

Digital Technology Practices and Vaccine Campaign in Korea: International Perceptions on Health Diplomacy amid COVID-19 Crisis

Iffat Tahira¹

The purpose of this study is two-fold: first, to discuss the concept of health diplomacy and the Korean government's response to contain the COVID-19 pandemic; second, to assess and compare assumptions of variances about foreigners' perceptions of how Korea is leveraging digital technology in battling the coronavirus spread, and its vaccine campaign; through the lenses of Chinese, Filipino, and Pakistani foreign nationals who are currently living in Korea. A total of 219 foreigners responded to the survey. The collected data were analyzed as percentages, mean averages, t-test, and ANOVA for statistical analysis. Results show that Korea is utilizing its digital technology practices and vaccine campaign in battling the pandemic through efforts of health diplomacy. ANOVA indicated significant results and assumptions of variance across three ethnic groups showing the Pakistani population had higher mean scores than the Chinese and Filipino about Korea's health diplomacy during the pandemic. This study contributes to the literature on Korea's digital technology practices and vaccine campaigns amidst the COVID-19 pandemic by promoting its image through health diplomacy efforts. It projects the country's soft image on a global scale, to save the lives of locals and foreign nationals, by providing insights into health diplomacy in Korea.

Keywords: Coronavirus, Contact tracing, Government response, Health diplomacy, Vaccine

¹ Iffat Tahira is a graduate student at department of Political Science & International Studies from Hanyang University. Please contact the author via iffattahira@gmail.com. The author is thankful to Chen Shanshan (Graduate student, Ewha Women University, Korea) for translating the questionnaire into Chinese language, Muhammad Alam Khan (Director, Al-Jehan International Trade Co. Ltd., Korea), and Maria Fe Toronon-Ocasla (Graduate student, Hanyang University, Korea) helping to collect data from Chinese, Pakistani, and Filipino foreign nationals in Korea.

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1. Introduction

Amid the pandemic, a new health care system organization is observed as a global need but the determination for the makeover was dormant, while the need has become a significant challenge during the COVID-19 crisis. For a healthier society, the use of digital technology is proving a better solution now more than ever (Martins, 2020a, p. 290). Global health diplomacy constitutes “the multilevel and multi-stakeholder negotiation processes that shape and manage the global policy environment for health” (Godinho, Martins, Al-Shorbaji, Quintana, & Liaw, 2021, p. 2) While global digital health is a crucial article on the global health diplomacy agenda, specified by the World Health Organization (WHO) and Global Strategy on Digital Health 2020-2025. Digital health diplomacy could provide a route for better policy formulation, technical collaboration, and implementation of common projects, which are urgently needed (Martins, 2020b, p. 712). From this point of view, the adoption of digital technology (diagnostic tests, surveillance, and preventative measures) becomes visible in reducing the impact of the current health crisis on humans and the healthcare system in a few countries, and South Korea is one among these countries.

The outbreak of COVID-19 has severely affected the global economy, climate change, and human beings on a large scale. The year 2020 has shown many uncertainties than previous years. Due to the spread of COVID-19 in China, the Korean government recognized the spread of this pandemic to other countries. As a neighboring country and having close relations with China through trade, exchange of tourists, students, and workforce; it seemed that the virus would have entered through travelers from China to South Korea (hereafter Korea). On January 20, 2020, Korea saw its first confirmed COVID-19 case in a Chinese visitor who traveled from Wuhan, China (Tahira, 2020). The rate of infection gradually increased and Korea went through the first wave of epidemic in late February and early March originating in a church in the city of Daegu. The second wave experienced a massive outbreak in late August in connection with a church in northern Seoul and anti-government rallies (Yonhap, 2021a). The third wave of sporadic reoccurrence of infection gripped and gradually moved its peak on December 25, 2020, and has been showing signs of a slowdown (Yonhap, 2021b). According to the Ministry of Health and Welfare, ease in social distancing policy might cause a new surge in cases. “Korea needs to scale up efforts to curtail the infection rate to the pre-third wave levels” (Arin, 2021).

In line with efforts to make public health a priority, the Korean government struggled to contain and mitigate the spread of coronavirus successfully at an early stage relative to other countries. By taking advantage of a technological powerhouse, Korea focused on adopting digital technology and its integration into health care policies. The country’s proficient handling of COVID-19 through digital responses includes public health measures, online work, online education, contact tracing, and open data management. Korea as a model is shining on the global profile due to the containment of novel viruses timely and accurately.

After the development of the COVID vaccine, the country has secured sufficient vaccine doses and started an inoculation campaign by February 26. The vaccination campaign is a symbol of suppressing the coronavirus spread in the country. A pandemic has no borders and inoculation

could be a chapter to beginning normal life again. The Korean government announced free vaccination for all residents in Korea regardless of the nationality and visa status of foreigners (Chang, 2021). Free inoculation to all foreigners shapes Korea's health diplomacy based on improving health and flattening the pandemic curve. It aids to attain global health objectives through vaccine campaigns for poor and unprivileged populations in the country in the context of health diplomacy. It also improves the country's positive image with the use of soft power around the world.

