الحوكمة الإلكترونية والصحة الرقمية في أوقات الوباء:

تجربة تايوان مع جائحة كورونا COVID-19

E-governance and Digital health in pandemic times: Taiwan's COVID-19 experience

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ملخص:

لقد شكل التفشي الأخير لجائحة كورونا COVID- 19 خطرًا كبيرًا على الحياة الصحية ورفاهية مليارات الأفراد حول العالم. فلقد عمل مرض SARS-CoV- 2 كاختبار توتر في كل جانب من جوانب الحياة، لكنه كشف بشكل خاص نقاط الضعف والفجوات في تصميم وقدرات النظم الصحي ; من المرافق الصحية منخفضة الموارد إلى التنسيق السيئ للبيانات والمعلومات.

في هذه الورقة، سوف نسلط الضوء على دور الحوكمة الإلكترونية واعتماد الأدوات والتقنيات الرقمية مثل التطبيب عن بعد والرعاية الافتراضية في تقديم خدمات الرعاية الصحية الرقمية أو الخدمات الصحية عن بعد باستخدام تكنولوجيا المعلومات والاتصالات (ICT) لعلاج المرضى. وبالتالي، سنحاكي تجربة تايوان وسنحاول تحديد الأسباب الكامنة وراء استجابة تايوان الفعالة لـ COVID-19.

كلمات مفتاحية: حوكمة الكترونية، صحة رقمية، جائحة، COVID-19، تكنولوجيا المعلومات والاتصالات، تايوان.

Abstract:

The recent outbreak of the COVID-19 pandemic has postured a critical danger to the healthy lives and well-being of billions of individuals around the world. The SARS-CoV-2 disease has acted like a stretch test on every aspect of life, but especially exposed weaknesses and gaps in the design and the capacity of health systems. From under resourced health facilities to poor coordination of data and information.

In this paper, we will highlight the role of electronic governance and the adoption of digital tools and technologies such as telemedicine and virtual care in the delivery of healthcare services digital or remote health services using Information and Communications Technology (ICT) for treatment of patients. Thus, we will take Taiwan's experience and we will attempt to identify the reasons behind Taiwan's effective COVID-19 response.

Key words: E-governance, Digital health, pandemic, COVID-19, ICT, Taiwan.

Résumé :

Le déclanchement de la récente pandémie COVID-19 a présenté un danger critique pour la vie saineet le bien-être de milliards d'individus dans le monde. La maladie du SRAS-CoV-2 a agi comme un test extensible sur tous les aspects de la vie, mais a particulièrement mis en évidence les faiblesses et les lacunes dans la conception et la capacité des systèmes de santé. Des établissements de santé sous-financés à une mauvaise coordination des données et des informations.

Dans cet article, nous soulignerons le rôle de la gouvernance électronique et l'adoption d'outilsdigitaux et des technologies numériques tels que la télémédecine et les soins virtuels dans la prestation de services de santé des services de santé numériques ou à distance utilisant les technologies de l'information et de la communication (TIC) pour le traitement des patients. Ainsi, nous prendrons l'expérience de Taiwan et nous tenterons d'identifier les raisons de la réponse efficace de Taiwan au COVID-19.

Mots clés : E-gouvernance, santé numérique, pandémie, COVID-19, TIC, Taiwan.

Introduction:

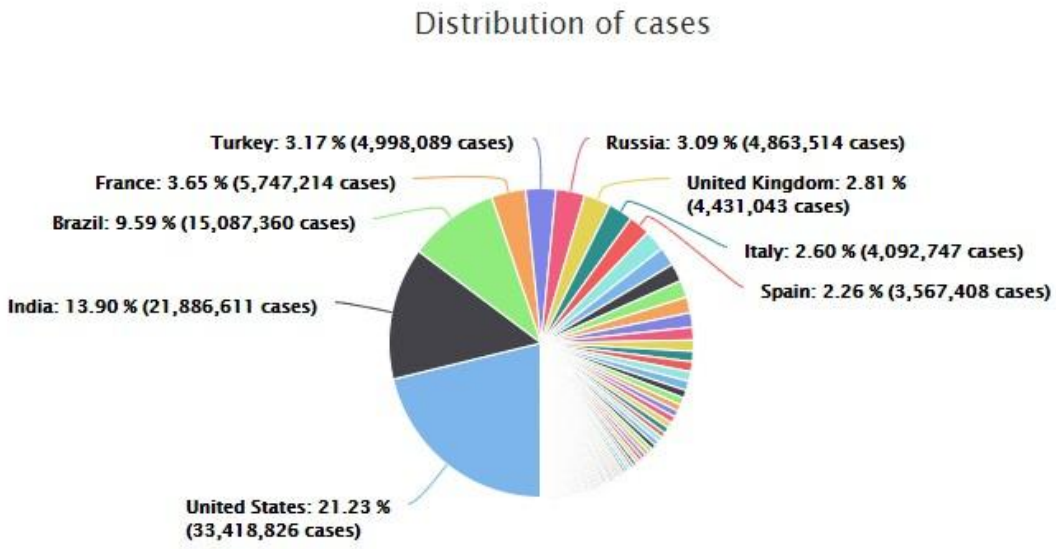
COVID-19 is not a "black swan" and even not the first epidemic which the globe has to face it. Before this, the world has seen the influenza pandemic of 2009, the 1968 pandemic and the most fatal of these the 1918 flu pandemic. Recently, there is the outbreak of Ebola virus diseases and Zika virus and the H1N1 within just the last decade[1].

