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Government pandemic policies associated with vaccine fund and vaccine diplomacy in response to COVID-19: A critical study of the Vietnamese experience

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Abstract:

Since the onset of the COVID-19 pandemic, Vietnam has experienced four coronavirus waves. While the government was able to bring the first three outbreaks under control, the fourth outbreak has been causing rampant health, economic, and social problems in Vietnam. This study contributes to the literature by conducting a systematic and critical analysis on how the Vietnamese government responds to the COVID-19 pandemic. We review a large number of policy documents issued by the central and provincial authorities over a two-year period from January 2020 to March 2022. Early success in pandemic control can be attributed to proactive communication to raise public awareness, strong contact tracing technology, and timely public health and economic policy measures. In response to the low national vaccination rate, which is a focal point during the fourth outbreak, the government proactively engages in diplomacy with other countries to take advantage of vaccine support and to set up the Vaccine Fund to secure and mobilize financial resources from the private sector to fund various vaccine activities including procurement, rollout, and research and development for domestic production. Vaccine diplomacy and the establishment of the Vaccine Fund represents a turning point in the pandemic campaign and demonstrates that Vietnam is capable of applying the formula of Vaccine + the 5 Ks: Khẩu trang (face mask), Khoảng cách (keeping a safe distance), Khử khuẩn (disinfection), Không tập trung đông người (do not gather in crowded places), and Khai báo y tế (health declaration), which gives Vietnam the best chance to vanquish COVID-19 in the long term. This paper also finds that the Vietnamese government has effectively controlled the pandemic by leveraging and harnessing public trust and upholding traditional cultural values. The lessons drawn from policy responses and the Vaccine Fund in Vietnam, as a lower-middle-income country, serve as a useful COVID-19 reference for other developing countries.

Keywords: **governmental policies, vaccination, vaccine diplomacy, vaccine fund, Vietnam.**

Classification numbers: **4.1, 5.1**

1. Introduction

The year 2019 witnessed the emergence of coronavirus from Wuhan, China, which was quickly declared a pandemic within months. As of 22 April 2022, there were 505.8 million confirmed COVID-19 cases worldwide, including 6.2 million deaths [1], with no sign that the devastating effects are abating. In addition to the tragic losses of human lives, the

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pandemic has posed an unprecedented challenge to public health, food systems, and the global economy. During the last two years, the COVID-19 disease not only has not weakened over time, but genetic mutations have created new variants such as B.1.1.7 (in the UK), B.1.617.2 (in India), and Omicron (in Botswana), which spread at a faster speed and therefore pose a greater danger [2, 3].

Vaccines are widely recognized by health authorities and the medical community as a major tool for safeguarding public health [4]. Vaccines provide protection for individuals against COVID-19. Mass vaccination campaigns should therefore be implemented to create favourable conditions for the full resumption of economic and social activities. In the fight against infectious diseases such as smallpox, polio, rabies, typhoid, and the plague, vaccines have played a paramount role in reducing mortality [5]. According to the U.S. Centers for Disease Control and Prevention (CDC), vaccination is a key public health tool that has successfully elevated the overall level of wellbeing for humanity in the 20th century [6]. This is why a number of countries quickly and generously allocated financial and human resources to COVID-19 vaccine research shortly after the onset of the disease outbreak.

Besides a number of common preventive measures such as face masking, social distancing, quarantine, travel restrictions, and lockdowns, there is high expectation that vaccines will bring an end to the COVID-19 pandemic. As of 6 June 2021, approximately 2.15 billion vaccine doses have been administered globally [7]. The U.S. accounted for the highest proportion at nearly 14% (more than 300 million doses) [7]. According to the CDC on 2 April 2021, those Americans who have received the second vaccine shot could move around freely and resume their social activities. It is clear that with the fastest vaccination speed, the U.S. has been able to re-open borders, restaurants, hotels, and place the economy on a path to recovery (with 6.5% growth rate in the first quarter of 2021) [8]. In the first months of 2022, several countries have switched from a "zero-COVID-19" strategy to "living with COVID-19" strategy in which people are allowed to resume all activities with lockdowns abandoned or eased.

Vaccinating the global population for COVID-19 has been the biggest public health campaign in the history of the world. The production, affordability, allocation, and deployment of vaccines are massive challenges for the whole world, particularly for low- and middle-income countries [9]. In fact, some wealthier countries such as the United Kingdom, France, the U.S., and China have been administering boosters or third vaccine doses to their citizens. In contrast, the percentage of people who received at least one dose is only 15.2% in low-income countries [10]. It is clear from Fig. 1 that the percentage of fully vaccinated people in most African and Southeast Asian countries only account for 10-20% and 50-70%, respectively [7].

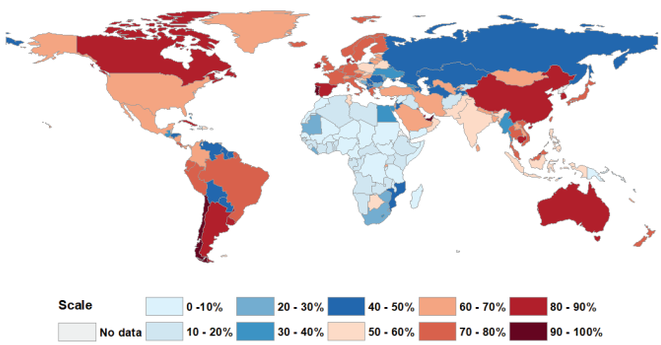

Fig. 1. Share of people who received at least one dose of COVID-19 vaccine. Source: Our World data [11].

To achieve global control of COVID-19, there are several vaccination-related challenges that must be overcome, namely: vaccines must be mass-produced, reasonably priced, distributed globally so that they are available where they are needed, and widely deployed in local communities (Fig. 1) [9]. An affordable price reflects elements of public investment and risk-sharing taking into account large purchase volumes and sustainable funding for COVID-19 vaccines and vaccination programmes. Setting vaccine prices is especially important as it affects a country's ability to procure sufficient supply. This is because countries are aiming to vaccinate their entire population as quickly as possible, which makes the total cost of acquiring vaccines potentially unaffordable for many governments, even when the price per dose is relatively low [9]. According to O.J. Wouters, et al. (2021) [9], governments will need to raise substantial financing through either domestic national budget or external aid to adequately fund COVID-19 vaccination programmes, which includes the costs of distribution, administration, record-keeping, and monitoring. For example, the World Bank and other multilateral development banks have earmarked billions of dollars in funds for COVID-19 vaccination programmes for low- and middle-income countries.

With 98 million people, Vietnam ranks 15th globally in population size [12]. As of 6 June 2021, however, only 1.24 million citizens received at least one COVID-19 vaccine dose, which makes up 1.11% of the total population [7]. However, as illustrated in Fig. 1, as of 31 March 2022, this figure surged to 79.2%; modest compared to that of the rest of the world, yet relatively larger than that of other Southeast Asian countries such as Malaysia (78.7%), Laos (60.6%), Indonesia (57.23%), and Thailand (71.8%) [11]. In the fourth outbreak, Vietnam recorded 5757 cases within the first 40 days (between 27 April and 7 June), which is twice as large as the total of the three previous outbreaks [13]. This dealt a powerful blow to the national economy, health care systems, non-smoke industry, and the education sector. Take Bac Giang province as an example. The gross regional domestic product of this province in Vietnam was the highest in 2020 with provincial exports valued at 10.9 billion USD (an increase of 44.8% from 2019) [14], however, during the latest outbreak, the province was locked down and many industrial zones closed [13].

Acknowledging the important role played by vaccines in suppressing COVID-19, the Vietnamese government invested heavily in domestic vaccine development. On 30 January 2021, the Oxford-AstraZeneca vaccine was approved, and its vaccination commenced on 8 March in Vietnam. The Sputnik V was later approved for use on 23 March, while the Sinopharm vaccine was approved for emergency use on 4 June. As of 7 June 2021, Vietnam ordered a total of 68.9 million doses of Oxford-AstraZeneca and 20 million doses of Sputnik V [13]. Meanwhile, four Vietnamese pharmaceutical manufacturers have engaged in the research and development of COVID-19 vaccines: VABIOTECH, POLYVAC, IVAC, and NANOGEN. Among them, the Nano Covax vaccine developed by Nanogen was the first vaccine in Vietnam to complete the research process and achieve high efficacy in pre-clinical trials. Currently, the third vaccine injection is ready to be trialled by volunteers. Additionally, Covivac, which is developed by VABIOTECH, started human clinical trials on 3 March 2021 and is considered to be the second potential vaccine as part of the domestic COVID-19 response toolkit. Vietnam is also actively promoting the purchase of vaccine technology with the aim that these technology transfers would bolster domestic vaccine production capability to service the local population [13].