This approach underlines that every state struggles to save human lives amidst a pandemic by conducting health diplomacy. Korea's emergence as a multicultural society represents the protection of the physical health of Korean nationals and immigrants too. The Korea Immigration Service reported 2.07 million foreign residents in Korea by October 2020. A shrinking workforce, the embracement of returning ethnic Koreans, and a sharp rise in international marriages contribute to a multicultural society in Korea (Kong, Yoon, & Yu, 2010). The country's success in containing the pandemic is commendable on the global stage. In the context of the Korean government's response to the public health emergency through digital technology practices, a review of the literature explores a number of studies on health diplomacy during the pandemic that has not been investigated from foreign nationals' view. Therefore, this study is an attempt to conduct research by administering a survey on these populations to have knowledge of their opinions on the Korean government's digital technology practices and vaccine campaign for all residents without discrimination.

Given the importance of health diplomacy particularly amidst the global health crisis, a great deal of research has been conducted to identify the government's response to tackling the public health crisis in Korea (McDonald, 2020; Lee, 2021; Park & Chung, 2021; Obinal, Baron, Sagsagat, Ong, Valenzuela, & Lucero-Prisno, 2021; Shim, 2021). Most research focused on the Korean government's digital technology techniques to handle the spread of the COVID-19 pandemic and examined public response in this regard. To encapsulate, the research on Korea's health diplomacy amid the pandemic to date has been investigated and analyzed though foreigners' perceptions are lacking. To fill the gap in Korean health diplomacy during the COVID-19 crisis literature, the objective of this study is to evaluate health diplomacy in Korea to understand the government's response to health emergencies using digital technology practices and vaccine programs and to assess the theoretical and empirical evidence on it. To achieve the purpose, the author employed self-contained selection criteria regarding participants' region of origin and sample size for data collection and selected foreign nationals from three ethnic groups who make up the largest, large, and smallest group of immigrants in Korea. According to the immigration data, Chinese nationals counted 865,000 (Cha, 2021), Filipinos 62,398 (Yonhap, 2020), and Pakistanis around 17,000 (Korea JoongAng, 2021) are living in Korea. This study is tailored to collect foreign nationals' perceptions including Chinese, Filipino, and Pakistani about Korea's digital technology practices and vaccine campaign during the pandemic; such subjects are essential to address amid the global health crisis. The author collected the opinions of participants from three populations with different cultures taking into consideration to generalize research results in terms of foreigners' viewpoints about Korean health diplomacy amid the COVID-19 crisis.

The composition of this study is as follows: first, it outlines the theoretical framework of health diplomacy, digital technology practices, and vaccine campaigns in Korea during the pandemic. Second, it provides a survey of fundamental questions to assess foreigners' perceptions; how they perceive Korea's success to contain the pandemic through digital technology practices, government health policies, public cooperation, inoculation campaign, and social distancing during the COVID-19 crisis. Third, it presents estimation results, discussions, and implications; and four, it offers a conclusion at the end. This study will contribute to research on Korea's health diplomacy during the global health crisis and the government's efforts using digital technology practices and vaccine programs, particularly by testing it through empirical evidence from foreigners' perspectives; considering a handful of research on this phenomenon in the existing literature.

2. Literature Review

The objective of this study is to explain the concept of health diplomacy and Korea's response to the COVID-19 pandemic using digital technology techniques, and vaccine campaign by conducting the existing literature review and to assess the theoretical and empirical evidence of the Korean government's response to public health emergency utilizing digital technology practices and free inoculation to all locals and foreign nationals. Below is an overview of health diplomacy, digital technology practices, and vaccine campaign in Korea.

It has been widely accepted that advanced states aim to practice health diplomacy when they promote and engage in health diplomacy with a bilateral, regional, and global perspective. The outbreak of the COVID-19 pandemic suggests advancing bilateral health aid by recognizing the less effectiveness of localized health diplomacy and urges the necessity of global health diplomacy (Fazal, 2020; Chattu & Chami, 2020; Chattu, Pooransingh, & Allahverdipour, 2021). Given the vital role of health technologies, they help to investigate the disease, and treatment, improve service efficiency, and also support to prevent the pandemic. In this context, the use of novel digital technologies and practices has been studied by many scholars (Ye, 2020; Whitelaw, Mamas, Topol, & Van Spall, 2021; Murray, Alamro, Hwang, & Lee, 2020). The application of modern technologies and practices has become viable to contain and control the coronavirus including artificial intelligence, telehealth, mobile health, and the Internet of things. States that successfully contained the current pandemic include New Zealand, Taiwan, Vietnam, and Korea. Among these countries, Yang (2021) notes Korea as a notable case that has managed to flatten the curve without adopting radical measures and through a "developed highly efficient, well-coordinated disaster response system, using highly advanced information and communication technology."