The outbreak of the novel coronavirus-caused infectious disease (COVID-19) has posed a severe threat to the healthy lives and wellbeing of millions of people around the world. On December 31, 2019, clusters of cases of coronavirus disease 2019 (COVID-19) were officially reported from Wuhan, Hubei Province, China[2].

COVID-19 is an illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)[3]. In the context of the Covid-19 crisis, the WHO declared a public health emergency of international concern on January 30, 2020, (after procrastinating for a few days. Indeed, on January 23, 2020, the WHO had decided not to qualify the epidemic as a public health emergency of international concern, considering that the risks of spreading in Europe were low, which was criticized by the international community[4]. In the case of these health crises, the WHO plays a central role, and its action in the management of past health crises has sometimes been the subject of criticism: The arbitration is delicate, and in the past, the WHO has often accused of doing too much or not enough: at the time of the flu epidemic in 2009, the WHO, then headed by Margaret Chan, was accused of overreacting, while during the Ebola crisis, which affected the DRC in 2018, the WHO had been singled out for its laxity[5].

On March 11, 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic. By June 22, COVID-19 had affected 213 countries, with more than 9,000,000 confirmed cases and more than 470,000 reported deaths globally. As this global pandemic shares the facets of complexity, uncertainty, and evaluatively that characterize grand challenges, overcoming such a global pandemic will require concerted and sustained contributions from various disciplines worldwide.

Figure1: Infected cases of COVID-19 around the world



Source :https://www.worldometers.info/coronavirus/worldwide-graphs/#case-distribution. Consulté le 08/05/2021.

As the entire world is battling the pandemic COVID-19, the role of information and communication technology (ICT) in improving public awareness, prevention, monitoring, diagnosis, treatment, and coordination of COVID-19 response is increasing.
Due to its geographical proximity to China and the intensive flow of people from/to China, Taiwan was believed to be at the highest risk for importation of COVID-19 when news of the virus first broke in January. But Taiwan has lately received much attention for its effective strategies in controlling the COVID-19 contagion. Notably, as early as April 2020, Taiwan was able to eliminate local transmission (no confirmed cases in the community) and recorded only 0.3 deaths per million people by end-August 2020[6].

Figure2: Infected cases of COVID-19 in Taiwan

Source :https://github.com/CSSEGISandData/COVID-19. Consulted 09/05/2021.

The problematic of the study:
Taiwan is one of the countries that achieves a big success and very good results in term of number of infected cases and deaths compared to other countries over the world.
In this study, we will try to answer the following problematic: **What are the plans and strategies that Taiwan has followed to achieve this success with Corona-19 pandemic?**

Study hypothesis:
- The role of E-governance and ICT in healthcare sector.
- Taiwan has used e-governance and ICT in its favor to manage Covid-19 pandemic.

Study objectives:
The study aims to shed light on the role of e-governance and ICT in the management and the control of our daily lives,especially in times of crisis like Covid-19 pandemic. And we took Taiwan to know the strategics and the steps taken during the time of pandemic and find what explains Taiwan's success with Corona-19 pandemic?

Study methodology:
The study used the descriptive approach to reviewthe theoretical context for describing the phenomenon under study and topresent a set of scientific references from books, articles, international reports and websites that dealing with topic of the study the e-governance and ICT in healthcare sector, especially the experience of Taiwan, in order to know the steps of success

that followed them and try to take advantages from the lessons they provide. By studying these axes:

- Section1 : the e-governance in healthcare sector
- Section2: ICT in healthcare sector and its interventions in Covid-19 pandemic
- Section3: Taiwan's experience with Covid-19
- Section4: lessons learned from Taiwan case

1. E-governance in healthcare sector:

Electronic governance (henceforth e-Governance) is often signaled as a way forward for governments around the world to achieve efficiency and better service delivery to both citizens and businesses.

The first step in defining e-governance is to define governance. There are a lot of definition to this concept 'Governance' some of them:

• *"The exercise of political authority and the use of institutional resources to manage society's problems and affairs!'* (The World Bank, 1991);

• *"The traditions and institutions by which authority in a country is exercised"* (The World Bank, 2007);

• *"The system and manner of providing authority and control"* (Integrated Justice Information Systems Glossary, 2009);

'e-Governance' is one such expression. This term has been in circulation for over a decade, but it has gained traction in recent years where, like digital and transformative government, it is often used as a substitute or replacement for the term 'e-government'.