Since the first domestic case was recorded, the Vietnamese government has taken prompt actions and shown flexibility in policy implementation. For instance, from January to July 2020 (with a total of 413 confirmed cases and 99 days of no new infection from local communities), there were close to 1000 policy documents issued in different classifications. The policy system responded promptly, proactively, and effectively at multiple authority levels (33 different agencies from the national to provincial governments) using a range of policy tools and measures [15]. At that time, it is estimated that Vietnam needed at least 150 million vaccine doses to achieve herd immunity with an associated cost of approximately 25 billion VND (12 million USD). Showing awareness of this enormous financial undertaking, on 26 May 2021, the Vietnamese government established the COVID-19 Vaccine Fund. This is a deft policy move on the part of the government to secure private sector financing to help with vaccination costs and to achieve herd immunity as quickly as possible [16].

This paper aims to review the pandemic policies of the Vietnamese government, particularly the establishment of the Vaccine Fund, in order to draw valuable lessons on combating the COVID-19 pandemic not only for Vietnam but also for other low- and middle-income nations around the world. We employ the critical review method to analyse secondary data on policy responses, financial policies, and the Vaccine Fund collected from various vetted sources in Vietnam and the scholarly literature.

The remaining sections are laid out as follows. Section 2 provides background information on the four COVID-19 outbreaks in Vietnam. Sections 3 and 4 present the literature review, data collection, and processing procedures. The findings on policy responses, financial support, and the Vaccine Fund are reported in section 5. Section 6 discusses the key findings and/or policy implications. Finally, section 7 summarizes the key findings and/or policy implications.

2. Background

COVID-19 has exerted far-reaching global ramifications on daily activities, social well-being, and sustainable economic growth. It has spread with ruthless rapidity to 220 countries and claimed millions of lives. Vietnam has so far experienced four outbreak waves (Fig. 2). Throughout these four episodes, the government has applied various preventive

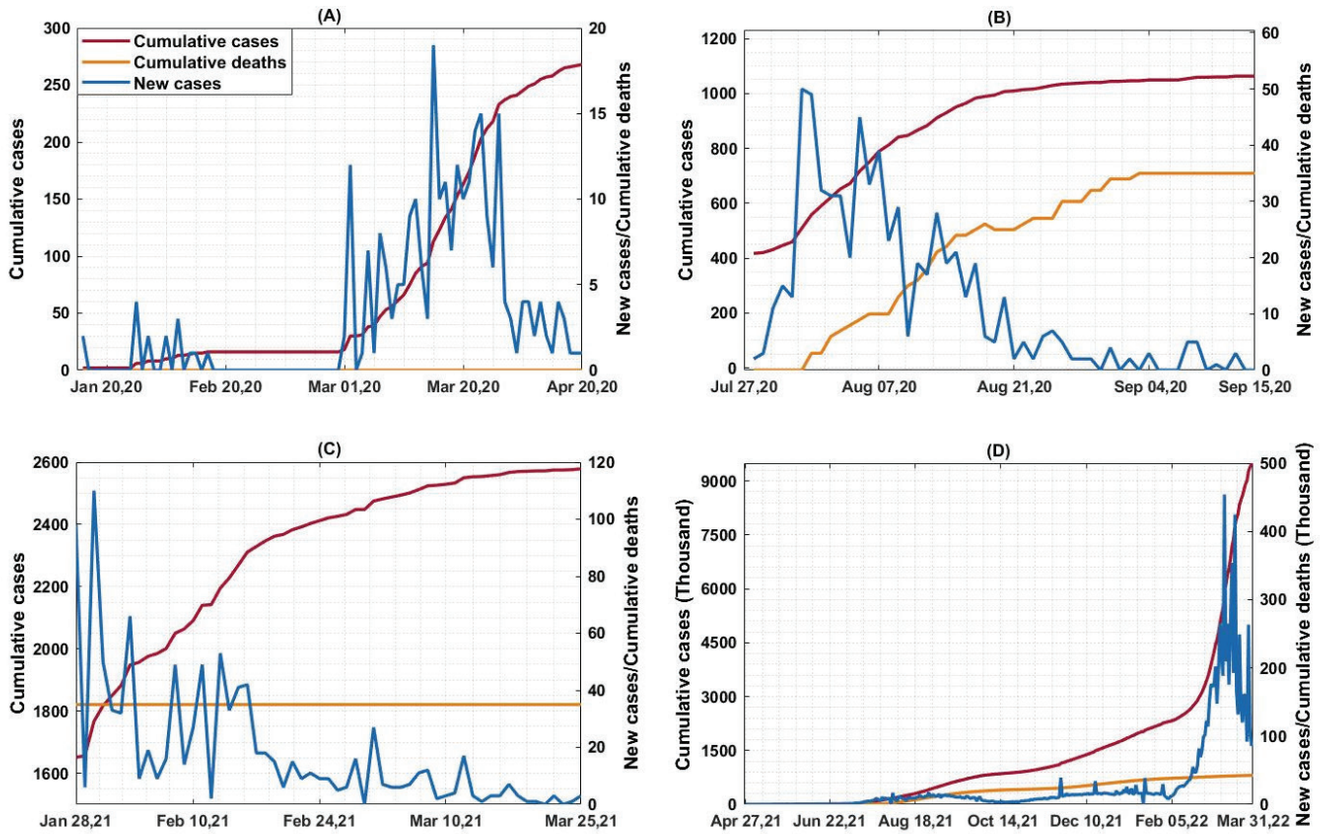

Fig. 2. The progression of COVID-19 across the four waves in Vietnam. Source: Compiled by authors.

measures including personal hygiene, nationwide social distancing, and travel restrictions depending on the severity of the outbreak, demonstrating the government's flexibility in implementing policies of disease control and prevention.

2.1. First wave

The first two confirmed cases in Vietnam were admitted to Cho Ray hospital in Ho Chi Minh city on 22 January 2020. The Chinese man flew from Wuhan to Hanoi to visit his son, who was reported to have contracted the virus from his father when they met in Nha Trang on 17 January [17]. On 1 February, a 25-year-old female (#6) was diagnosed with coronavirus in Khanh Hoa province, which marked the first case of domestic transmission [18]. Then Vietnam declared the acute respiratory disease caused by the new coronavirus (nCoV) a pandemic in Vietnam and introduced laws to tighten border control, revoke air permits, and restrict visa issuance [19]. Early detection of confirmed cases and prompt active contact tracing are two key factors for Vietnam's initial COVID-19 success story. For the first 16 cases, the medical staff treated a variety of patients including infants, the elderly, and those with underlying conditions. This initial phase was akin to "an exercise" for the Vietnamese medical system to prepare and study the new virus.

With a 22-day streak of no community infection, the first COVID-19 outbreak was kept under control. However, on the evening of 6 March, the Hanoi Department of Health confirmed the 17th case in the capital, which was a 26-year-old woman who returned to Hanoi from Europe [20]. Subsequently, the government tracked and isolated about 200 close contacts of those infected within a day to avert community transmission. In March and April 2020, the number of cases increased rapidly due to a large number of people coming from European countries and emerging epicentres such as Bạch Mai hospital in Hanoi and Buddha bar in Ho Chi Minh city, urging the government to implement nationwide social distancing [21]. As of 30 April 2020, the first outbreak of COVID-19 in Vietnam culminated in a total of 270 cases. The number of people who recovered from the disease was 224. The drastic pandemic control measures yielded positive results and the country

confirmed no more local transmission cases from mid-April to the end of July. As a result, Vietnam began loosening domestic travel restrictions in May 2020 [22].

2.2. Second wave

By 25 July 2020, Vietnam marked 99 days without any community transmission before a new outbreak emerged in the city of Da Nang [23]. It was especially crowded in July as people were eager to travel after a quiet Tet holiday because of social distancing and fear of COVID-19 infection. The government also promoted domestic tourism to offset economic losses from international tourists unable to visit Vietnam. What started as nosocomial transmission quickly spilled into the community and new incident cases increased by about 30 percent during the last week of July, which was reported to be the fastest growth rate since the beginning of the pandemic [24]. On 28 July, the Da Nang authorities immediately locked down the city for 15 days [25]. Between 25 July and 8 September, 551 locally transmitted cases were reported in 15 cities and provinces across the country. Approximately 98 percent of those cases were either connected to major hospitals in Da Nang or have visited Da Nang. Ironically, the first two deaths were recorded on 31 July after Vietnam has gained international plaudits as one of the most successful countries in its COVID-19 responses. A temporary hospital for treating suspected and mild cases was built and two other hospitals designated for COVID-19 treatment were placed under the direction of a special committee from the Ministry of Health (MOH) [26].