On the other hand, the most efficient way of preventing the spread of the novel virus is to save humans from being exposed to infectious diseases. After the manufacturing of vaccines, it is necessary to inoculate all citizens. In the early stage, Korea utilized its digital technology techniques quite effectively and after making the vaccine, local and foreign residents are being vaccinated voluntarily (Acharya, Moon, & Shin, 2021; Oh, Kim, Hwang, Kim, Lee, Lee, & Lee, 2021). Further, Korea is also helping all foreign residents like Korean nationals to receive medical

facilities through the operations of health diplomacy.

2.1 Health diplomacy

In the 19th century, health was acknowledged as an analytic cross-border issue and health diplomacy became a primary process of the global response. Health diplomacy has been conducted for more than 160 years, though the term is comparatively new. Particularly, it connects to global health problems and factors and needs global cooperation to direct them (Kickbusch & Kokeny, 2017). Health diplomacy is the “policy-shaping processes through which states, intergovernmental organizations and non-state actors negotiate responses to health challenges or utilize health concepts or mechanisms in policy-shaping and negotiation strategies to achieve other political, economic or social objectives” (Novotny, Kickbusch, & Told, 2013, p. 216). Subarkah and Bukhari (2020) note the objectives of health diplomacy that help to increase health safety for all people, improve ties between states and collaboration among several actors by working together, and it also reduces poverty and inequality. By considering these objectives, Korea’s health diplomacy amidst the current COVID-19 crisis helps to improve its national image through cooperation and providing equal healthcare facilities for all.

Godinho et al., (2021) consider that states have utilized digital capacities to conduct diplomacy for global health before the outbreak of COVID-19, and diplomacy worked as a major promoter in responding to the pandemic. Moreover, states have taken advantage of artificial intelligence in global health diplomacy despite its challenges, it requires attention from diplomats, political and social scientists, and health experts due to the increasing significance of digital means. According to them, digital health diplomacy is at its developmental stage to date and they propose three dimensions of digital health diplomacy including “diplomacy for digital health, digital health for diplomacy, and digital health in diplomacy.”

As far as health diplomacy is concerned, it carries out through swift and rapid measures in finding solutions to health problems. It gets more important amidst the outbreak of a pandemic. As the COVID-19 crisis evolves, health experts addressed and alerted people about the impacts of the virus's spread. Driving this point home, the outbreak of disruptive Coronavirus has tested health care facilities in all states. Thus, an inadequate health care system in developing countries makes them vulnerable in the fight against novel viruses. Whereas, developed countries with cultural diversities have been tested by nation branding and soft power; medical care system, and policies for immigrants during the global health crisis. Fontein (2020) argues that the global health emergency requires advanced global cooperation and diplomacy, it is in this perspective that Korea is promoting a public diplomacy campaign through health diplomacy by sharing information, action plans, and medical equipment with other nations that are essential to preventing them from infectious disease. All these activities reflect the country's soft power and elevate its public diplomacy campaign reflecting a positive impact on foreign audiences.

2.2 Digital technology practices

In the information spaces, digital technologies have transformed the ways to battle pandemics, and data are regarded as a vital component for health institutions. The use of digital technology has the potential in dealing with the COVID-19 pandemic through the effective implementation of data management strategies and their integration with health policies and the health care system (Portela, Brito, & Monteiro, 2021). Moreover, digital tools can be leveraged to promote vaccine take-up and deployment and help medical staff in immunization services.

By learning from Middle East Respiratory Syndrome (MERS-CoV) the Korean government strengthens the cooperation among government institutions through amendments to the Infectious Disease Control and Prevention Act (Oh, 2020). The government initiated a massive testing campaign via TV and social media. The coronavirus spread alerted the KCDC; and the Office of Risk Communication KCDC responded by disseminating public health suggestions, providing information, and updating about infected patients. Moreover, TV broadcasters, subway stations' public announcements, and text message alerts work as reminders to citizens' mask-wearing and maintain social distancing (Lee & Kim, 2020). Korea's public health communication policies exemplify gaining public trust and helping people with civic awareness and cooperation with authorities to contain COVID-19.

Moreover, the creation of a new highly automated system the Epidemiological Investigation Support System (EISS) works as an effective tool that exerts a force on credit card and smartphone data. This system enables control of the virus spread through tracking and tracing contacts (Cheshire, 2020). This system works to control the spread of coronavirus efficiently and successfully. Information about all positive cases is updated in the system. Epidemic intelligence service staff get patients' travel history from two days before the development of symptoms (Shin, Jin, and Smith, 2020). The new digitized process saves time and can be used to take the information on wide-ranging movements of a positive tested patient.