E-Governance and e-Government concepts are mostly used interchangeably and synonymously in literature, but they have distinctive meanings and differences.

E-governance is not just "electronic" governance or Digital governance. It may be defined as the delivery of government services and information to the public using the electronic means. E-governance is the effective use of Information and Communication Technology (ICT) to improve the system of governance that is in place, and thus provide better services to the Citizens. It may be understood as the performance of this governance via the electronic medium in order to facilitate an efficient, speedy and transparent process of disseminating information to the public, and other agencies, and for performing government administration activities. E-governancecomprises e-Democracy, e-Service, and e-Citizen to empower citizens to take part in policy decisions and allow them to communicate with government, participate in the governments' policy-making and citizens to communicate each other. E-governance highlights several elements of good governance such as transparency, accountability, participation, social integration, public financial management reform and development.

E-Government is about people: new skill sets, mindsets and leadership approaches. It will transform how public servants work, relate to each other, do business, and engage citizens and others. E-government is a process that requires a sustained commitment of political will, resources and engagement among the government, private and public sectors[7].

1.1. Delivery models of E-governance[8]:

a) Government- to- Citizen (G2C):

G2C services will include providing information and facilitating transitions such as electronically paying bills, making appointments, and renewing licenses. G2C is about giving

citizens the convenience of choosing when and where they access public services. It is about changing the way people view the government. And it is about being transparent and efficient rather than bureaucratic.

b) Government- to- Business (G2B):

G2B services could include providing information, such as industry standards and supplier directories and ratings, and conducting transactions, such as electronic quotations and company registrations. G2B is about making interactions, transactions, and communication faster, clearer, and easier for business.

c) Government- to- Government (G2G):

G2G services or transactions between ministries or agencies could include the provision of central services and information.

d) Government- to- Employees (G2E):

G2E services or transactions between employees and their ministry or agency could include information management [intranets], knowledge management [content management systems], and collaborative and communication management [e-mail, messaging systems].

1.2. E- Governance in Healthcare

Inspire of much talk and hyped concept there is very little which is done and which can be quoted as achievement in this area by the government bodies. Enormous number of resources have been spent but very little change on actual health status of people have been noticed. Thus, despite the availability of technical skills the gains from information technology usagehave been apparent. Effective usage of technology is not purely technical. It has socio-cultural andorganizational aspects which need to be recognized and carefully implemented. IT applications such as computers, networks, databases will be of very little help if they are used to just automate the existing infrastructure. To benefit from the potential of IT corresponding organizational changes should be anticipated, planned and brought about in the health departments in a systematic way.

2. ICT in healthcare sector:

Understanding how ICTs can generate value in health systems can help to guide decision about ongoing and future ICT initiatives, underpin the business case for further investment and identify outcome drivers.

In the healthcare sector, there is often no measure of performance comparable to the interests of the private sector. Although a non-healthcare business that selects its assets in ICTs can only accept financial returns on investments, health care is a sector that places an unusual emphasis on non-financial goals. In health care, a standardized production process is difficult to identify, and, depending on the care setting, there is considerable variation in how and what outputs are produced, and what type and mix of inputs are used to produce them.

Embedded in this challenge is, however, a substantial opportunity: to improve health care quality and reduce health care costs through ICTs – by improving the efficiency with which health care is delivered, and reducing the delivery of services with little or no value. While the case studies are not perfect, they do illustrate the types of benefits that can result from ICT implementation according to four broad, inter-related categories of objectives listed below:

- Increasing quality of care and efficiency.
- Reducing operating costs of clinical services.
- Reducing administrative costs.
- Enabling entirely new modes of care[9].

