

Volume-1, Issue-2, April 14, 2020

Journal of Development Research



COVID-19 PANDEMIC: EXPERIENCE OF CHINA



Published by:
DevResonance Ltd.
House 10, Flat 102, Block D, Road 5/1,
Niketan, Gulshan, Dhaka-1212, Bangladesh.
email: devresonance.bd@gmail.com
website: www.devresonance.com

An Institution of Development Research and Management

Preface

Since the start of the COVID-19 outbreak, the world has had to deal with the crisis. A number of countries and their respective governments have tackled the pandemic differently to each other. The objective of this series of analyses is to present and discuss the actions undertaken in various countries, with each case discussed individually. We hope our presentation of all the literature and materials reviewed will certainly facilitate easy and ready reference, allowing for future contributors to add to the research. we have tried to rigorously verify the authenticity and completeness of the information presented in literature and materials cited in this study but, we apologize to our readers for any inconvenience that may result from any error in the publications.

Effort has been made to present all the information in a chronological manner with the exception of reordering information to fit the narrative of the study as intended. We sincerely hope that much more additional material could come to light enabling us to substantially improve on this study.

We express our earnest gratitude and acknowledgement to all who translated and published works cited in this study in different forms earlier. Finally, we hope our effort will be well rewarded by the warm and enthusiastic response of our esteemed readers and wish that our study extends an invitation to more academic contributions on COVID-19 in the future.

*Nazme Sabina
Chief Executive
DevResonance Ltd.
Dhaka, Bangladesh.
Email: nazme.sabina@gmail.com*

Contents

Abstract	3
Introduction.....	3
Research Questions	3
Methodology.....	4
Findings and Discussions	4
China's Healthcare Sector.....	4
Medical Insurance Programs Coverage	4
China's multifaceted Healthcare System.....	5
Lessons learned from Past Pandemics.....	6
COVID-19 outbreak in China.....	7
Response to COVID-19 outbreak.....	7
Technological Fight against COVID-19	8
Economic stimulus package to tackle the financial difficulties	9
Role of China's People's Liberation Army (PLA)	10
Conclusion	11
Abbreviation.....	11
Authors' contributions	12
Competing Interest	12
Funding.....	12
Acknowledgement.....	12
References	12

Study on 'Covid-19 Pandemic: Experience of China'

Md. Aminur Rahman¹
Amitabha Dey²
DevResonance Ltd.

Abstract

The COVID-19 outbreak since end of last year has disrupted global health and economy and presented substantial challenges to control this highly contagious disease, resulting in deaths in tens of thousands all over the world. It has originated from Wuhan State of China during the second week of December 2019. The outbreak overlapping with the biggest Chinese festival of year presented substantial challenges for the Chinese Government in taking steadfast decisions to curb the spread of the disease. In this study, we have reviewed secondary literature and materials and outlined all the measures and policies adopted and advanced technology leveraged by the Chinese Government. The study looks at how existing healthcare system in the country has helped the Chinese Government in their cause, while they further ramped up the efficiency of its healthcare delivery and imposed other strict measures utilizing past experiences with pandemics. It looks at how the Chinese Government developed and allocated its financial schemes and support packages to accelerate the nation's economy recovery as a result of the fallout from this pandemic and the role of China's military force and other agencies in providing assistance in various ways to mitigate the negative consequences.

Introduction

As of 2019, China is the most populous country in the world, home to 1.43 billion people³ spread out across 22 provinces and governed entirely by the Communist Party of China (CPC). China, with GDP (Gross Domestic Product) in PPP (Purchasing Power Parity) of a staggering USD25.27 trillion⁴, is the largest economy in the world, even exceeding the size of other super-power nations such as the United States and Japan. From the initial days of December 2019, the Coronavirus (later known as COVID-19) has likely infected inhabitants of Wuhan State of China, having originated from the wet Huanan Seafood Market where it might have latched on to humans from exotic animals present there as it is zoonotic disease. Since the disease can take as many as 14 days for the symptoms to appear in the infected person, an unknown case of pneumonia was detected on 12 December 2019. The disease was identified when the country was celebrating the Chinese Lunar New Year.

Research Questions

- i. What is the existing structure of Chinese Health care system?
- ii. What is the extent of coverage of financial insurance schemes in China?
- iii. What was China's initial response to COVID-19?
- iv. How did China utilize past experiences of influenza pandemics to fight against COVID-19?
- v. How did the Chinese Government set up new hospitals on a short notice?
- vi. How did China leverage technology to trace and contain COVID-19 spread?
- vii. How did the Chinese Government develop and allocate its financial schemes and support packages?
- viii. What role did China's Military forces play in its anti-COVID suppression efforts?

¹ Consultant, Inclusion and MEL, DevResonance

² Senior Research Officer, DevResonance

³ United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019: Highlights.

⁴ Caleb Silver (18 March 2020), The Top 20 Economies in the World. Cited from *Investopedia* website.