After two months of employing the same coping strategies as implemented in the first outbreak - targeted lockdowns, travel bans, business closures, mass quarantines, and widespread testing - Vietnam successfully contained the disease for the second time. As of 10 September, 61,968 people were being monitored, 998 were quarantined in health care facilities, 15,619 were quarantined in centralized facilities, and 45,351 self-quarantined at home [27]. Having kept the viral spread under control, Vietnam lifted restrictions and resumed almost all economic activities, including international commercial flights. However, sporadic community infections continued during November and December causing public panic and the authorities reacted with stronger measures.

2.3. Third wave

After 4 months of relaxed social distancing measures, Vietnam entered into the third COVID-19 outbreak where 84 community transmission cases were recorded within a single day on 28 January 2021 in Hai Duong and Quang Ninh provinces. Most of these were related to a Hai Duong migrant worker diagnosed with the UK variant and reported back to Vietnam as a new infected case by the Japanese authorities after arriving in Osaka on 17 January. Initially, the government only quarantined areas directly related to known infected cases for the purpose of disease control and minimum disruption to the economy. But after two weeks, there was still no sign of the case number slowing down. So, on 15 February, Hai Duong was placed in provincial lockdown for 15 days while Hanoi and Ho Chi Minh city suspended all entertainment activities [28]. Similar to the second wave, 3 field hospitals were swiftly built in Hai Duong to ease the burden on existing hospitals to provide treatment in response to the surge in COVID-19 patients [28]. This was the most serious outbreak since the beginning of the pandemic in Vietnam due to slow contact tracing process, mismanagement in quarantine facilities and residents' overly incautious attitudes and complete disregard for public health rules such as social distancing and lockdown after a long period of living with restrictions. Besides, there was an increase in infection risk and the danger level in the presence of a newly emerging variant with a much faster transmission rate [29]. During this wave, COVID-19 quickly spread to 11 more provinces and cities across the country. As of 16 February 2020, Hai Duong province recorded 501 cases, mainly in hot spots including Chi Linh, Cam Giang, Kinh Mon, and Nam Sach [28]. However, disease-stricken localities were not required to reduce trading activities. Authorities chose not to impose overly strict restrictions that would further inconvenience nearby residents and ensure that regular commercial trading could continue as usual in non-lockdown regions. On 7 March 2021, the situation in northern provinces appeared to have been largely brought under control when the number of new cases fell to single digits. On the following day, a mass COVID-19 vaccination campaign with the AstraZeneca vaccine for healthcare workers in Hai Duong, Hanoi and Ho Chi Minh city was launched [30].

2.4. Fourth wave (April 27, 2021 - present)

On April 27, 2021, after a series of nearly 50 days with no cases of COVID-19 in the area, Ho Chi Minh city recorded a new case of a man born in 1993 who flew into the city from the Ha Nam outbreak. This is considered the beginning of the fourth wave of the epidemic. The fourth wave of COVID-19, however, did not arrive until May 26, when the first case of the missionary group transmission chain located in Go Vap district appeared [31]. The Delta variant emergence and replication has compounded the pandemic scenario in Vietnam. With the rapid spread of the Delta virus in India, this chain of infections grew very quickly, with roughly 500 cases of COVID-19 in less than a week. In addition, this infection chain also gave rise to 21 other infection chains throughout 22 districts of Ho Chi Minh city. The fourth wave can be divided into two phases. In the first phase, the government investigated and isolated locations where cases were reported. For the first time during Vietnam's 1.5-year anti-pandemic, ten medical facilities were forced to blockade/medically isolate themselves to complete zoning and tracking in less than ten days. Three medical establishments in Hanoi have temporarily stopped receiving patients. After recording the first 14 cases of COVID-19 infection on the afternoon of May 5, the Central hospital for tropical diseases 2 (Dong Anh, Hanoi) decided on medical isolation [32].

Phase 2 is characterised by the number of infections per day exceeds 10,000 cases and the government's efforts to promote vaccination and vaccine diplomacy. On June 12, Vietnam reached more than 10,000 cases of COVID-19. After a month and a half, the number of cases increased to more than 100,000 cases. Nearly 2 months later, it reached more than 700,000 cases. The Prime Minister agreed to apply social distancing measures in a series of 19 southern provinces and cities from July 19. This is the first time that social distancing was implemented urgently throughout Ho Chi Minh city and several other locations. The health system was overburdened by too many F0 cases. In response to an escalating number of serious cases and deaths, a medical force of about 20,000 people was sent to Ho Chi Minh city and the southern regions to assist. In the northern regions, especially Hanoi - the capital of Vietnam, Omicron variant was the most dominant. The medical situation was less severe compared to that in the southern regions, yet the number of cases surged due to the variant's highly contagious nature. On March 8, 2022, a peak of 32,600 new cases was recorded, which then dropped to approximately 9,000 cases per day towards the end of the month. So far, 42,493 people have died from the COVID-19 outbreak as of March 31, 2022, accounting for 0.4% of total confirmed cases in Vietnam [33]. The cumulative number of confirmed deaths ranked 24th out of 227 countries and territories worldwide on 31st March 2022 [33].

Besides medical issues, the COVID-19 pandemic also took its toll on Vietnam's economy. Gross domestic product (GDP) in the fourth quarter of 2021 was estimated to increase by 5.22% over the same period last year, which was lower than the growth rate of the fourth quarter over the same previous of years in 2011-2019 before the pandemic. This was partly due to the negative growth of some service industries such as the transportation and warehousing industry and the accommodation and foodservice industry [34]. Moreover, the impact of the COVID-19 epidemic has left millions of workers in a crisis. According to the General Statistics Office, in the third quarter of 2021 alone, more than 28.2 million people aged 15 and over were adversely affected by the COVID-19 pandemic, increasing by 15.4 million people compared to the previous quarter [35].

In response to such a situation, the Government of Vietnam (GOV) has taken a number of measures. With aims to control the pandemic, focus was placed on accelerating the vaccination process. The largest-scale vaccination campaign in Vietnamese history was launched in July 2021 with the goal of 150 million doses for more than 75 million people by early 2022 [36]. Thanks to the COVID-19 vaccine fund and effective vaccine diplomacy with other nations, the goal was achieved. As of late January 2022, around 163.5 million vaccine doses were administered with up to 71.5 million people receiving the second jab, reaching 93% of the population [37]. More impressively, one year from the very first administered dose of the COVID-19 vaccine in Vietnam on March 8, 2021, the country has administered 198 million vaccinations and ranked as the sixth most highly vaccinated country in the world [38]. In addition, the state adopted a new anti-pandemic campaign, shifting from "zero COVID" to "new normal" in order to fight the pandemic while also recovering the economy. For example, inbound and outbound tourism was reopened starting March 15 under "new normal" conditions, showing positive signs for the service industries [39]. In Hanoi, food and beverage facilities remained open until midnight instead of being forced to close before 9 p.m. as previously required [40].

3. Literature review

Eradicating the 2019 coronavirus disease (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been the most formidable challenge faced by humanity over the last century. In their research examining infected patients, M.C. Paules, et al. (2020) [41] found that 20 to 30% required mechanical ventilation and 10% died, with higher fatality rates in older patients and those with medical comorbidities. According to a research study of 5,484 contacts of SARS-CoV-2 index cases detected in Lombardy, Italy, Piero Poletti, et al. (2020) [42] reported that the risk of symptoms increased with age. Specifically, 6.6% of infected subjects older than 60 years had critical diseases, with males possessing significantly higher risk. A.S. Fauci, et al. (2020) [43] calculated the median age to be 59 years, with higher morbidity and mortality among the elderly and those with coexisting conditions (similar to the situation with influenza), where 56% of the patients were male. Notably, L. Zou, et al. (2020) [44] found that it is possible for person-to-person transmission to occur from asymptomatic COVID-19 carriers to the community. J.B. Aguilar, et al. (2020) [45] stated that the asymptomatic sub-population frequently escapes detection by public health surveillance systems, which results in contagion. On the other hand, the emerging genetic variants are now raising serious concerns about transmission of the coronavirus. B. Korber, et al. (2020) [46] reported on the spread of a SARS-CoV-2 spike (S) protein mutation, D614G (i.e., an aspartic acid to glycine amino acid substitution at position 614 in the viral S gene) across multiple countries, which suggested that it was a more 'transmissible' form of the virus.