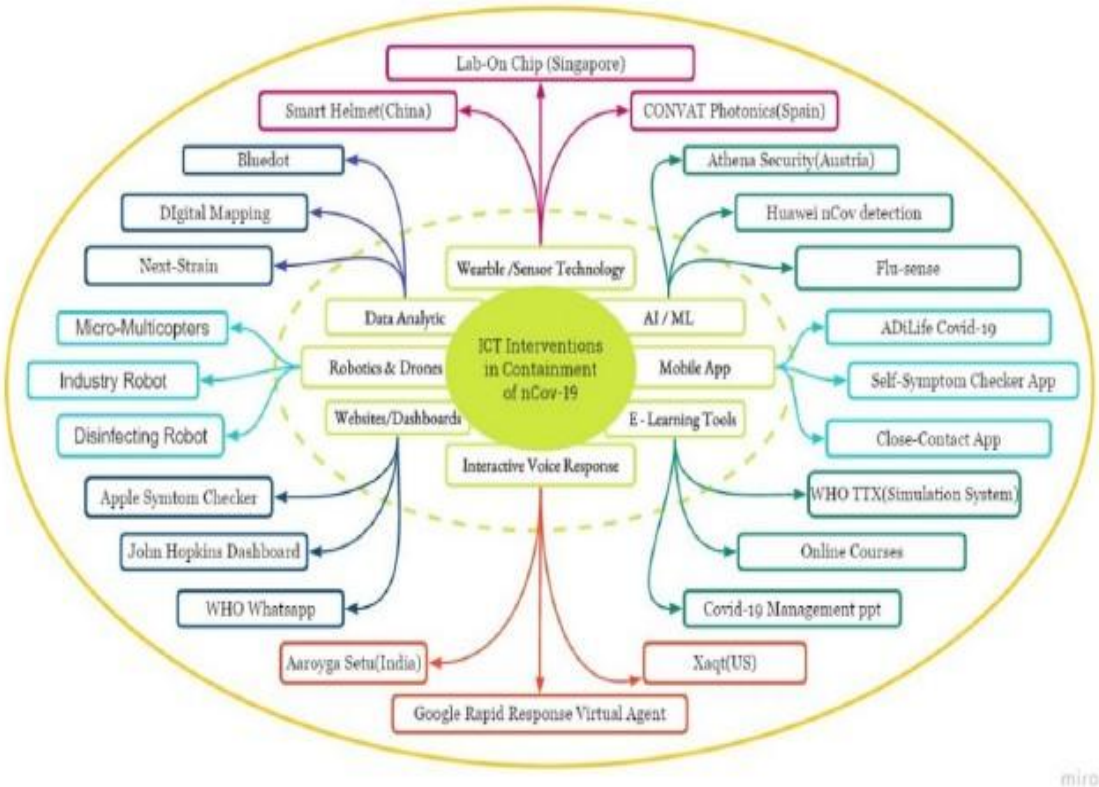
2.1. ICT INTERVENTIONS IN COVID-19 PANDEMIC

In fact, one of the main challenges for governments is to adopt and use ICT innovations in their operations. Hence, numerous scholars attempted to understand the conditions that make it more likely for innovation to occur in the public sector, defining the factors that act as a barrier or as a driver (also referred to as antecedents), which influence the adoption and diffusion of innovations in public organizations[10].

Information and communication technologies ICT had a big importance and role to help government and healthcare system to control and fight against covid-19 pandemic. ICT interventions can be regarded as one of the most effective, commonly used, and popular ways to combat the COVID-19 that is spreading across the globe. Around the world, a range of ICT projects are taking place, such as creating a dashboard or web platform to provide current statistics on Coronavirus, digital interactive maps, awareness programs, and emergency calling information or hot-line numbers.

Many approaches use a combination of digital technologies and may rely on telecommunications infrastructure and internet availability. Machine learning is shown as a separate branch for clarity, although it also underpins many of the other technologies. Much of the data generated from these technologies' feeds into data dashboards. SMS, short message service[11]

Figure3: ICT Interventions in containment of COVID-19 pandemic.



Source : A. Zaman et al. The Pandemic Spread of COVID-19: An Exploratory Study

While SARS-CoV-2 is causing a pandemic worldwide, it is also favoring the rapid adoption of digital solutions and advanced technology tools in healthcare[12]. There are a lot of digital or

ICT-based technologies that are being used for containment of pandemic spread of COVID-19

around the globe like: WHO has partnered with several social media platforms (such as Facebook and WhatsApp) to propose authentic updates as well as a messaging service for health alerts. China has developed a host of robot and drone technology to assist medical personnel, as well as thermal imaging and temperature detection software applications and smart helmets to identify possible virus carriers. India, Singapore, Canada, USA and South Korea have launched several ICT-based development programs to combat the coronavirus pandemic. Few developed countries, such as Bangladesh, have also launched ICT interventions to combat COVID-19, like creating social media awareness groups, an online framework for monitoring Coronavirus, a national Corona information network, and the likes. However, ICT intervention in such a widespread case necessitates a thorough examination of many open topics, such as how much capacity ICT technology possesses in emerging and developed countries, what possibilities exist in the use of ICT technology in such fragile situations, and what potential risks exist while relying on ICT technology to reduce risk. ICT technologies will be used to alleviate the unprecedented crisis created by the pandemic outbreak of a novel Coronavirus. As a result, further research and study are needed to investigate the problems posed by ICT initiatives for COVID-19 pandemic containment.

3. Taiwan's experience with Covid-19:

The coronavirus disease 2019 (COVID-19) pandemic significantly impacted the global health and economy. By 7 December 2020, there were more than 66 million people confirmed with COVID-19 globally[13]. Taiwan was expected to be one of the most affected countries due to its close relationship with China, both geographically and economically[14]. Learning from the Severe Acute Respiratory Syndrome (SARS) outbreak, an extensive public health infrastructure has been established in Taiwan. With early detection of the outbreak in Wuhan via the event-based surveillance (EBS) system, followed by the rapid risk assessment and management, Taiwan could respond to COVID-19 early and avoid national lockdown in the following months[15].