Methodology

The study systematically reviewed literature and policies to construct the entire timeline of events as they unfolded and outlined the measures and policies the Chinese Government issued in response to COVID-19. Furthermore, the study analyzed statistical data presented in literature reviews to draw comparison with respective figures of other nations to assess the level of success and effectiveness of the measures particularly for China. The study reviewed literature reviews to understand the chain of events through detailed contextual analysis and their interlinked relationships. The study relied on a variety of sources to investigate the unique situation in China. The study also sheds light on why the measures were proven to be effective under the given circumstances and how did China respond differently than other nations and was able to “flatten the curve”.

Findings and Discussions

China's Healthcare Sector

China's health-care sector is widely regarded as one of the fastest-growing in the world with the CPC's healthcare expenditures projected to soar from USD357 billion in 2011 to USD1 trillion in 2020, while government health care expenditures have more than doubled since 2006. The boom in the country's health-care sector reflects CPC's priority in strengthening the country's health-care system and has provided an incentive for multinational health-care provider companies to expand their operations in China to cater for a billion people.⁵

China had exceeded Japan in total healthcare expenditure in 2016 with USD574 billion compared to Japan's USD469 billion. The numbers of doctors per 1,000 inhabitants has also been continuously growing in China since 2002, from 1.13 to 2.01 in 2017. A similar development is seen in the number of nurses per 1,000 inhabitants, with 1 in 2004 rising to 2.7 in 2017⁶. Consequently, the health of the Chinese population has improved significantly with life expectancy at birth rising from 67 years in 1990 to 76.3 years in 2015⁷. The maternal mortality ratio decreased from 80 per 100 000 live births in 1990 to 23.2 per 100 000 live births in 2013⁸, with hospital births becoming standard. From 1996 to 2014, China reduced its under-5 mortality by 75 percent. In many parts of China, under-5 mortality is now lower than in Canada or the United States of America⁹. Nutrition situation in the country has also improved substantially, number of underweight children under 5 years fell by 74 percent between 1990 and 2010.¹⁰ These improvements in healthcare is attributable to a massive and complex health care system that China has developed over the years.

Medical Insurance Programs Coverage

Perhaps the largest contributing factor in massive improvement in health care delivery is that China has created the world's largest network for basic medical insurance accessible for all and formed a healthcare service system encompassing both urban and rural areas. By the end of 2016, basic medical insurance had reached over 1.3 billion citizens nationwide, accounting

⁵Franck Le Deu, Rajesh Parekh, Fangning Zhang, and Gaobo Zhou (November 2012), Health care in China: Entering 'uncharted waters', McKinsey & Company.

⁶Elyar Najmehchi B.A., chinadaily.com.cn; China's healthcare sector promising for 2020 and beyond, chinadaily.com.cn | Updated: 2019-12-25

⁷National Bureau of Statistics of China. 2015 national economic and social development statistic report (http://www.stats.gov.cn/tjsj/zxfb/201602/t20160229_1323991.html accessed on 29 February 2016).

⁸National Bureau of Statistics of China. 2015 national economic and social development statistic report (http://www.stats.gov.cn/tjsj/zxfb/201602/t20160229_1323991.html accessed on 29 February 2016).

⁹Horton R. Offline: China—the triumph (and danger) of transition, Vol.386, 7 November 2015. ([http://dx.doi.org/10.1016/S0140-6736\(15\)00756-4](http://dx.doi.org/10.1016/S0140-6736(15)00756-4) accessed on 29 February 2016).

¹⁰World Health Organization, National Health and Family Planning Commission (NHFPC), China-WHO Country Cooperation Strategy 2016-2020

for more than 95 percent of the total population.¹¹ There are primarily three insurance programs that differ in how they are financed and operated. Urban Employee Basic Medical Insurance (UEBMI) and Urban Residence Basic Medical Insurance (URBMI) are designed to cater to employees and residents in the urban areas and New Rural Cooperative Medical Scheme (NRCMS) is designed for residents in rural areas. On top of the three primary insurance programs, basic health care insurances, insurances for critical illness, medical assistance (MA), and emergency disease assistance is also incorporated in the health insurance system of the country that protects and relieves Chinese citizens from expenses related to medical conditions and further encourages them to seek health care services when in need¹² unlike in some countries.

China's multifaceted Healthcare System

Although there are variations in conditions in different jurisdictions of the vast country and bringing millions of citizens within the reach of the health care system presents a substantial challenge, China's government system combined central government leadership with highly localized policy implementation and management of health-care reforms. China's government system spans many levels, from central government and line ministries (including agencies responsible for health) through provinces, cities, counties, towns/townships and villages. Cities and counties play a very important role in delivering health care services, despite their relatively low position in the government system, and many decisions are decentralized to these levels, including much day-to-day planning and management of health and welfare systems.¹³ The complex health care system of the nation is constituted of specialized public health services, primary public and clinical health care, and curative health care (secondary and tertiary).

