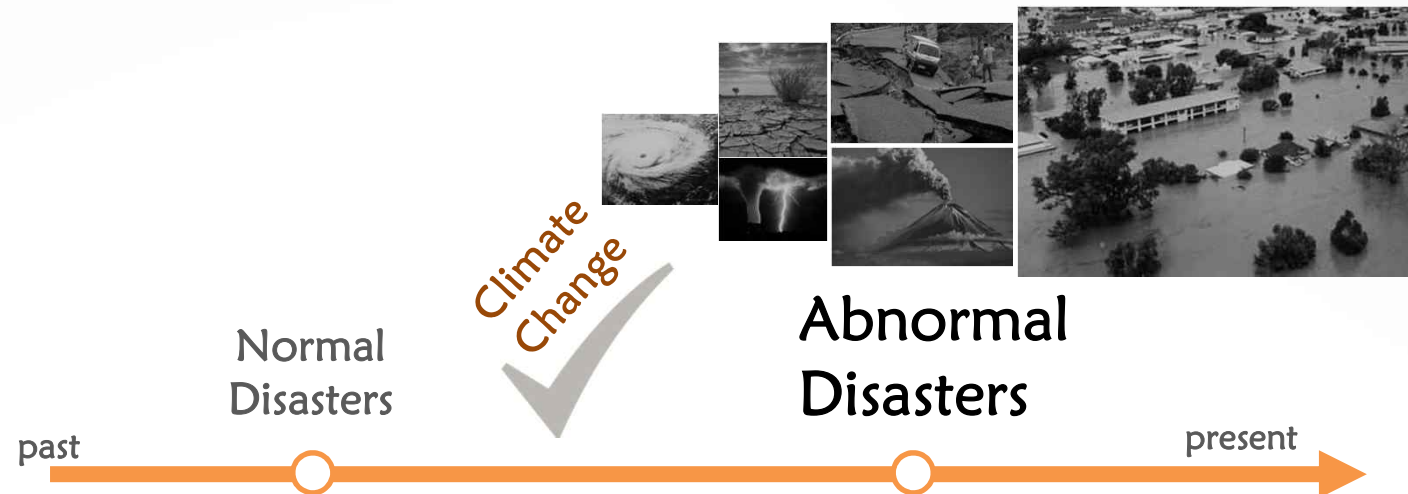


Cross-border Movement with Globalization

Foot-and-mouth disease
AI



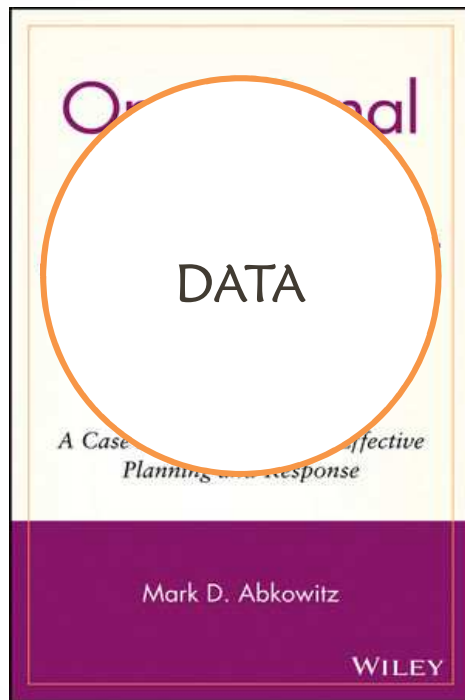
New Normal Era



- Combined disasters
- Growth of disaster size
- Increase of frequency of disaster
- Increase of scale of damage

⇒ **Paradigm Changes** for disaster management
on risks and uncertainties

Wisdom of disaster management



01. No signs, no disasters
02. Failure of information sharing is a disaster
03. Excessive profit is to begin of disaster
04. Misjudgment of experts is short cut of disaster
05. Rushed measure is cause of disaster
06. Thorough ready is made even bad luck into a chance
07. Policy ignored disaster characteristics is a disaster
08. Incorrect politics upgrades disaster
09. Breaking rules is the catalyst for disaster
10. Lock the stable door after the horse is stolen
11. No disaster prevention, only decrease in disasters
12. Learning from real world disasters



Social – Big Data

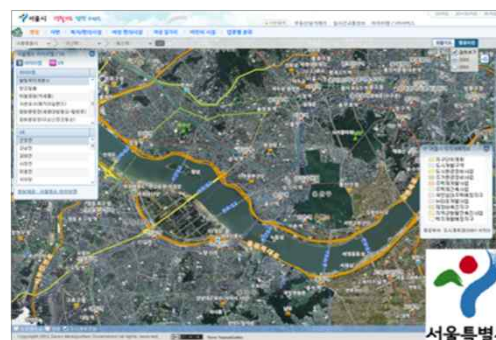
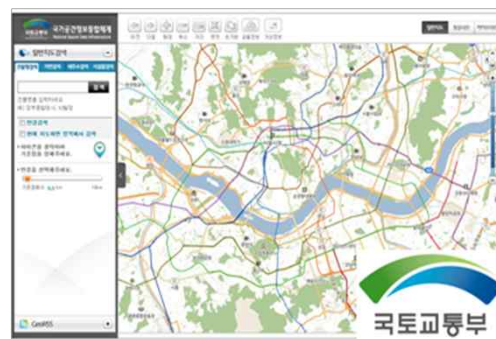


We need **data utilization
for adapting paradigm
changes of disaster
management**

Structured Data

• Application data in organization

Records and transactions stored in database in organization : weather, traffic, tide, landslide, ...



Unstructured Data

- Man-made data and machine-made data

- Social Network data created by human and Stream data made by various sensors like CCTV
- Velocity of unstructured data creation is **very fast** and volume is **very big**



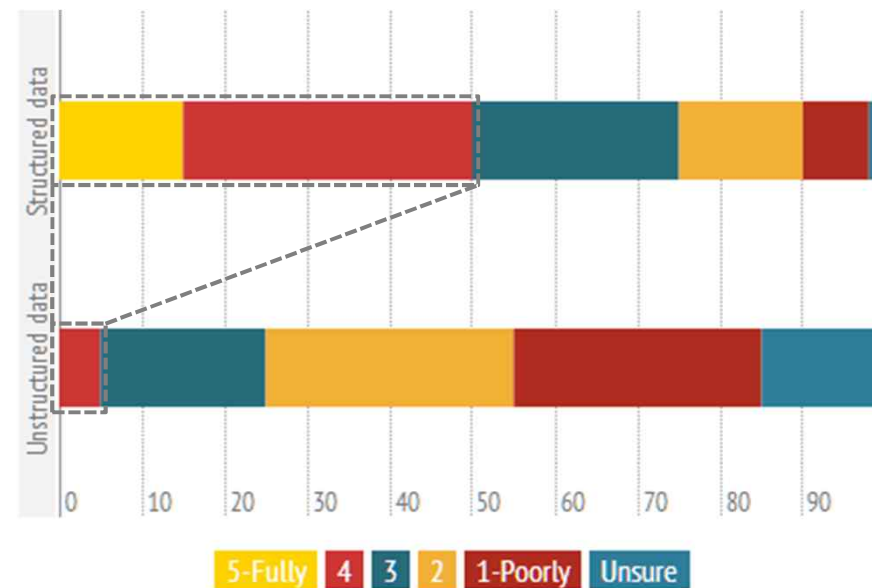
Degree of Exploiting Organization's Data

80% ~ 90% of Big data is
Unstructured data

What degree do organizations exploit their data
for analysis and decision making purposes?

Degree of Exploiting Organization's Data

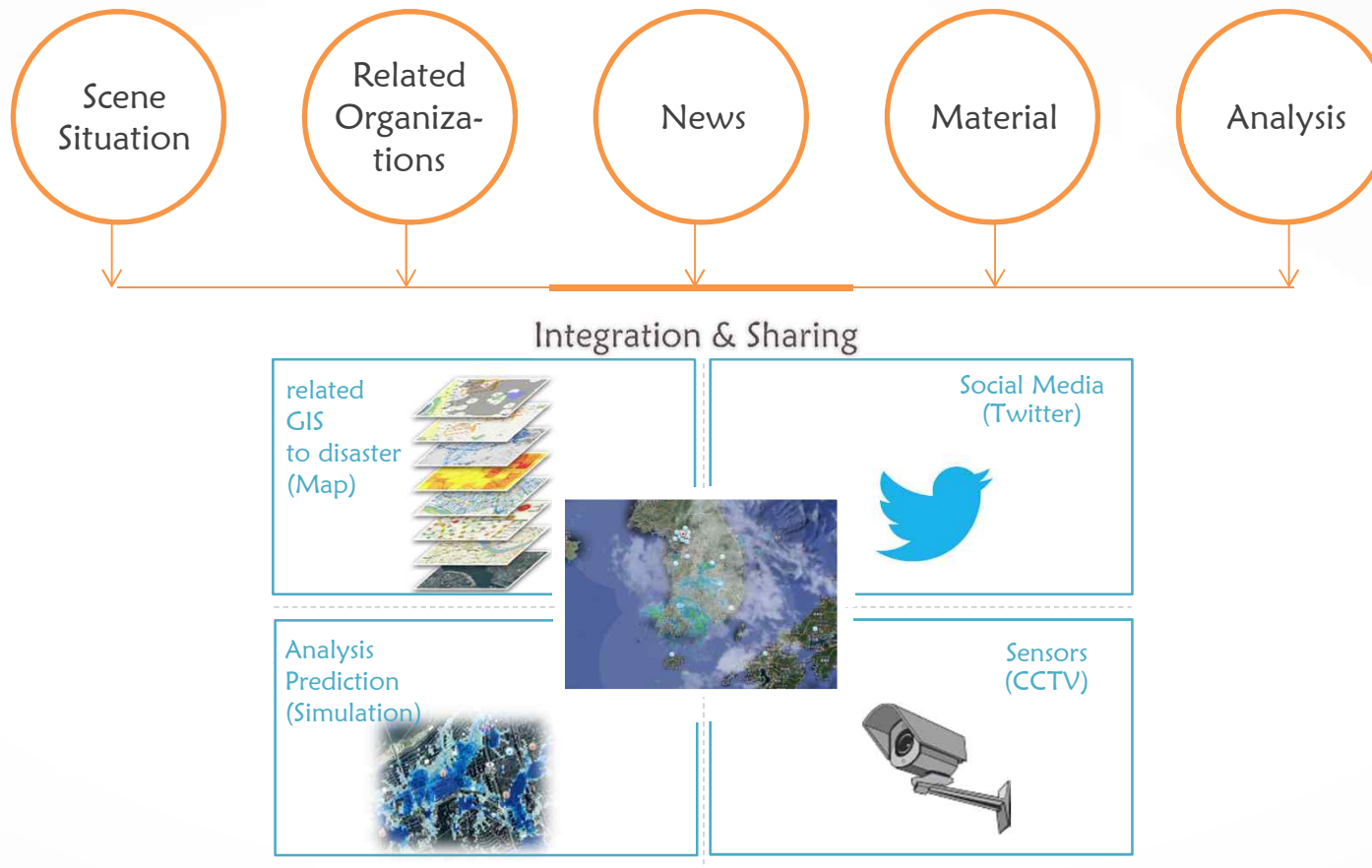
- Vulnerable to exploit unstructured data for decision making purposes
- Need for integration analysis of structured data and unstructured data



