TCLK: BLOCKCHAIN-POWERED INFORMATION PLATFORM

Hubert Pun, Jianping (James) Liang, Jing Chen, Roger Wang, and Huaxi Li wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

In April 2020, the number of new cases of the COVID-19 virus was declining rapidly in China. Stores and restaurants were beginning to open up, and citizens were becoming more comfortable with taking public transit again. Wuhua Ma took comfort in knowing that the worst of the virus was behind the country, but he now needed to decide on how to reapply the mobile application (app) he had built to help combat the virus.

In February 2020, during the height of the virus outbreak in China, Ma and a team of 10 of his co-workers and friends built an app named Tong Cheng Lian Kang (TCLK) on the Chinese messenger platform WeChat as a tool to track publicly known cases of the virus. By the end of April, TCLK had a total of 38,000 submissions from 20,000 unique users, creating a database for other users to search and find out if they had been exposed to a contagious individual. While other apps served a similar purpose, TCLK was unique in that it leveraged blockchain technology to track and validate case submissions, ensuring that the data was more secure, trustworthy, and complete compared with other available tools.

The quick adoption of TCLK by WeChat users indicated to Ma that his model for the application of blockchain had strong potential. As the pandemic seemed to be coming to an end, Ma wondered how TCLK's model could be applied to other business problems in the long term.

COVID-19

The first case of COVID-19 that was reported in China was in the city of Wuhan in December 2019, but the origins of the virus were still unconfirmed as of April 2020. The primary symptoms of COVID-19 were fever, dry cough, and tiredness. While 80 per cent of people who contracted the disease had mild symptoms, the remaining 20 per cent became seriously ill and had difficulty breathing. The highest-risk demographics were older people or those who had underlying health conditions such as high blood pressure, heart and lung conditions, diabetes, or cancer.[1] Globally, the mortality rate of the disease was estimated at 3.4 per cent,[2] but the figures varied drastically by country, based on such factors as access to testing, age of population, and preparedness of the national healthcare system.

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[1] "Q&A on Coronaviruses (COVID-19)," World Health Organization, April 17, 2020, accessed April 26, 2020, www.who.int/news-room/q-a-detail/q-a-coronaviruses.

[2] "WHO Director-General's Opening Remarks at the Media Briefing on COVID-19—3 March 2020," World Health Organization, March 3, 2020, accessed April 26, 2020, www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-COVID-19---3-march-2020.

The most common way in which the virus spread was through liquid droplets from a person coughing or sneezing. People could be infected when these liquids entered their respiratory system through their eyes, nose, or throat, which could occur when they interacted with infected individuals in close proximity or when they touched an infected surface and then proceeded to touch their face. Most countries, including China, faced an initial exponential growth of new cases due to the rapid spread of the virus from person to person. The primary measure of how fast a virus spreads was R0 (pronounced R nought), which represented the average number of people each sick individual would infect.[3] The primary goal of governments during this pandemic was to reduce the R0 in an attempt to contain the spread of the virus. The total confirmed cases of COVID-19 in China from January 20, 2020, to June 8, 2020, are graphed here (see Exhibit 1).

FLATTENING THE CURVE

Countries across the world took various approaches toward combating COVID-19 with a common end goal of "flattening the curve." The "curve" referred to a visual representation (e.g., a graph) of the projected number of individuals who would contract COVID-19. Thus, "flattening the curve" referred to taking proactive measures to reduce the transmission rate of the virus so that the number of infected patients at any given time did not overburden the national healthcare system[4] (see Exhibit 2). Countries' most common strategies included contact tracing, closing borders, increasing testing, and social distancing.

Contact Tracing

Contact tracing was the strategy of identifying patients who had contracted COVID-19 and tracing their steps between their initial infection and their diagnosis. This tracing allowed health officials to identify individuals who had potentially been exposed to COVID-19, ensuring they were tested and quarantined appropriately. Some countries, such as South Korea, focused on this strategy and had experienced great success in slowing the spread of the virus. One of the biggest barriers to successful contact tracing, however, was the ability to quickly and efficiently disseminate information about where COVID-19 patients had appeared in public so that exposed individuals could seek support before they infected others.

Closing Borders

Most countries took aggressive measures to close international travel to prevent the spread of the virus from other countries. China was the first country that many Western nations blacklisted for travel because it was the epicentre of the disease throughout the majority of the first quarter of 2020. However, as the number of domestic cases in each country reached a critical mass, closing borders became a less effective way to slow the spread of the virus.

Increasing Testing

Broader access to testing ensured that citizens knew if they were infected and, if so, could take the necessary precautions to avoid infecting others. Many countries faced a bottleneck around sourcing sufficient test kits and therefore could not get a grasp on the number of active cases in the country. As a result, many

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[3] Morgan McFall-Johnsen and Aria Bendix, "An Average Coronavirus Patient Infects at Least 2 Others. To End the Pandemic, That Crucial Metric Needs to Drop below 1—Here's How We Get There," *Business Insider*, April 18, 2020, accessed April 28, 2020, www.businessinsider.com/coronavirus-contagious-r-naught-average-patient-spread-2020-3.
[4] Brandon Specktor, "Coronavirus: What Is 'Flattening the Curve,' and Will It Work?," LiveScience, March 16, 2020, accessed April 28, 2020, www.livescience.com/coronavirus-flatten-the-curve.html.

biotechnology companies across the world had been competing to go to market with a test kit that was cheap, quick and easy to administer, and accurate.

Social Distancing

Social distancing was a strategy to minimize the contact between individuals within a society, in an effort to reduce the virus's transmission rate. According to the vast majority of healthcare officials, social distancing was the most effective way of preventing both the rapid spread of the disease and the overburdening of the healthcare system. From a policy standpoint, governments enforced social distancing by closing non-essential businesses, cancelling public events, and banning social gatherings.

The Strategy in China

To slow the spread of the virus, China closed all non-essential businesses, including shopping centres, restaurants, and office buildings. Social gatherings were forbidden, and strict measures limited where people were allowed to go. For example, people entering apartment buildings needed to show their identification to prevent outsiders from entering.

The government also established local quarantine centres for sick individuals to ensure they would not infect others. Anyone suspected of having the virus was taken to the quarantine centre to reduce the risk of infecting others. Cities and provinces that had large numbers of cases were sealed to prevent their citizens from travelling to other areas of the country and spreading the virus.

In an attempt to identify other individuals who might have been infected, the government also took aggressive action in contact tracing, closely tracking in which public locations and transportation the infected patients had appeared. This step was especially important in reducing the R0 of the disease but to succeed, required the co-operation and connectedness of people within the country.

BARRIERS TO SUCCESS

The biggest barrier to implementing the above strategies was the ability to efficiently disseminate information about where COVID-19 patients had appeared in public so that exposed individuals could seek support before they infected others.

The most reliable source for reports of COVID-19 cases came from government websites and news agencies (see Exhibit 3). While these sources provided accurate and verified information, they were scattered across many different websites, which made it difficult for citizens to determine whether they might have been exposed to a publicly known case. The more difficult it was for citizens to learn whether they had come into contact with the virus, the more difficult it was for the government to test and quarantine the necessary individuals to stop the spread of the disease. Therefore, a number of mobile applications were launched to simplify this search process.

TRADITIONAL SOLUTIONS

Ma, like many other citizens, was concerned about the safety of himself and his family, as well as that of his friends, neighbours, and colleagues. He browsed online looking for a tool to search publicly known cases of the virus so he could verify if any of his family members had been exposed to the virus. He found several existing WeChat-integrated applications being used to track reported COVID-19 cases (see Exhibit 4).