Specialized public health services are carried out by Centers of Disease Control and Prevention (CDC) and health care agencies for women and children. Governments at provincial and county levels usually have a CDC and also a health care agency for women and children. In 2014, there were 3,490 CDCs and 3,098 health care agencies for women and children in China. The primary health care services are carried out by sub-district health centers, community health service centers (stations) in the urban areas, township health service centers, village clinics in the rural areas, and outpatient departments in both areas. The total number of primary health care institutions reached 917,335 in 2014, including 595 sub-district health centers, 34,238 community health service centers (stations), 36,902 township health service centers, 645,470 village clinics, and 200,130 outpatient departments.¹⁴

Furthermore, curative health care services are carried out by hospitals, two-third of which is owned by the government and rest is privatized. Hospitals are accredited as levels ranging from 1–3 where level one correspond to hospitals at township level for primary public and clinical health care introduced in Primary public and clinical healthcare section, level two

¹¹ElyarNajmehchi B.A. (25 December 2019), China's healthcare sector promising for 2020 and beyond, China Daily.

¹²Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>

¹³Xiao, Y., Husain, L. & Bloom, G. Evaluation and learning in complex, rapidly changing health systems: China's management of health sector reform. *Global Health* 14, 112 (2018). <https://doi.org/10.1186/s12992-018-0429-7>

¹⁴Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>

correspond to hospitals at the county levels providing comprehensive health service with coverage for certain regions and level three correspond to providing comprehensive or advanced health service at the provincial level. In 2014, China had 16,524 general hospitals, 3,115 hospitals specialized in traditional Chinese medicine, and 5,478 specialized hospitals. Village clinics, township health centers, and hospitals at the county level make up the basic rural health care delivery system. These primary health care institutions only possess basic health care equipment and therefore, health care needs that cannot be managed by primary health care institutions are referred to hospitals and other specialized health institutions at the county level. This process of referring patients within different tiers of institutions is known as the village–town–county three-tier referral system for the rural area.¹⁵

Additionally, Chinese government has developed a few programs to compliment the health care delivery and acts as an extension of the basic medical care system. The Medical Assistance (MA) program is designed for people belonging to low income households who are provided with minimum living allowance from the government. This program covers remainder of the medical bills that is not covered by URBMI and NRCMS. The Emergency Disease Program, operated by the Chinese government, provides medical assistance to those who don't have their identification paperwork and cannot afford to pay for emergency situations so that they are not left out of the reach of the country's medical care network. The program is financed by local government and donations.¹⁶

Lessons learned from Past Pandemics

The evolution of China's comprehensive health care system is partly attributable to the country's long history of influenza pandemics, the recent one being the 2009 H1N1 Pandemic and the 2019 Coronavirus Pandemic that has held the entire world in hostage since early 2020 at present. The Chinese government is therefore not unfamiliar with the risks, impacts and severity of pandemics. In 2000, China enhanced their earlier influenza surveillance efforts, a collaboration between the Chinese National Influenza Center of the Chinese Center for Disease Prevention and Control (China CDC) and the Influenza Division of the United States Centers for Disease Control and Prevention, by establishing an influenza-like illness (ILI) and virological surveillance system to report ILI cases and isolate viruses for seasonal influenza vaccine strain recommendations. The surveillance system includes 8 network laboratories and 31 heavily guarded hospitals.¹⁷ Furthermore, China has developed a comprehensive Disease Surveillance Points (DSPs) system in order to control these diseases since 1950. The DSP system covers 161 counties and districts in 31 provinces and is used primarily for surveillance of communicable diseases where the system monitors 37 communicable diseases and reports deaths caused by them. Over the years, the state CDC has developed a nationwide web based automated system for outbreak detection and rapid response to communicable diseases.¹⁸

¹⁵Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>

¹⁶Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>

¹⁷Shu, Y., Song, Y., Wang, D. et al. A ten-year China-US laboratory collaboration: improving response to influenza threats in China and the world, 2004–2014. *BMC Public Health* 19, 520 (2019). <https://doi.org/10.1186/s12889-019-6776-3>

¹⁸Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>

COVID-19 outbreak in China

At the onset of December 2019, the novel Coronavirus (nCoV), emerged in Wuhan State, capital city of Hubei Province in China. Initially, an unknown case of pneumonia was detected on 12 December 2019¹⁹ and on 31 December 2019 was reported at the WHO China Country Office²⁰. By the 3rd of January 2020, a total of 44 case-patients with pneumonia were reported to WHO authorities in China and it began to show telltale signs of a possible outbreak. The coronavirus outbreak coincided with the Spring Festival in China, which is the most famous traditional festival in China, during which nearly 3 billion people travel countrywide. These conditions caused favorable conditions for transmission of this highly contagious disease and severe difficulties in prevention and control of the epidemic.²¹ As of 10 April 2020, China has reported 83305 total confirmed cases of which there are a total of 3345 deaths from COVID-19 cases.²²