As of 2020, there were 58 vaccines developed for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and in the process of clinical trials. M.D. Knoll and C. Wonodi (2021) [47] reported some vaccines had more than 90% efficacy against COVID-19 in clinical trials such as Moderna or Pfizer/BioNTech. A group of researchers showed that the recent COVID-19 vaccines have an efficacy rate of disease prevention between 50% and 94% against the D614G and B.1.1.7 genetic variants [48]. Therefore, an increase in vaccine uptake in the community should strongly boost the chance of achieving herd immunity. In particular, T.P. Velavan, et al. (2020) [49] showed that vaccination played an indispensable role in herd immunity and should be applied to each age group. A game was also created by W. Lim and P. Zhang (2020) [50] to prove that vaccination played a key role in facilitating the elimination of a pandemic.

On the other hand, successful herd immunity requires high willingness in the community to get vaccinated. H. Harapan, et al. (2020) [51] studied the acceptability of COVID-19 vaccine in Indonesia, which was found to be highly influenced by the baseline effectiveness of vaccines.The authors showed that 93.3% of respondents would like to be vaccinated by a 95%-effective vaccine, but the acceptance rate decreased to 67.0% (911/1,359) when vaccine effectiveness dropped to 50%. S. Neumann-BÖhme, et al. (2020) [52] conducted a survey investigating the difference in willingness across European countries in receiving COVID-19 vaccine and found that if availability was not an issue, 73.9% of respondents from Denmark, France, Germany, Italy, Portugal, the Netherlands, and the UK were happy to get vaccinated. The difference in the level of willingness between countries ranges from 62% in France to 80% in Denmark [52], which can be mainly attributed to the German and French respondents expressing deep concerns about the vaccine side effects. L.P. Wong, et al. (2020) [53], using a belief model for Malaysia, found a definite intent to receive the vaccine at 48.2%, followed by a probable intent at 29.8%, and a possible intent at 16.3%. Within the Malaysian cohort, 28.9% were willing to pay MYR$100 (US$23) and 27.2% were willing to pay MYR$50 (US$11.5) for vaccine. Y. Lin, et al. (2020) [54] investigated vaccination willingness in China and showed that a high "probably yes intent" at 54.6% while a "definite yes intent" was only at 28.7%. Moreover, the Chinese respondents, whose responses were expected to be mainly influenced by socio-economic factors, tended to express a preference for domestically produced vaccines and their willingness to pay was CNY¥200 (US$28). On the contrary, a study conducted in the Middle East by W.A. Al-Qerem and A.S. Jarab (2021) [55] concluded that a comparatively high percentage of participants (36.8%) would decline vaccination if it becomes available and 26.4% answered "Not sure" [55]. The main reasons for their vaccine refusal or hesitancy were concerns about vaccine efficacy and the need for additional information. Results from a Chilean study conducted by A.A. Cerda and L.Y. García (2019) [56] showed that the top reason for vaccine hesitancy was the risk of side effects (40% of respondents), which is followed by a lack of knowledge about the vaccines (24%).

Newly emerging COVID-19 variants have been becoming more transmissible and causing higher fatality rates. At the same time, vaccine supply has been in chronic shortage worldwide. Hence it is imperative for governments to take leadership in devising policy

frameworks to optimize provision and distribution in order to improve vaccine equality. According to the WHO, well-managed vaccine programme and logistics support can increase efficiency and quality while minimizing operational costs [57]. A U.S. study showed that only 59.1% of respondents reported a high level of trust in COVID-19 vaccine, which suggests that government agencies need to disseminate information more promptly through platforms with high volumes of users to maximize reach [58]. J.V. Lazarus, et al. (2021) [59] conducted a global survey of 13,426 people and found that it is more likely for respondents to agree to get vaccinated if they trust the information published by government sources. Moreover, rural residents usually account for a greater proportion of the national population in developing countries. As there is scant research examining their vaccination willingness, it is important for governments to initiate more in-depth studies to offer scientific guidance on achieving herd immunity in rural communities.

Since the rollout of COVID-19 vaccines, uneven vaccine distribution persisted either between regions within a country or across countries internationally. Evidences of vaccine inequality were abound in that nearly half of all supply available in the world were concentrated in China and the United States, yet merely 2% are allocated for Africa [60]. High-income countries, despite constituting only 16% of the world population, hold 65% of all COVID-19 vaccines, whereas the figures for middle- and low-income countries are 26% and 9%, respectively [61]. According to the MOH, Vietnam was estimated to require 150 million doses to ensure adequate COVID-19 vaccination in 2021, which is believed to be vital in preventing the spread of COVID-19, thereby raising the need for massive financial injection from the government [62]. At its regular meeting in May 2021, the government agreed to cut at least 50% of expenses for the remainder of the year on conferences and business trips taken by ministries, central agencies, and local authorities. There was also an additional 10% savings to come from reductions in recurrent expenditures in 2021 to supplement COVID-19 prevention and control, investment project promotion, and necessary security and defence tasks [63]. According to preliminary calculations by the MOH, the cost of buying and administering vaccines was about 25,000 billion VND ($1.1 billion) [62]. Moreover, it was expected that fiscal pressures on the state budget would continue to intensify the longer the pandemic persists in addition to the potential demand for annual booster shots in the future.

According to IMF (2020), more than 40 countries approved extra budgetary expenditures to raise the level of financial support in response to the COVID-19 crisis [64]. As the pandemic had placed tremendous pressure on the Vietnamese government to balance the national budget, it was critical that an alternative channel of financing was established to fund vaccine activities. According to the Prime Minister, a COVID-19 Vaccine Fund was founded with the view that social contributions from the private sector would help ease pressures on the state budget for vaccine import purchases and R&D for domestic vaccines [65]. Bui Dinh Hien, a lawyer from the Hanoi Bar Association, maintained that "A separate COVID-19 vaccine charity fund should be established to gather all sources of support in an open and transparent manner for jointly public supervision and be subject to inspection, examination and supervision according to the law regulations" [66]. Clifford Chance (2020) [67] reviewed the pandemic financial assistance practice of 21 countries including measures of liquidity injection into the credit markets for businesses, sick pay or unemployment benefits for workers unable to work, tax cuts, and improved credit schemes. In an OECD (2020) [68] study, more than 160 countries implemented expansionary monetary and fiscal policies including quantitative easing carried out by the European Central Bank and the U.S. Federal Reserve. Moreover, there were many other government programmes in the forms of guarantees, loans, deductions, recapitalizations, and grants provided by banks. In most cases, the government initiates financial measures to aid businesses, but not many countries utilize a Vaccine Fund to call for donations from the private sector as a way of speeding up the vaccination process.

4. Methods

We obtained data on pandemic policy responses, financial policies, and the Vaccine Fund to conduct our study along these three dimensions. Data on policy responses would provide an overall picture on how and the extent to which the government has been able to control COVID-19. Information extracted from financial policies would focus on how the government supports businesses and citizens during the pandemic period. Finally, we examine the Vaccine Fund, which is perceived to be the most effective way for the Vietnamese government to mobilize financial resources in the private sector

to help achieve herd immunity by the end of 2021. Additionally, the Fund is expected to also aid in the longer-term phases of the COVID-19 campaign financially [68]. Because the primary goal of this paper is to examine government policies in response to the COVID-19 pandemic, we employed secondary data only [69]. We utilized four data sources (Fig. 3). Government policy documents are our first source (Fig. 3A), which were obtained from the government web portal (http://vanban.chinhphu.vn/). This source focuses on COVID-19 information disseminated in Vietnam. We used the MOH's official COVID-19 information page (https://ncov.moh.gov.vn) to collect data on new and accumulated cases, recoveries, and daily deaths since the first outbreak. This second source contains COVID-19-related scientific documents (Fig. 3B). We extracted these documents using some of the most popular websites including Web of Science (WOS), Scopus, Google Scholar, and ResearchGate to summarize the existing literature review on vaccination and governments' responses to epidemics and pandemics. The search phrases and key terms were constructed based on the study purpose, namely, "COVID-19", "vaccination", "governmental policies", "vaccine fund", and "vaccine diplomacy." The third source comes from electronic and online newspapers (Fig. 3C). We mainly obtained information from Vnexpress and Vnexpress International (https://vnexpress.net) because they are the most popular bilingual online newspapers in Vietnam and they keep readers abreast of the latest Vaccine Fund developments on a daily basis. The last source is the vaccine fund's website (https://quyvacxincovid19.gov.vn/) (Fig. 3D). We obtained all information about the fund's establishment, progress in receiving donations, and daily funding updates.

