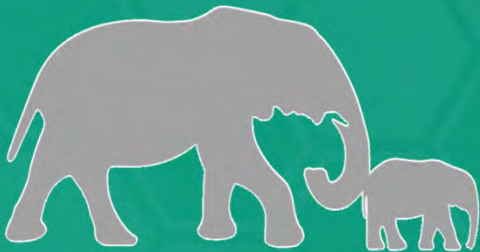




Riyadh Global  
**Digital Health  
Summit** —

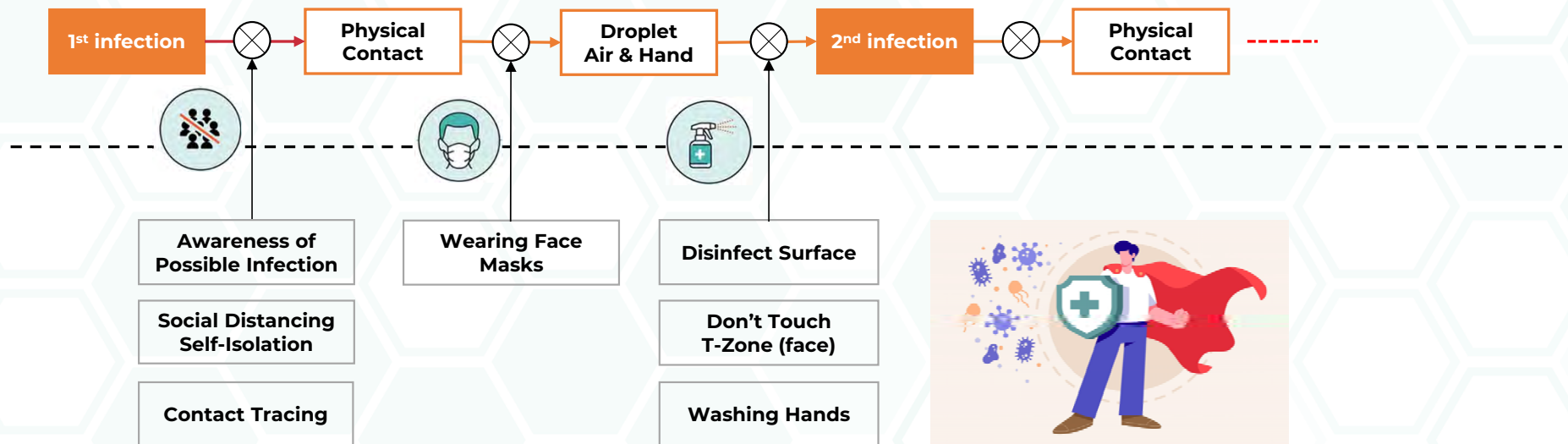
11-12 August, 2020

# Nudging the Public to Improve Compliance



KAIST, South Korea  
Uichin Lee

# Transmission and Containment Processes of COVID-19



**Prevention & Protection Measures are closely related to Human Behaviors**  
- Social Distancing, Personal Hygiene, Contact Tracing

# Recent Advances in Digital Technologies



Mobile & Wearable Devices



Social Media and Crowdsourcing



Internet of Things (IoT) and Artificial Intelligence (AI)

