Digital Government System to Respond to COVID-19 of Korea

COVID-19
Contact Tracing System

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This presentation will focus on introducing COVID-19 Contact Tracing System (CTS) of Korea. The CTS is an epidemiological investigation system for tracking COVID-19 confirmed patients’ movement routes. The CTS was developed through the Smart City Data Hub Platform, the achievement of the National Smart City R&D program.

This presentation will provide a short background history of the development, main concept of Smart City, operating structure of the system. Participants will understand main framework of the Smart City and some implications of Korea's COVID-19 response related with CTS.
Structure

1. About COVID-19 Contact Tracing System (CTS)
2. Understanding Smart City and Data Hub
3. Key Functions of the System
4. Implications
Objectives

To understand development background and main function of COVID-19 Contact Tracing System

To understand concepts of smart city and data hub that are basis of COVID-19 Contact Tracing System

To understand the success factors of K-quarantine, such as ICT infrastructure, governance system between ministries and medical agencies, institutional foundation, etc.
01  About COVID-19 Contact Tracing System

Enabled the Automation of the Epidemiological Investigation Process

- **Automatic analysis of movement routes, source of infection, and transmission network**
  - By ‘the Act on Infectious Disease Control and Prevention’
  - Using location data from GPS and credit card use history

- **Also called COVID-19 Smart Management System (SMS) in Korea**

01 About COVID-19 Contact Tracing System

Brief Timeline of Development of the System

- Developed from Smart City R&D Program

Consulting Program
utilizing mobile data on confirmed cases (supported by MSIT, NIA)

Data Flagship Project
early response to the infectious disease using roaming big data (supported by MSIT, NIA)

National Strategic Smart City R&D Program
(supported by MSIT and MOLIT)

2015 2017 2018 2019 2020

Amended Infectious Disease Prevention Management Act
(to provide information on confirmed cases by mobile carriers and credit card companies based on the experience of MERS('15))

Smart City Data Hub
(KETI and 15 institutions)

COVID-19 Contact Tracing System
(KETI and 4 companies)

Data-based System Advancement
(KETI and 4 companies)

The impossible to input data manually due to mass infection in Daegu(Feb)

Discussion about development of contact tracing system using data hub by KCDC, MOLIT, MSIT (Feb)

System operated by KCDC (Mar)

Data Flagship Project
System Advancement with KCDC and MSIT (May ~)

Source: Korea Agency for Infrastructure Advancement (KAIA), World-leading Smart City R&D Program Plan (Presentation on R&D Preliminary Feasibility Study), 2017.5,25.


02 Understanding Smart City and Data Hub

<table>
<thead>
<tr>
<th>National Smart City R&amp;D Program</th>
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<td>Korea National Strategic Smart City Program (NSSC) has launched for the purpose of developing standardized Open Data Hub Architecture on existing cities which will be the common bases to apply transparent and shared administrative services and facilitate digital economy.</td>
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- **Duration**
  2018 ~ 2022

- **Total Amount of Budget**
  Approx. US$ 120 million

- **Participants**
  more than 120 organizations with approx. 1,200 research members

- **Competent Ministries**
  Managed by MOLIT / Supported by MSIT

Source: Korea Agency for Infrastructure Advancement (KAIA), Smart Cities Brochure – English Version, 2019.5.26., http://www.smartcities.kr/about/about.do
02 Understanding Smart City and Data Hub

| Concepts of Smart City and Data Hub |

Framework Design of Smart City

Source: Korea Agency for Infrastructure Advancement (KAIA), World-leading Smart City R&D Program Plan (Presentation on R&D Preliminary Feasibility Study), 2017.5,25.

Concept of Smart City Data Hub

Source: Korea Agency for Infrastructure Advancement (KAIA), World-leading Smart City R&D Program Plan (Presentation on R&D Preliminary Feasibility Study), 2017.5,25.
02 Understanding Smart City and Data Hub

Data Hub Architecture

Source: Daeyeon Cho (KAIA), Current Standing and Future Prospects for Smart City in Korea (Presentation on 2019 International Conference on Smart Cities), 2019.7.17.
03 Key Functions of the Contact Tracing System

| Operating Structure |

System Flowchart

- New Confirmed Case
- Information request (KCDC & Municipalities)
- Identify the route of confirmed cases
- Verify the route by interview
- Lockdown/Quarantine on visited areas

- Approve Information Provision (National Police Agency, CREFA)
- Identify confirmed cases’ information
- Analyze Infection network
- Contact tracing and indentify Infection route

- Provide Information of Confirmed Cases to Telecom & Credit Card Companies
- Obtain location & payment Information of confirmed cases
- Reveal information and route to the public

COVID19 Epidemiology Investigation Support System

03 Key Functions of the Contact Tracing System

Operating Structure

In case of the occurrence of large-scale transmission

- **Before application**: Analysis on routes of confirmed cases in 24h (Manual analysis by officials taking 24 hours).
- **After application**: Automatic analysis via system in less than 10 minutes.

**Agile process**
- Tedious process
- Limited accuracy
- Challenging to deal with widespread transmission

**Guaranteed accuracy**
- Agile response to large-scale viral outbreak

**Coordination between organisations**
- Overloaded work and delayed contact
- Real-time information interchange


※ Paperwork and contacts needed amongst 28 organisations supporting KCDC have been replaced with the automatic system.
03 Key Functions of the Contact Tracing System

| System Advancement |

CTS, QR Code Registry System and Self-Quarantine Safety Application can be interacted through the package

- Self-quarantine Safety Protection App
  - Provide remote management and monitoring system for those under self-isolation

- Electric Registry System
  - Identity facility that confirmed persons have visit
  - Identify the person who used the same facilities that confirmed persons visited at the same time

- Korean Epidemiological Investigation Support System
  - Location Information of Confirmed Cases provided by mobile carrier
  - AI Investigator
  - Credit Card Usage/Road Data
  - Automated Epidemiological Investigation
  - Confirmed Cases Travel Route
  - Transmission Network
  - High-risk Area

- Integrated Monitoring System
  - Provide intelligent epidemiological investigation
04 Implications

Smart City Technology

- ICT, fundamental facilitator of smart city, plays a substantial role in pandemic control

Human being, as Main Actor

- Human being, is the main actor making decisions, establishing related systems and intervening crisis through whole process
- Social consensus is needed for making decisions and systems, using personal data

Non-pharmaceutical intervention such as contact tracing, self quarantine, self diagnosis, etc.

Pharmaceutical interventions, inter alias, digital medicare

the Act on Infectious Disease Control and Prevention

Strictly cautious to access information
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• Daeyeon Cho (KAIA), Current Standing and Future Prospects for Smart City in Korea (Presentation on 2019 International Conference on Smart Cities), 2019.7.17.

• The Government of the Republic of Korea, Flattening the curve on COVID-19 - How Korea responded to a pandemic using ICT, 2020.4.15., pp.44-48

• Korea Agency for Infrastructure Advancement (KAIA), World-leading Smart City R&D Program Plan (Presentation on R&D Preliminary Feasibility Study), 2017.5.25.

• Korea Agency for Infrastructure Advancement (KAIA), SmartCities Brochure – English and Korean Version, 2019.5.26., http://www.smartcities.kr/about/about.do