When performing data validation, we carefully checked the accuracy and/or relevance of the collected data [70]. Specifically, we focused on three key information categories: COVID-19 progress, policy, and the Vaccine Fund. A 2-3-person team is responsible for compiling the dataset for an information category. One person would conduct the search; once data is obtained, the other person checks to confirm the validity of the collected data; and finally the two team members and the group leader collaborate to verify and decide whether to proceed with the constructed dataset. As the pandemic began in late 2019, we relied heavily on documents published only in the last two years.

The data is cleaned, coded and verified [69]. Data cleaning includes removing noisy/false/unnecessary information and rectifying missing data. Data coding aims to shorten information attached to data and making it easier to incorporate into statistical methods. Lastly, data verification confirms that the data is accurate and ready for further processing. We classified the provincial and governmental documents that we collected into 8 policy categories [12]: (1) Outbreak announcements and steering documents; (2) School closures; (3) Emergency responses; (4) Border control measures; (5) Social distancing and isolation measures; (6) Financial supports; (7) Medical measures; (8) Other policies related to COVID-19. We use descriptive statistics and critical overview analysis to analyse the data and draw relevant lessons and/or policy implications for Vietnam and other similar countries. Data visualization, which helps to communicate our story more concisely, is carried out using Python version 3.7.7 and ArcGIS version 10.2.2.

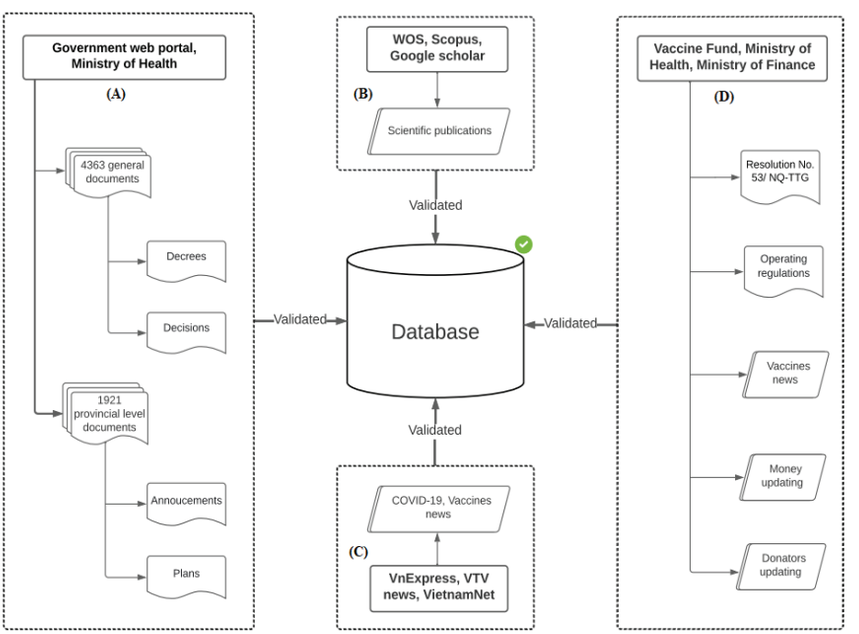

Fig. 3. Data collection flowchart. Source: Authors.

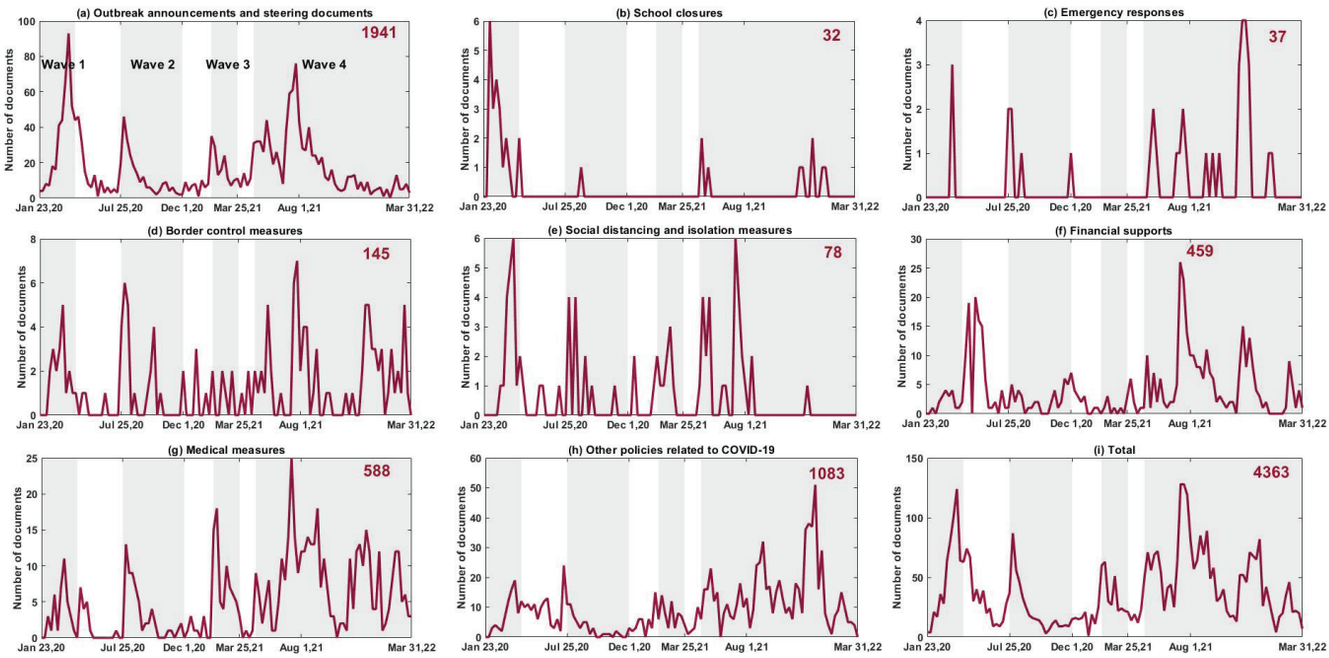

Fig. 4. Legal documents by topics over the four different COVID-19 outbreaks. Source: Compiled by authors.

5. Results

5.1. Pandemic policy responses

The line graphs illustrate the weekly number of policy documents from the 8 categories over the four COVID-19 outbreaks in Vietnam (Fig. 4). We take the frequency of official policy document publication as a measure of the intensity level of pandemic policy responses by the government. Over the four COVID-19 waves, outbreak announcements and steering documents/medical measures are the two most frequently used policies, while school closures and emergency responses register the lowest numbers of policy document publication.

During the study period, the total publication number of policy documents fluctuated greatly. The number of newly enacted policies reached its local peak either at the beginning of an outbreak (Waves 2-4) or during the outbreak (Wave 1) before subsiding. The total number of policies decreased substantially in the transition intervals. Outbreak announcements and steering documents accounted for approximately half of all policy documents (1941), over three times as many as the second most used policy in medical measures (588). The fourth outbreak has the highest total number of published policy documents due to its long duration and high severity.

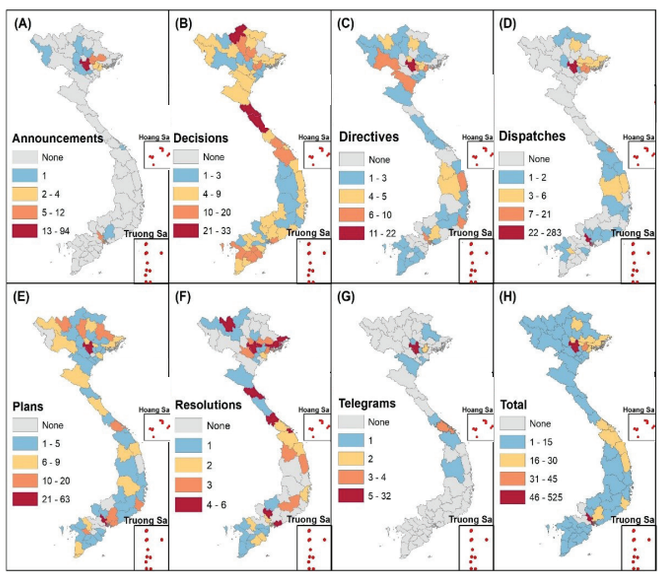

Fig. 5. Policy documents by topic and province during the COVID-19 time. Source: Compiled by authors.