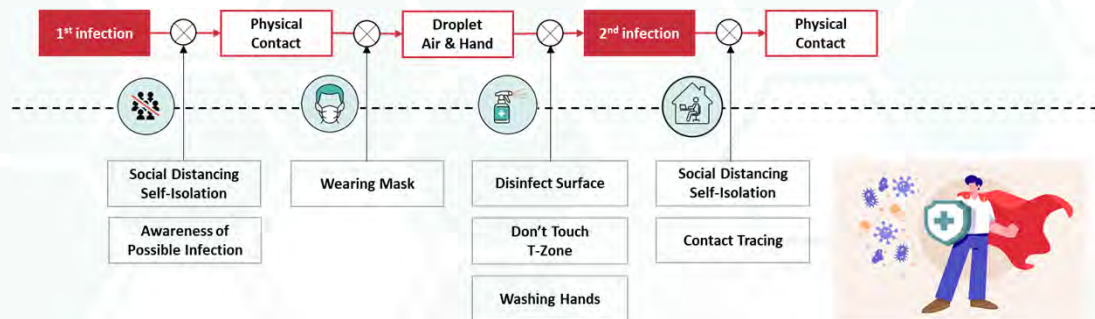


Big Data and Data Analytics

# Digital Public Health: Crisis Communications & Interactions



**Crisis Communications & Interactions:** Communicate, Empower, Engage



**Prevention & Protection:** Social Distancing, Personal Hygiene, Contact Tracing



# Human Mind & Behavior Nudge

## Human Mind: “Dual Process Theory”

### SYSTEM 1: Automatic Mind

Intuition & instinct

95%

Unconscious  
Fast  
Associative  
Automatic pilot



### SYSTEM 2: Reflective Mind

Rational thinking

5%

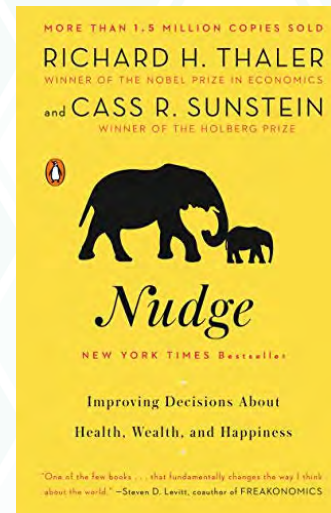
Takes effort  
Slow  
Logical  
Lazy  
Indecisive

Image from <https://uxdesign.cc/better-decisions-72e955c70a5c>

“Thinking, Fast and Slow” Daniel Kahneman

## Definition of Nudge

“... any aspect of **the choice architecture** that **alters people’s behavior** in a predictable way without forbidding any options or significantly changing their economic incentives”



“Nudge” Richard H. Thaler and Cass R. Sunstein

# Nudging: Guiding Automatic Mind



Ah, Yes,  
Face Mask



Mask sign & door hanger

<https://www.youtube.com/watch?v=xzjNOF44bMs>



Floor sign (Denmark)

<https://pabii.co.kr/5537/>



Swim noodle hat (Germany)

<https://nypost.com/2020/05/15/>

# Nudging: Persuading Reflective Mind



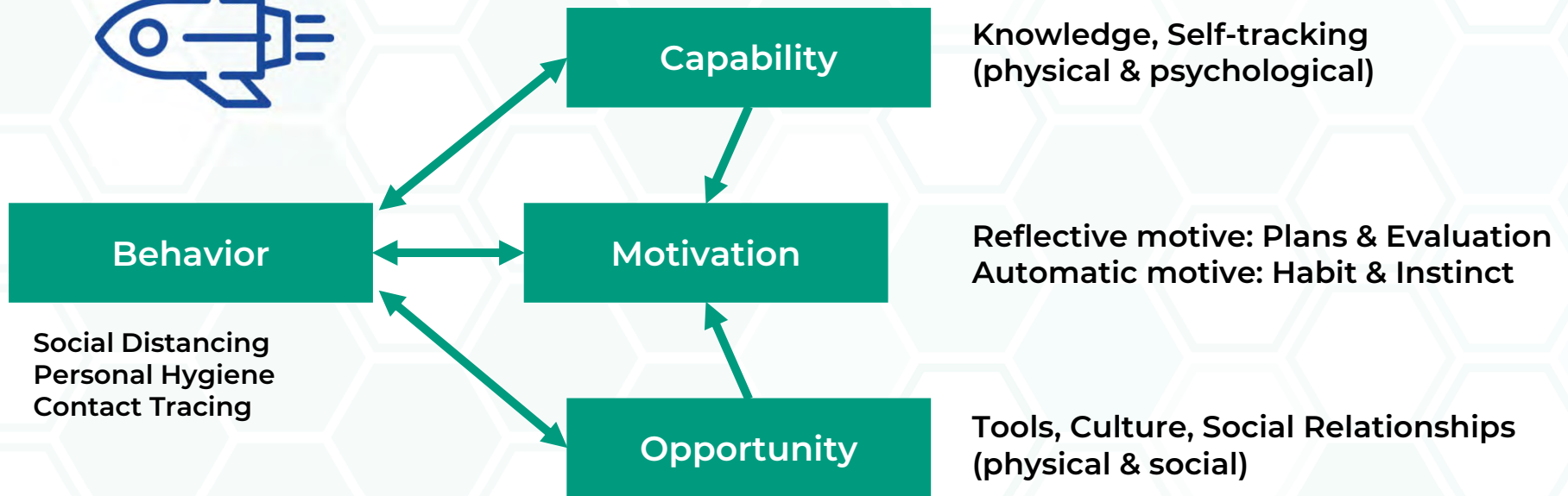
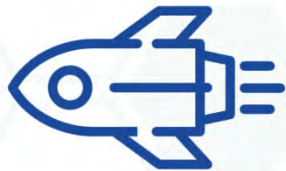
<https://www.who.int/publications/i/item/covid-19-message-library>