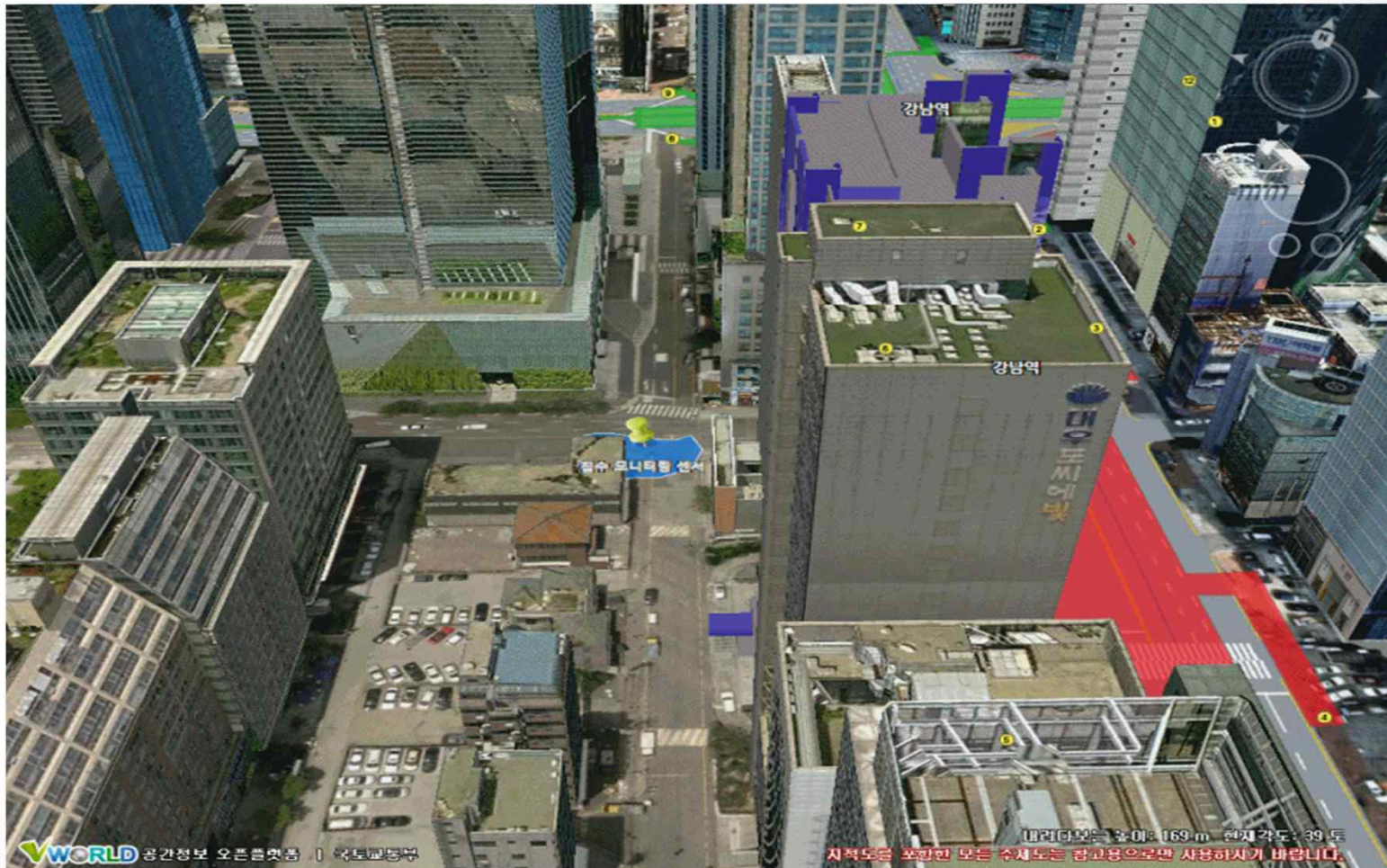
Current disaster management



Disaster management 3.0

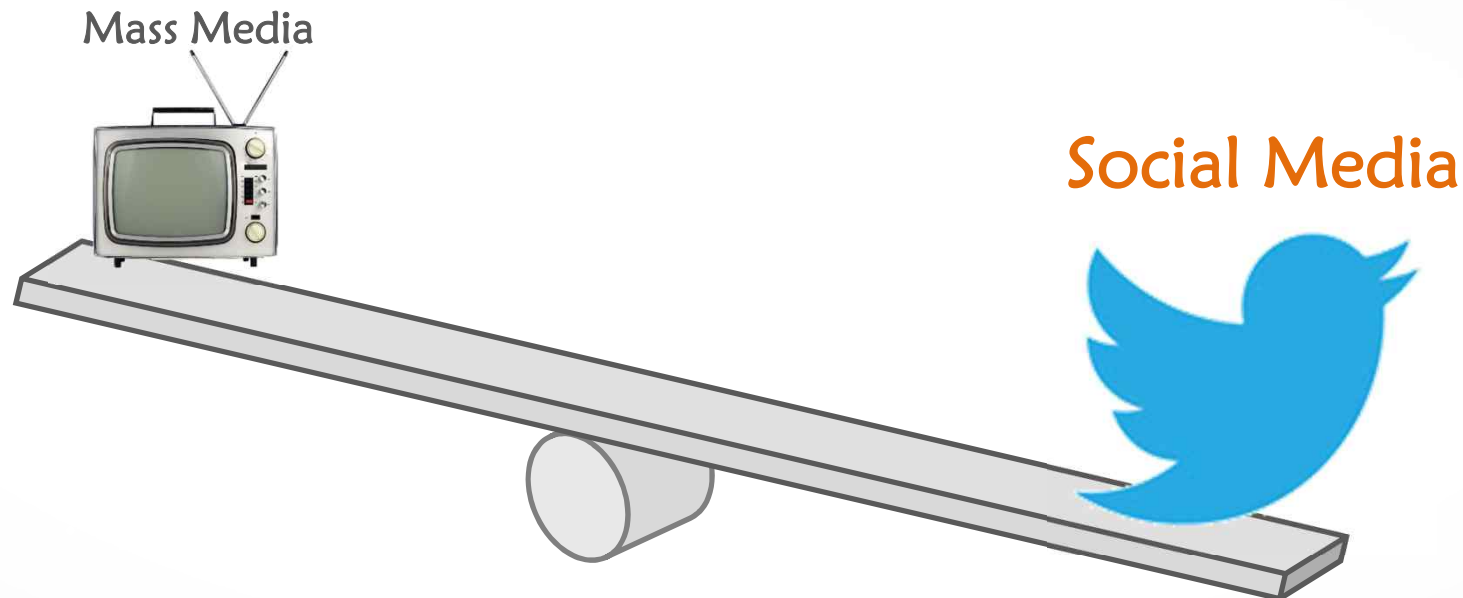


People customized disaster management



New Communication Channel, Social Media

- Communication channel has changed to social media
 - During a crisis, supporting backchannel communications, allowing for wide-scale interaction that can be collectively resourceful, self-policing, and generative of information



Disaster and Social Media

• Hurricane Sandy, USA(2012)

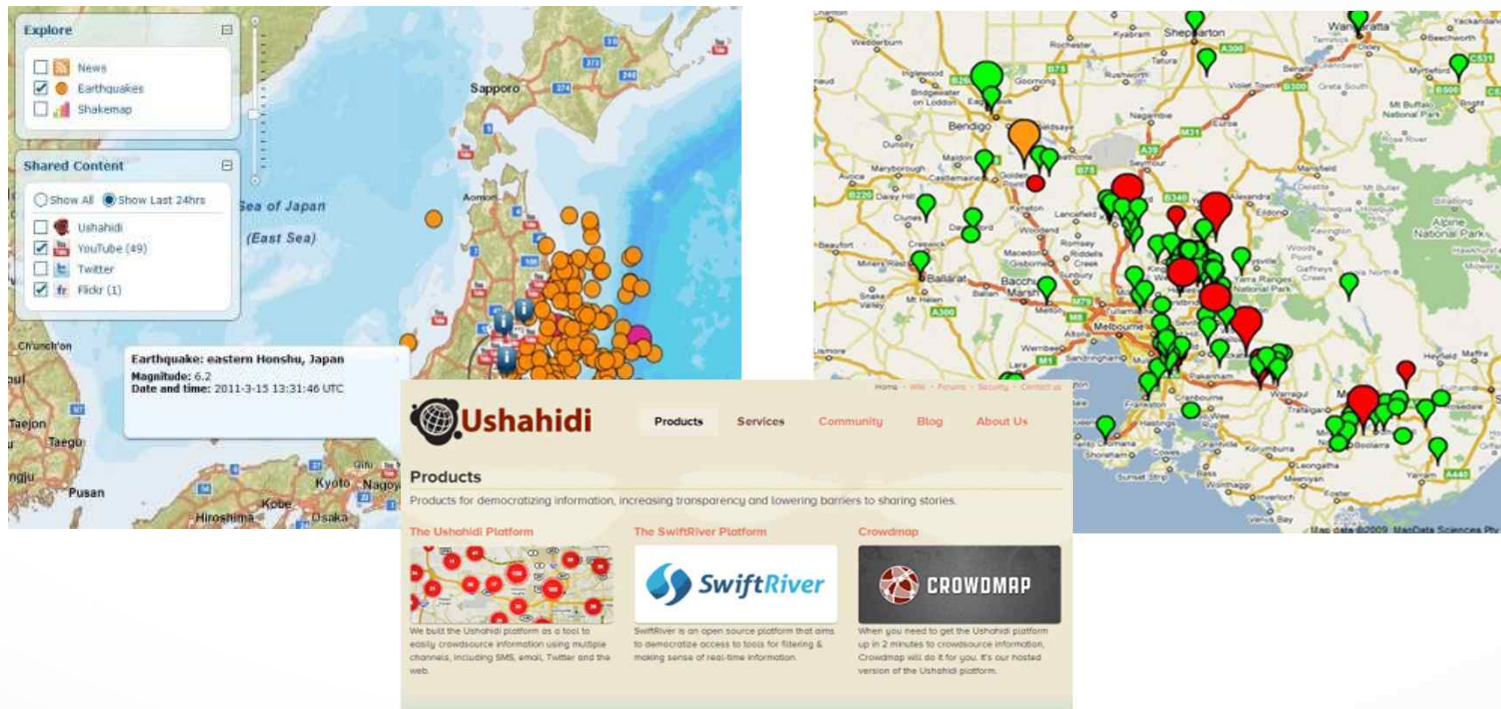
- The millions blackout in areas affected by Sandy have been struggling to find gas stations still open with resources.
- The innovative use of social media and mapping technology to make live fuel supply data was a solution to response this crisis