On the other hand, Global Positional System (GPS) or cell phone location identifies the transmission route of a patient. The card transaction log establishes the route of the patient and states a location for protection against contagious diseases. Close Circuit Television (CCTV) identifies the route of the patient, and medical symptoms, and examines the exposure risks of contact (COVID-19 National Emergency Response Center, Epidemiology and Case Management Team, Korea Centers for Disease Control and Prevention, 2020). To detect COVID-19, Korea introduced the Safe Assessment and Fast Evaluation Technical booth of Yangji Hospital (SAFETY). It is also called a "walk-through" test. The SAFETY system is developed on a single-person screening booth through which medical staff and patients are separated. It mitigates the risk of infections and lets seniors and patients walk through the box and get the test (Hyun-tai, 2020). Since the outbreak of the novel virus in Korea, it has reached for an advanced version of excel to stay well informed through different channels.

Korea's response to tackling the massive outbreak of coronavirus is an effective model by combining digital technology practices, civic participation, without imposing lockdowns (Lee,

Heo, & Seo, 2020), and advancing its quarantine model, K-Quarantine, as a cost-effective way (Paek & Hove, 2021). The country's success in containing the COVID-19 spread rests on the country's measures for massive testing with prompt test results, mobile technologies, diagnostic kits, medical equipment, effective treatment of infected people, and citizens' cooperation (Lee & Lee, 2020). Oh, et al. (2020) identify Korean strategies for the prompt national response to containing the pandemic that include diagnostic capacity, prevention of human-human transmission, healthcare systems, and appropriate measures for medical treatment; and found that proactive measures are also due to the Korean experience of 2015 MERS-CoV epidemic.

2.3 Vaccine campaign

A vaccine is an efficient way to fight against infectious diseases or neglected infections. It helps to contain infectious diseases during the outbreak of a pandemic. "Vaccination is a simple, safe, and effective way of protecting people against harmful diseases before they come into contact with them. It uses your body's natural defenses to build resistance to specific infections and makes your immune system stronger" (World Health Organization, 2021).

Within the context of health diplomacy, a vaccine campaign is an effective tool to curb virus spread during the global health crisis. After the development of the vaccine, Korea started its vaccine campaign on February 26, 2021. Vaccination will help to control the novel virus. After vaccination, our immune system will be able to fight against the lethal coronavirus if it is exposed. The Korean government has received vaccine doses to immunize 79 million people, to complete the task of inoculation for the whole population (Chang, 2021). According to Korea Disease Control and Prevention Agency (KDCA) over 2.1 million vaccine doses will be secured by May under the World Health Organization's global vaccine COVAX facility project (Han-joo, 2021). The Korean government is endeavoring to inoculate all people in return to the country for a more normal life.

After the launch of its long-awaited inoculation campaign, the first vaccine doses were given to nursing home staff and some patients. According to health officials, around 70% of inoculation would be restored by November (Chang, 2021). Around 23.95 million people are fully vaccinated (47%) and 14.56 million are only partly vaccinated (28%) (Our World in Data, 2021). Free COVID-19 vaccination is being provided to all locals and foreign nationals (Yonhap, 2021c). Some 398,518 foreigners are overstaying in Korea while the majority of them belong to the Chinese, the Philippines, Vietnam, Thailand, and Nepal. The government has encouraged illegal foreigners to get tested without their screen visas at test centers for free testing (Choon, 2021).

Since the launch of a public vaccine campaign in February, it has been estimated some 36 million people would receive the first dose of COVID-19 by September. However, the disruption in vaccine doses has created concerns about the vaccination program last month and it may be obstructed amid a recent surge in new cases. According to reports by government officials, some 70% of the population will receive the second shot of the COVID-19 vaccine by October (Yonhap, 2021d). After the Chuseok (a three-day fall harvest festival), some 85% of new COVID cases have

been seen among those who have not been fully vaccinated. Thus, Korea plans to start a vaccine booster campaign (Voice of America, 2021). After vaccination, people should take preventive health measures. A large number of people are not fully vaccinated yet. People who have been inoculated with the vaccine dose feel secure since the outbreak of the virus. A safe return to life without a mask would not be possible this year. Health experts say it would be better to keep a certain level of social distancing and mask-wearing after inoculation.

Korea’s health policy approaches and digital technology techniques enabled her to adopt several policies to battle COVID-19 effectively (Heo, Lee, Seo, & Choi, 2020). The country has showcased the significance of diplomacy in health by holding webinars with medical experts to disseminate information and share its experience to contain the pandemic. To understand and explain different groups’ perceptions about digital technology practices and vaccine campaigns in Korea, this study displays the similarities and differences across three groups in an accurate manner through the eyes of the Chinese, Filipino, and Pakistani communities in Korea.

3. Research methodology

3.1 Sample of the study and site

The sample of the study included 219 respondents (Chinese, n=73; Filipino, n=73; & Pakistani, n=73). All the respondents who participated in the survey are currently staying in Korea.