<https://www.bbc.com/news/technology-52037573>

# Behavior Model for Nudge Design

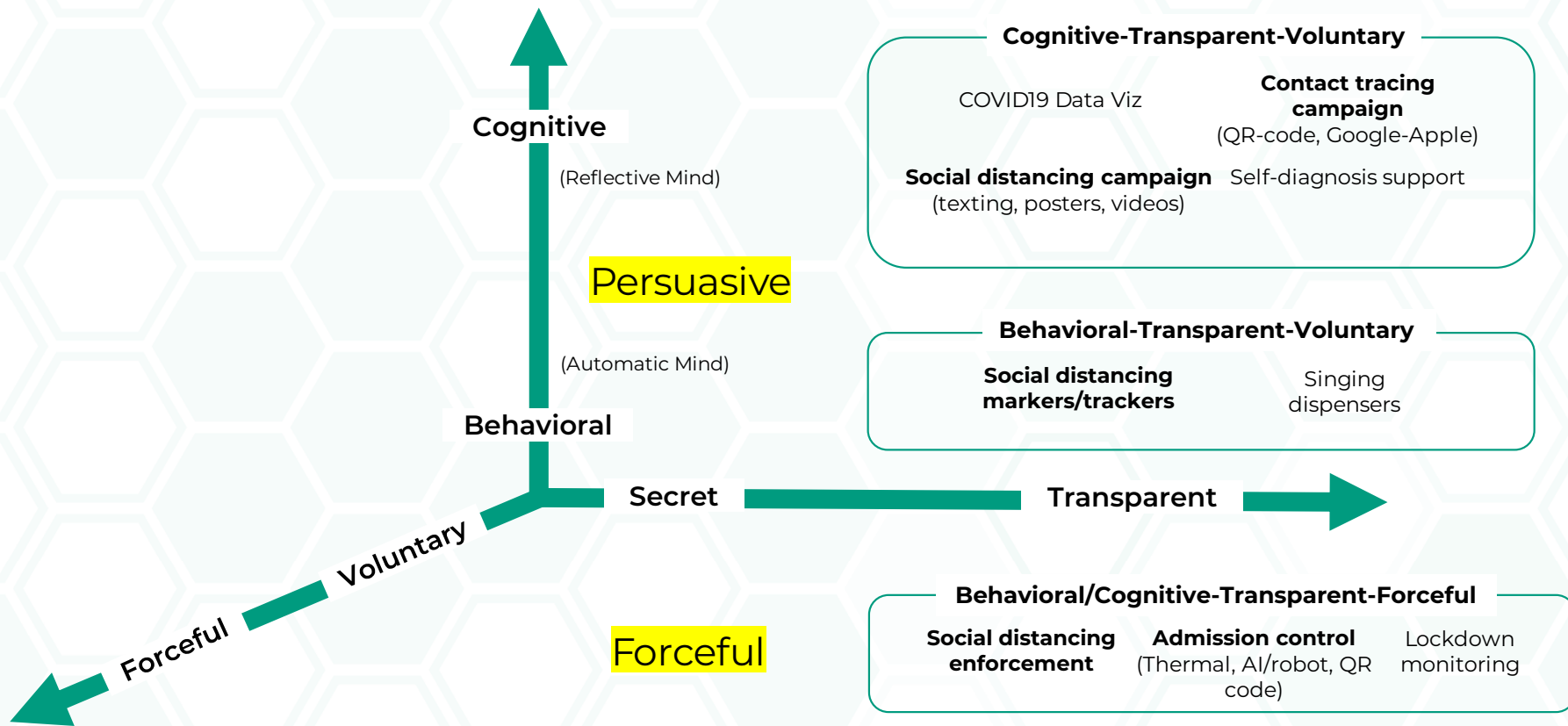
(Michie, van Stralen, West, 2011)