< Mappler service for reporting gas stations>

Disaster and Social Media

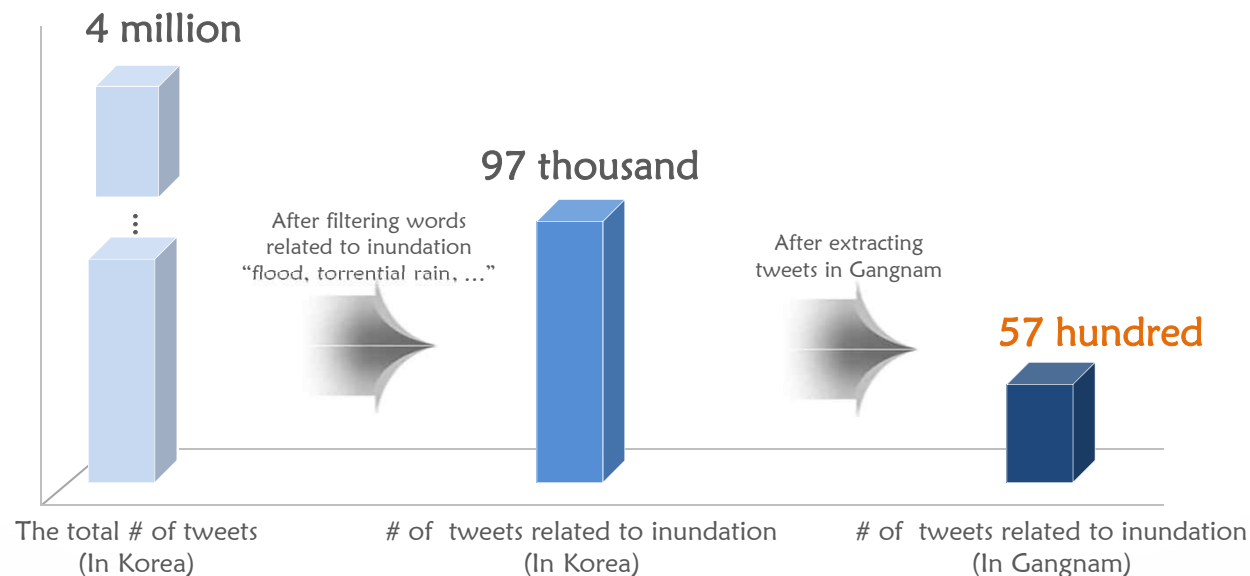
- Earthquake(2011), Fire(2009), Riot, ...
 - There were many cases using social media and community mapping for response of a disaster :
Earthquake in Japan and Haiti, Fire in Australia, Riot, and so on



Social Media is Human Sensor

- Gangnam Inundation damage in Korea(2011)

- Since social media can also be constructed as a form of **collective wisdom** which is **prompt**, **accurate**, and **well-formed information** with a high propagation capacity
- It has a big potential power on a disaster area. Especially It can be used like a **Human sensor**



Social Media is Human Sensor

• Asiana aircraft accident in San Francisco(2013)

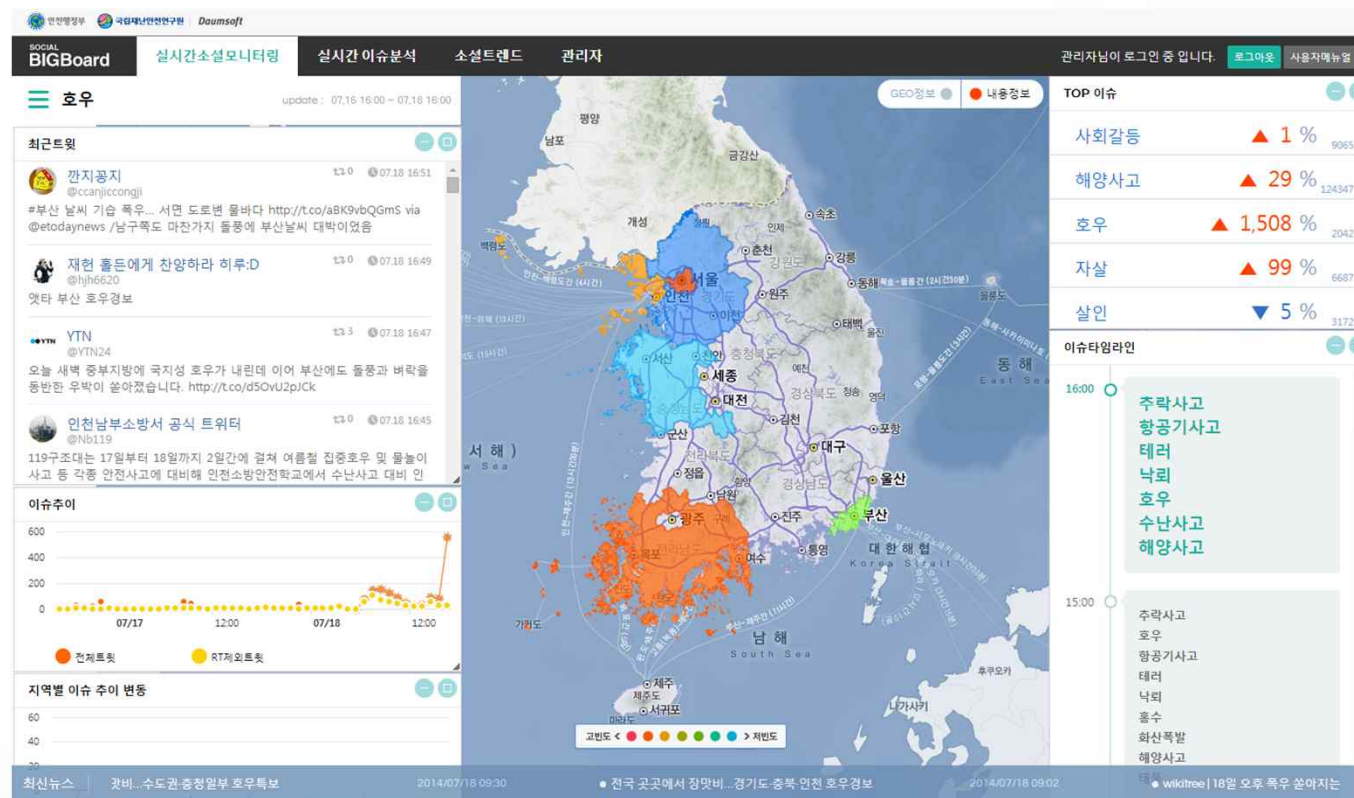
- The first report to inform the accident occurred by a passenger's tweet after 1 hour
- This tweet was faster than any media



Social media is a sensor **to report** the occurrence of disasters **initially** and the situation of disasters **promptly** in the scene

Social Big Board

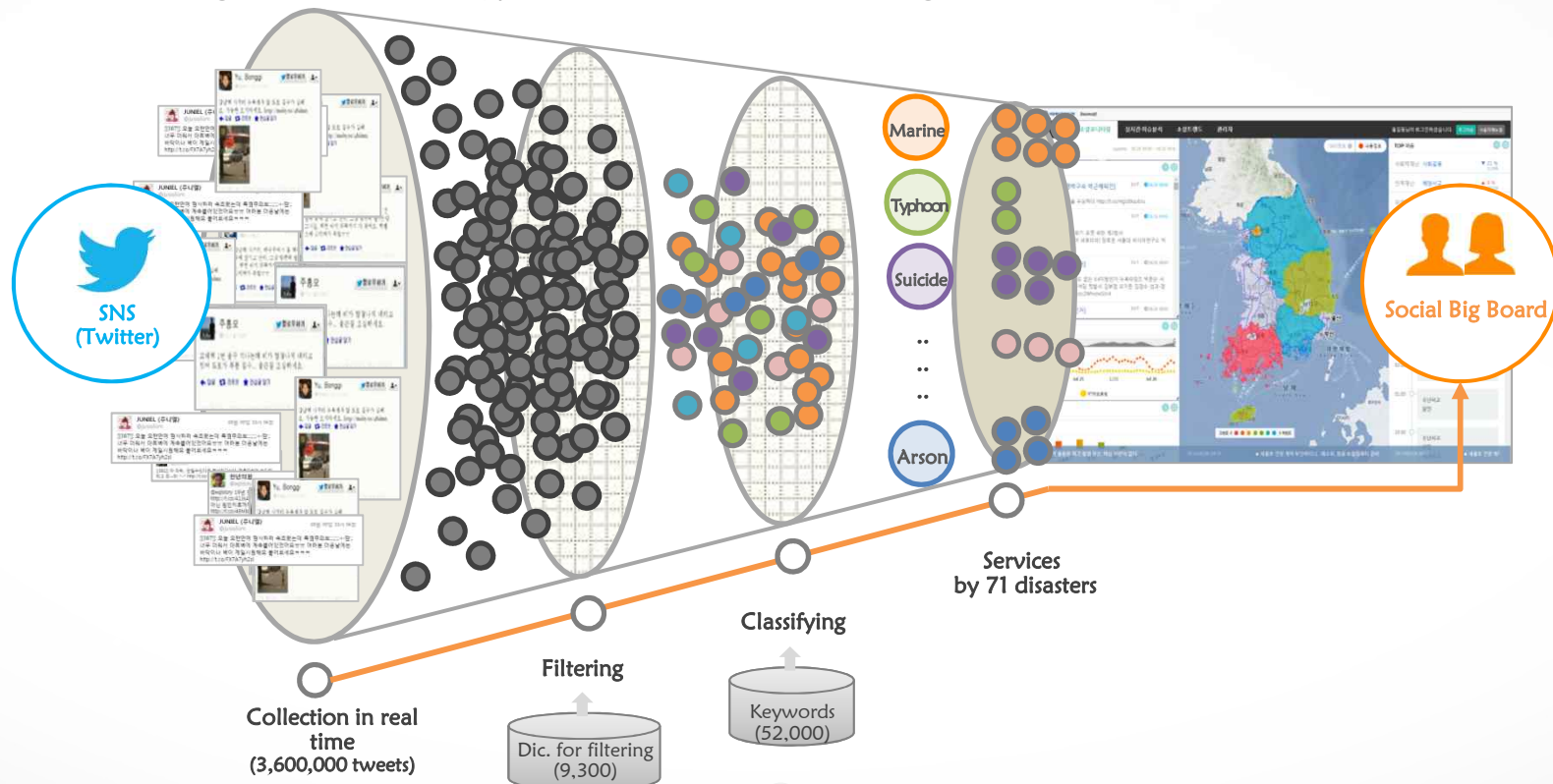
- Real-time Monitoring System of Social Big Data
 - For disaster management, developed in 2013 by NDMI