Table 1

Demographic Information of the sample (N=219)

Variables	Category	Frequency	n (%)
Gender	Male	123	56
	Female	96	44
Age (in years)	21-30	62	28
	31-40	122	56
	41-50	30	14
	More than 50	5	2
Highest Level of Education	High School	36	17
	Undergraduate	53	24
	Master	82	37

	Graduate	35	16
	Postgraduate	13	6
Marital Status	Married	119	54
	Single	100	46
Employment/Current Status	Employed Full-Time	69	32
	Employed Part-Time	20	9
	Self-employed	33	15
	Seeking Opportunities	33	15
	Student	64	29
Origin of Country	China	73	33.3
	Pakistan	73	33.3
	Philippines	73	33.3

The demographic characteristics in Table 1 show the respondents' gender, age, highest educational level, marital status, employment/current status, and origin of country. There were more male respondents (n=123; 56%) than female (n=96; 44%). The most represented age group was 31-40 years old (n=122; 56%), among the other groups ranged from (n=62; 28%) 21-30 years of age, (n=30; 14%) 41-50 years of age, and smallest group ranged from (n=5; 2%) more than 50 years old, respectively. In terms of educational level, respondents had master's (n=82; 37%), undergraduate (n=53; 24%), high school (n=36; 17%), graduate (n=35; 16%), and postgraduate (n=13; 6%). More than half of the respondents (n=119; 54%) were married. Regarding the employment/current status, there were full-time employees (n=69; 32%), students (n=64; 29%), self-employed (n=33; 15%), seeking opportunities (n=33; 15%), and part-time employees (n=20; 9%). A total number of N=219 respondents who accessed to responding the survey, belong to China (n=73; 33.3%), Pakistan (n=73; 33.3%), and the Philippines (n=73; 33.3%).

3.2 Data collection procedure

The survey questionnaire was developed by the author through a data collection technique by conducting a literature review of various sources such as books, articles, and newspapers. Before conducting a survey, the author conducted in-depth interviews (with 15 participants including 5 Chinese, 5 Filipinos, and 5 Pakistanis) who were staying in Korea for more than five years, to obtain detailed information about their perceptions. The author found there was no item associated with expected serious harm or risks to participants. This technique provided context to data in

designing survey questions. To determine the research model of this study, an online survey technique was used to collect data. A self-administered questionnaire survey was used considering it a cheap and efficient way during the global health crisis. Therefore, to test the extent of effectiveness of the Korean government's response to the COVID-19 pandemic by utilizing integrated novel digital practices and vaccine campaign; the empirical data for this study was collected from foreign nationals including Chinese, Filipino, and Pakistani populations that are accounted as the largest, large, and the smallest ethnic groups in Korea. The survey was administered between March 13 and March 19, 2021. The questionnaire was first prepared in *English, then it was translated into the Chinese language, and Urdu language (the national language of Pakistan) for a clear understanding of Chinese and Pakistani respondents. Google Forms were used for an online survey questionnaire and disseminated publicly on the social media forum (Facebook) and also shared personally (email, WhatsApp) with the target sample. The author's friends also shared the link with friends in their respective populations. A total of N=219 responses were collected and imported to Statistical Package for Social Sciences (SPSS) version 26 for statistical analysis.

3.3 Data analysis

The survey was comprised of twelve items for a clear understanding of foreigners' perception of Korea's digital technology practices and vaccine campaign as a form of health diplomacy to measure the outcomes of all questions. The survey also collected participants' demographic characteristics. Reliability analysis was used to find Cronbach's Alpha. According to a generally accepted rule, a of 0.6-0.7 is considered an acceptable level of reliability (Ursachi, Horodnic, & Zait, 2015). Cronbach's Alpha value indicated the internal consistency of the questionnaire $\alpha=.670$, for all items on digital technology practices and health diplomacy, government support, social distancing campaign, and vaccine campaign. To save the respondents time and get a good response rate in a limited time, all the instruments were measured using 3-point Likert-Scale (Yes=3, No=2, May be=1)". Descriptive statistical analysis was used to determine the mean and standard deviation. To test the differences across groups, the study measurement method was adopted using the One-Way ANOVA to compare variances in mean scores of respondents' perceptions about Korea's digital technology practices, government response, and vaccine campaign based on their ethnicity and employment/current status; and Independent samples t-test was used to compare mean scores between male and female, and between married and unmarried sample.

4. Results

4.1 Research question

The author laid out the following primary research question:

Is Korea utilizing its digital technology practices and vaccine campaign effectively in battling the COVID-19 pandemic through efforts of health diplomacy?