COM-B Model of Behavior  
<https://www.qeios.com/read/WW04E6.2>



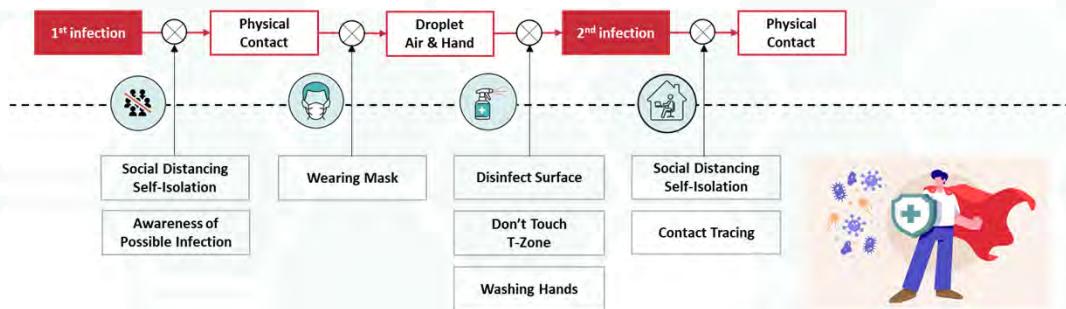
# Nudge Design for Socially Responsible Behaviors