In terms of the geographical distribution of COVID-19 policies in Vietnam, there were generally substantial differences in publication numbers between the northern, southern, and central regions. Fig. 5 shows that more policies were published in the north than in the south of the country. They also varied greatly among provinces as the majority of policies were introduced in the two largest cities Hanoi and Ho Chi Minh.

COVID-19 exerted widespread negative effects on Vietnam and no regional provinces were spared because of their economic interdependence and potential risks of cross-infections. As clearly illustrated in the maps, policies were applied nationwide but there is substantial unevenness in their spatial distribution between major cities such as Hanoi and Ho Chi Minh, and other provinces.

The GOV and the MOH issued the highest number of guidelines and announcements to the public with some documents classified as exclusive to limited communications. The two agencies that issued the bulk of communications were the Ministry of Finance and the GOV. The remainder includes the COVID-19 Prevention Committee and the Ministry of Transport and various other ministries of which documents issued constituted a small proportion. We can also connect different types of policy documents to each agency. The MOH was the primary agency that published dispatches, decisions, and plans. Furthermore, certain types of documents were almost exclusively published by some government agencies. The GOV was the dominant issuer of announcements while most circulars were published by the Ministry of Finance.

5.2. Financial support policies

The COVID-19 pandemic has imposed tremendous costs on the economy of Vietnam. To combat the economic downturn, the government launched large-scale fiscal and monetary support packages. However, there are concerns that if these macroeconomic packages are poorly designed and executed, they could pose a threat to the stability of domestic financial markets. Thus, legislators need to be scrutinized more closely to avoid hasty decisions. So far, various government agencies have issued hundreds of policy documents on financial support measures. We classify these measures into 4 groups and discuss them in more detail below.

Tax support policies: The government simultaneously improved the tax law and extends the tax break period for residents and businesses. For instance, enterprises, cooperatives, non-business units, and other organizations that generated total revenues less than 200 billion VND in 2020 were entitled to a 30% reduction in payable Corporate Income Tax (CIT) (Resolution No. 16/2020/QH14; Decree No. 114/2020/ND-CP) [71]. Accordingly, this tax break measure benefited about 700,000 enterprises (or 93% of the total number of enterprises operating in the country). Moreover, extending the deadline for tax payment and land rent (Decree No. 41/2020/ND-CP), which became effective from the date of signing on 8 April 2020, created more favourable conditions for businesses and households to survive through the economic hardship caused by COVID-19 [72].

Credit support policies: Since the beginning of 2020, the State Bank (SBV) has loosened domestic monetary conditions on three separate occasions by cutting a suite of operating interest rates, namely, deposit interest rates, open market operations interest rates, lending rates, and rediscount rates [73]. Additionally, a credit support package, with an estimated value of 36.6 trillion VND (0.6% of GDP), was introduced to complement the interest rate reductions. Specific measures in the package include: (i) Preferential interest rates for new loans originated by credit institutions that are 1-2.5% lower than normal rates (and this committed reduction totals to 600 trillion VND); (ii) Credit institutions to restructure the repayment term while keeping the same debt group (no penalty interest); (iii) Interest exemption or reduction by 0.5-1.5% per annum for existing loans; (iv) Exemption and reduction of fees, especially payment fees and some other service fees [74].

Social security packages: These policies aim to support unemployed workers. A 62-trillion-VND support package was implemented during the first outbreak targeting 20 million people in 7 categories, i.e., those who have performed meritorious services to the Revolution that are covered by monthly preferential policies; those who are covered by social protection schemes; poor and near-poor households; furloughed employees who are on unpaid leave; and employees whose contracts were terminated [75]. The 18,600 billion VND support package that was introduced in the second outbreak focused on supporting small- and medium-sized enterprises, cooperative groups and workers affected by the COVID-19 pandemic [76].

Deepening the domestic capital markets: COVID-19 has made it more difficult for businesses to secure capital through credit institutions in Vietnam. Thus, the government introduced new measures to facilitate raising capital through bond issuance, creating an important mobilization channel for businesses. Specifically, Decree No. 81/2020/ND-CP, which was introduced on 9 July 2020, amended a number of articles of Decree No. 163/2018/ND-CP.

Its purpose was to append regulations and sanctions governing bond trading and enhance information disclosure for bond issuance by businesses [77].

Although the government has implemented many policies to support those affected by the COVID-19 pandemic, a joint study by National Economic University (NEU) and Japan International Cooperation Agency (JICA) showed that only 22.25% of businesses were able to access financial support packages in which fiscal measures such as tax breaks and social security were found to have highly positive impacts [78]. By contrast, businesses often reported that complicated procedures hindered access to government loans, and this is reported to have affected 54.6% of businesses in Vietnam. On the other hand, social security packages were inefficiently implemented as evidenced by the disbursement progress found to be at only 20% of the target mainly due to problems in the approval process for casual and non-officer employees.

In short, the timely implementation of financial policies has partly achieved positive results in supporting businesses and households so far and is able to restore some levels of economic and social activities. However, these are only temporary policy measures to stabilize economic fluctuations as the main threat to the economy remains epidemiological in nature. Hence, the long-term strategy to combat the pandemic is through medicine but this requires the population to work co-operatively with the government.

5.3. COVID-19 Vaccine Fund

It is increasingly clear, as COVID-19 drags on with rising infection numbers across the country, that vaccines are the only way to achieve herd immunity and possibly end the pandemic. At the same time, given the additional fiscal pressure on the national budget, the government will not be able to muster sufficient public funding to purchase and administer vaccines. Therefore, establishing the Vaccine Fund (Fig. 6) is necessary to mobilize private sector financial resources from individuals and organizations to help speed up vaccine purchase so that large-scale vaccination can be quickly deployed to the Vietnamese people. On 26 May 2021, Prime Minister Pham Minh Chinh signed Resolution No. 53/NQ-TTG to establish the COVID-19 Vaccine Fund. The MOH is given the primary responsibility of co-ordinating with the Ministry of Finance to purchase and import vaccines, research and produce vaccines domestically, and implement the vaccination programme. According to the regulations, documents would need to be submitted to the Prime Minister for approval on spending from the Fund to finance the above activities. The Ministry of Finance then disburses funds as approved by the Prime Minister and in accordance with the base profile of the MOH proposals.

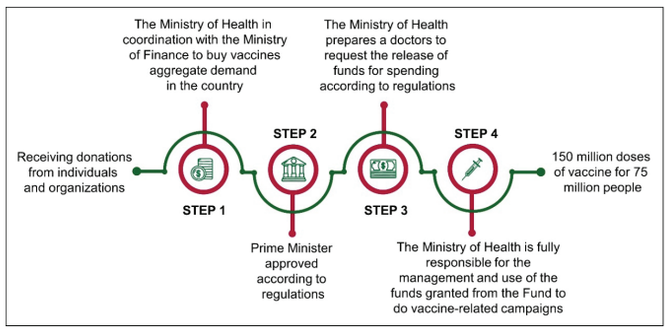

Fig. 6. Operation process of the Vaccine Fund. Source: Compiled by authors.

When herd immunity is assessed to have been achieved, the government would announce the termination of the Fund. Any unused balance held at the Fund will be transferred to the central budget at the time of its dissolution. The Vaccine Fund was launched on the evening of 5 June 2021 in the capital Hanoi by Prime Minister Pham Minh Chinh and leaders of the Central Committee of the Vietnam Fatherland Front. During the launching ceremony, Prime Minister Pham Minh Chinh emphasized that, "The consensus of the people is the key to open the great door for us to get out of the pandemic and return to a normal, peaceful and safe life". As of 10 p.m. on the same evening, total contributions from businesses to the Vaccine Fund were close to 1,268.5 billion VND of which more than 17 billion VND were transferred via text messages. After launch day, the level of contributions continued to increase dramatically, especially on 7-8 June where it increased threefold. By 9 pm on 2 July, the total amount reached 8,038 billion VND of which nearly 106 billion VND were sent by 2.37 million text messages with an average of 74,000 text messages per day. As of 5 July, total contributions have reached 8,046 billion VND with a daily rate increase at approximately 225.9 billion VND. After nearly one year of establishment, over 2,562,314 VND via SMS, 113.79 billion via Portal 1400, and 4.23 billion via the COVID-19 Vaccine Fund website was donated by 419,872 individuals and organization (Fig. 7).