Social Big Board

Collection & Analysis Process

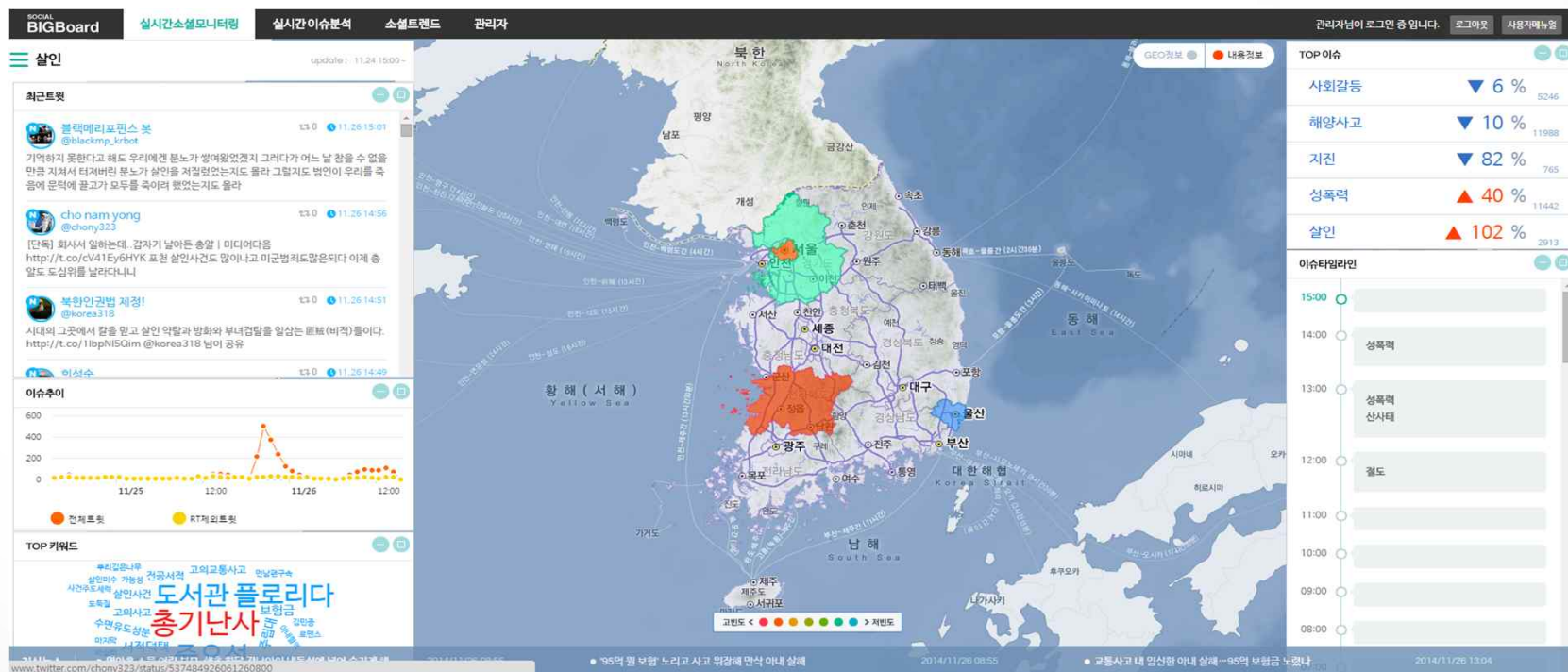
- Collecting 36 hundred thousand tweets daily average and Filtering disaster related tweets
- Classifying tweets into 71 types of disasters and analysing disaster issues by types of disaster



Social Big Board

• Real-time monitoring service

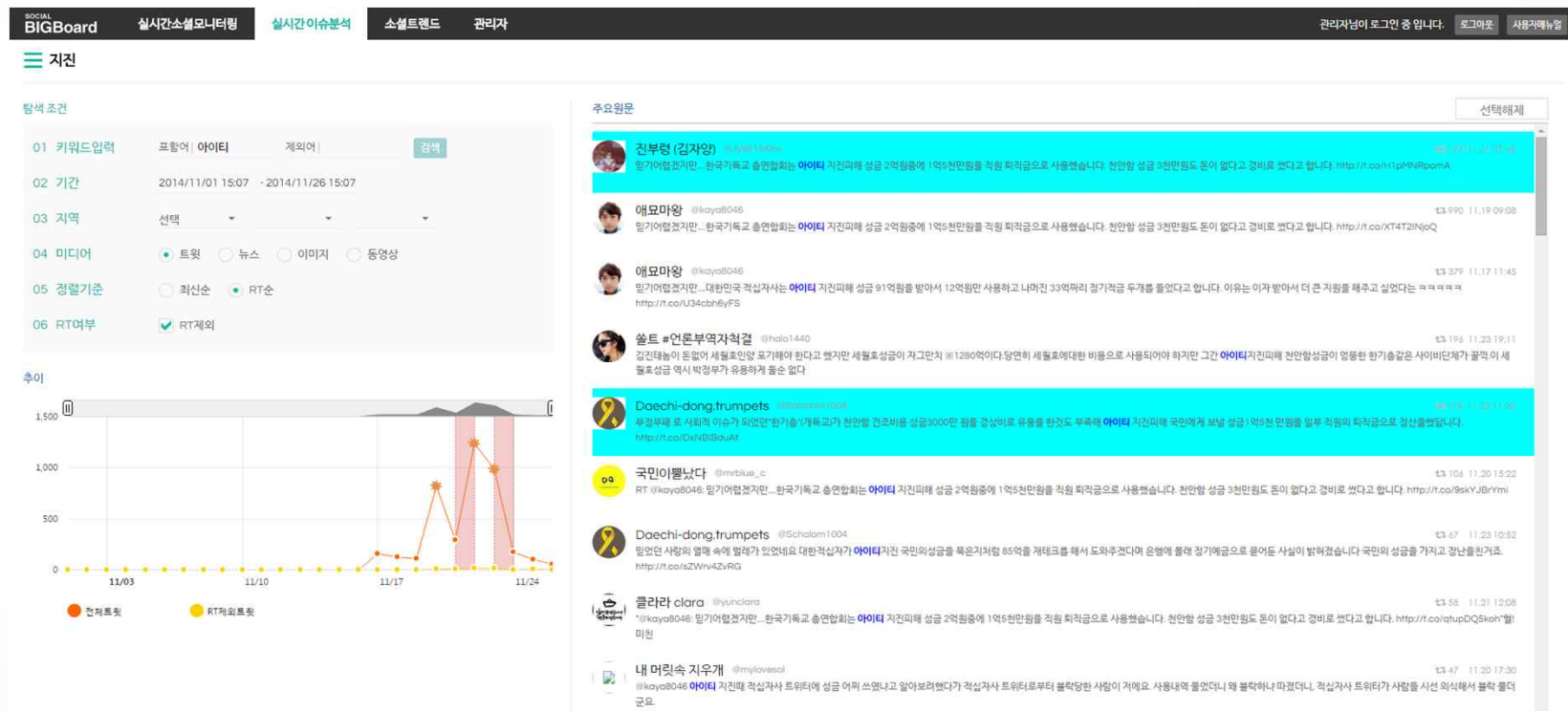
- to provide disaster issues based on disaster relevance of tweet in real-time
- Tweet text, frequency trend, related words, issue time-line, and frequency fluctuation of 71 types of disasters



Social Big Board

• Real-time Issue analysis service

- to retrieve user defined criteria for more detail awareness : keywords, period, region, sorting, and RT or not



- the disaster-related word set and emotional information by semantic analysis on a text of tweets

23



Geo – Big Data



Cholera Occurrence in London, 1854

CHOLERA

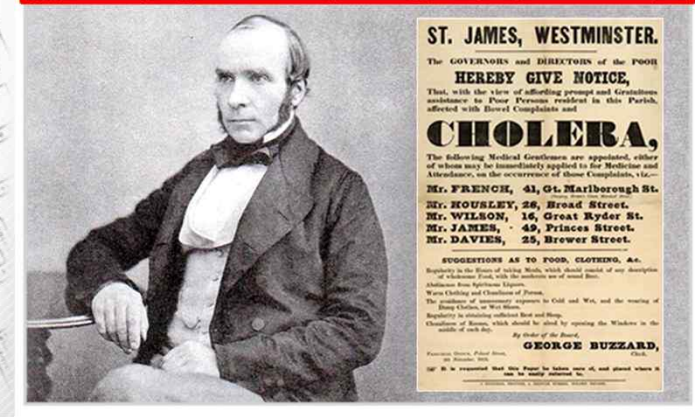
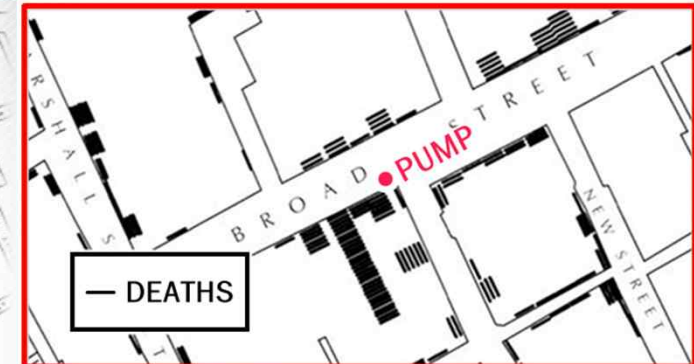
- 19 Broad St London
- 128-3 Broad St London
- 33 Broad St London
- 14-17 Old Broad St London
- 78 Bishopsgate London
- 26 Throgmorton St London
- 55 Bishopsgate London
- 23 Austin Friars London