# Digital Public Health: Crisis Communications & Interactions



**Crisis Communications & Interactions:** Communicate, Empower, Engage



**Prevention & Protection:** Social Distancing, Personal Hygiene, Contact Tracing

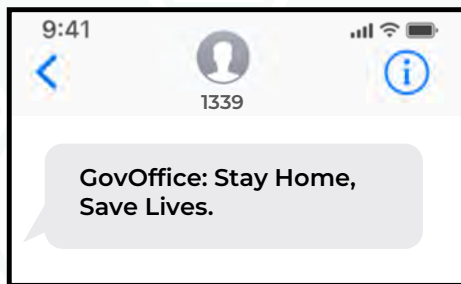
**Crisis Communications**



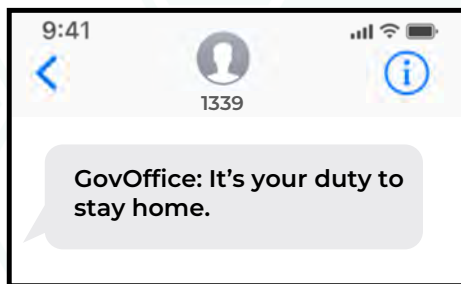
**Crisis Interactions**

# Communicate: Persuasive Message Framing

People tend to interpret a message differently depending on its framing



Pro-social Framing



Responsibility Framing



FOLLOW THESE STEPS TO AVOID GETTING COVID-19

Personal Framing

FOLLOW THESE STEPS TO AVOID SPREADING COVID-19

Public Framing

FOLLOW THESE STEPS TO AVOID GETTING & SPREADING COVID-19



**Wash your hands**  
after going to the bathroom, before eating, and after blowing your nose, coughing, or sneezing



**Don't shake hands or hug**  
It's OK to remind others if they forget



**Avoid touching your face**  
with your hands



Identity Framing

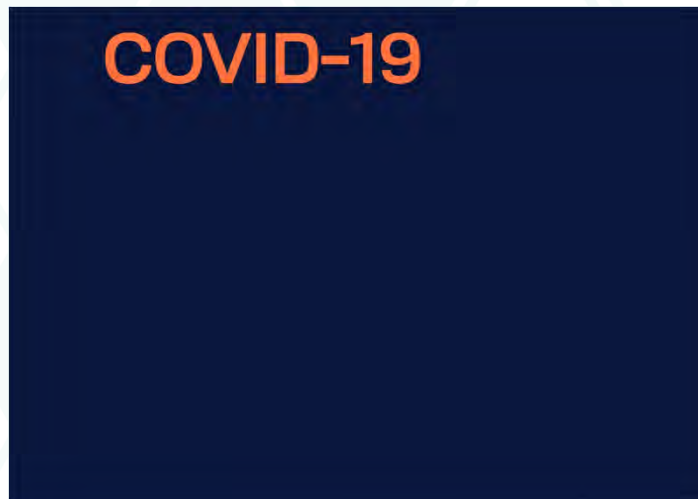
(Jordan, Yoeli, Rand 2020)

# Communicate: Data-driven Persuasion with Visualization

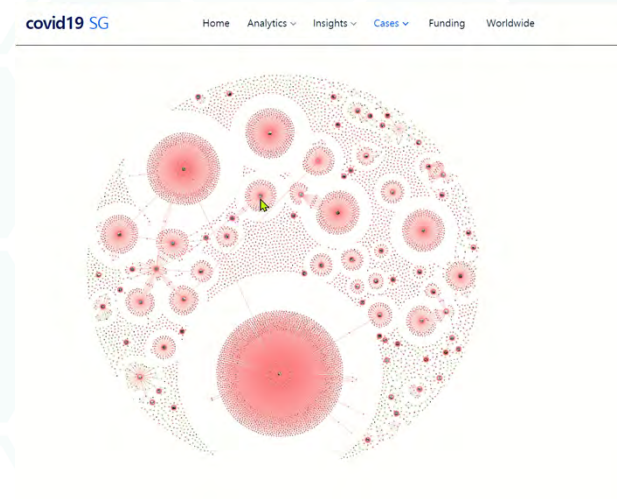
People want to make informed decisions by better understanding current situations



COVID-19 Dashboard  
(Johns Hopkins Univ.)



Daily COVID-19 Data in Motion  
(Johns Hopkins Univ.)



Infection Network Viz  
(<https://co.vid19.sg/singapore>)



# Communicate: Key Issues

## Digital Tech Analysis



Personalized Media

Multiple, Fragmented Touchpoints

Large-scale Testing (Evidence-based Policy)