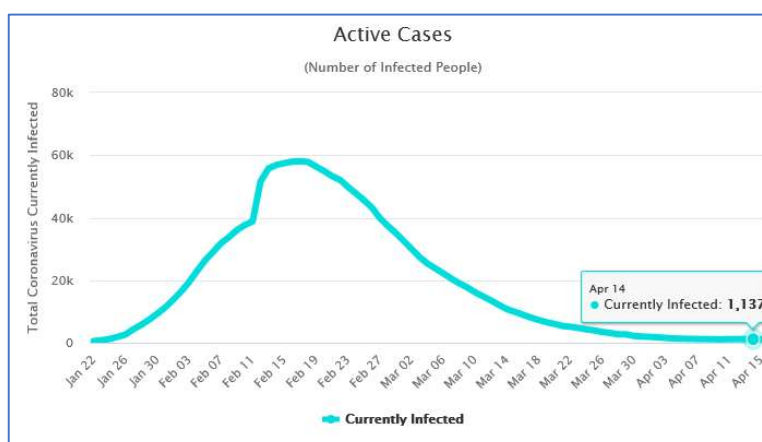


Figure 1: Active Covid-19 Cases in China [Source: website of worldometer; www.worldometers.info/coronavirus/country/china/]

Response to COVID-19 outbreak

As of 31 March 2020²³, the Chinese government has been able to drastically reduce the number of new cases, or in other words, “*flattened the curve*”. Government policies enacted during the Chinese Lunar New Year holiday are likely to have helped reduce the spread of the virus by decreasing contact and increasing physical distance between those who have COVID-19 and those who do not. When it came to the knowledge of the Chinese government that there was a possibility of a highly contagious disease outbreak, and that too when the country was celebrating the biggest festival of the year, the Chinese Government made quick and steadfast decision of extending the Lunar New Year holiday. The holiday end date was changed to March 10 for Hubei province and Feb 9 for many other provinces so that the duration of the holiday would be sufficiently long to fully cover the suspected incubation period of COVID-19 and provide treatment for them. In addition, people diagnosed with COVID-19 were isolated in hospitals.²⁴

As part of these social distancing policies, that they have learned from their experiences with past pandemics, the Chinese Government encouraged people to stay at home; discouraged mass gatherings; cancelled or postponed large public events; and closed schools, universities, government offices, libraries, museums, and factories. Only limited segments of urban public transport systems

¹⁹Sahin AR, Erdogan A, MutluAgaoglu P, Dineri Y, Cakirci AY, Senel ME, et al. 2019 Novel Coronavirus (COVID-19) Outbreak: A Review of the Current Literature. EJMO 2020;4(1):1-7.

²⁰ Novel Coronavirus (2019-nCoV), SITUATION REPORT – 1, 21 JANUARY 2020, World Health Organization.

²¹Sahin AR, Erdogan A, MutluAgaoglu P, Dineri Y, Cakirci AY, Senel ME, et al. 2019 Novel Coronavirus (COVID-19) Outbreak: A Review of the Current Literature. EJMO 2020;4(1):1-7.

²² Coronavirus disease 2019 (COVID-19) Situation Report – 81, World Health Organization.

²³Michael Hernandez (31 March 2020), Death toll hits 3,415 surpassing figures given by Beijing, Anadolu Agency.

²⁴Simiao Chen, Juntao Yang, Weizhong Yang, Chen Wang, Till Bärnighausen, COVID-19 control in China during mass population movements at New Year, February 2020 .VOLUME 395, ISSUE 10226, P764-766, MARCH 07, 2020. DOI:[https://doi.org/10.1016/S0140-6736\(20\)30421-9](https://doi.org/10.1016/S0140-6736(20)30421-9)

remained operational and all cross-province bus routes were taken out of service. Being familiar with contagious diseases from the past, the citizens also started to take measures to protect themselves against COVID-19, such as staying at home as far as possible, limiting social contacts, and wearing protective masks when they needed to move in public. On the other hand, in Wuhan, where the largest number of infected people live, those with mild and asymptomatic infection were also quarantined in so-called shelter or “Fang Cang” hospitals, which are public spaces such as stadiums and conference centers that have been repurposed for medical care.²⁵

Moreover, China built two new 1,000-1,300-bed hospitals to fight the coronavirus, one created in six days, and the second in 15 days, using prefabricated modules. Their past experience with 2002-2003 SARS outbreak led to quick manufacturing processes because the systems were already in place. Additionally, other buildings got repurposed to support more coronavirus patients. In China, elective surgeries and other non-critical doctors' visits were delayed, and many medical services were moved online. Chinese public health officials have attempted to trace near every single one of the 80,000-plus cases in that country with technology discussed later on in the report. Chinese social media including Weibo, Tencent, and WeChat also shared out accurate, up to date information on the virus, countering fake coronavirus garlic cures and other disease misinformation on the internet. During the SARS outbreak in 2002-2003, China set up large-scale surveillance systems that included contact tracing, a front-line public-health strategy that involves identifying and following up with people who may have come into contact with an infected person, which they have utilized during the current COVID-19 pandemic. When it came to the non-medical response, there was a nationwide sense of solidarity with Hubei. Other provinces sent 40,000 medical workers to the center of the outbreak, many of whom were volunteers. Workers in transportation, agriculture, and clerical positions were reassigned to new positions as well.²⁶