Table 2

Digital technology practices and vaccine campaign during COVID-19

Items	Yes, <i>n</i> (%)	No, <i>n</i> (%)	May be, <i>n</i> (%)	Mean Average	Reliability
1. Korea's efforts of invasive contact tracing system helped to handle the spread of coronavirus at early stages	149(68)	17(8)	53(24)	2.43	.640
2. Korea is a model for other countries to control the spread of pandemic through digital technology practices and social distancing	124(57)	31(14)	64(29)	2.27	.626
3. Lockdown of cities is a better solution to handle the spread of the COVID-19 crisis	100(46)	68(31)	51(23)	2.22	.690
4. Korea's experience to handle the Middle East Respiratory Syndrome (MERS) enabled to deal with COVID-19 without lockdown in cities	106(48)	39(18)	74(34)	2.14	.634
5. Korea's success in controlling pandemic is because of the government's efforts and cooperation of the public	185(84)	13(6)	21(10)	2.74	.668
6. The Ministry of Justice has suspended a crackdown on illegal immigrants. It urges overstayers to come forward for coronavirus testing?	122(56)	23(10)	74(34)	2.21	.675
7. Korea helps foreigners by providing them special medical facilities like Korean nationals during the pandemic	171(78)	9(4)	39(18)	2.61	.659
8. As the vaccination campaign begins, I would maintain a certain level of social distancing and mask-wearing	198(90)	3(2)	18(8)	2.82	.679
9. The Korean government policy of free vaccine for foreigners represents that Korea guarantees human rights	103(47)	29(13)	87(40)	2.07	.641

10. Vaccination campaign is fast in my country relative to Korea	77(35)	110(50)	32(15)	2.20	.670
11. Korea's delay launch to vaccinations is likely due to priority for domestic production	83(38)	35(16)	101(46)	1.91	.649
12. After vaccination, a safe return to life without a mask would not be possible this year	101(46)	35(16)	83(38)	2.08	.694

Respondents' perceptions in Table 2 indicate that they were asked about Korea's digital technology practices and vaccine campaign during COVID-19. A majority of respondents perceived Korea's efforts of invasive contact tracing system helped to handle the spread of coronavirus (mean average: 2.43). Foreigners' perceptions exposed Korea as a model for other countries to control the spread of pandemic through digital technology practices and social distancing (mean average: 2.27). They explored that the lockdown of cities is a better solution to handle the spread of the COVID-19 crisis (mean average: 2.22). They believed Korea's experience to handle the MERS enabled them to deal with COVID-19 without lockdown in cities (mean average: 2.14). Foreigners highly valued Korea's success in controlling pandemic because of the government's efforts and the cooperation of the public (mean average: 2.74). Regarding the question that the Ministry of Justice has suspended a crackdown on illegal immigrants. It urges overstayers to come forward for coronavirus testing, reported by respondents (mean average: 2.21). Many respondents supported Korea helping foreign residents by providing them with special medical facilities like Korean nationals during the pandemic (mean average: 2.61). They highly valued, as the vaccination campaign begins, they would maintain a certain level of social distancing and mask-wearing (mean average: 2.82). The Korean government policy of free vaccines for foreigners represents that Korea guarantees human rights (mean average: 2.07). They opined on the question about vaccination campaign is fast in their countries relative to Korea (mean average: 2.20). Foreign residents least valued Korea's delayed launch of vaccinations is likely due to priority for domestic production (mean average: 1.91). Foreigners' perception indicated that after vaccination, a safe return to life without a mask would not be possible this year (mean average: 2.08).

In answer to the primary research question, Korea as an emerging multicultural society aims to safeguard populations and save their lives during the pandemic. Korea has responded to the pandemic by aggressive contact tracing, rapid and immediate testing, information sharing, voluntary cooperation of the public, proactive measures implemented by authorities, and the launch of the inoculation campaign. It explores Korea's digital health care capacity, digital technology practices, the government's nationwide COVID-19 vaccination campaign, and public cooperation. These efforts have a more positive impact on society and improve the country's soft image on the global stage.

4.2. Hypotheses

The author developed the following hypotheses:

H1: There are likely to be significant differences about Korea's health diplomacy during the COVID-19 pandemic across Chinese, Filipino, and Pakistani participants' perceptions.

H2: There are likely to be significant differences about Korea's health diplomacy during the COVID-19 pandemic across employees, job seekers, and students' perceptions.

H3: There are likely to be significant differences about Korea's health diplomacy during the COVID-19 pandemic between male and female perceptions.

H4: There are likely to be significant differences about Korea's health diplomacy during the pandemic between married and unmarried participants' perceptions.

Thus, the finding of the empirical evidence would present acceptance or rejection of hypotheses.