## Data-Driven Insights

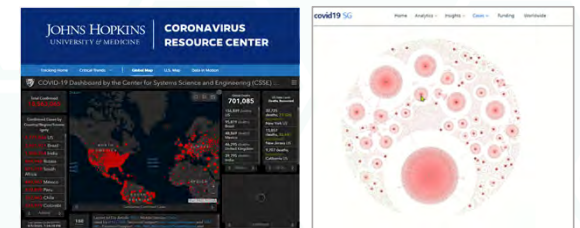


Data Integration & Pre-Processing

Explore New Data Sources

Large-scale, Real-Time Assessment

## Data Viz & Storytelling



Interactive Data Visualization Tools

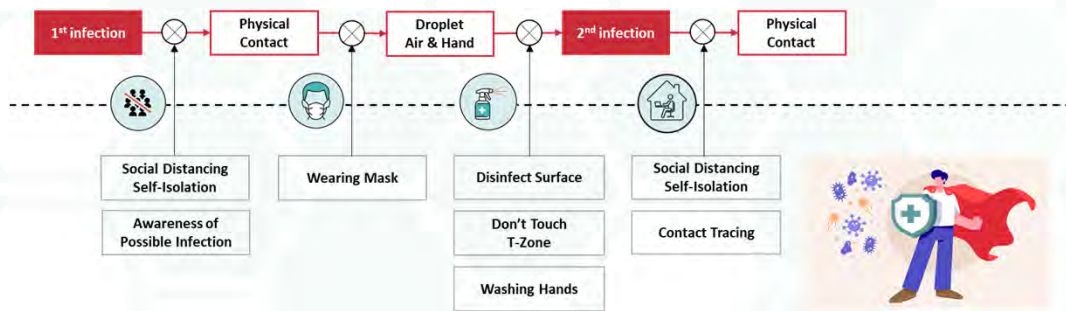
Data-Driven Crisis Communications

Targeted Persuasion (Individual & Community)

# Digital Public Health: Crisis Communications & Interactions



**Crisis Communications & Interactions:** Communicate, Empower, Engage



**Prevention & Protection:** Social Distancing, Personal Hygiene, Contact Tracing

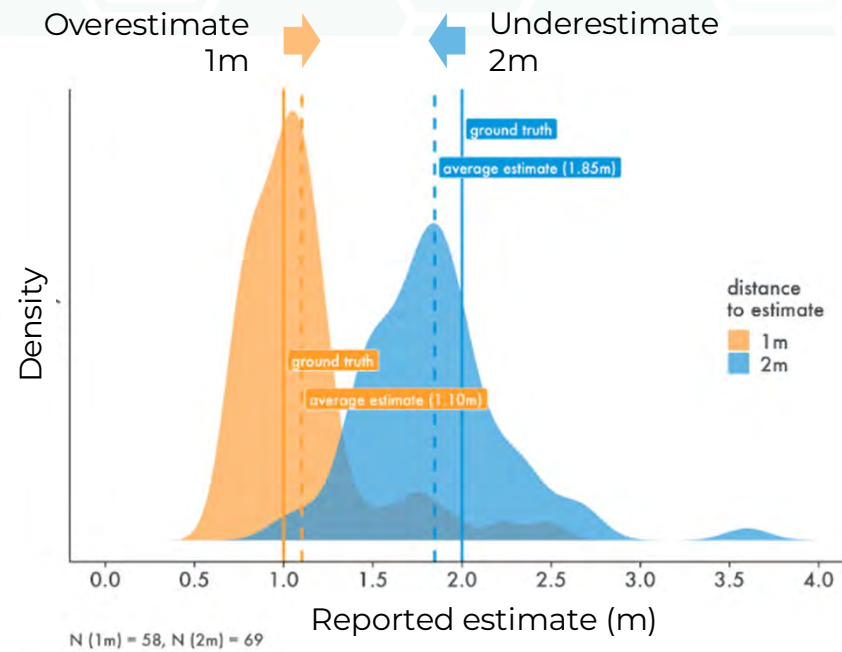
**Crisis Communications**



**Crisis Interactions**

# Empower & Engage: Social Distancing

People have difficulties in distance estimation: overestimate 1m & underestimate 2m