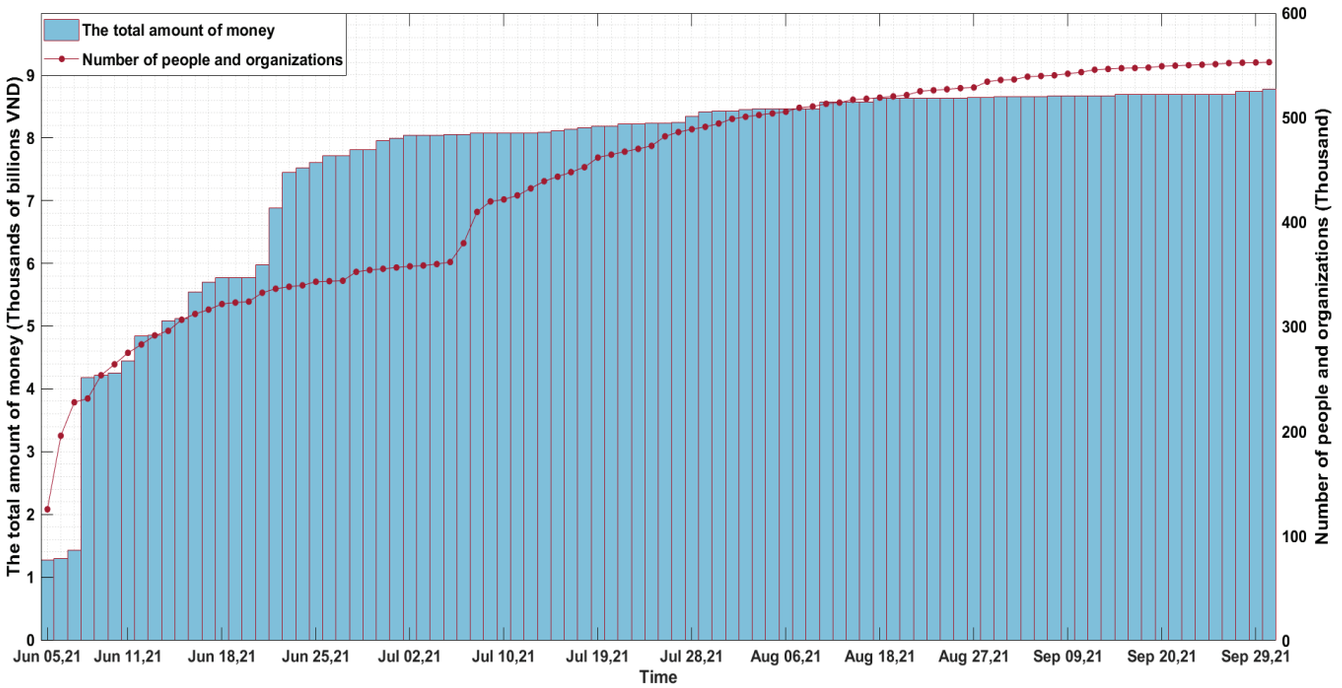

Fig. 7. The contribution progress of the Vietnam Vaccine Fund. Source: Compiled by authors.

5.4. COVID-19 vaccine diplomacy

In addition to full exploitation of internal resources, a call for aid from wealthy nations should be attached with great significance to secure a fluid and well-supplied flow of vaccines against COVID-19. Hence, vaccine diplomacy can be seen as a short-term solution to vaccine shortages in low- and middle-income countries. In essence, vaccine diplomacy is a form of medical diplomacy for cooperation on vaccine supply to strengthen public access to vaccines nationwide. High vaccination coverage enables wealthy countries to recover from the pandemic and even Russia and the U.S. have millions of doses expired, whereas developing countries are far behind in their inoculation efforts and attempting to cope with a severe lack of vaccines.

Acknowledgement of the importance of vaccine diplomacy at the peak of the COVID-19 outbreak, the Vietnamese government has actively promoted vaccine diplomacy. Specifically, Prime Minister Pham Minh Chinh signed a resolution on the formation of a Government Working Group on Vaccine Diplomacy on August 13, 2021 [79]. Working group is responsible for mobilizing aid for vaccines, therapeutic drugs, and medical products; transfer technology to produce vaccines and drugs from bilateral and multilateral partners; report to the Prime Minister for direction on measures to be implemented. It is noted that vaccine diplomacy is not limited to strengthening access to vaccine sources in the form of either purchases or donations, yet it consolidates international cooperation in technology transfer, which opens a wide range of opportunities for sustainable vaccine supply.

In response to vaccine shortages and a surge in infected cases, Vietnam has launched an appeal for vaccine donations from foreign countries. As of October 24, 2021, a total of 101,786,606 doses of COVID-19 Vaccine have arrived in Vietnam [80]. In terms of bilateral negotiation, Vietnamese high authorities also successfully negotiated vaccine companies with a total of more than 180 million doses. Currently, 66,939,386 doses have been distributed, with another 114 million doses on the way. Aside from vaccine purchasing, more than 20.7 million doses of the vaccine through the COVAX mechanism and are being added. In addition, more than 13 million doses have already been sent directly from other countries, and more than 8.2 million doses are coming as planned [80].

6. Discussion

As of 20 June 2021, Vietnam has recorded a total of over 10.5 million local infections and 43,000 deaths [81]. These numbers are comparatively mild by global

standards, which makes the country one of the best performers around the world in resisting COVID-19. The main reason for this outcome can be attributed to the government's timely and comprehensive policy responses throughout the four outbreaks. The central government and ministries have issued nearly 2000 policy documents across the country. Geographically, more than 1000 are issued by provincial authorities (Fig. 5) containing directives to inform the public of the latest developments and establish measures to control the pandemic. More specifically, the widespread use of the 5K-formula, combined with strong contact tracing technology to localize and isolate cases in quarantine areas, has effectively limited and controlled the pandemic. Despite being hampered by poor resourcing constraints, Vietnam is still able to effectively combat the pandemic, which serves as an example to other countries facing similarly difficult circumstances [15, 82, 83].

Increasing the vaccination rate to achieve herd immunity remains the key to suppressing the pandemic completely in the long term. Despite being one of the few countries that had early success, Vietnam still has a low vaccination rate [7]. The problem is that this is likely to lead to spikes in transmission and infection rates. This was evident during the fourth wave that added another 865,559 infection cases, which makes this last surge far worse than those of the previous three waves. Given that dangerous strains from India and the United Kingdom are circulating in Vietnam, vaccination is the best way forward to control the disease despite doubts from some quarters about its efficacy and/or possible side effects. This is because the risk of death for a vaccinated person is significantly reduced, even if the same person is subsequently infected.

Vietnam seemingly encountered an unsettling new phase with a sharp increase in confirmed COVID-19 cases in the presence of a new hybrid variant, the Delta variant. According to CDC, the Delta variant is more than twice as contagious as early forms of SARS-CoV-2 [84]. Similar to previous COVID-19 waves, Vietnam has taken approaches such as self-quarantine, designated quarantine camps, containment zones, and contact tracing. However, the rapid transmission of the new strain has presented Vietnamese high authorities with major challenges to bringing the situation under control. Moreover, statistics in Canada and Scotland suggest that compared to those contracting Alpha or original virus strains, unvaccinated individuals infected with the Delta variant run higher risks of hospitalization and severe illness [85, 86]. It is noted that with reference to breakthrough infections, the Delta variant produced the same amount of virus in the body of both fully vaccinated and unvaccinated people, but vaccinated patients show mild symptoms and experience shorter periods of infection compared to unvaccinated ones [84, 87]. Low vaccination coverage and the increased transmissibility and disease severity of the Delta variant account for the recently accelerated COVID-19 mortality rate in Vietnam with an average number of roughly 300 deaths. Vaccines are still in short supply in Vietnam because developing countries are put at a disadvantage in the highly competitive race for COVID-19 vaccines [88]. Although there are chances of breakthrough infections, vaccines are proven effective for any types of new strains, namely, milder illness, quicker recovery, and low hospitalization and mortality probabilities [89-92]. Notably, the Pfizer/BioNTech vaccine and the AstraZeneca vaccine have been proven effective against the dangerous highly transmissible Delta variant after two doses [93]. Compared to other developing countries such as Thailand, the number of confirmed cases in Vietnam is still much smaller, but, due to a low vaccination rate, Vietnam has suffered a higher death rate [94]. Hence, when the Zero-COVID-19 strategy appears unfeasible to pursue, vaccines serve as a key factor to the long-term fight against the COVID-19 pandemic.