Table 3

One-Way ANOVA Analysis of foreigners' perceptions about digital technology practices and vaccine campaign (N=219)

Source of Variance	SS	Df	MS	F	P
Between Groups	265.653	2	132.826	6.810	.001
Within Groups	4212.904	216	19.504		
Total	4478.557	218			

Descriptives					
Participants Group	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
				LL	UL
Chinese	27.3836	4.4616	.5222	26.3426	28.4245
Pakistani	29.7534	4.4807	.5244	28.7080	30.7989
Filipino	27.4521	4.3045	.5038	26.4477	28.4564

Multiple Comparisons					
Participants Groups	Mean Difference	Sig	95% Confidence Interval		
			LL	UL	
Chinese-Pakistani	2.36986*	.005	5.2147	8.1685	
Chinese-Filipino	.06849	1.000	2.4039	5.2596	
Pakistan-Filipino	2.30137*	.006	4.2623	1.4573	

*p <.05.

One-way ANOVA analysis in Table 3 indicates that participants by nationality (China, Philippines, and Pakistan) are a significant contributory factor to their perceptions about digital technology practices, government response, and vaccine campaign $F(2, 216) = 6.810$ $p < .001$. A

significant difference was found among ethnic groups' perceptions. Results indicated that Pakistanis had higher mean scores ($M = 29.75$, $SD = 4.48$) than Chinese ($M = 27.38$, $SD = 4.46$) and Filipino ($M = 27.45$, $SD = 4.30$).

Table 4

One-Way ANOVA Analysis of foreigners' perception about digital technology practices and vaccine campaign (N=219)

Source of Variance	SS	df	MS	F	P
Between Groups	110.675	4	27.669	1.278	.280
Within Groups		214	21.656		
Total	4634.448	218			
	4745.12				

Descriptives					
Participants Group	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
				LL	UL
Employed Full-time	26.7391	4.4670	.5379	25.6559	27.8124
Employed Part-time	27.2501	4.2286	.5244	25.2709	29.2291
Self-employed	28.8788	4.5398	.7903	27.2690	30.4885
Seeking opportunities	27.0606	4.7431	.8256	25.3788	28.7424
Students	27.0001	4.9729	.6216	25.7578	28.2422

One-Way ANOVA analysis in Table 4 indicates participants' perceptions by employment/current status (Employed full-time, Employed part-time, Self-employed, Seeking opportunities, & Students) indicated that there is no significant difference in mean scores among all groups' perceptions about Korea's health diplomacy during the pandemic.

Table 5

Independent samples t-test on mean scores about foreigners' perceptions about digital technology practices and vaccine campaign (N=219)

Variables	N	M	SD	t	p	95%CI		Cohen's d
						LL	UL	
Gender	Male (n=123)	28.65	4.21	1.685	.093	-1.1757	2.2474	0.22
	Female(n=96)	27.61	4.87					

Table 5 shows an independent-samples t-test was used to compare mean scores on foreigners' perceptions of digital technology practices and vaccine campaign in Korea between male and female respondents. An insignificant difference was found in the mean scores of male ($M=28.65$,

SD=4.211) and female respondents (M=27.614, SD=4.873); $t(219) = 1.685, p .093$ with a small effect size, Cohen's d 0.22.

Table 6

Independent samples t-test on mean scores about foreigners' perceptions about digital technology practices and vaccine campaign (N=219)

Variables	N	M	SD	T	p	95%CI		Cohen's d
						LL	UL	
Marital Status	Married (n=119)	27.93	4.11	2.449	.015	.2993	2.7661	0.32
	Unmarried (n=100)	26.41	5.14					

* $p < .05$.

Table 6 shows an independent-samples t-test was used to compare mean scores on foreigners' perceptions of digital technology practices and vaccine campaign in Korea. A significant difference was found in the mean scores of married (M=27.94, SD=4.11) and unmarried sample (M=26.41, SD=5.14); $t(219) = 2.449, p .015$ with a small effect size, Cohen's d 0.32.

5. Discussion and implications

In the age of globalization, digital healthcare power is based on technology as well as the ways for the presentation of its well-functioning enactment, experts, and people. Ultimately, the use of digital practices enhances the possibility of self-healthcare and has a positive impact on society. With reference to Korea's digital technology practices and the vaccine campaign during COVID-19, this study assessed three ethnic groups' perceptions (Chinese, Filipino, and Pakistani). There is little research on this subject administering surveys on foreigners in Korea. Therefore, the author analyzed foreigners' perspectives who are living in Korea. In essence, an overview of opinions gives the answer to the primary research question and explores how Korea is utilizing its digital technology practices and vaccine campaign in battling the COVID-19 pandemic through efforts of health diplomacy effectively. Thus, the findings were supported by past research on the government response to battling the coronavirus (Lee, Heo, & Seo, 2020; Paek & Hove, 2021; Oh et al., 2020; Heo et al., 2020), and digital technology practices (Ryan, 2020; Lee & Lee, 2020). However, this research did not support past research on the vaccine campaign as it was delayed. Korea's delay in inoculation rests on monitoring the vaccine effects and side effects with health professionals. Nevertheless, a speedy response would be needed for a vaccination with other measures including social distancing and mask-wearing.