⋮

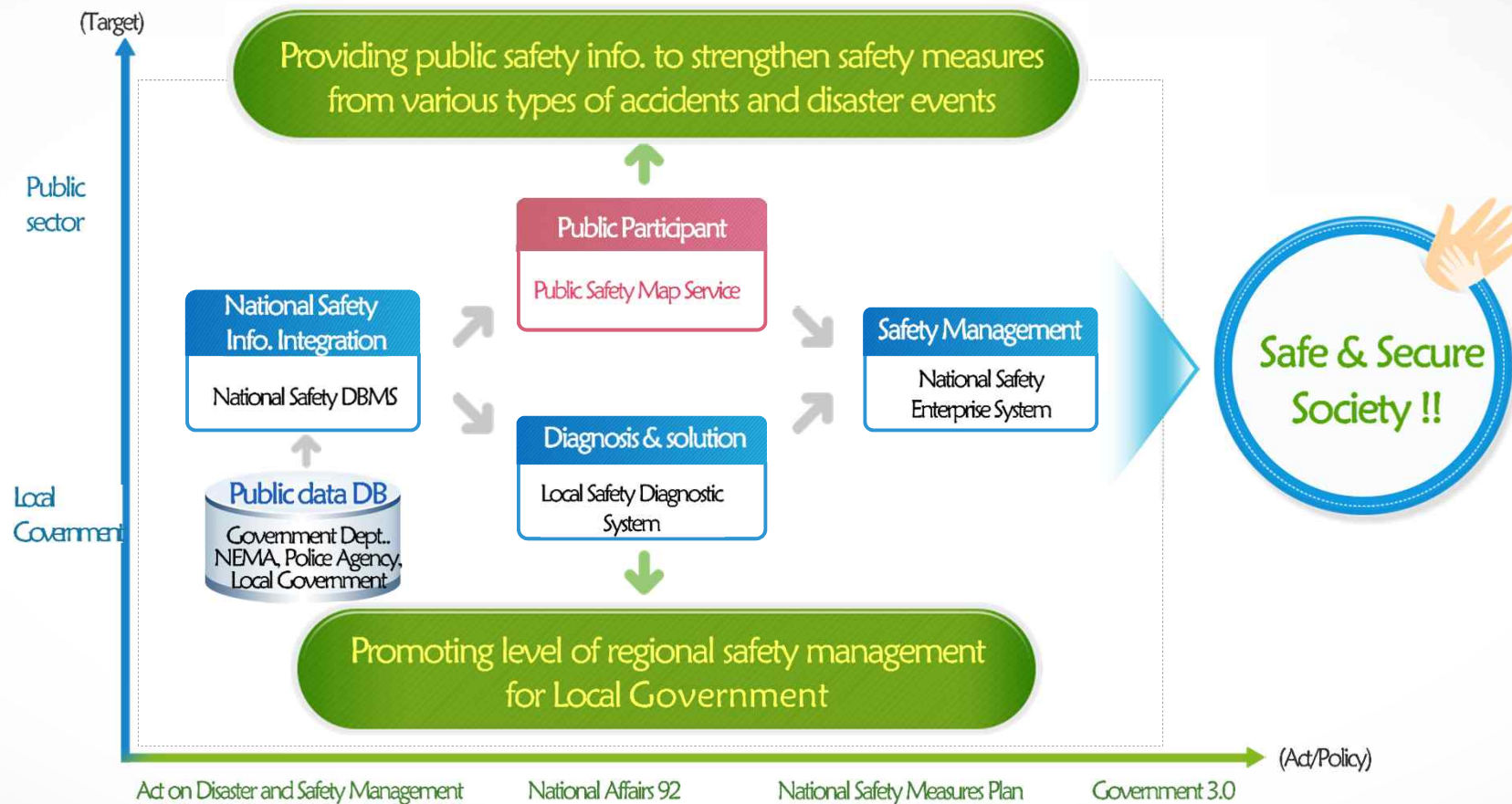


Map, Solution for Understanding Social Problems

An Easy, Simple and Powerful Tool, MAP!!



Project Overview



1. The Public Safety Map(<http://www.safemap.go.kr>)

World's first portal site of the safety map

Online

- 국민안전처
- NDMS
- 국토교통부
- National GIS
- 통계청
- SGIS
- 경찰청
- GeoPros·UTIS
- 국토교통부
국토지리정보원
- Internet Map
- KoROAD
도로교통공단
- Traffic information system
- 산림청
- Forest Disaster Control



127 safety information from 20 agencies

Off line

Crime Statistics

Construction

Accident

Old building

Disease outbreak

...

Real-time links



Pollutant Index

Nitrogen Dioxide

UV Index

Ozone

Dust

Ultrafine Particles



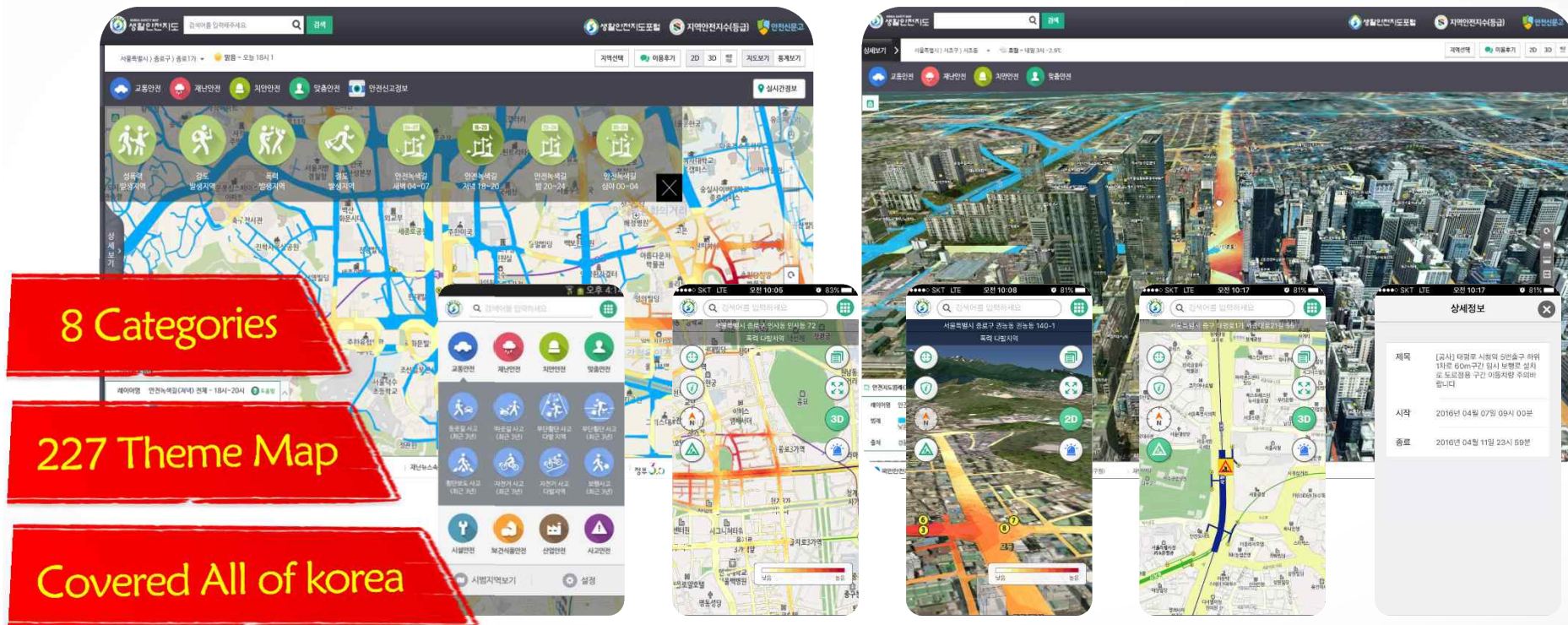
Radioactivity Information



Traffic Accident

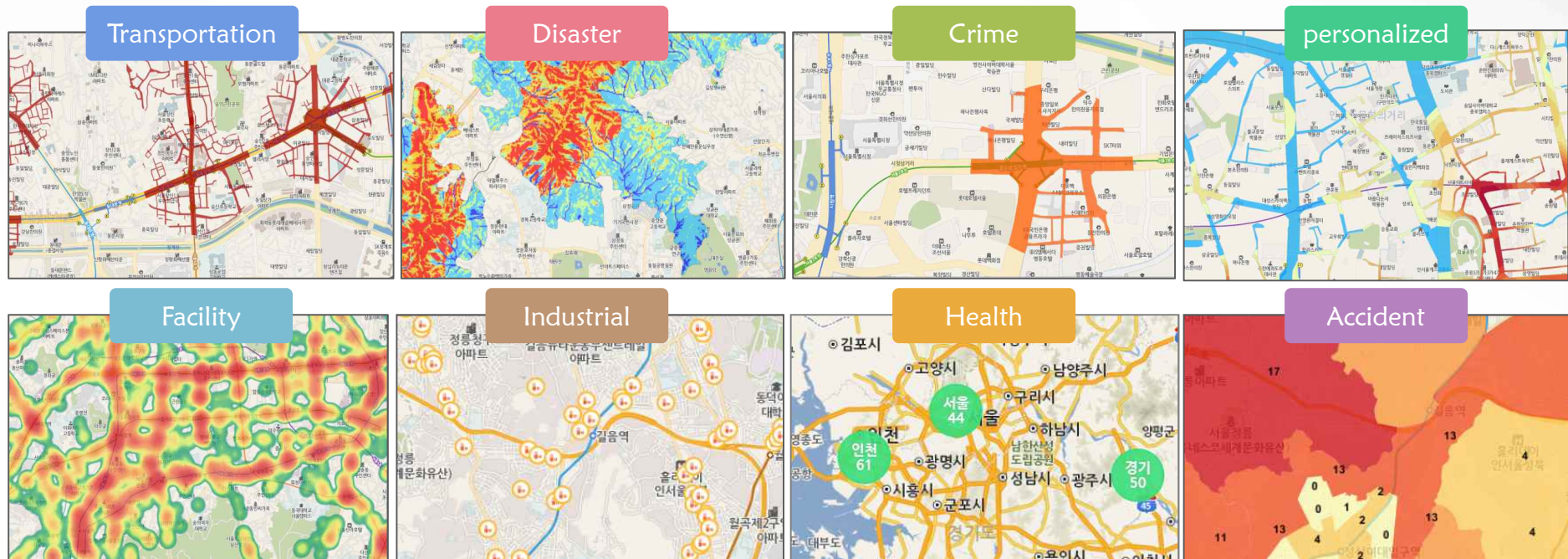
1. The Public Safety Map (<http://www.safemap.go.kr>)