The global economy has been hit hard by COVID-19. Only a few countries have experienced positive economic growth during the last year. Strong public health measures, while necessary to prevent and suppress the pandemic, have imposed a severe toll on everyday lives and caused rising incidences of social problems (e.g., domestic violence) [95]. In view of this despairing trade-off between public health and livelihoods, the Vietnamese government established dual objectives of maintaining acceptable economic growth rates and controlling the pandemic. Timely social isolation and a cessation of economic activities would save thousands of lives and minimize loss since major outbreaks take a much longer period of time and much larger number of resources to bring the situation under control. The establishment of the Vaccine Fund is a deft policy move by the Vietnamese government to secure sustainable financial resources from the private sector to help fund vaccine procurement. On this point, Prime Minister Pham Minh Chinh stated that

"The fight against COVID-19 with a vaccine will have to go a long way and we have to inject people every year" [96]. The government has also approved many major infrastructure projects to support the economy, such as the My Thuan - Can Tho expressway, the Long Thanh airport, and three additional sections for the North - South expressway [97, 98]. Hence, the Vaccine Fund helps to reduce mounting fiscal burdens on the national budget, which is important as the pandemic has slowed economic activities substantially [99].

The establishment of the Vaccine Fund involved the entire political system in Vietnam - the Politburo, the Secretariat, the central government, and the Vietnam Fatherland Front - where the Vietnam Fatherland Front is the main agency responsible for calling for contributions from individuals and businesses. This approach is consistent with the Vietnamese ethos of "the people against foreign enemies" [82]. Additionally, the government hopes to demonstrate its steadfast determination in combating COVID-19 and bolster public trust through statements like "openness, transparency, and effective use of funds for the right purposes" [96]. Public trust in government and authorities also greatly contribute to the success of the COVID-19 Vaccine Fund, with an exceedingly high number of over 100 billion VND donated for vaccine-related activities such as purchases, research, and programme rollouts.

Cultural values have become a key fulcrum for the Vietnamese in standing up to adversity. According to Hofstede Insights, Vietnam scores only 20 on the individualism dimension, suggesting a collectivistic society [100]. Loyalty in a collectivist culture is paramount and overrides most other societal rules and regulations. Such a society fosters strong relationships where everyone takes responsibility for fellow members of their group. During the COVID-19 pandemic, this trait manifests itself in the national consensus to follow the pandemic policy rules closely. The population has rallied around the slogan of "fighting the pandemic is like fighting against the enemy" as a sign to show patriotism and national pride. Governmental policies and citizen's approval and compliance should go hand in hand to be conducive to a successful combat against common problems. When the COVID-19 vaccines were in its development stage, the Vietnamese government took more drastic measures compared to other countries all over the world, prioritizing contact tracing and introducing stringent regulations on movement restriction to stop the spread of COVID-19. Our contact tracing method is unique and comprehensive because it categorized the contact degree into five levels starting with F0 (the infected individual), then F1 (those in close contact with F0 or being suspected of being infected) and F2 (those in close contact with F1), and all the way up to F5. Partly due to the great internal strength steeped in Vietnamese culture, the public have followed the pandemic policy rules closely to keep infection and death rates in the country some of the lowest in the world. One can argue that Vietnam is fighting the pandemic through not only policies and technology, but the third arrow is cultural values that raise national solidarity. Despite difficult economic circumstances, businesses and individuals have donated enthusiastically to the Vaccine Fund such the total number exceeded the target (5.5 trillion VND), ahead of expectations [96]. This third arrow of cultural values can explain the relatively low vaccine hesitancy rate in Vietnam, which also contributes to a smoother rollout [101].

Vietnamese government shows flexibility in its vaccine-related policies, evidenced by fully exploiting bilateral and multilateral relationships [102] to boost the vaccine supply. Vaccine diplomacy, currently an all-embracing term, has been emphasized as Vietnam's key solution to vaccine shortages. Significantly reduced new cases and death tolls are indicators of governmental quick responses and effective policymaking. This provides implications for developing countries of which seeking outside assistance should be stepped up to enable effective COVID-19 vaccine roll-out plans.

As the competition of buying vaccines is fierce, poor countries will find it difficult to procure sufficient supply in a short span of time. In fact, the biggest issue for developing countries is insufficient financial means, which also complicates the negotiation process with pharmaceutical companies. Meanwhile, vaccine assistance from wealthier nations is either limited or takes a long time to organize. Instead of relying solely on outside assistance, the Vaccine Fund can be a useful strategy for some developing countries to raise funds internally from the private sector and the expatriate network to boost the chances of securing vaccines. Overall, government and high authorities should be flexible in its response to COVID-19 by making the most use of both internal resources and external support in the fight against the invisible enemy.

With a combination of measures and policies that draw up support from internal and external forces, the Vietnamese government has significantly increased the national vaccination rate and brought the COVID-19 situation under control as evidenced by the consistently decreasing figure of new daily infected cases and a low death rate (0.4%) [81]. In recent months, Vietnam has reached a new normalcy in which all economic activities are resumed, restrictions on movement are relaxed, and COVID-19 has become less of a concern to the general public. Hence, the economy is expected to gradually bounce back in the coming time.

7. Conclusions and lesson learned

COVID-19 seems to have gone strength to strength sparing no countries or regions around the world. As COVID-19 mutates into new variants, countries will have to contend with possibly more severe outbreaks in the future. Moreover, we witnessed COVID-19 vaccines were in short supply globally in the past, which has resulted in huge, uneven gaps in vaccine distribution between rich and poor countries. Given this backdrop, our study examines the pandemic policy responses of the Vietnamese government; in particular, the establishment of a Vaccine Fund to mobilize financial resources from the private sector to assist with funding various vaccine activities and relieve fiscal burdens on the government budget. By systematically reviewing all relevant documents issued by the central and provincial authorities since the onset of the pandemic, particularly focusing on financial policies and the Vaccine Fund, we can summarize our findings into five points.

Firstly, the government plays a central role in dictating the ultimate success of the pandemic management campaign. During the pandemic, the government promulgates policies, supervises policy implementation, and enforces policy directives. The government is directly involved in all pandemic management activities ranging from technology application, vaccine procurement and research, communication to raise community awareness, mobilization of the population to participate in the pandemic campaign through the Vaccine Fund, and negotiations with other countries for vaccine donations and purchases.

Secondly, the availability of designated financial resources is critical for the viability of the campaign. To this end, the Vaccine Fund was designed to secure additional financial resources from the private sector to supplement public expenditures on vaccine activities. However, it also serves as a conduit for boosting public trust through its open and transparent operation.

Thirdly, cultural values can be an important driving force to unite the citizens in support of the government pandemic policies. Massive donations to the Vaccine Fund in a short period of time demonstrate solidarity in businesses and individuals to rally behind the government in overcoming this national crisis together. This is a unique "anti-pandemic" cultural tradition, which boosts the overall national effort to vanquish the pandemic.

Fourthly, vaccine diplomacy should be promoted to boost public access to COVID-19 vaccines. Developing countries are far behind in the competition for vaccine purchases, so it is imperative to facilitate cooperation in vaccine supply with wealthy countries in the form of donations, negotiation, and technology transfer.

Finally, there is no "one-size-fits-all" policy framework. Rather, a suite of policy measures-5Ks, technology, vaccines and vaccine diplomacy - must be co-ordinated to give Vietnam the best chance to fully suppress the virus in the long run.

CRediT author statement

Quy Van Khuc: Conceptualisation, Methodology, Validation, Formal analysis, Writing - Original draft preparation, Writing - Review and Editing, Visualisation, Supervision; Shawn Leu: Writing - Original draft preparation, Writing - Review and Editing, Validation; Hien Nguyen: Data curation, Writing - original draft preparation; Nguyen Truc Le: Validation, Writing - Review and Editing; Thuy Nguyen: Writing - Original draft preparation, Writing - Review and Editing; Hoang Khac Lich: Validation, Writing - Review and Editing; Thi-Hong Nguyen: Data curation, writing - review and editing; Nguyen Thuy Anh: Validation, Writing - Review and Editing; Duc-Bao Nguyen: Validation, Writing - Review and Editing; Thang Ngo: Data curation, Visualisation, Writing - Original draft preparation; Phu Pham: Data curation, Visualisation, Writing - Review and Editing; Le Thanh Ha: Validation, Writing - Review and Editing; Phuong Luu: Validation, Writing - Review and Editing; Nguyen Duc Lam: Validation, Writing - Review and Editing; Trung Tran: Visualisation, Writing - Review and Editing.

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COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

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