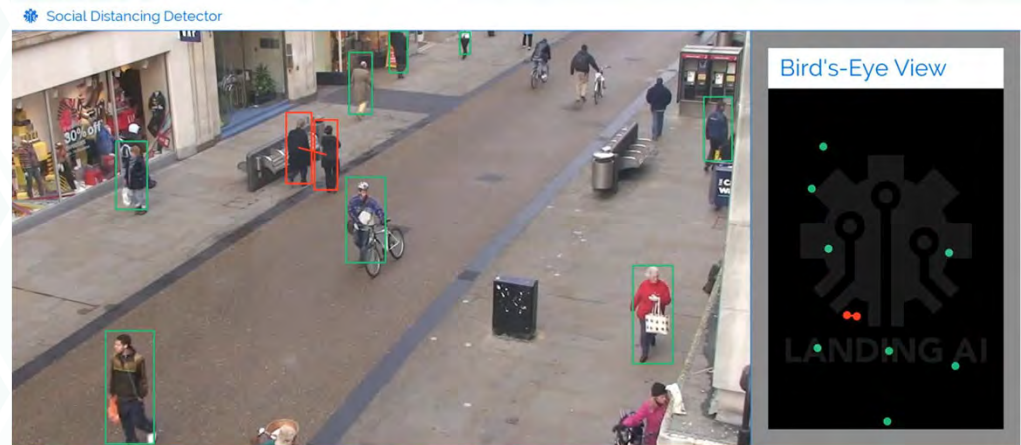


# Empower & Engage: Social Distancing

People have difficulties in distance estimation and often forget to follow social distancing



Just-in-time alert with wearables  
(Samsung Galaxy Watch)

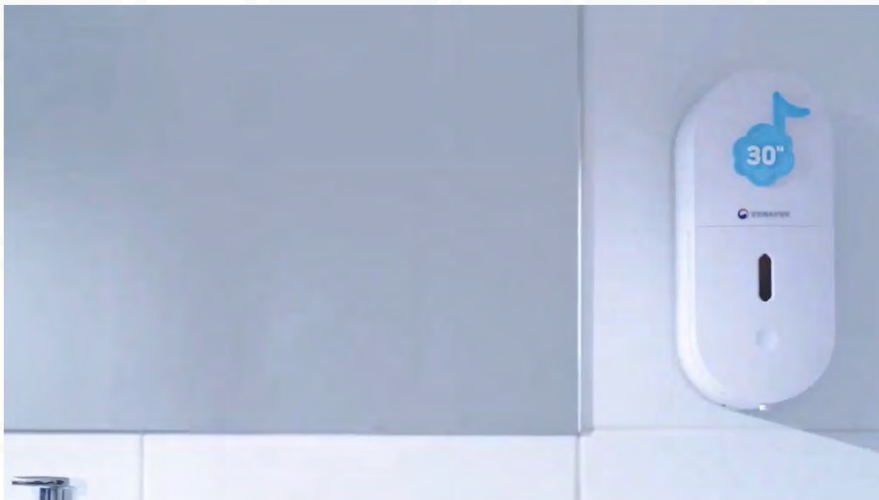


Real-time social distance tracing  
(Landing.ai)



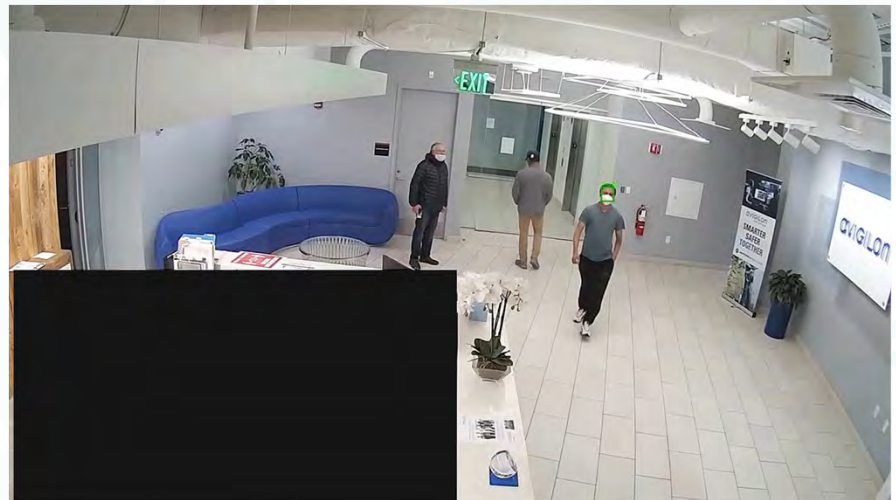
# Empower & Engage: Personal Hygiene

People tend to underestimate time or forget to wear protective gears



30s Singing Soap Dispenser (South Korea)

<https://www.youtube.com/watch?v=F19QUhF18VI>



Face Mask Detection & Alerting  
(Motorola Solutions, Inc.)