 **World's first portal site of the safety map**



2. Web / Mobile service

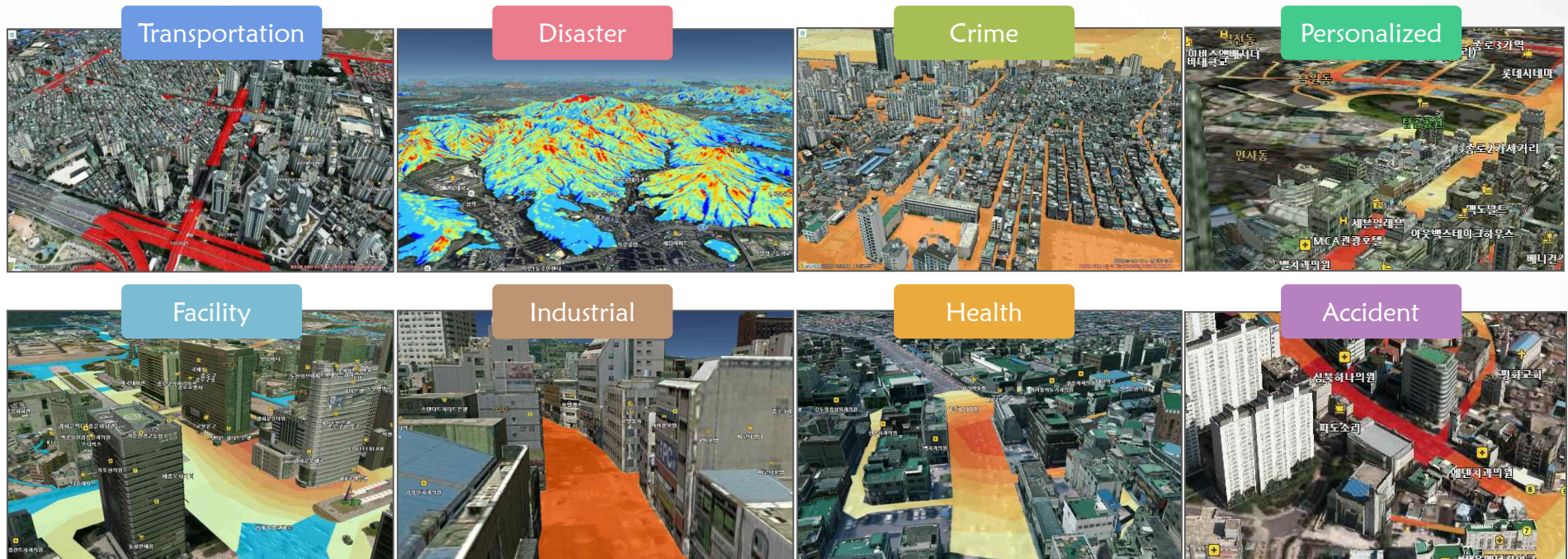
8 Specialized services for safety(2D)



provides safety information in a variety of ways

2. Web / Mobile service

8 Specialized services for safety(3D)



the public safety map provides Real 3D based.

Communicating with people

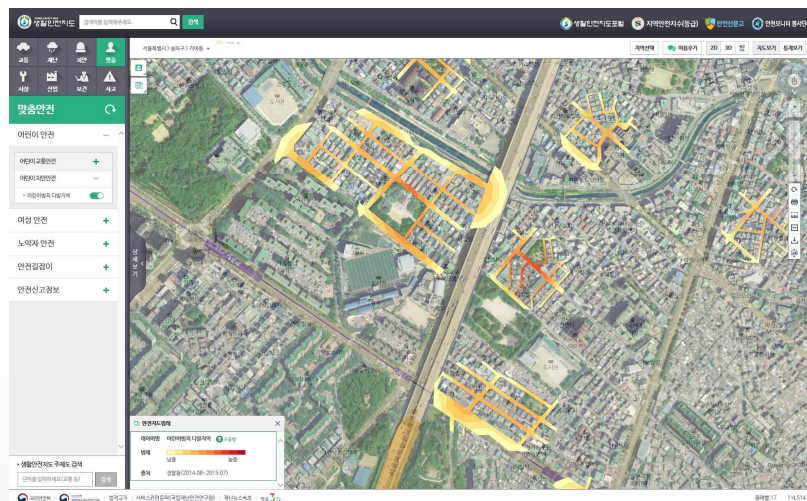


2.Web / Mobile service

Customized for vulnerabilities

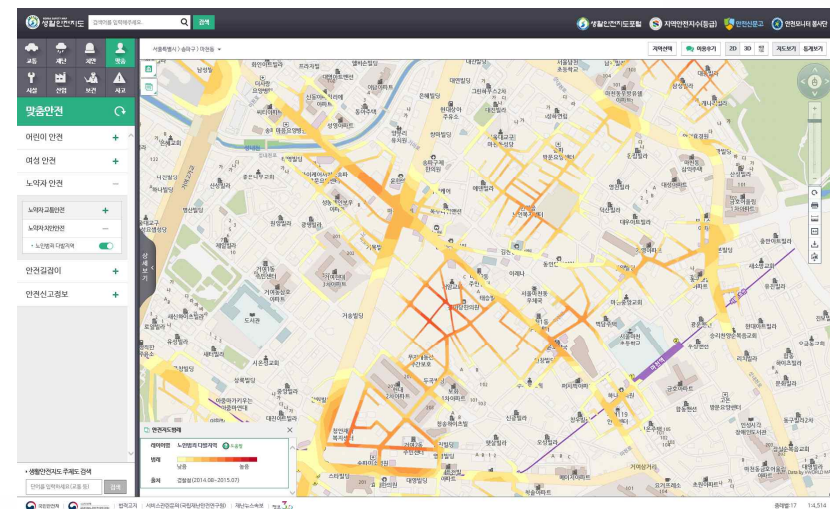
Children

Information of crime against children
Provided by police department



Old and infirm

Provide information about
Crime against old and infirm

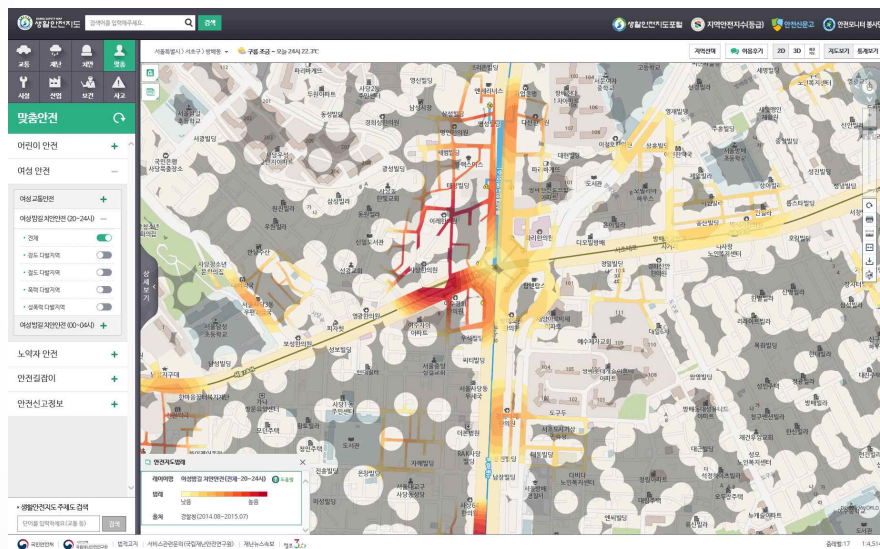


2. Web / Mobile service

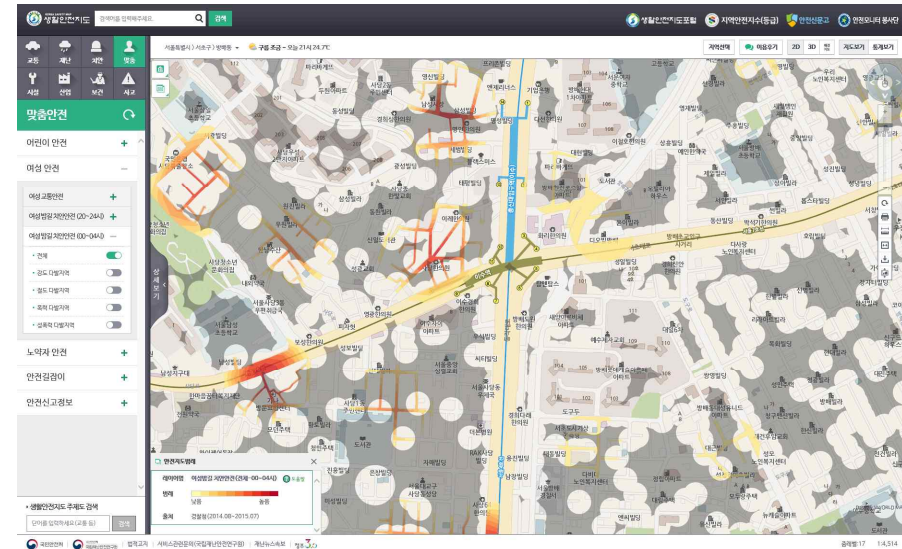
Customized for vulnerabilities

Service for Women

Information of crime against women & Safety Place



Night road(8-12PM)



Night road(0~4AM)

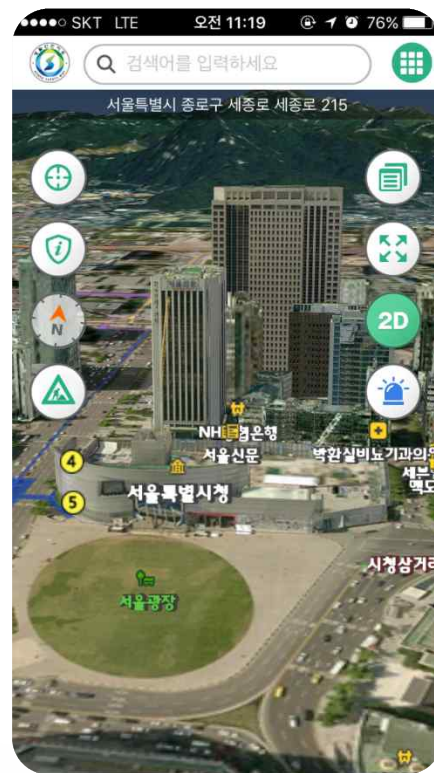
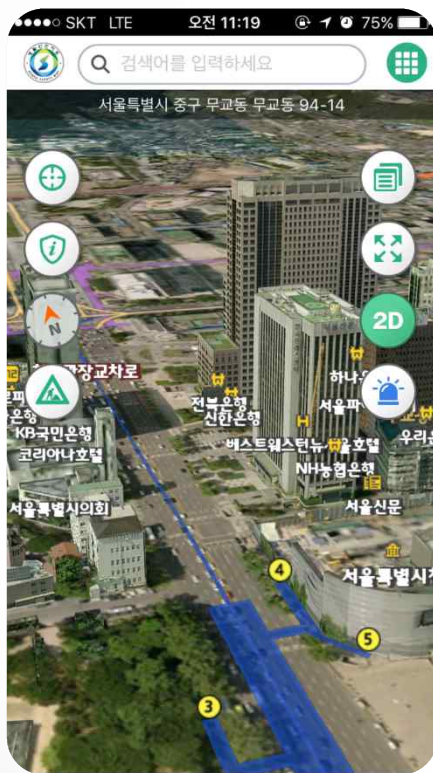
2. Web / Mobile service