Technological Fight against COVID-19

Early models of the disease's spread suggested that the virus would potentially infect 40% of China's population but China's extreme lockdowns and other measures were responsible for bringing the crisis under control. Cities that suspended public transport, closed entertainment venues and banned public gatherings before their first COVID-19 case had 37% fewer cases than cities that didn't implement such measures.²⁷ In addition to lockdowns, the Chinese government leveraged technological advancements to fight coronavirus. Prior to the outbreak, China had a pre-existing sophisticated and expansive surveillance network, utilizing which tech giants Alibaba and Tencent assisted the government in developing a color-coded health rating system to track millions of people daily. They assigned color to people based on their travel and medical histories. People were denied access in public spheres based on their color rating. Robots entirely replaced jobs that required human-human interactions temporarily, like preparing meals at hospitals or serving up food in restaurants as waiters. Shenzhen based company Multicopter used robots to transport medical samples, while robots were also used to deliver food to passengers on flights who were being quarantined in hotels. In severely affected areas, drones were operated to transport both medical

²⁵Simiao Chen, Juntao Yang, Weizhong Yang, Chen Wang, Till Bärnighausen, COVID-19 control in China during mass population movements at New Year, February 2020 .VOLUME 395, ISSUE 10226, P764-766, MARCH 07, 2020. DOI:[https://doi.org/10.1016/S0140-6736\(20\)30421-9](https://doi.org/10.1016/S0140-6736(20)30421-9)

²⁶Hilary Brueck, Anna Medaris Miller and Shira Feder (March 24, 2020), China took at least 12 strict measures to control the coronavirus. They could work for the US, but would likely be impossible to implement, Business Insider.

²⁷Huaiyu Tian, Yonghong Liu, Yidan Li, Chieh-Hsi Wu, Bin Chen, Moritz U. G. Kraemer, Bingying Li, Jun Cai, Bo Xu, Qiqi Yang, Ben Wang, Peng Yang, Yujun Cui, Yimeng Song, Pai Zheng, Quanyi Wang, Ottar N Bjornstad, Ruifu Yang, Bryan Grenfell, Oliver Pybus, Christopher Dye (2020), The impact of transmission control measures during the first 50 days of the COVID-19 epidemic in China. Preprint at medRxiv <https://doi.org/10.1101/2020.01.30.20019844>..

equipment and patient samples. This not only saved time and enhanced speed of delivery but also prevented the risk of sample being contaminated. Drones were also used to disseminate warning messages and using facial recognition technology urged citizens to wear facemasks when they stepped out of their houses without one.²⁸

Smartphone apps kept a tab on people's movements and tried to identify whether or not they have been in contact with an infected person. Autonomous vehicles such as Apollo, introduced by tech giant Baidu, removed the need for people to come in contact with each other by delivering essential goods like medicines and food. The cause of *social distancing* was further boosted by tech startups like Neolix and Idriverplus that delivered supplies and food to big hospitals in Beijing and operated electric street cleaning vehicles. Machine controlled vehicles were also used to disinfect hospitals. This allowed for the rest of the country to be in a complete lockdown and comply with Government recommendations without experiencing too much of inconvenience.²⁹ Finally, the Chinese Government encouraged and supported grassroots activities for routine screening, contact tracing, and early detection and medical care of COVID-19 patients, and it promoted hand washing, surface disinfection, and the use of protective masks through social marketing and media.³⁰

Economic stimulus package to tackle the financial difficulties

As of 19 February, insurance funds had disbursed more than 17 billion RMB to health facilities. As of 5 March 2020, China increased central budget transfers to Hubei, the province at the center of the outbreak, to 6.2 billion RMB for prevention and control of COVID-19. Cash advances have been implemented in China, where advance payments have been made by insurance funds to health facilities to lessen the financial pressure on Hubei province.³¹ China didn't make direct cash infusions to workers as many other countries have. To help companies and individuals with liquidity, China ordered banks to extend loans or roll over debts without penalty or negative credit reporting. It eased rules for borrowers that use corporate stock as collateral, effectively loosening margin requirements so that these borrowers aren't forced to sell equities while valuations are depressed. The Chinese Government didn't include worker payments because the state-owned enterprises in China already serve as a financial safety net for many workers and about 60 percent of Chinese companies have cash on hand to sustain operations, and current employment levels, for three months.³²

China's central bank, the People's Bank of China (PBOC), has implemented several policy measures aimed at providing monetary stimulus. On February 3, 2020, the PBOC expanded reverse repo operations by USD 174 billion. This means that the central bank extended the amount of loans to keep money markets (markets for very short term loans) stable and allow banks to have more cash on hand. It added another USD 71 billion on February 4. On February 16, the PBOC also cut the one-year medium-term lending facility rate (the rate at which it lends to banks) by 0.10 percent. It followed this up by cutting its one-year and five-year prime rates (the rate at which banks lend to the most credit-worthy corporations) by 0.10 percent and 0.05 percent, respectively. On March 13, the PBOC lowered bank reserve requirements, freeing up about USD79 billion to be lent out. On April 3, the PBOC cut the reserve ratio for small and medium-sized banks. It also cut the interest rate it pays

²⁸Aditya Chaturvedi (As of 8 April 2020), How China is using technology to fight coronavirus, Geospatial World

²⁹Aditya Chaturvedi (As of 8 April 2020), How China is using technology to fight coronavirus, Geospatial World

³⁰Simiao Chen, Juntao Yang, Weizhong Yang, Chen Wang, Till Bärnighausen (24 February 2020), COVID-19 control in China during mass population movements at New Year. VOLUME 395, ISSUE 10226, P764-766, MARCH 07, 2020.

