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“In January 2020, the Johns Hopkins University predicted that Taiwan would be the second-highest country/region at risk of experiencing a breakout due to its proximity and linkages (c. 700 flights a week) to mainland China.

However, as of January 12, 2021, Taiwan's COVID-19 cases count remained at an extraordinary low of 838, with 58 domestic cases and 7 fatalities.”

– Albert TING, CX Technology Taipei, Taiwan

Image Source: Free facial masks distribution in a convenience store, a commonplace scene in Taiwanese cities during the pandemic. Photo Mai Ling, all rights reserved ©



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Taiwan's resilient public health system: leveraging urban and digital infrastructure to combat COVID-19

Taiwan is a technological powerhouse with a highly urbanized population of 23 million. The greater Taipei metropolitan area is densely settled by 7 million people.¹ According to the International Institute for Management Development (IMD), Taiwan's economy was the 11th most digitally competitive in 2020.² Taiwan's sophisticated urban and digital public health infrastructure allowed it to combat COVID-19 effectively. In January 2020, Johns Hopkins University predicted that Taiwan would be the second-highest country/region at risk of experiencing a

breakout due to its proximity (110 kilometers away) and linkages (c. 700 flights a week) to mainland China.³ However, as of January 12th, 2021, Taiwan's case count remains at an extraordinary low of 838 – with 58 domestic cases and 7 fatalities.⁴

Centralized Command Enables Decisive Early Actions

Decisive early government action was key in preventing the spread of COVID-19. Back in 2003, Taiwan suffered one of the highest Severe Acute Respiratory Syndrome (SARS) fatality rates with 73 deaths.⁵ As a result, in 2005, a framework for the Central Epidemic Command Center (CECC) was established.⁶ On December 31st, 2019, a month before the World Health Organization (WHO) declared a Public Health Emergency of International Concern, Taiwan notified the WHO of its concerns, began onboard health inspections of aircraft passengers from Wuhan, and stockpiled respirators and N95 masks.⁷ Before COVID-19 reached Taiwan, the CECC was activated on January 20th, 2020. After, on February 25, 2020, Taiwan's legislative body passed The Special Act for Prevention, Relief, and Revitalization Measures for Severe Pneumonia with Novel Pathogens and granted the center sweeping executive power.⁸ The center made a necessary decision to ban healthcare professionals from traveling abroad to prevent pathogen importation into the healthcare system.⁹ By late March, the CECC also limited foreign tourists from entry.¹⁰ Careful management allowed Taiwan to maintain air links to major US, European and Asian cities throughout 2020.

World-Class Digital Contact Tracing w/ Mandatory 14-Day Self Quarantine

While standardizing travel and quarantine procedures, authorities took advantage of vacant urban hotels, municipal administrative resources, and digital healthcare infrastructure. National Health Insurance's Medi-Cloud digital platform (with real-time patient records, claims, and fee deductions) was integrated with Immigrations and Customs databases, so healthcare providers could see patients' complete travel history along with health records.¹¹ In late January of 2020, this allowed for case identification.¹²

Travelers bound for Taiwan are required to quarantine for 14-days.¹³ At customs, they download the Quarantine System for Entry app, which triangulates their location via reception towers as part of the Digital Fence System, created by officials alongside telecom companies.¹⁴ At the municipality level, officials call quarantining households daily, furnishing them with food and supplies, and noted turned-off phones.¹⁵ If someone breaks quarantine, local civil affairs departments and police are notified immediately, and officials trace further contacts.¹⁶ Using mobile phone location data, coupled with in-person interviews and CCTV footages, healthcare officials rigorously trace all patient contacts. Each case means an average of 25 people undergo quarantine. About 400,000 people took part in mandatory 14-day self quarantines during 2020. Remarkably, the non-compliance rate is approximately 0.3%.¹⁷

Facemasks Stop Local Transmissions

Early adoption of facemasks reduced local transmissions. The CECC limited facemask exports on Jan 24th, 2020, and temporarily nationalized the production chain on Jan 30th, 2020.¹⁸ The Ministry of Economic Affairs worked with 26 local manufacturers to set up 60 production lines in 1 month¹⁹ and increased daily facemask production from 1.8 million per day to 20+ million per day in a record 4 months' time.²⁰ Military reservists were brought in for midnight shifts to ensure 24/7 production.²¹ Taiwan quickly became the world's second-largest facemask supplier.²² Starting in March 2020, the CECC partially lifted bans and subsequently returned control of production facilities to private entities.²³

Authorities leveraged existing urban and digital infrastructure to rapidly prototype a mask distribution system. On February 6th, over 6,500 pharmacies were supplied with requisitioned masks. Residents could present their national health insurance cards for 2 masks per week, later 10 per two weeks²⁴, at a price of NT\$5 per mask (c. US\$ 15 cents) (later reduced to NT\$4 per mask) at these outlets.²⁵ When long lines formed, authorities swiftly took advantage of Taiwan's urban layout, dotted with convenience stores, and tasked a further 11,500 convenience stores including 7-11 and Family Mart stores to distribute facemasks 24/7/365.²⁶ In the final iteration, residents can order adult or kid-sized masks online, retrieve them 24/7, send them overseas to relatives, or

donate them to international humanitarian efforts.

During the pandemic, digital innovation was encouraged. Ministries worked with Taiwan's active hacktivist community on a "rapid, iterative and bottom-up process."²⁷ Armed with government open data, netizens, coders, and AI/Blockchain start-ups used distribution ledger technology to design interactive maps with chatbots and real-time stock levels of facemasks in distribution outlets to put a stop to panic buying.²⁸

Effective Communication Strategy Generates High Level of Public Trust

From late January through early June of 2020, the CECC held daily press conferences.²⁹ The Minister of Health and Welfare personally provided updates in infection numbers and advice. The daily 2 pm show became one of the highest-rated television programs in Taiwan. Officials used social media outlets like Facebook, Line, and Twitter to connect with younger populations.³⁰ They sometimes released self-mocking memes to combat misinformation with humor.³¹ In addition, online platforms like vTaiwan allowed youths and netizens to voice, upvote, and communicate policy expectations to officials, health experts, and business leaders.³² This brought a degree of transparency to decision-making and helped officials gain public trust.

Resulting in an Extraordinarily Low Case Count of 838 in Taiwan as of January 12th, 2021

In conclusion, decisive early actions and transparent

leveraging of digital public health and urban infrastructure enabled Taiwan to 1) set up a world-class contact tracing program; 2) enforce effective 14-day self quarantines; and 3) manufacture then widely distribute facemasks to stop local transmission. Instead of becoming the second-highest country/region at risk of a major outbreak, by working with its public, Taiwan enjoyed a run of 253 days free of local transmissions during 2020, and successfully contained COVID-19 with an extraordinarily low total case count of 838 as of January 12th, 2021.³³ Nonetheless, COVID-19 has been a humbling lesson for all of humanity. Taiwan needs to continue to be vigilant in its public health defenses to ensure the wellbeing and safety of its residents.

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