The island is just 81 miles and a short flight away from mainland China, where COVID-19 is believed to have originated in the city of Wuhan. As the outbreak took hold in January, many Taiwanese business people and their families based in China were returning to celebrate the Lunar New Year, and up to 2,000 Chinese tourists a day visited the island, potentially bringing the virus with them.

As the global number of confirmed COVID-19 cases surpasses 30 million, Taiwan has been one of the few success stories of containing the novel coronavirus. The island democracy with a population of 23 million has 1173 confirmed cases and just 12 deaths since the beginning of the pandemic[16]. Many of the confirmed cases were imported from abroad. "Taiwan is the only major country that has so far been able to keep community transmission of Covid eliminated," said Peter Collignon, an infectious disease physician and professor at the Australian National University Medical School. Taiwan "probably had the best result around the world," he said. Taiwan will likely be among the few economies to grow this year, with the government in August forecasting that the gross domestic product will expand 1.56% in 2020.

What countries with surging infections can take away from Taiwan's experience is that nothing works without contact tracing those who have tested positive and then quarantining them, said Chen Chien-jen, Taiwan's former vice president and an epidemiologist, in an interview. Also, as it's not easy to make people stay in quarantine, Taiwan has taken steps to provide meal and grocery delivery and even some friendly contact via Line Bot, a robot that

texts and chats. There is also punishment -- those who break quarantine face fines of up to NT$1million ($35,000).

"When information concerning a novel pneumonia, outbreak was first confirmed on Dec. 31, 2019, Taiwan began implementing onboard quarantine of direct flights from China's Wuhan immediately," Shih chung Chen told Anadolu Agency. Chen said thanks to the collective efforts of 23.5 million Taiwanese, his country responded to threats posed by the pandemic through four principles: prudent action, rapid response, advanced deployment, and openness, and transparency.

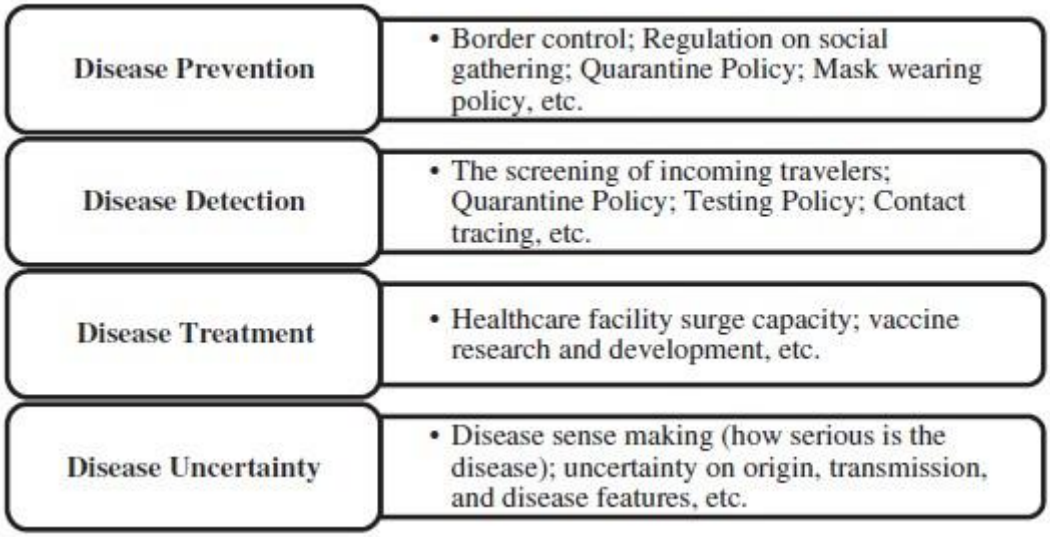
Taiwan was able to put the lessons it learned during the SARS outbreak in 2003 to good use. That epidemic ended up killing 73 people and hurting the economy. This time, Taiwan's government and people were prepared, and that readiness has helped push up President Tsai Ing-wen's approval rating. Last but not the least, Kolas said that she believes the country's health insurance system, which covers 99 percent of the population, has been crucial to fighting the spread of the outbreak.

"Taiwan's health insurance lets everyone not be afraid to go to the hospital. If you suspect you have coronavirus, you won't have to worry that you can't afford the hospital visit to get tested," she said. "You can get a free test, and if you're forced to be isolated, during the 14 days, we pay for your food, lodging and medical care," Kolas said. "So, no one would avoid seeing the doctor because they can't pay for health care."

3.1. Taiwan's core strategies

An effective COVID-19 response still hinges on a country's governance structure, capacity, and legitimacy. COVID-19 is a transboundary epidemic crisis. Facing an epidemic, all governments must compose a response strategy combining disease prevention, detection, and treatment. Of the three epidemic tasks, Taiwan relies heavily on disease prevention and detection in their COVID-19 response. Relatively, the country spends fewer resources on disease treatment, such as increasing health care beds or investment in vaccine development. Moreover, the synergy and transparent communication between the government and civil society strengthen governance legitimacy and citizens' cooperation.