³¹ Helene Barroy, Ding Wang, Claudia Pescetto and Joseph Kutzin (25 March 2020), How to budget for COVID-19 response? A rapid scan of budgetary mechanisms in highly affected countries, World Health Organization.

³² MICHAEL MAIELLO (7 April, 2020), China's economic response to COVID-19 has helped, for now, Chicago Booth Review.

on excess reserves. As of mid-march, many local governments in China have been giving out prepaid spending vouchers to boost consumer spending, but the amounts are relatively small. The Chinese government has asked banks to extend the terms of business loans and commercial landlords to reduce rents. Regional and local governments have also been increasing subsidies for certain auto purchases, and raising the cap on the number of cars that can be owned in each locality. As of April 2, total funding to fight the virus has amounted to USD183 billion and includes: Increase epidemic prevention spending, Production of medical equipment, Moving up unemployment payments, and Social security tax relief.³³

Hong Kong announced a coronavirus financial relief package of HKD 137.5 billion (US\$18 billion) to support affected businesses and ensuring approximately 1.5 million workers would continue to get paid in the tough months ahead. The Government has decided that it would, through employers, pay 50 per cent of salaries for half a year, each worker's monthly subsidy capped at HKD 9,000. The government would also create 30,000 new jobs in the coming two years, spend billions on helping businesses not covered under earlier relief efforts, and lower train fares, among other measures. The chief executive also announced she and her cabinet would take a 10 per cent pay cut for a year. The latest plan is to spend HKD 80 billion on a six-month wage scheme for Hong Kong's entire private sector, as long as employers make contributions to Mandatory Provident Fund schemes for workers. HKD 21 billion has been set aside for 16 types of sectors and businesses hit especially hard, from aviation to smaller ventures such as education and tutorial centers and school bus operators. Subsidies for closed businesses will vary from HKD 10,000 for individuals such as school bus operators and PE coaches, to HKD 100,000 for gyms, game centers and beauty parlors. For the general public, fares on railway services will also be discounted by 20 per cent for six months starting from July, with HKD 1.6 billion in costs shared by the government and MTR Corporation. Five million passengers are expected to benefit from the measure.³⁴

Role of China's People's Liberation Army (PLA)

The People's Liberation Army (PLA) has played a central role in China's anti-COVID suppression efforts, but in the context of a state-led, cross-governmental response that is centrally directed by the Chinese Communist Party. Generally, the military is likely to remain in a supporting role during the pandemic except in countries where weak civilian institutions, sometimes compounded by poor political leadership, have failed to prevent the uncontrolled spread of the virus. China's PLA had a prominent role from the start of the pandemic, owing partly to the fact that Wuhan hosts the Central Military Commission's Joint Logistics Support Force. At least 10,000 military medical personnel were mobilized to treat COVID-19 patients in Hubei Province, including relief forces deployed in several waves, from late January onwards. The PLA was additionally put in charge of supplying medicine to hospitals, and food to the local population under lockdown. Helicopters from the Central Theatre Command provided airlift. Specialists from the PLA's Academy of Military Medical Sciences, led by a Major General, have been present in Wuhan since January. They have been charged with the critical task of developing a vaccine. Although the impact of the virus on the PLA itself is unlikely to be known for some time, according to one report 3000 PLA personnel had been infected by mid-March. The real number could be substantially higher.³⁵

³³ GABE ALPERT (Updated 9 April, 2020), Government Stimulus Efforts to Fight the COVID-19 Crisis, Investopedia.

³⁴ Lilian Cheng, Gary Cheung, Phila Siu and Kanis Leung (8 April 2020), Coronavirus: Carrie Lam unveils Hong Kong's biggest Covid-19 relief package yet, worth HK\$138 billion, to ensure 1.5 million workers still get paid, South China Morning Post.

³⁵ Euan Graham (8 April 2020), The armed forces and COVID-19, International Institute for Strategic Studies.

Since Beijing declared the highest level of medical emergency in Hubei on January 25, the Central Military Commission (CMC) has sent more than 10,000 personnel into the area. The PLA was also armed with more power than local governments to control medical supplies, a sign of the central government's determination to contain the spread of the virus. The first batch of 1,400 military personnel was sent to Huoshenshan on February 4, two days after the hospital was completed. The 25,000-square-metre complex was built within 10 days and provides 1,000 critical care beds. When confirmed case numbers climbed to more than 60,000 in mid-February, President Xi ordered an extra 2,600 troops into two hospitals in Wuhan to help treat 1,600 patients. When SARS broke out in late 2002 and 2003, the CMC sent a 1,200-strong PLA medical contingent to Xiaotangshan temporary hospital in Beijing, which was built in a week, to help treat 680 patients.³⁶