Regarding H1, with respect to comparing differences in assumptions across three ethnic groups, results indicated the Korean government's response to the COVID-19 pandemic by utilizing digital technology practices and vaccine campaign has a positive effect on all residents from the Chinese, Filipino, and Pakistani viewpoints. However, Pakistani had shown a more significant response comparatively Chinese and Filipino. In reference to H2 and H3, no significant

difference was found among respondents' perceptions based on their employment/current status, and also between the male and female samples. Lastly, in support of H4 results indicated a significant difference in perceptions between married and unmarried samples.

5.1 Theoretical implications

From a theoretical perspective, these findings show few implications; Korea has been utilizing digital technology practices since the onset of the COVID-19 outbreak. Foreigners have a positive attitude toward the healthcare system and government response to fight against the virus. This study did not find significant differences among the three ethnic groups about Korea's health diplomacy and vaccine campaign, based on their status. It could be the outcome of the Korean government's equal health policies for all including foreigners as they are receiving amid the pandemic. Vaccine efficacy and speedy response toward inoculation for all people in Korea will help to mitigate the risk of the coronavirus spread. The empirical evidence showed that the assumption of equal variances was not assumed among three ethnic groups from Pakistan, China, and the Philippines. It is noteworthy that three ethnic groups perceive that Korea is utilizing its digital technology practices and vaccine campaign during the COVID-19 pandemic. However, the smallest ethnic group (Pakistani) highly favored Korea's health diplomacy relative to other groups. It might be the outcome of the weak medical care system, facilities, and lack of digital health technology practices that people receive in Pakistan compared to the health care system in Korea. Further, a significant difference between married and unmarried participants' perceptions could be the result of married persons' more frequent visits to hospitals.

5.2 Practical implications

Focusing on the practical perspective, this study reveals that Korea has taken stricter and more substantive measures to flatten the epidemic curve through several strategies and policies. The country's response to the novel virus remained impressive during the last year. Korea has achieved success in three stages of the epidemic preparedness and response framework that include detention, containment, and treatment. Moreover, other factors include health experts' guidelines, medical testing, contact tracing, people's cooperation, and public support in quarantine.

To drive the point home, it is established that Korea is not guaranteed without non-pharmaceutical interventions and the cooperation of the public to stem the spread of the novel virus. Vaccines are an effective approach to fight against coronavirus and free inoculation is started in the country, however, few people seem reluctant toward vaccine acceptance.

Korea's response to contain the virus stands out without implementing radical measures like the lockdown of cities that were imposed in other states like China, the UK, Italy, Denmark, and Spain. The country's success in controlling the spread of the novel virus can be helpful to promote its relations with other countries by using health diplomacy for immigrants. Foreign residents are piece-of-mouth to promote Korea's image and elevate the country's soft image across the globe.

In the early months of 2020, Korea was the second-largest state affected by the COVID-19 pandemic but the government's swift measures proved to flatten the curve and emerged as an example for other countries in fighting against the virus. The global demand for Korean medical equipment also reflects that it will attract foreign investors. Korea strives to help other countries by using its experience to fight against the virus and using health diplomacy. Particularly, global demand for Korean quarantine equipment improves the country's ties with other states, promotes the economy, and improves its positive image.

This study contributes to the literature on Korea's digital technology practices and vaccine campaign amidst the COVID-19 pandemic by promoting its image through health diplomacy efforts. It projects the country's soft image on the global scale, to save the lives of locals and foreign nationals, and indicates the country's effective digital infrastructure, healthcare facilities, and public cooperation, by providing insights into health diplomacy through the eyes of foreigners in Korea.

6. Conclusion

Health is the most important part of development and healthy people lead to economic growth. International health collaboration enables improving health care systems. A key component of Korean diplomacy during the global crisis is global health diplomacy. In this respect, Korea has expanded its cooperation with foreigners for their health security through free testing and immunization programs. Well-designed Korean health diplomacy during a pandemic could prove a secure and healthy environment and shows health equity for all. Still, the way to greater focus is to mask ubiquitous and keep social distance policies that need to be implemented.

Korea's success in containing the coronavirus at its initial stages makes several states ask for assistance and learn from her experience. Apropos to this, Korea's efforts in global health diplomacy are obvious in its activities such as sharing information and medical supplies with other states. It improves the country's image and soft power among foreign audiences, promotes new economic linkages, and opens the window of geopolitical opportunities. In line with efforts, a few government measures promote policies for foreigners but other issues and problems remain. Rights violation and accentuated pervasive racial discrimination raise questions, but foreigners should hope for urging fair and equitable treatment in an emerging multicultural society in Korea. This study contributes to research on Korea's health diplomacy during COVID-19 through empirical evidence considering it to generalize findings in reference to foreigners' perceptions of this phenomenon in the existing literature.

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