Figure4: Public Health Crisis Management Framework



*Source:*Wei-Ting Yen. (2020). Taiwan's COVID-19 Management: Developmental State, Digital Governance, and State-Society Synergy. *Asian Politics & Policy—Volume 12, Issue 3.*

Taiwan was able to avoid a widespread outbreak of COVID-19 for several reasons. First of all, Taiwan used hard-learned lessons from the Severe Acute Respiratory Syndrome (SARS) epidemic in 2003 and alerted the government to monitor the pandemic since early January. Secondly, the government quickly implemented strategies in response to the pandemic[17], including the following core components:

3.1.1. The Legacy of SARS

SARS left a painful mark on Taiwan. Like COVID-19, SARS was a fatal respiratory disease caused by a coronavirus. The SARS outbreak in 2003 was a dress rehearsal for Taiwan's response to COVID-19. The SARS virus originated in China's southeastern Guangdong province in late 2002 and spread rapidly to Taiwan in early 2003. The island's health authorities put potential SARS patients into its hospitals and mandated more than 131,000 people, who had contacts with suspected SARS patients or had traveled to affected countries, to quarantine at home[18]. The painful lessons of past epidemics paved the way of Taiwan's success in fighting Covid. It began building an emergency-response network for containing infectious diseases after its experience with SARS in 2003, when hundreds became ill and at least 73 died, for the world's third-highest infection rate. Taiwan later experienced pandemics like bird flu and influenza H1N1. As a result, its residents are acutely aware of disease-fighting habits like hand-washing and mask wearing.

Taiwan's COVID- 19 response benefits from SARS's legacy particularly the Taiwan's government realized it needed a more comprehensive and integrated approach to tackle future public health crises. The central government thus established the National Health Command Center (NHCC)[19] and the overhaul of the Communicable Disease Control Act (CDC Act). The new organization and the amended law are the central pillar in Taiwan's COVID-19 institutional design.

Another legacy of SARS was that many government officials and experts in the COVID-19 fight had direct experiences of SARS. Such experience created a cohort of technocrats who are more agile and cautious about any possible "second SARS" in Taiwan. From very early on in the COVID-19 crisis, government officials constantly and repeatedly mentioned SARS in media interviews. This consensus directed the administration to take a more preemptive approach toward COVID-19. For example, out of precaution, Taiwan immediately sent doctors to Wuhan China on January 5th to gather more information once experts suspected a new epidemic[20].

Even though SARS certainly contributed to Taiwan's quick reaction to COVID- 19, there are other concurrent factors that contributed to Taiwan's quick reaction. The first was Taiwan's exclusion from the WHO. Research shows that countries excluded from international organizations would make more cautious and responsible policies. Deprived of the WHO's support, Taiwan must resort to the "self-help" approach, nudging the administration to be more prudent.

Even though a coronavirus is the cause of both epidemics, COVID-19 and SARS are still different. Unlike SARS, the defining features of COVID-19 include longer incubation periods, higher transmission rates, more virus mutations, but lower death rates.

3.1.2. Border Control

Taiwan adopts a border control and strict quarantine policy to block the outside- in transmission route for disease prevention. Taiwan took tough action early. On Jan. 26, five days after it

confirmed its first case, Taiwan banned arrivals from Wuhan, earlier than any other country. Then, it began shutting down to non-residents shortly after the pandemic broke out in January and has kept tight control over its borders since.

That includes symptom-based surveillance before traveler's board flights and digital fence tracking via cellular signals to ensure their compliance with a 14-day quarantine. Not long after, it did the same for flights from all but a handful of Chinese cities, and only Taiwanese people were allowed to fly in.

3.1.3. **The Developmental State Roots of the Successful Mask Policy**

There is also a strong consensus within the government that Taiwan cannot and should not repeat the mistakes made during SARS. The government swiftly imposed export bans on N95 and surgical masks on January 24, one day after China decided to lockdown Wuhan.

The government early in the pandemic stockpiled all domestically produced face masks and banned export. Taiwan relies heavily on the mask policy to prevent the disease from spreading. As mentioned above, the government quickly imposed export bans on masks and introduced a rationing system after the CECC was activated, but a crucial piece to a successful mask policy is ensuring sufficient mask supplies. Taiwan's mask policy success lies exactly in the government intervention in lowering transaction cost and enlarging future profitability for the private sector.

On the one hand, the government directly supported the infrastructure needed for rapid mask production, which essentially lowered the private sector's machinery costs. The government intervened with a US$6.6 million subsidy and built 60 new mask production lines. In the traditional developmental state, the government would channel the capital the industry needs through financial institutions. In this crisis, direct government interventions solved both the capital and the basic infrastructure issues.