Customized Safety Map(Safe Green way)



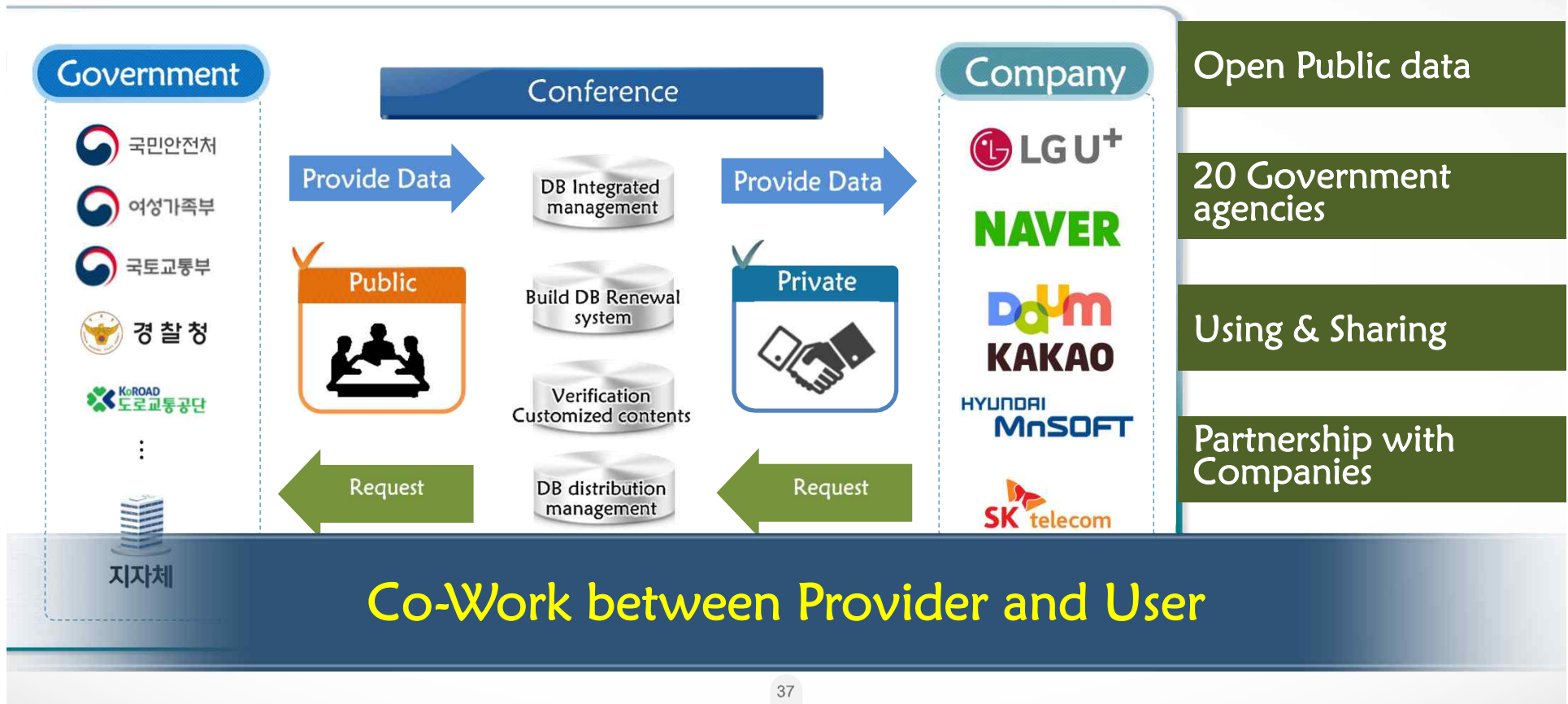
2. Web / Mobile Service

3D Mobile Service Just like Real



3. Open Public Data Service

The Public Safety Map Consultative Group



3. Open Public Data Service

The Public Safety Map API 132 references



College

Seoul National
University
KCIST

12



Government

Gwang-Ju Metro City
Cultural Heritage
Administration
...

22



Private

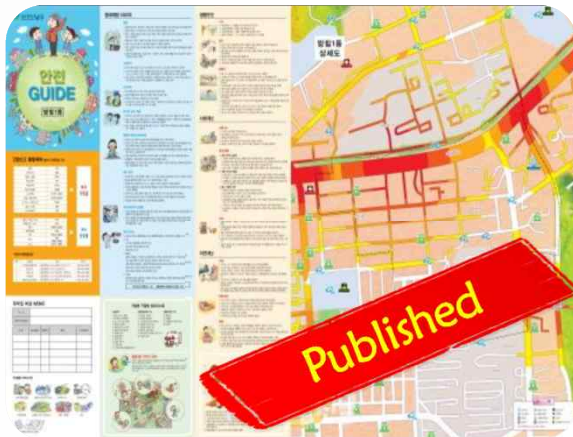
LG U+
Hyundai MN soft
Soho companies

98

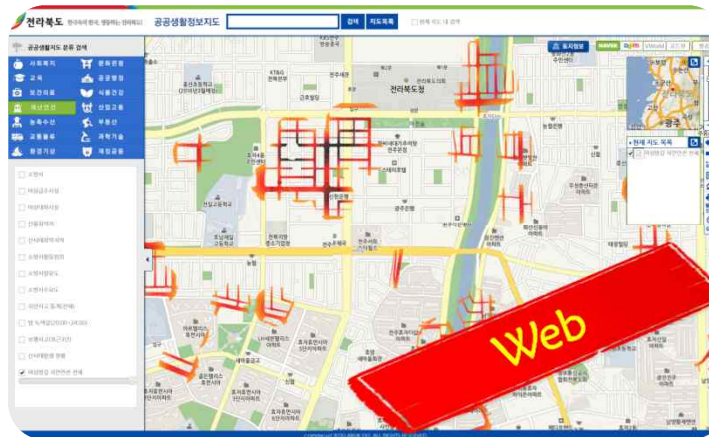
3. Open Public Data Service

Expanding Localized Safety Map

[Gwang-Ju' Community map]



[Jeollabuk-do "Public Life Map"]



[Gyeongsangbuk-do "Alimi"]



Provide 16 local government agencies

3. Open Public Data Service

City of Gwang-Ju 'Community safety map'



Community map

Critical zone
Safety facilities

Emergency Plan

Leaflet form map for the senior citizen who can't use IT devices

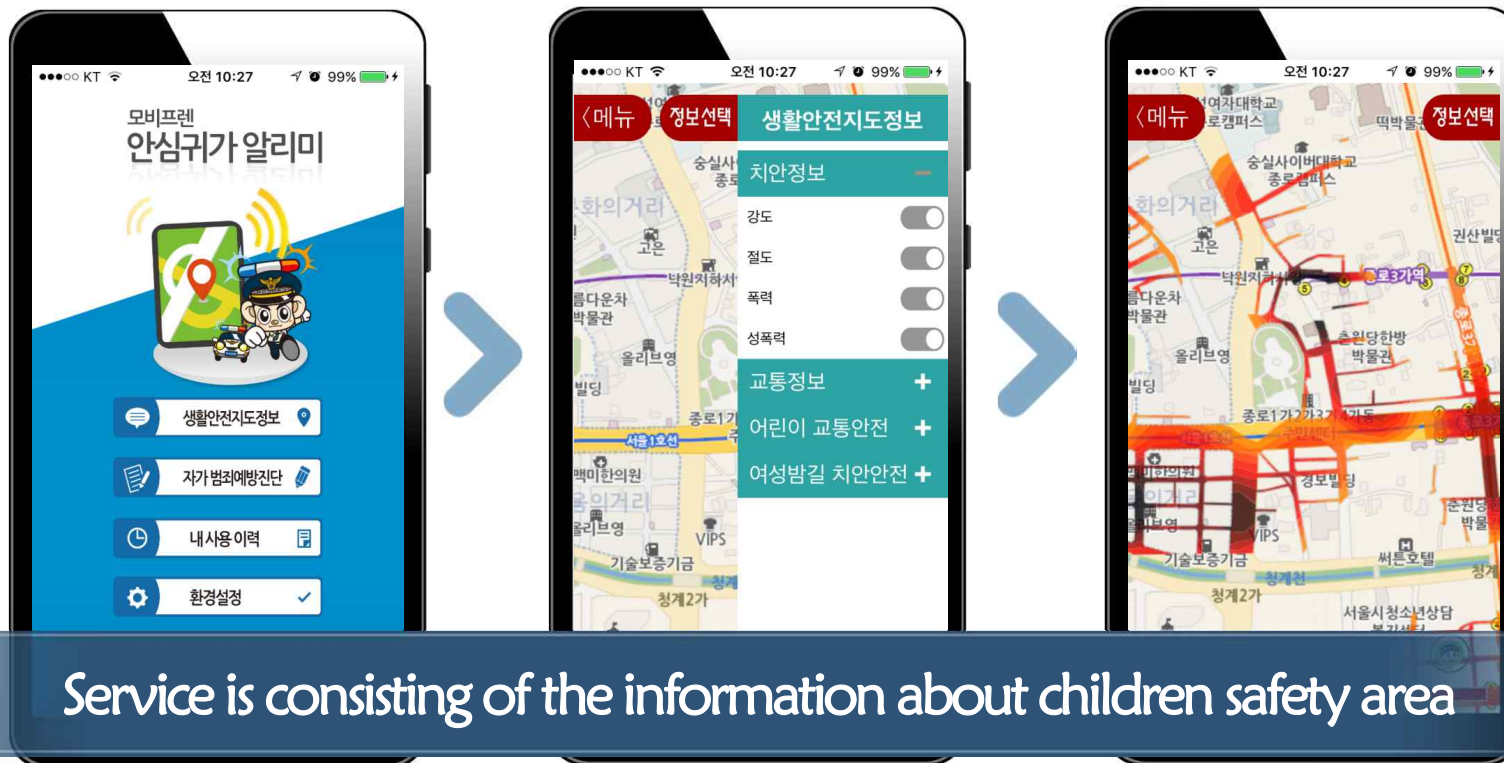
3. Open Public Data Service

Jeollabuk-do 'Public Life Map'



3. Open Public Data Service

Gyeongsangbuk-do 'Alimi'