The armed forces have dispatched over 4,000 medical professionals in three groups to assist with the battle against coronavirus in Wuhan, the epicenter of the COVID-19 outbreak and capital of Hubei, since 24th Jan. Nearly 3,000 beds have been set up by 63 military hospitals designated to treat COVID-19 patients, with over 10,000 military medics working at the front line. the designated hospitals of the armed forces and military medical teams dispatched to Hubei had treated 4,450 COVID-19 patients with 1,000 cured. 260 troops and 130 transport vehicles from the Central Theater Command of the People's Liberation Army (PLA) had been tasked with transporting 8,500 tonnes of household goods and 23,600 items covering protective materials and equipment to Wuhan. the military's joint task force for responding to public health emergencies allocated 400,000 medical masks, 8,000 sets of protective clothing, 50 sets of positive pressure respiratory protective hoods and two sets of negative pressure isolation transfer cabins to Wuhan to provide urgent medical treatment.³⁷

Conclusion

In conclusion, there are several contributing factors that played out in China's mission to curb the spread of COVID-19. China's quick and steadfast decision to put the entire nation of a billion people in complete quarantine, extreme measures to locate and trace the spread of the infectious disease, leverage technology to eliminate human-human exposure, utilize past experience of SARS outbreak to promote recommended hygiene practices and disinfect hospitals, and quickly build new hospitals and repurpose existing ones to accommodate new patients infected with COVID-19 in isolation units. Although the Chinese government has often been criticized for violating the privacy of its citizens by monitoring their movements, it has been applauded globally for its extreme measures. The *"flattening of the curve"* required unprecedented level of coordination between the government, privatized institutions, military forces, and people's co-operation.

Abbreviation

CDC - Center for Disease Control and Prevention

CMC – Central Military Commission

COVID-19 – Corona Virus Disease 2019

CPC – Communist Party of China

DSP - Disease Surveillance Point

GDP -Gross Domestic Product

ILI - Influenza-like Illness

MA – Medical Assistance

nCOV - novel Coronavirus

³⁶ Minnie Chan (17 March 2020), How China's military took a frontline role in the coronavirus crisis, South China Morning Post.

³⁷ XinhuaNet (2 March, 2020), China Focus: China's armed forces provide supplies, patient treatment in COVID-19 fight. Cited from the website http://www.xinhuanet.com/english/2020-03/02/c_138836052.htm

NRCMS- New Rural Cooperative Medical Scheme
PBOC – People's Bank of China
PLA – People's Liberation Army
PPP – Purchasing Power Parity
RMB - Ren Min Bi (Chinese currency)
SARS – Severe Acute Respiratory Syndrome
UEBMI-Urban Employee Basic Medical Insurance
URBMI-Urban Residence Basic Medical Insurance

Authors' contributions

The idea for the study was conceived by DevResonance Ltd and formed a team for this study. The study team responsible for developing the theory, reviewing literature and other materials, investigating the integrity of the information and supervising the findings of this work. Study team discussed the results and contributed to the final manuscript.

Competing Interest

DevResonance Ltd. and its team has no significant competing financial, professional or personal interests that might have influenced the performance of presentation of the work described in this manuscript.

Funding

The entire study encompassing research, authorship, and publication of the article has been supported, financially or otherwise, by DevResonance Ltd.

Acknowledgement

First and foremost, the study was conceived and brought to fruition by the generous support and supervision of DevResonance Ltd. The organization established the foundational framework and guideline under which the study was carried out. Appreciation also goes to all employees of DevResonance Ltd. who have reviewed the paper and contributed in different aspects to the best of their abilities that improved the overall quality of the study and presentation of information.

References

1. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019: Highlights.
2. Caleb Silver (18 March 2020), The Top 20 Economies in the World. Cited from *Investopedia* website.
3. Franck Le Deu, Rajesh Parekh, Fangning Zhang, and Gaobo Zhou (November 2012), Health care in China: Entering 'uncharted waters', McKinsey & Company.
4. Elyar Najmehchi B.A., chinadaily.com.cn; China's healthcare sector promising for 2020 and beyond, chinadaily.com.cn | Updated: 2019-12-25
5. National Bureau of Statistics of China. 2015 national economic and social development statistic report (http://www.stats.gov.cn/tjsj/zxfb/201602/t20160229_1323991.html accessed on 29 February 2016).
6. National Bureau of Statistics of China. 2015 national economic and social development statistic report (http://www.stats.gov.cn/tjsj/zxfb/201602/t20160229_1323991.html accessed on 29 February 2016).
7. Horton R. Offline: China—the triumph (and danger) of transition, Vol.386, 7 November 2015. ([http://dx.doi.org/10.1016/S0140-6736\(15\)00756-4](http://dx.doi.org/10.1016/S0140-6736(15)00756-4) accessed on 29 February 2016).
8. World Health Organization, National Health and Family Planning Commission (NHFPC), China-WHO Country Cooperation Strategy 2016-2020
9. ElyarNajmehchi B.A. (25 December 2019), China's healthcare sector promising for 2020 and beyond, China Daily.

10. Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>
11. Xiao, Y., Husain, L. & Bloom, G. Evaluation and learning in complex, rapidly changing health systems: China's management of health sector reform. *Global Health* 14, 112 (2018). <https://doi.org/10.1186/s12992-018-0429-7>
12. Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>
13. Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>
14. Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>
15. Shu, Y., Song, Y., Wang, D. et al. A ten-year China-US laboratory collaboration: improving response to influenza threats in China and the world, 2004–2014. *BMC Public Health* 19, 520 (2019). <https://doi.org/10.1186/s12889-019-6776-3>
16. Sun, Y., Gregersen, H., & Yuan, W. (2017). Chinese health care system and clinical epidemiology. *Clinical epidemiology*, 9, 167–178. <https://doi.org/10.2147/CLEP.S106258>
17. Sahin AR, Erdogan A, MutluAgaoglu P, Dineri Y, Cakirci AY, Senel ME, et al. 2019 Novel Coronavirus (COVID-19) Outbreak: A Review of the Current Literature. *EJMO* 2020;4(1):1-7.
18. Novel Coronavirus (2019-nCoV), SITUATION REPORT – 1, 21 JANUARY 2020, World Health Organization.
19. Sahin AR, Erdogan A, MutluAgaoglu P, Dineri Y, Cakirci AY, Senel ME, et al. 2019 Novel Coronavirus (COVID-19) Outbreak: A Review of the Current Literature. *EJMO* 2020;4(1):1-7.
20. Coronavirus disease 2019 (COVID-19) Situation Report – 81, World Health Organization.
21. Michael Hernandez (31 March 2020), Death toll hits 3,415 surpassing figures given by Beijing, Anadolu Agency.
22. Simiao Chen, Juntao Yang, Weizhong Yang, Chen Wang, Till Bärnighausen, COVID-19 control in China during mass population movements at New Year, February 2020 .VOLUME 395, ISSUE 10226, P764-766, MARCH 07, 2020. DOI:[https://doi.org/10.1016/S0140-6736\(20\)30421-9](https://doi.org/10.1016/S0140-6736(20)30421-9)
23. Simiao Chen, Juntao Yang, Weizhong Yang, Chen Wang, Till Bärnighausen, COVID-19 control in China during mass population movements at New Year, February 2020 .VOLUME 395, ISSUE 10226, P764-766, MARCH 07, 2020. DOI:[https://doi.org/10.1016/S0140-6736\(20\)30421-9](https://doi.org/10.1016/S0140-6736(20)30421-9)
24. Hilary Brueck, Anna Medaris Miller and ShiraFeder (March 24, 2020), China took at least 12 strict measures to control the coronavirus. They could work for the US, but would likely be impossible to implement, *Business Insider*.
25. Huaiyu Tian, Yonghong Liu, Yidan Li, Chieh-Hsi Wu, Bin Chen, Moritz U. G. Kraemer, Bingying Li, Jun Cai, Bo Xu, Qiqi Yang, Ben Wang, Peng Yang, Yujun Cui, Yimeng Song, Pai Zheng, Quanyi Wang, Ottar N Bjornstad, Ruifu Yang, Bryan Grenfell, Oliver Pybus, Christopher Dye (2020), The impact of transmission control measures during the first 50 days of the COVID-19 epidemic in China. Preprint at medRxiv <https://doi.org/10.1101/2020.01.30.20019844>.
26. Aditya Chaturvedi (As of 8 April 2020), How China is using technology to fight coronavirus, *Geospatial World*
27. Aditya Chaturvedi (As of 8 April 2020), How China is using technology to fight coronavirus, *Geospatial World*
28. Simiao Chen, Juntao Yang, Weizhong Yang, Chen Wang, Till Bärnighausen (24 February 2020), COVID-19 control in China during mass population movements at New Year. VOLUME 395, ISSUE 10226, P764-766, MARCH 07, 2020.
29. Helene Barroy, Ding Wang, Claudia Pescetto and Joseph Kutzin (25 March 2020), How to budget for COVID-19 response? A rapid scan of budgetary mechanisms in highly affected countries, *World Health Organization*.
30. MICHAEL MAIELLO (7 April, 2020), China's economic response to COVID-19 has helped, for now, *Chicago Booth Review*.

31. GABE ALPERT (Updated 9 April, 2020), Government Stimulus Efforts to Fight the COVID-19 Crisis, Investopedia.
32. Lilian Cheng, Gary Cheung, Phila Siu and Kanis Leung (8 April 2020), Coronavirus: Carrie Lam unveils Hong Kong's biggest Covid-19 relief package yet, worth HK\$138 billion, to ensure 1.5 million workers still get paid, South China Morning Post.
33. Euan Graham (8 April 2020), The armed forces and COVID-19, International Institute for Strategic Studies.
34. Minnie Chan (17 March 2020), How China's military took a frontline role in the coronavirus crisis, South China Morning Post.
35. XinhuaNet (2 March, 2020), China Focus: China's armed forces provide supplies, patient treatment in COVID-19 fight. Cited from the website http://www.xinhuanet.com/english/2020-03/02/c_138836052.htm