On the other hand, the government relied on price setting and guaranteed demand to further guarantee companies' profitability in working with the government. Amid the pandemic, the demand can easily be bigger than the supply, but in a post-COVID19 world, that demand might disappear. Oversupply could also create an undesirable price war situation between mask suppliers. To tame the concern and to incentivize production increase, Taiwan's government set the purchasing price structure and guaranteed that face masks will become a national security necessity. The government will continue purchasing a fixed number of masks to ensure the demand stream.

3.1.4. **An Effective Digital Governance Regime**

One of the raisons of Taiwan's successful COVID-19 response is its utilization of digital governance. The use of digital tools as main infrastructure to fight coronavirus is not enough, but when it combined with other policy tools, digital governance reinforces the effectiveness of disease prevention and detection measures, such as GPS tracking, which greatly expands the government's governance capacity. Specifically, during COVID-19, digital governance helped improve disease detection through integrated databases of people's health records and travel history, through more accurate contact tracing, and through active surveillance tracking for people under quarantine. On disease prevention, the mask rationing system also benefited from the digitized mask distribution platform.

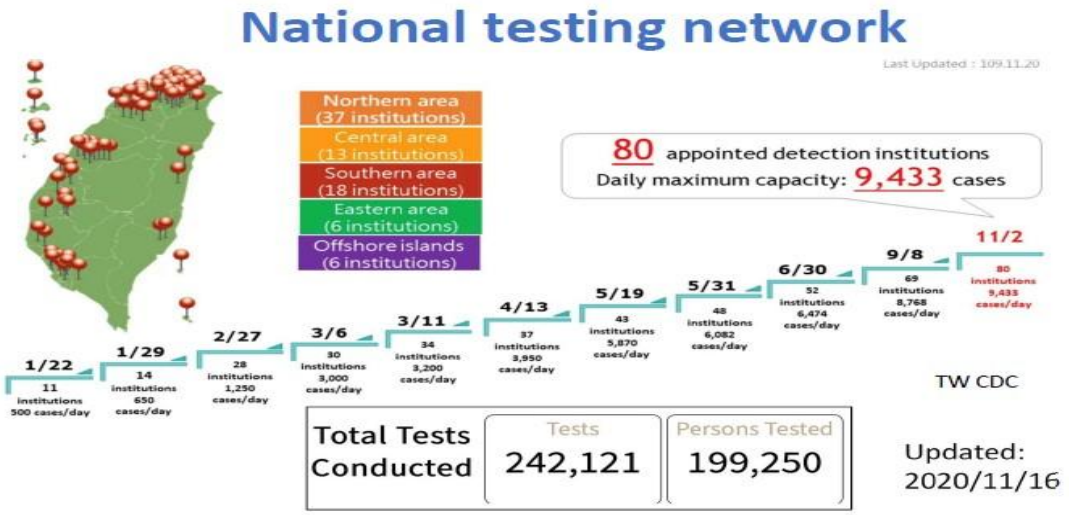
The most important e-governance step the government took early on was to link individual international travel history to the national health insurance system on January 27th.

Such measures boost the capacity of local health facilities in real-time classification and monitoring. Meanwhile, Taiwan asked incoming passengers to submit a mandatory health declaration form before entering the border. Due to Taiwan's geographical advantage as an island, the coronavirus risks come mostly from imported cases. Therefore, Taiwan imposed a strict quarantine policy with a high monetary penalty Effective enforcement of the quarantine policy was further enhanced through active surveillance.
Taiwan's government works with telecommunications companies to track the location of quarantined people through GPS data of their phones. If the individual could not be reached or if the phone location changed based on triangulating the base station data, an alarm would be triggered. The quarantined person and local authorities would all receive a text message. Local authorities would also pay an in-person visit to verify the individual's whereabouts.

3.1.5. Taiwan's healthcare system & Clinical management

Taiwan, where high healthcare investments have facilitated not only information distribution but also the creation of knowledge synergies, such as digital technological systems, to respond effectively to the crisis. in Taiwan, the government was able to use health workers and multiple databases, such as the National Health Insurance database, to proactively identify and test patients and provide treatment[21].
Taiwan's healthcare system helps successfully in treating serious cases of COVID-19 and the death rate goes much lower than those of the nations with advanced medical technology and universal healthcare coverage. Every 4 years, all hospitals are required to be officially accredited by the Joint Commission of Taiwan, a non-for-profit professional accrediting organization, to ensure that all necessary infection control personnel, equipment, and reserve stock are in position. Therefore, when the government made the announcement in January, the hospitals were able to activate immediate measures such as triage, quick isolation, strictly controlled crowd flow, medical task force, and epidemic prevention materials to maintain the normal operation of the medical care system[22].
They even put detection institutions over the country to increase the number of tests and reach the objective to test every person with the symptoms of Covid-19.

Figure5: National Testing Network in Taiwan



Source: Sheng-Fang Su, Ph.D.Taiwan's experience in the responseto COVID-19. Usher Institute, University of Edinburgh. December 2, 2020.