3. Open Public Data Service

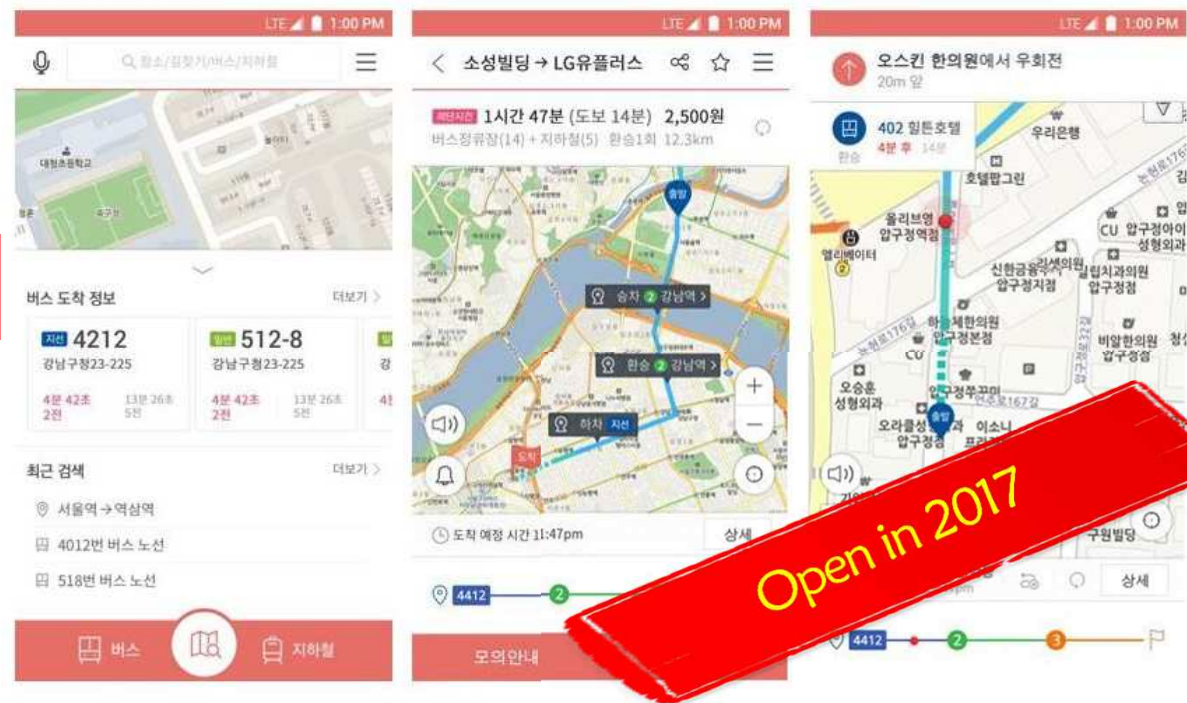
 **First Provider of “The Public Safety Map” based services**



Pedestrian Navigation

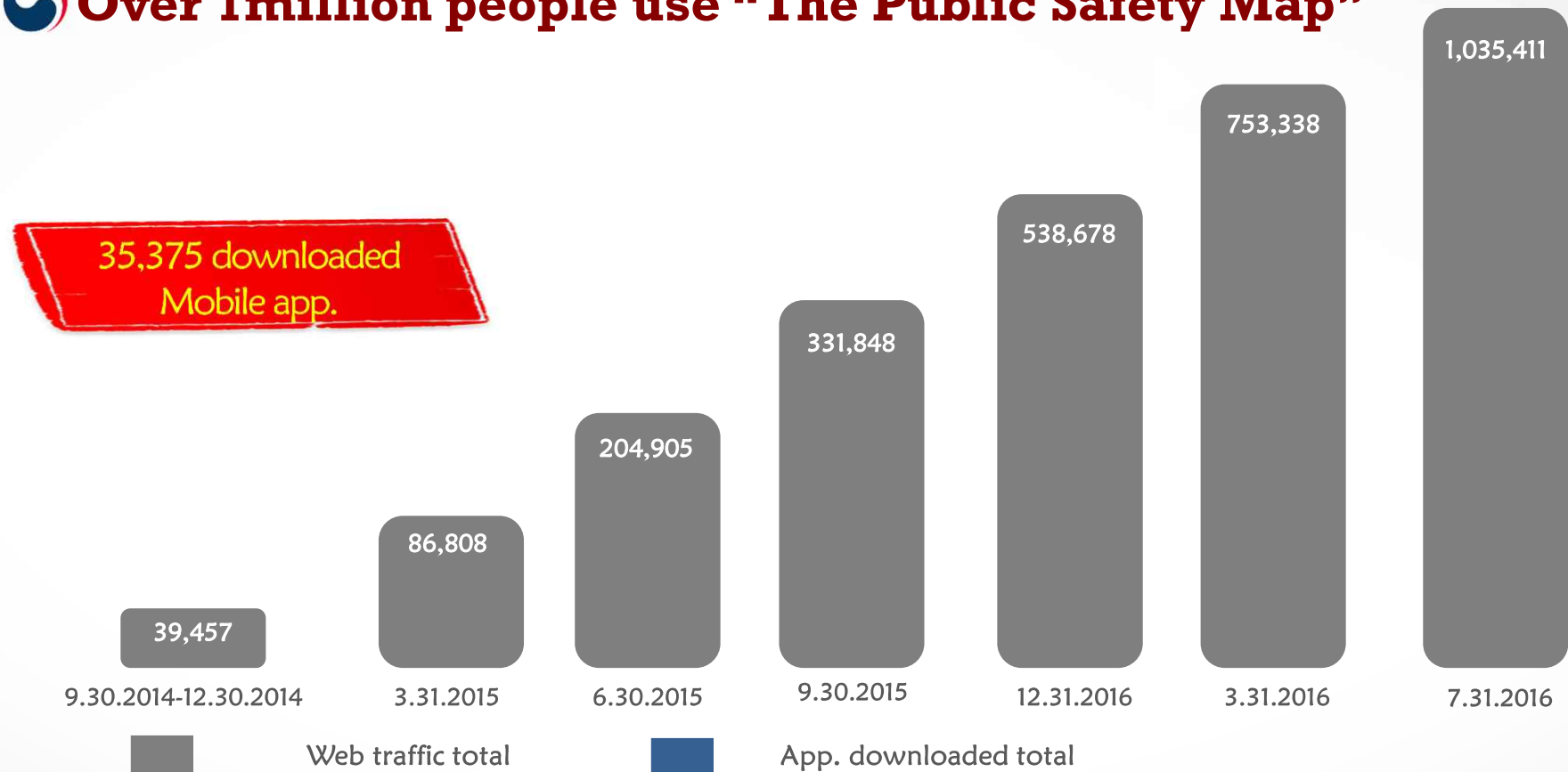
Traffic Accident Blackspot

Women safety information for
night road

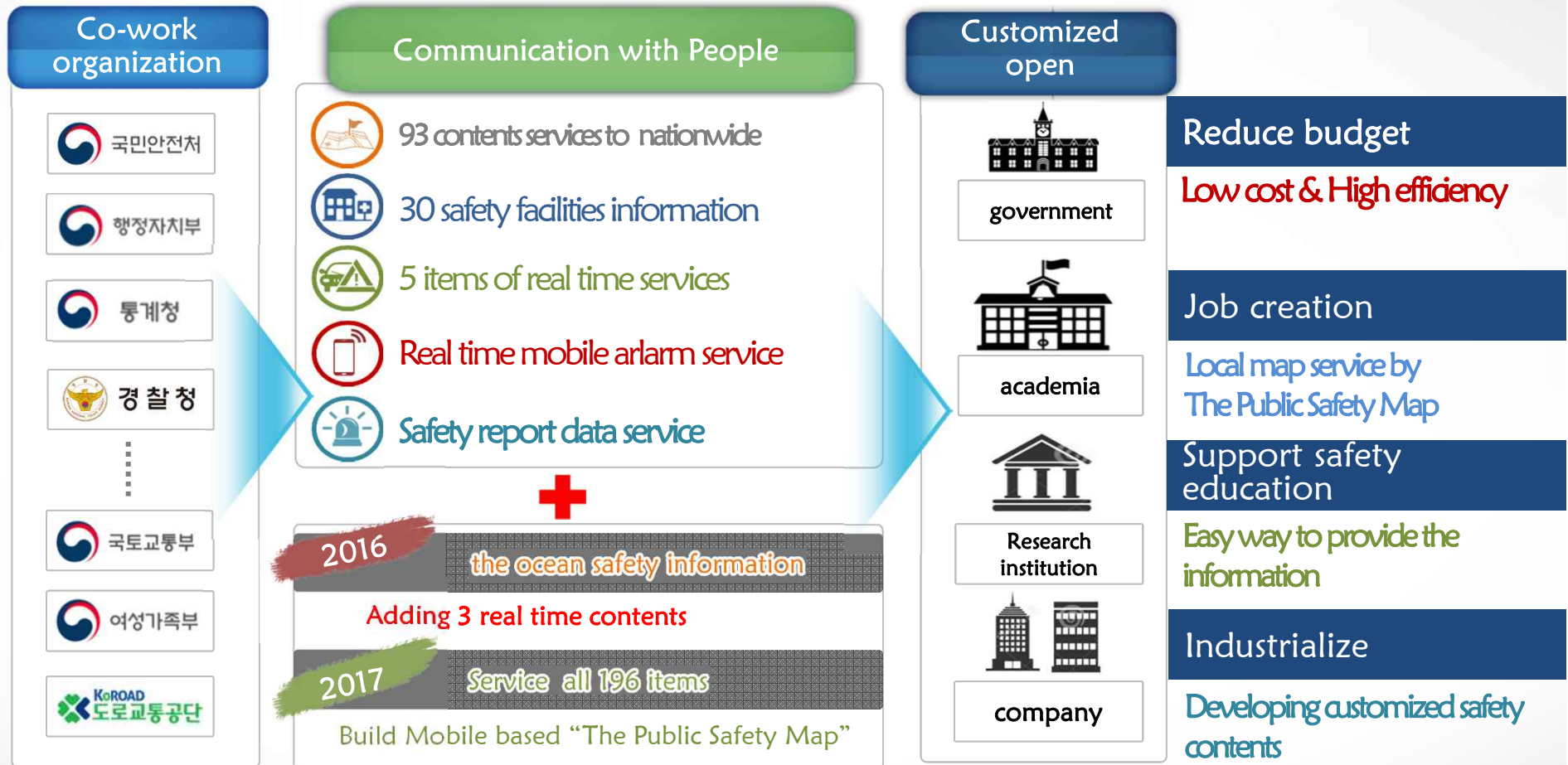


3. Open Public Data Service

 **Over 1million people use “The Public Safety Map”**



4. Plan & Expected Effects



Thank You



Ministry of Public Safety and Security

National Disaster Management
Research Institute