<https://www.youtube.com/watch?v=8XM-r8ChTXM>

# Empower & Engage: Contact Tracing

People are willing to help contact tracing and early containment



**QR Code to Check-in (Place)**  
(Korea KI-PASS, NZ COVID)



**Bluetooth Contact Tracing**  
(Google-Apple Alliance)



**Self-Assessment & Quarantine**  
Mobile Applications

# Empower & Engage: Key Issues

## Surveillance

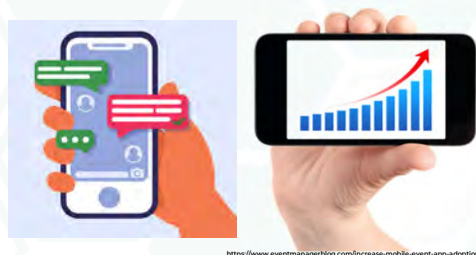


Privacy & Security

Trust & Accountability

Transparency

## Adoption



User Experiences (UX)

Critical Mass & Accuracy

Cost & Digital Literacy

## Thriving



Sustained Usage

Community Building

Software Lifecycle Management

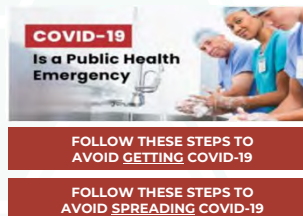
# Digital Public Health: Crisis Communications & Interactions



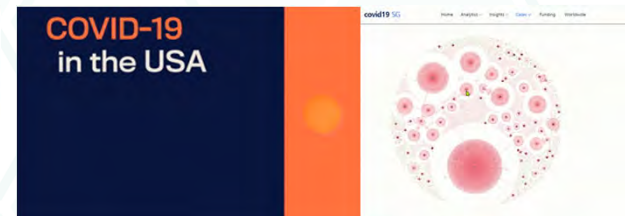
**Key Issues:**  
 Digital Tech Analysis  
 Data-Driven Insights  
 Data Viz & Storytelling

**Key Issues:**  
 Surveillance  
 Adoption  
 Thriving

## Crisis Communications: Communicate

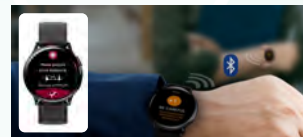


Message Framing



Interactive Data Visualization

## Crisis Interactions: Empower & Engage



Social Distancing



Personal Hygiene

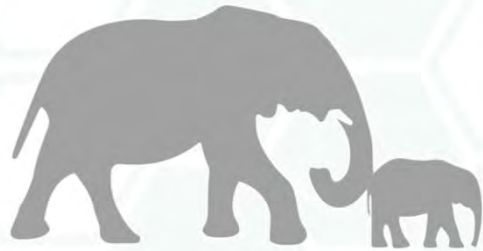


Contact Tracing



# Nudging the Public to Improve Compliance

Digital Public Health:  
Crisis Communications &  
Crisis Interactions



**Key Issues:**  
Digital Tech Analysis  
Data-Driven Insights  
Data Viz & Storytelling

## Crisis Communications: Communicate



Message Framing



Interactive Data Visualization



**Key Issues:**  
Surveillance  
Adoption  
Thriving

## Crisis Interactions: Empower & Engage



Social Distancing



Personal Hygiene



Contact Tracing



# THANK YOU



وزارة الحرس الوطني - الشؤون الصحية  
Ministry of National Guard - Health Affairs



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