Among the by-laws of the Ministry of Health and the Welfare and Taiwan Centers for Disease Control for the clinical management of COVID-19 pandemic in Taiwan, there are:

- List of designated isolation hospitals and responding hospitals of the Communicable Disease Control Medical Network (CDCMN)
- Interim guidelines for clinical management of COVID-19 infection
- Medical device supplies
- Limit the size of work units
- Maintain a high bed-per-capita ratio
- Integration of health and immigration databases to track travelers with Covid-19 symptoms
- Nationalized Healthcare System
- Wearing masks, checking temperatures, filling in or reporting travel/contact history when entering hospitals
- Separate entrances and exits

3.1.6. Strong State-Society Relation with Open Communication and Synergy

Amid the immense level of uncertainty, governments around the world are confronted with two tasks. First, as the crisis and the inherent uncertainty are evolving, it is almost impossible for a government to identify best practices. Governments are likely to make mistakes. The task at hand is to continue calibrating the national response after considering the structural and moving factors. Taiwan's government dealt with such uncertainty through continuing and transparent communication with the country's vibrant civil society. Active communication helped the government define the crisis as dangerous at an early stage. The CECC used the analogy of «war time mobilization» to warn the seriousness of COVID-19. It helped the society's collective sense-making of the virus. Moreover, the daily conference is used as an educational platform to address false information, social stigmas, and bias. The CECC used the conference platform to educate the public that every migrant worker, legal or illegal, should be included and treated the same during the coronavirus fight. The CECC stated that illegal foreign workers should not be excluded from the healthcare system, explaining that a crackdown would only result in a bigger loophole in the fight against COVID19.

During the COVID-19 fight, there have been several collaborative efforts between digital civil society and the government. One example is fighting misinformation. Of the active civil society, a civic-tech community, pioneered by the G0v movement, has grown rapidly. These «civic hackers» advocate for open government, transparency, and citizens' agenda-setting power. Such synergy was possible partially due to Audrey Tang, Taiwan's current digital minister. Tang was once a civic hacker and was one of the G0v's core members. Her long-term advocacy for big data and open government facilitated active collaboration between the government and the digital civil society.

One myth about Taiwan's success is that Confucianism plays a role. Asian people do not question the government as often and are more submissive to strict government regulation. However, In Taiwan, governments are subject to frequent criticism. Even when the government's measures are necessary, it does not mean that society accepts those decisions submissively. Society questions the government, forcing the government to be transparent and be responsive.

4. Lessons learned from the Taiwan Case

Taiwan's successful COVID-19 experience has demonstrated the imperative of early intervention to limit the spread of the coronavirus. In a public health crisis, speed is of the

essence. But it is also the government's overall containment strategy that has been key in preventing the astronomical infection and death rates as seen in the United States, Russia, India, Brazil, Iran, and many other areas around the world. First, the legacy of the developmental state helped Taiwan create the "mask economy" within a short period of time as well as contributing to the digital governance infrastructure. Also, transparent communication helped define the nature of COVID-19 early on in Taiwan, decreasing public panic and increasing public trust in the government and citizens' compliance level. Then, the tech-savvy civil society also collaborated with the government in refining crisis measures. Finally, the successful crisis management strategy has also had international repercussions, enhancing Taiwan's standing on the international stage.

Taiwan's experience is testament to the counterargument that democratic governance is indeed compatible with pandemic prevention and containment.

However, to prevent the second wave of infection the government and health providers continue to be on guard. While residents are resuming their normal life and regular economic activities, the government and medical experts request all residents to shun from crowded places, to keep social distancing, and to maintain strict control over port-of-entry inspection. More importantly, Taiwan needs to collaborate with research institutes in other nations to develop vaccines and new drugs as part of the preemptive strategies against the next wave of the epidemic[23].

Taiwan has drawn the right lessons since SARS outbreak. It has proven itself to be not only self-reliant but also capable of helping other countries, in alignment with international healthcare organizations to fight against COVID-19.

Conclusion:

Inthe age of ICT, Governments are able to provide various services efficiently. Now people can communicate with each other's in different countries using technologies such as internet, messaging, video conferencing etc. E-Governance minimizes the time as well as corruption while availing the services. Technology has proved a useful and necessary tool to help ensure that local and regional governments on the frontline of the emergency continue to provide essential public services during the COVID-19 crisis. As the coronavirus continues to spread

around the world, governments have put in place important restrictions on the movement of people, the functioning of services, and rules on physical distancing.

At the early stage of the outbreak, the strategy in Taiwan had three pillars: real-time surveillance with rapid risk assessment, border control and quarantine, and laboratory capacity building. Before the outbreak, Taiwan CDC has established comprehensive surveillance systems that included laboratory and social media surveillance[24].

More importantly, the success of the epidemic control has resulted from the post-SARS self-alert and self-discipline of the residents, who voluntarily put on face masks, wash hands properly, and practice social distancing. Another contribution from the public is the wide application of big data analysis and advanced information and communication technology (ICT)[25]. Advocated by the government as well as on social networking, ICT has been applied broadly to various prevention measures.

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